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Part No. 0102010
Date: 30 NOV 64
TDRR 16466
Revision B

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR REMOTE OPTICS CONTROLLER (NECP A32)

ORIGINATOR: AC SPARK PLUG DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	—	—			
B	16477	1 & 3			

Prepared by ________ Date________

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Approval ________ Date 12/7/64

Design Review Board
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TDRR 16466
Revision A

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) provides instructions for modifying the Remote Optics Controller, P/N 1900491-011. The modification permits the Remote Optics Controller to be used with a greater degree of positional freedom and still maintain its illumination control capability. The modification consists of deleting an adapter cable and two jumper wires.

II. AUTHORITY

This retrofit is authorized by NECP A32.

III. UNITS AFFECTED

Name	P/N	Retrofit S/N's	New P/N or Mod Mark
Remote Optics Controller Assy	1900491-011	ACSK 6, 7, & 8	REV T

IV. PRIORITY CHANGES

None.

V. RELATED CHANGES

RIB's 0102006, 0102008, 0102009, 0102011, and 0102013.

VI. MATERIAL REQUIRED

A. One (1) Retrofit Kit, P/N 8102005, consisting of the following:

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VI. MATERIAL REQUIRED (Continued)

Item	Qty	Nomenclature	P/N
1	1	Retrofit Instruction Bulletin (RIB)	0102010

B. Special tools or equipment required, but nut supplied, in kit:

Item	Qty	Nomenclature	P/N
1	1	Removal Tool (Hughes)	TWO-22 RT-000 or equivalent
2	AR	Lacing Tape, Black	MIL-T-713

VII. MODIFICATION INSTRUCTIONS

A. General

1. Read and thoroughly understand the RIB before attempting the retrofit.

2. Assure that the latest revision of the RIB is used to effect the modification (verify by checking with SIDL).

3. All workmanship shall meet the standards defined in workmanship standard AC-STD-1, dated March 1964.

B. Procedural

1. Open the case cover of the Remote Optics Controller. Remove adapter cable "C", P/N 1900652, from the cable brackets on the underside of the cover. Discard the removed cable.

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VII. MODIFICATION INSTRUCTIONS (Continued)

2. Loosen the four (4) thumb screws, P/N 1015830-2, on the handles of the front panel, P/N 1900656.

3. Stand the Remote Optics Controller on end and slowly pull the front panel away from the case, P/N 1900680. When the clearance between the front panel and the case is sufficient to permit disconnection of connector plug P2, P/N MS24056-2, from connector receptacle J2, P/N MS24055-2, rest the panel on end.

4. Disconnect P2 from J2 and slowly pull the front panel from the case until the leads between the front panel and connector J1 P/N 1010411-1 on the case become taut.

   CAUTION: Care should be taken to assure that none of the leads are accidentally broken or pulled loose.

5. Determine if the clearance between the panel and the case is sufficient to enable cutting of the spot-tie(s) nearest connector J1 to permit the removal of two (2) jumper wires from J1. One jumper wire is from pin 61 to pin 63, and the other is from pin 62 to pin 64. If the clearance is sufficient, go to Step 6. If it is not, unfasten J1 from the case by removing two (2) each pan head screws, P/N MS35216-014, and self-locking nuts, P/N 1016151-004. Set aside the removed hardware and separate the panel with attached connector from the case.

VII. MODIFICATION INSTRUCTION (Continued)

6. Cut the harness spot-tie(s) nearest connector J1 and extract pins 61, 62, 63, and 64 from the connector with a Hughes removal tool, P/N TWO-22 RT-000. Discard the two loose jumper wires.

7. Using black lacing tape, P/N MIL-T-713, spot-tie the harness near J1, at the location(s) of the original spot-tie(s). If J1 was not unfastened from the case, proceed to Step 8. If J1 had been unfastened, refasten it with the hardware removed in Step 5.

8. Connect P2 and J2 and carefully position the front panel against the case. Tighten the four (4) thumb screws on the handles to fasten the panel to the case.

9. Locate and remove the existing revision letter and schematic drawing number from the Remote Optics Controller. Reidentify the unit with, "Rev. T" and "Schem. 1900651". Use Rubber Stamp Ink 28 Special or equivalent. Mark with characters .12 inches high.

C. Retest

1. Visually inspect connector J1 and assure that pins 61, 62, 63, and 64 have been removed.

VIII. MODIFICATION DESIGNATION

The Remote Optics Controller, P/N 1900491-011, will be marked, "Rev. T" and "Schem. 1900651".

IX. DISPOSITION OF PARTS REMOVED

Scrap.

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR MODIFICATION OF POWER SUPPLY AND LOAD PANEL ASSEMBLY, P/N 1902375-011

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	MXC-205698	1,49 & 50			16 OCT 65
B	MXC-205895	1,43 & 45			18 OCT 65
C	23403	ALL			19 OCT 65

Prepared by D. Lind Date 16 Aug 65
P.C. Engineering BWS
Approval Date 19 Aug 65
Design Review Board
Approval LSG EA Glenn Date 20 Oct 65
MIT/IL Approval W 20 Oct 65 CCB Date 20 Oct 65
NASA Approval N.K. Date

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) provides Block II modification instructions for the Power Supply and Load Panel Assembly P/N 1902375-011, located in the Optics - Inertial Analyzer.

II. AUTHORITY

This retrofit is authorized by Block II/LEM contract NAS9-497.

III. UNITS AFFECTED

Name	Old P/N	New P/N Or Mod Mark
Power Supply and Load Panel Assembly	1902375-011	2900033-011
2 Volt, 3200 CPS Power Supply Assembly	1900081-011	2900162-011

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

RIB 0102043

VI. MATERIALS REQUIRED

A. Materials required for Power Supply and Load Panel Assembly.

1. One retrofit kit, part number 8102117, consisting of the following:

Qty	Part Number	Nomenclature
2	1006927	Indicator, Total Time
1	8102125	Retrofit Kit for Power Supply Assembly, 2V, 3200 CPS
1	F02A250V1/2A (1897099-007)	Fuse (MIL-F-15160/02)
1	1015873-008	Fuseholder
1	RE65G2490 (1896981-327)	Resistor (MIL-R-18546/1)
3	1015802-004	Relay, Armature
8	1016151-006	Nut, self locking
2	MS35216-5	Screw, pan head
8	MS35216-28	Screw, pan head
8	AN960C6 (1897006-026)	Washer, flat
1	2900146	Panel, front
4	1006783-101	Screw, button head, hex socket
4	MS35216-1	Screw, pan head, cross recess
2	2900243	Spacer, bar
21	1010490-198	Insulation sleeving, electrical, heat shrink (white)
2	1015818-416	Contact, socket
2	1015818-420	Contact, socket

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Nomenclature
4	1015902-49	Terminal lug, crimp style
34	1015864-167	Insulation sleeving, electrical, clear
12	1015864-137	Insulation sleeving, electrical, clear
17	1015864-109	Insulation sleeving, electrical, clear
3	1016006-003	Splice reducer, crimp style
1	0102036	Retrofit Information Bulletin
1	1004260-110	Nameplate (APOLLO GSE)
6	1016151-004	Nut, self locking
1	2900372	[redacted] wire list
3	1010490-194	Insulation sleeving, electrical, heat shrink
22	MS3192-20A	Contact, pin, crimp type
1	1010490-286	Insulation sleeving, electrical, heat shrink

2. Materials and special tools required but not supplied in kit:

Qty	Description	Part Number
AR	Solder (QQ-S-571)	SN60WS
AR	Flux (type A or W)	MIL-F-14256
AR	Solder (QQ-S-571)	SN60WRAP
AR	Lacing tape, type P, class 2, black	MIL-T-713
1	No. 30 drill	Any hi-speed type

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Description	Part Number
1	No. 50 drill	Any hi-speed type
1	2-56-NC-2 tap	Henry Hanson (ACE)
AR	Clear flat lacquer	N/A
AR	Lacquer thinner	N/A
AR	Black marking ink	N/A
1	Heat gun (300°F)	Master Appliance G7673A
1	Stamp set (1/16" size)	Greenfield
1	Extractor tool	Bendix 11-7880-20
1	Insertion tool	Bendix 11-8107-20
1	Crimping tool	Buchanan MS3191-1
1	Positioner	Buchanan MS3191-20A
1	Extractor tool	Winchester 107-1001
1	Insertion tool	Winchester 107-1015
1	Crimping tool	Burndy MR8-33T
1	Crimping tool	Burndy Y10MRF-4 (single die groove)
1	Procurement specification	2900033-011
1	Torque wrench (0 to 50 inch lbs, 3/8 inch sq. dr.)	P.A.Sturtevant F50-1
1	Socket wrench adapter (1/4 inch sq. dr. female X 3/8 inch sq. dr. male)	Snap-On TA-3
1	1/8 inch hex head cap screw driver (1/4 inch sq. drive)	Snap-On TMA-4

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials required for 2 Volt, 3200 CPS Power Supply Assembly.

1. One retrofit kit, part number 8102125, consisting of the following:

Qty	Part Number	Nomenclature
1	1897244	Transformer, power
1	1897236	Transformer, power
2	1016151-004	Nut, self locking
2	MS35216-24	Screw, pan head
1	2900242	Bracket, transformer
1	1016006-002	Splice reducer
1	1010490-258	Insulation sleeving, electrical, heat shrink
2	1010490-198	Insulation sleeving, electrical, heat shrink
1	1015817-424	Contact, pin
1	1015817-420	Contact, pin
1	1016023-001	Grommet, rubber
1	MS17122-11	Terminal, stud
22	1015864-109	Insulation sleeving, electrical, (clear)
1	2900438	Wire list
1	1015864-613	Insulation sleeving, electrical
1	0102036	Retrofit Information Bulletin

VI. MATERIALS REQUIRED (CONTINUED)

2. Materials and special tools required but not supplied in kit:

Qty	Description	Part Number
AR	Solder (QQ-S-571)	SN60
AR	Flux	MIL-F-14256
AR	Clear flat lacquer	N/A
AR	Lacquer thinner	N/A
1	Crimping tool	Burndy Y10-MRF-4 (single die groove)
1	Heat gun (300°F)	Master Appliance G7673A
AR	Black marking ink	N/A
AR	Lacing tape	MIL-T-713
1	21/64 drill	Any hi-speed type
1	No. 21 drill	Any hi-speed type
1	No. 32 drill	Any hi-speed type
1	Insertion tool	Winchester 107-1015
1	Procurement specification	PS 2900162
1	Swaging anvil	Cambridge Thermionic Corp. PSA 6401
1	45° flare swaging punch	Cambridge Thermionic Corp. PSP-PC-6663
1	Crimping tool	Buchanan MS3191-1
1	Positioner	Buchanan MS3191-20B

VII. PROCEDURE

A. GENERAL INSTRUCTIONS

1. Read and understand complete RIB prior to attempting this modification. No deviation should be made from the procedure outlined herein.

2. All workmanship shall meet standards defined in Workmanship Standard AC-STD-1. 15 January 1965

3. The suffix letter of a conductor identification number indicates conductor shielding, color or marking. The code is as follows:

A - "From" end shield
B - "To" end shield
K - White with letter K, or white with black tracer
L - White with letter L, or white with blue tracer
R - White with letter R, or white with red tracer
W - White with letter W, or white
Y - White with letter Y, or white with yellow tracer

4. Ink Markings.

a. Markings to be removed should be removed using lacquer thinner.

VII. PROCEDURE (CONTINUED)

b. New marking characters should be 0.90 inch in height and colored black unless otherwise specified.

c. New markings will be covered with a coat of clear, flat lacquer after ink has dried.

5. Use backing plate when drilling holes and remove burrs from newly drilled holes.

6. After wiring deletions, changes and additions in wiring harness have been completed, harness will be laced as necessary with lacing tape.

7. Any existing conductors which are disconnected and then later reconnected shall be cut back, and restripped and tinned as necessary. If conductor length thus becomes too short, it will have to be replaced with an identical size, type and marked conductor.

8. Heat sinks will be used when soldering or unsoldering connections on or near semiconductor devices.

B. DETAIL INSTRUCTIONS FOR MODIFICATION OF POWER SUPPLY AND LOAD PANEL ASSEMBLY

1. Remove Power Supply and Load Panel Assembly from Optics - Inertial Analyzer.

VII. PROCEDURE (CONTINUED)

2. Remove 2 Volt, 3200 CPS Power Supply Assembly, part number 1900081-011, from Power Supply and Load Panel Assembly as follows:

   a. Disconnect connector P1 from connector J5.

   b. Remove six pan head screws which secure 2 volt, 3200 CPS Power Supply Assembly to Power Supply and Load Panel Assembly. Retain hardware for later reassembly.

   c. Remove 2 volt, 3200 CPS Power Supply Assembly from Power Supply and Load Panel Assembly.

3. Modify 2 volt, 3200 CPS Power Supply Assembly in accordance with paragraph C in this section.

4. Disconnect conductors listed in table 1 from front panel. Discard associated sleevings when disconnecting conductors.

5. Remove front panel from Power Supply and Load Panel Assembly by removing four button head screws and four self-locking nuts. Retain four self-locking nuts for later reassembly.

6. Obtain new front panel, part number 2900146, from kit.

VII. PROCEDURE (CONTINUED)

Table 1. Conductors Disconnected From Front Panel

Conductor Number	Connection Point
A110R	M1-1
A110L	M1-2
A109R	M2-1
A109L	M2-2
A107L	M3-1
A107R	M3-2
A108R	M4-1
A108L	M4-2
A95	XF1-1
A97R	XF1-2
A95 and A94	XF2-1
A98R	XF2-2
A100	XF3-1
A101R	XF3-2
A111	XF4-1
A126	XF4-2
A104	XF5-1
A137R and A105	XF5-2
A116	XF6-1
A80	XF6-2
A115	XF7-1
A79	XF7-2
A113	XF8-1
A160R	XF8-2
A93 and A90	XF9-1
A91R	XF9-2
A93	XF10-1
A96R	XF10-2

VII. PROCEDURE (CONTINUED)

7. Remove ISS total time indicator from old front panel and mount on new front panel in position marked ISS OPERATE utilizing same attaching screws, washers and self-locking nuts.

8. Remove WHEEL total time indicator from old front panel and mount on new front panel in position marked WHEEL, utilizing same attaching screws, washers and self-locking nuts.

9. Remove AGC total time indicator from old front panel and mount on new front panel in position marked AGC/LGC utilizing same attaching screws, washers and self-locking nuts.

10. Remove OPTICS total time indicator from old front panel and mount on new front panel in position marked OPTICS utilizing same attaching screws, washers and self-locking nuts.

11. Obtain one total time indicator, part number 1006927, four pan head screws, part number MS35216-28, four flat washers, part number AN960C6, and four self-locking nuts, part number 1016151-006, from kit and mount in position marked OIA ON on new front panel.

VII. PROCEDURE (CONTINUED)

12. Obtain one total time indicator, part number 1006927, four pan head screws, part number MS35216-28, four flat washers, part number AN960C6, and four self-locking nuts, part number 1016151-006, from kit and mount in position marked ISS STANDBY on new front panel.

13. Remove BLOWER A8-B1 fuseholder from old front panel and mount on new front panel in position marked BLOWER A8-B1.

14. Remove BLOWER A8-B2 fuseholder from old front panel and mount on new front panel in position marked BLOWER A8-B2.

15. Remove 115V-400 CPS LAMP fuseholder from old front panel and mount on new front panel in position marked 115V-400 CPS LAMP.

16. Remove 115V-400 CPS 0Ø fuseholder from old front panel and mount on new front panel in position marked 115V-400 CPS 0Ø.

17. Remove 115V-400 CPS πØ fuseholder from old front panel and mount on new front panel in position marked 115V-400 CPS πØ.

18. Remove 2V-3200 CPS fuseholder from old front panel and mount on new front panel in position marked 2V 3200 CPS.

VII. PROCEDURE (CONTINUED)

19. Remove 28VDC fuseholder from old front panel and mount on new front panel in position marked 27VDC RLP.

20. Remove 115V-60 CPS PILOT POWER fuseholder from old front panel and mount on new front panel in position marked 115V-60 CPS PILOT POWER.

21. Obtain fuseholder, part number 1015873-008, from kit and install on new front panel in position marked 28V 3200 CPS.

22. Obtain 0.5 amp fuse, part number F02A250V1/2A, from kit and install in fuseholder mounted on new front panel in preceding step.

23. Remove BLOWER A23-B1 fuseholder from old front panel and mount on new front panel in position marked BLOWER A23-B1.

24. Remove BLOWER A23-B2 fuseholder from old front panel and mount on new front panel in position marked BLOWER A23-B2.

25. Remove SPARE 6 AMP fuseholder from old front panel and mount on new front panel in position marked SPARE 6 AMP.

VII. PROCEDURE (CONTINUED)

26. Remove one SPARE 3 AMP fuseholder from old front panel and mount on new front panel in position marked SPARE 3 AMP.

27. Remove SPARE .5 AMP fuseholder from old front panel and mount on new front panel in position marked SPARE 0.5 AMP.

28. Remove SPARE .25 AMP fuseholder from old front panel and mount on new front panel in position marked SPARE 0.25 AMP.

29. Remove two handles from old front panel by removing two flat head screws which secure each handle to front panel.

30. Mount two handles, removed in preceding step, on new front panel using same securing screws.

31. Dispose of old front panel as directed in section IX.

32. Obtain two spacer bars, part number 2900243, and four hex socket button head screws, part number 1006783-101, from kit.

VII. PROCEDURE (CONTINUED)

33. Place two spacer bars between front panel and chassis of Power Supply and Load Panel Assembly and secure parts together using four hex socket button head screws (obtained from kit) and four self-locking nuts retained in step 5. See figure 1 for reference. Screws will be torqued to 33 to 36.2 inch pounds using P.A. Sturtevant F50-1 torque wrench with Snap-On TA-3 socket wrench adapter and Snap-On TMA-4 hex head screwdriver.

34. Remove slide assembly on left side (as viewed from front) of Power Supply and Load Panel Assembly.

35. Reinstall slide assembly on left side one position forward as shown in figure 2 using original securing screws. Only three of original four screws will be used. Screws shall be torqued to 33 to 36.2 inch pounds using same torquing tools as used in step 33.

36. Relocate slide assembly on right side of Power Supply and Load Panel Assembly in same manner as left side assembly. Torque securing screws to 33 to 36.2 inch pounds.

37. Remove conductors listed in table 2 and discard associated sleevings. Conductors removed from E points will be cut as close as possible to splice reducer.

VII. PROCEDURE (CONTINUED)

38. Relocate four conductors on relay K9 as indicated in table 3. After each conductor is unsoldered, conductor shall be trimmed, restripped 0.25 inch and tinned before being soldered to new pin. Discard old insulation sleevings and obtain new insulation sleevings from kit for reinstallation.

Table 2. Conductors Removed From Wiring Harness A

Conductor Number	From Circuit Point	To Circuit Point	Remarks
A1	J2-j	K6-14	Cut off at J2
A3	J2-h	K6-7	Cut off at J2
A36A	Shield A36	E2	
A36L	J1-c	R7-1	Cut off at J1
A36R	J1-b	L1-1	Cut off at J1
A37	L1-2	R7-2	
A38A	Shield A38	E2	
A38L	J1-e	R8-1	Cut off at J1
A38R	J1-d	L2-1	Cut off at J1
A39	L2-2	R8-2	
A40A	Shield A40	E2	
A40L	J1-g	R9-1	Cut off at J1
A40R	J1-f	L3-1	Cut off at J1
A41	L3-2	R9-2	
A42A	Shield A42	E2	
A42L	J1-i	R10-1	Cut off at J1
A42R	J1-h	L4-1	Cut off at J1
A43	L4-2	R10-2	

VII. PROCEDURE (CONTINUED)

Table 2. Conductors Removed from Wiring Harness A (continued

Conductor Number	From Circuit Point	To Circuit Point	Remarks
A44A	Shield A44	E2	
A44L	J1-k	R11-1	Cut off at J1
A44R	J1-j	L5-1	Cut off at J1
A45	L5-2	R11-2	
A46A	Shield A46	E2	
A46L	J1-n	R12-1	Cut off at J1
A46R	J1-m	L6-1	Cut off at J1
A47	L6-2	R12-2	
A56	J1-HH	K7-4	Cut off at J1 and K7
A78A	Shield A78	E3	
A78L	J2-p	K7-11	Cut off at J2 and K7
A78R	J2-n	K7-13	Cut off at J2
A78Y	J2-q	K7-9	Cut off at J2
A79	K7-12	XF7-2	Previously removed from XF7-2
A80	K7-10	XF6-2	Previously removed from XF6-2
A105B	E3	Shield A105	
A105L	TB1-5	J2-g	Cut off at J2
A105R	XF5-2	J2-f	Cut off at J2. Previously removed from XF5-2
A106A	Shield A106	E5	Apply blue glyptal to end of conductor protruding from E5 splice reducer.

VII. PROCEDURE (CONTINUED)

Table 2. Conductors Removed from Wiring Harness A (Continued)

Conductor Number	From Circuit Point	To Circuit Point	Remarks
A106L	J5-F	J1-Z	Cut off at J1 and J5
A106R	J5-E	J1-Y	Cut off at J1 and J5
A139	K6-6	K5-8	Cut off at K6
A141	K6-2	K5-11	Cut off at K5
A146	K9-20	K9-12	Cut off at K9-20
A148	K9-17	K9-14	Cut off at K9-17 and K9-14
A149	K9-8	K9-5	Cut off at K9-8 and K9-5
A150	K9-11	K9-3	Cut off at K9-3
A154B	Shield A154	E4	
A154L	K9-3	K5-11	
A154R	K9-12	K5-8	

Table 3. Relocation of Conductors on Relay K9

Conductor Number	Old Circuit Point	New Circuit Point	Accessory Item P/N
A155L	K9-5	K9-11	1015864-167
A155R	K9-14	K9-20	↓
A157L	K9-4	K9-10	
A157R	K9-13	K9-19	

VII. PROCEDURE (CONTINUED)

39. Remove reactors L1 through L6 from chassis by removing four self-locking nuts from each reactor. Dispose of reactors and self-locking nuts as directed in section IX.

40. Remove L1, L2, L3, L4, L5, and L6 markings from chassis.

41. Remove resistors R7 through R12 from terminal board. Dispose of resistors as directed in section IX.

42. Remove R7, R8, R9, R10, R11, R12, and associated pin number (1 and 2) markings from terminal board.

43. Remove and retain four screws and associated hardware which secures terminal board to chassis.

44. Remove part number "1900410" marking on bottom side of terminal board and stamp new part number "2900275" in same location. Characters should be 0.09 inch in height and colored black.

45. Secure terminal board to chassis using original hardware used to secure terminal board.

CAUTION: Use extreme care when performing the next step to avoid damaging wiring and other nearby components.

VII. PROCEDURE (CONTINUED)

46. Drill six mounting holes in chassis for new relays K8, K10, and K11 using number 30 size drill and in locations as shown in figure 3.

47. Stamp designations K8, K10, K11, R15, and 1 and 2 pin designations for R15 in locations as shown in figure 3. Characters should be 0.12 inch in height and colored black.

48. Obtain resistor, part number RE65G2490, and two pan head screws, part number MS35216-5, from kit and mount on chassis as shown in figure 3.

49. Obtain three relays, part number 1015802-004, and six self-locking nuts, part number 1016151-004, from kit.

50. Mount and secure three new relays to chassis in locations marked K8, K10, and K11 with self-locking nuts. Relays shall be orientated as shown in figure 4.

51. Remove splice reducer at E2 by cutting conductors A118, A48A, and A137A as close as possible to body of splice reducer. Discard splice reducer and associated insulation heat shrink sleeve.

52. Strip insulation on conductors A118, A48A, and A137A 0.25 inch at E2.

VII. PROCEDURE (CONTINUED)

53. Remove splice reducer at E4 by cutting conductors A120, A87A, A88A, A155B, A156B, A157B, and A160A as close as possible to body of splice reducer. Discard splice reducer and associated insulation heat shrink sleeve.

54. Strip insulation on conductors A120, A87A, A88A, A155B, A156B, A157B, and A160A 0.25 inch at E4.

55. Remove splice reducer at E3 by cutting conductors A119, A63A, A91B, A96B, A97B, and A98B as close as possible to body of splice reducer. Discard splice reducer and associated insulation heat shrink sleeve.

56. Strip insulation on conductors A119, A63A, A91B, A96B, A97B, and A98B 0.25 inch at E3.

57. Reconnect conductors listed in table 4 to front panel. Restrip all conductors 0.25 inch and tin before reconnecting.

Table 4. Conductors Reconnected to Front Panel

Conductor Number	Connect To:	Accessory Item P/N	Remarks
A95	XF1-1		Use "to" end of A95.
A97R	XF1-2		
A94 and A95	XF2-1		Use "From" end of A95.

VII. PROCEDURE (CONTINUED)

Table 4. Conductors Reconnected to Front Panel (Continued)

Conductor Number	Connect To:	Accessory Item P/N	Remarks
A98R	XF2-2		
A100	XF3-1		
A101R	XF3-2		
A111	XF4-1		
A126	XF4-2		Do not solder in place until new conductor A185 is added
A104	XF5-1		
A137R	XF5-2		Do not solder in place until new conductor A162W is added
A116	XF6-1		
A115	XF7-1		
A113	XF8-1		
A160R	XF8-2		
A90 and A93	XF9-1		Use "From" end of A93.
A91R	XF9-2		
A93	XF10-1		Use "To" end of A93.
A96R	XF10-2		
A110R	M1-1	1015864-137	
A110L	M1-2	↓	
A109R	M2-1	↓	
A109L	M2-2	↓	
A107L	M3-1	↓	
A107R	M3-2	↓	
A108R	M4-1	↓	
A108L	M4-2	↓	

VII. PROCEDURE (CONTINUED)

58. Obtain wire list and accessory items from kit and install as indicated in table 5. Cut excess length from conductors as necessary and route conductors along existing branches of wiring harness A. Do not connect conductors at E2, E3, and E4 at this time.

VII. PROCEDURE (CONTINUED)

Table 5. New Conductors Added to Wiring Harness A

Conductor Number	From Ckt.Pt.	To Ckt. Pt.	Strip Jack.	Strip Shld.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A161			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A161A	A161 SHLD				0.25	No		
		E2			0.25	No		
A161W	K7-12				0.25	Yes	1015864-167	
		J2-f			0.19	No	MS3192-20A	See note A.
A162			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A162A	A162 SHLD				0.25	No		
		E2			0.25	No		
A162W	K7-14				0.25	Yes	1015864-167	See note B.
		XF5-2			0.25	Yes		Solder on A137B also.
A163			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A163A	A163 SHLD				0.25	No		
		E2			0.25	No		
A163W	K7-13				0.25	Yes	1015864-167	
		XF11-1			0.25	Yes		
A164			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A164A	A164 SHLD				0.25	No		
		E2			0.25	No		
A164W	J2-g				0.19	No	MS3192-20A	See note A.
		TB1-5			0.25	No	1015902-49	See note C.

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VII. PROCEDURE (CONTINUED)

Table 5. New Conductors Added to Wiring Harness A (Continued)

Conductor Number	From Ckt.Pt.	To Ckt. Pt.	Strip Jack.	Strip Shld.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A165	K5-19				0.25	Yes	1015864-167	
		K5-13			0.25	Yes	1015864-167	See note B.
A166	K5-13				0.25	Yes		
		R15-1			0.25	Yes		
A167			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A167A	A167 SHLD				0.25	No		
		E2			0.25	No		
A167W	K5-14				0.25	Yes	1015864-167	
		K7-2			0.25	Yes		
A168			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A168A	A168 SHLD				0.25	No		
		E2			0.25	No		
A168W	K5-20				0.25	Yes	1015864-167	
		K7-6			0.25	Yes	1015864-167	
A169			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A169A	A169 SHLD				0.25	No		
		E2			0.25	No		
A169W	K6-14				0.25	Yes	1015864-167	
		K7-1			0.25	Yes	1015864-167	
A170			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A170A	A170 SHLD				0.25	No		
		E2			0.25	No		

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VII. PROCEDURE (CONTINUED)

Table 5. New Conductors Added to Wiring Harness A (Continued)

Conductor Number	From Ckt.Pt.	To Ckt. Pt.	Strip Jack.	Strip Shld.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A170W	K6-7				0.25	Yes	1015864-167	
		K7-7			0.25	Yes	1015864-167	
A171			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A171A	A171 SHLD				0.25	No		
		E2			0.25	No		
A171W	K7-3				0.25	Yes	1015864-167	
		J2-j			0.25	Yes	MS3192-20A	See note A.
A172			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A172A	A172 SHLD				0.25	No		
		E2			0.25	No		
A172W	K7-5				0.25	Yes	1015864-167	
		J2-h			0.19	No	MS3192-20A	See note A.
A173			3.50	3.25				Prepared end.
			3.50	3.25			1010490-286	
A173A	A173 SHLD				0.25	No		
		E3			0.25	No		
A173L	K6-2				0.25	Yes	1015864-167	
		K9-8			0.25	Yes	1015864-167	
A173R	K6-6				0.25	Yes	1015864-167	
		K9-17			0.25	Yes	1015864-167	
A174			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A174A	A174 SHLD				0.25	No		
		E3			0.25	No		

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VII. PROCEDURE (CONTINUED)

Table 5. New Conductors Added to Wiring Harness A (Continued)

Conductor Number	From Ckt.Pt.	To Ckt. Pt.	Strip Jack.	Strip Shld.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A174W	J5-J				0.19	No	1015818-420	See note D.
		XF11-2			0.25	Yes		
A175	K7-8				0.25	Yes	1015864-167	
		J1-z			0.19	No		See note A.
A176	K7-9				0.25	Yes	1015864-167	
		J1-AA			0.19	No		See note A.
A177	J1-FF				0.19	No		See note A.
		K10-3			0.25	Yes	1015864-109	
A178			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A178B	A178 SHLD				0.25	No		
		E3			0.25	No		
A178L	M5-2				0.25	Yes	1015864-137	
		K10-5			0.25	Yes	1015864-109	
A178R	M5-1				0.25	Yes	1015864-137	
		K10-1			0.25	Yes	1015864-109	
A179			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A179B	A179 SHLD				0.25	No		
		E3			0.25	No		
A179L	M6-2				0.25	Yes	1015864-137	
		K11-5			0.25	Yes	1015864-109	
A179R	M6-1				0.25	Yes	1015864-137	
		K11-1			0.25	Yes	1015864-109	
A180	K11-7				0.25	Yes	1015864-109	
		K10-7			0.25	Yes	1015864-109	See note B.

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Table 5. New Conductors Added to Wiring Harness A (Continued)

Conductor Number	From Ckt.Pt.	To Ckt. Pt.	Strip Jack.	Strip Shld.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A181	K10-7				0.25	Yes		
		K8-7			0.25	Yes	1015864-109	See note B.
A182	K11-6				0.25	Yes	1015864-109	
		K10-6			0.25	Yes	1015864-109	See note B.
A183	K11-2				0.25	Yes	1015864-109	
		K10-2			0.25	Yes	1015864-109	See note B.
A184			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A184A	A184 SHLD				0.25	No		
		E3			0.25	No		
A184L	K10-2				0.25	Yes		
		TB1-1			0.25	No	1015902-49	See note C.
A184R	K10-6				0.25	Yes		
		TB1-2			0.25	No	1015902-49	See note C.
A185	XF4-2				0.25	Yes		
		K11-3			0.25	Yes	1015864-109	
A186			3.50	3.25				Prepared end.
			7.00	6.75			1010490-198	
A186A	A186 SHLD				0.25	No		
		E3			0.25	No		
A186L	J2-p				0.19	No	MS3192-20A	See note A.
		TB1-3			0.25	No	1015902-49	See note C.
A186R	J2-n				0.19	No	MS3192-20A	See note A.
		XF7-2			0.25	Yes		
A186Y	J2-q				0.19	No	MS3192-20A	See note A.
		XF6-2			0.25	Yes		

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VII. PROCEDURE (CONTINUED)

Table 5. New Conductors Added to Wiring Harness A (Continued)

Conductor Number	From Ckt.Pt.	To Ckt. Pt.	Strip Jack.	Strip Shld.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A187	K8-7				0.25	Yes		
		K7-10			0.25	Yes	1015864-167	
A188	J2-v				0.19	No		See note A.
		CR1-2			0.25	Yes		
A189	K7-4				0.25	Yes	1015864-167	
		K8-3			0.25	Yes	1015864-109	
A190	K7-10				0.25	Yes		
		K7-11			0.25	Yes	1015864-167	
A191	K9-2				0.25	Yes	1015864-167	
		K9-4			0.25	Yes	1015864-167	
A192	K9-5				0.25	Yes	1015864-167	
		J1-x			0.19	No		See note A.
A193	K9-3				0.25	Yes	1015864-167	
		J1-y			0.19	No		See note A.
A194			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A194A	A194 SHLD				0.25	No		
		E4			0.25	No		
A194W	K7-14				0.25	Yes		
		K5-8			0.25	Yes	1015864-167	
A195			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A195A	A195 SHLD				0.25	No		
		E4			0.25	No		
A195W	K5-11				0.25	Yes	1015864-167	
		K9-7			0.25	Yes	1015864-167	

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VII. PROCEDURE (CONTINUED)

Table 5. New ConductorsAdded to Wiring Harness A (Continued)

Conductor Number	From Ckt.Pt.	To Ckt. Pt.	Strip Jack.	Strip Shld.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A196			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A196A	A196 SHLD				0.25	No		
		E4			0.25	No		
A196W	J1-Y				0.19	No	MS3192-20A	See note A.
		K8-6			0.25	Yes	1015864-109	
A197			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A197A	A197 SHLD				0.25	No		
		E4			0.25	No		
A197W	J1-Z				0.19	No	MS3192-20A	See note A.
		J5-F			0.19	No	1015818-416	See note D.
A198			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A198A	A198 SHLD				0.25	No		
		E4			0.25	No		
A198W	J5-E				0.19	No	1015818-416	See note D.
		K8-8			0.25	Yes	1015864-109	
A199			3.50	3.25				Prepared end.
			3.50	3.25			1010490-198	
A199A	A199 SHLD				0.25	No		
		E4			0.25	No		
A199W	J5-K				0.19	No	1015818-420	See note D.
		K8-1			0.25	Yes	1015864-109	
A200	R14-2				0.25	Yes		
		R15-2			0.25	Yes		

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VII. PROCEDURE (CONTINUED)

Table 5. New Conductors Added to Wiring Harness A (Continued)

NOTE A: 1) Remove pin from connector with Bendix 11-7880-20 extractor tool.
2) Install pin on conductor with Buchanan MS3191-1 crimp tool with Buchanan MS3191-20A positioner.
3) Install pin in connector with Bendix 11-8107-20 inserter.

NOTE B: One more conductor to be connected to this point.

NOTE C: Crimp terminal lug using Burndy MR8-33T crimp tool.

NOTE D: 1) Remove pin from connector with Winchester 107-1001 extractor.
2) Install pin on conductor with Buchanan MS3191-1 crimp tool and Buchanan MS3191-20A positioner.
3) Install pin in connector with Winchester 107-1015 insertion tool.

59. Remove crimped contact pins b, c, d, e, f, g, h, i, j, k, m, n, and HH in connector J1 with Bendix 11-7880-020 extractor tool.

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VII. PROCEDURE (CONTINUED)

60. Obtain thirteen contact pins, part number MS3192-20A from kit and install in void pin holes of connector J1 with Bendix 11-8107-20 inserter.

61. Obtain one splice reducer, part number 1016006-003, and one insulation heat shrink sleeve, part number 1010490-194, from kit.

62. Mark "E3" on insulation heat shrink sleeve.

63. At E3, insert conductors A63A, A91B, A96B, A97B, A98B, A173A, A174A, A178A, A179A, A184A, and A186A in large end of splice reducer and crimp with Burndy Y10MRF-4, single die groove, crimping tool.

64. Slip insulation heat shrink sleeve over conductor A119 at E3 and crimp small end of splice reducer on conductor A119 with Burndy Y10MRF-4, single die groove, crimping tool.

65. Position insulation heat shrink sleeve over E3 crimped splice reducer and heat shrink in place.

66. Obtain one splice reducer, part number 1016006-003, and one insulation heat shrink sleeve, part number 1010490-194, from kit.

VII. PROCEDURE (CONTINUED)

67. At E4, insert conductors A87A, A88A, A155B, A156B, A157B, A160A, A194A, A195A, A196A, A197A, A198A, and A199A in large end of splice reducer and crimp with Burndy Y10MRF-4, single die groove, crimping tool.

68. Slip insulation heat shrink sleeve over conductor A120 at E4 and crimp small end of splice reducer on conductor A120 with Burndy Y10MRF-4, single die groove, crimping tool.

69. Position insulation heat shrink sleeve over E4 crimped splice reducer and heat shrink in place.

70. Obtain one splice reducer, part number 1016006-003, and one insulation heat shrink sleeve, part number 1010490-194, from kit.

71. Mark "E2" on insulation heat shrink sleeve.

72. At E2, insert conductors A48A, A137A, A161A, A162A, A163A, A164A, A167A, A168A, A169A, A170A, A171A, and A172A in large end of splice reducer and crimp with Burndy Y10MRF-4, single die groove, crimping tool.

73. Slip insulation heat shrink sleeve over conductor A118 at E2 and crimp small end of splice reducer on conductor A118 with Burndy Y10MRF-4, single die groove, crimping tool.

VII. PROCEDURE (CONTINUED)

74. Position insulation heat shrink sleeve over E2 crimped splice reducer and heat shrink in place.

75. Obtain identification band, part number 1016128-001 from kit wire list and mark part number "2900373" on it using nylon marking ink.

76. Remove identification band from wire harness A and replace it with new identification band marked in preceding step. Secure new identification band to harness with lacing tape.

77. Install 2/28.5 volt, 3200 CPS Power Supply Assembly, part number 2900162-011, on chassis in same position occupied by unmodified unit utilizing hardware retained in step 2b.

78. Reconnect connector P1 to connector J5.

79. On right side of chassis (as viewed from front), remove schematic drawing number "1902377" and replace with new schematic drawing number marking "2900271". Characters should be 0.12 inch high and black in color.

80. Remove part number "1902376" marked on right side of chassis and replace with part number "2900261".

81. Obtain nameplate, part number 1004260-100, from kit.

VII. PROCEDURE (CONTINUED)

82. Transfer serial number and contract number from old nameplate mounted on chassis to new nameplate. Stamp data on new nameplate using 1/16 inch size characters.

83. Remove old nameplate from chassis and discard nameplate and drive screws.

84. Enlarge four nameplate mounting holes on chassis to 0.070 inch diameter using number 50 size drill.

85. Tap four nameplate mounting holes with 2-56-NC-2B thread.

86. Secure new nameplate to chassis with four pan head screws, part number MS35216-1, supplied in kit.

87. Perform checkout as required in procurement specification PS2900033-011.

C. DETAIL INSTRUCTIONS FOR MODIFICATION OF 2 VOLT, 3200 CPS POWER SUPPLY ASSEMBLY

1. Remove terminal board assembly from electronics components bracket (main chassis), part number 1900401, as follows:

    a. Unsolder all wires connected to terminals 1 through 6 on transformer T4.

VII. PROCEDURE (CONTINUED)

b. Unsolder all wires connected to terminals 1 through 5 on transformer T2 and discard insulation sleevings.

c. Remove all transformer T3 wires which are connected to terminal board terminals 76, 77, 80, and 81.

d. Unsolder all wires connected to transformer T1, diode CR1, capacitor C9, inductor L2, and transistors Q7 and Q8 and discard insulation sleevings.

e. Remove cable clamp securing harness to main chassis near inductor L2. Retain hardware for later reassembly.

f. Remove four screws, washers and spacers which secure terminal board to main chassis and remove terminal board from main chassis. Retain hardware for later reassembly.

CAUTION: Care must be exercised in next step to avoid damaging the terminal board.

2. Remove transformer T3 from terminal board by mechanical means. Use sharp pointed instrument to loosen bonding material.

VII. PROCEDURE (CONTINUED)

3. Drill 0.328 inch diameter hole through terminal board in location shown in figure 5 using 21/64 inch drill.

4. Drill 0.116 (+0.003) (-0.002) inch diameter hole through terminal board using number 32 size drill in location shown in figure 5.

5. Install grommet, part number 1016023-001 (supplied in kit), in hole drilled in step 3.

6. Remove part number "1900400" stamped on terminal board and stamp new part number "2900262" in same location.

7. Remove part number "1900402-011" stamped on terminal board and stamp new part number "2900161-011" in same location.

8. Stamp number "97" on terminal board in position as shown in figure 5.

9. Install terminal stud, part number MS17122-11 (supplied in kit), in hole drilled in step 4 using Cambridge Thermionic Corporation swaging anvil, PSA 6401, and 45° flare swaging punch, PSP-PC6663. Terminal stud shall protrude from same side of terminal board as existing terminal studs.

VII. PROCEDURE (CONTINUED)

10. Drill two 0.159 (+0.004) (-0.003) inch diameter holes through main chassis in locations shown in figure 6 using number 21 size drill.

11. Remove two screws and washers which secure transformer T2 to main chassis and remove transformer T2 from main chassis. Retain screws and washers for mounting new transformer T2.

12. Obtain new transformer T2, part number 1897236 from kit and install in same position occupied by former transformer T2. Note correct orientation of transformer as indicated by colored dot in figure 6. Use two screws and washers retained in step 11 to secure transformer to main chassis.

13. Obtain transformer bracket, part number 2900242 and new transformer T3, part number 1897244 and two self-locking nuts, part number 1016151-004 from kit and secure transformer to bracket using two self-locking nuts. Note correct orientation of transformer in bracket as shown in figure 7.

14. Obtain two pan head screws, part number MS35216-24, from kit and secure T3 transformer bracket to main chassis as shown in figure 8, utilizing two new holes drilled in step 10.

15. Secure terminal board to original position on on main chassis using four screws, washers and spacers retained in step 1f.

VII. PROCEDURE (CONTINUED)

16. Obtain conductors BB5 through BB9 and one insulation sleeve, part number 1015864-613, from kit. Feed five conductors through insulation sleeve. (Insure all "to" ends are together.)

17. Feed one end ("to" ends) of five BB conductors through grommet on terminal board to permit connection to terminal board terminals 76, 77, 80, 81, and 97. ("From" ends will be connected to T3.) See figure 8 for reference.

18. Solder "To" ends of five BB conductors to points listed in table 6 after stripping insulation 0.25 inch and tinning each conductor.

Table 6. New Wire List BB Connections On Terminal Board

Conductor Identification	Connect To Terminal Board Terminal Number:
BB5	97
BB6	80
BB7	81
BB8	76
BB9	77

VII. PROCEDURE (CONTINUED)

19. Solder "From" end of five BB conductors to points listed in table 7 with associated insulation sleeving (furnished in kit) after cutting off excessive conductor length, stripping insulation 0.25 inch and tinning each conductor.

Table 7. New Wire List BB Connections On T3

Conductor Identification	Connect To:	Insulation Sleeve P/N To Be Installed
BB5	T3-1	1015864-109
BB6	T3-2	↓
BB7	T3-3	↓
BB8	T3-4	↓
BB9	T3-5	↓

20. Secure cable clamp (encircling harness A) to original position on main chassis with pan head screw and washer retained in step 1e.

NOTE: All old wiring which has been unsoldered and that will be reconnected in the following steps shall be cut-back and restripped and tinned as required. If wire length thus becomes too short, it will have to be replaced with an identical size, type and marked wire.

VII. PROCEDURE (CONTINUED)

21. Solder following disconnected wire harness A conductors to points listed in table 8 installing insulation sleeving as required. Insulation sleeving is supplied in the kit. Reference figures 7 and 9 for pins numbers on transformers T2 and T3.

Table 8. Wire Harness A Reconnection Points

Conductor Number	Strip Length	Tinned	Connect Loose End To:	Accessory Item P/N
A5	0.25	Yes	T1-5	1015864-109
A6	↓	↓	T1-1	↓
A7	↓	↓	T1-4	↓
A8	↓	↓	Q7-2	↓
A9	↓	↓	Q7-1	↓
A10	↓	↓	Q8-2	↓
A11	↓	↓	CR1-1	None
A12	↓	↓	Q8-1	1015864-109
A14L	↓	↓	*T2-5	↓
A14R	↓	↓	*T2-6	↓
A15L	↓	↓	T4-1	None
A15R	↓	↓	T4-2	None
A17	↓	↓	*T1-2	1015864-109
A39	↓	↓	T2-3	↓
A40	↓	↓	T2-1	↓
A41	↓	↓	*T2-6	↓
A42	↓	↓	*T2-5	↓
A49	↓	↓	T1-3	↓

VII. PROCEDURE (CONTINUED)

Table 8. Wire Harness A Reconnection Points (Continued)

Conductor Number	Strip Length	Tinned	Connect Loose End To:	Accessory Item P/N
A50(From End)	0.25	Yes	*T1-2	1015864-109
A50(To End)	↓	↓	CR1-2	None
A51(From End)	↓	↓	*Q7-3	1015864-109
A51(To End)	↓	↓	*C9(+)	None
A52(From End)	↓	↓	*C9(+)	↓
A52(To End)	↓	↓	*L2-2	↓
A53	↓	↓	*L2-2	↓
A54	↓	↓	L2-1	↓
A55	↓	↓	*C9(-)	↓
A59(From End)	↓	↓	*Q7-3	1015864-109
A59(To End)	↓	↓	Q8-3	↓
A60(From End)	↓	↓	T2-2	↓
A60(To End)	↓	↓	*C9(-)	None

* More than one connection to this point.

22. Install new conductor A61 and A62 (supplied in kit) as follows:

    a. Crimp contact pin, part number 1015817-420, (supplied in kit) on prepared end of conductor A61 (end with ferrules) using Buchanan crimp tool MS3191-1 and positioner MS3191-20B.

VII. PROCEDURE (CONTINUED)

b. Feed prepared end of A61 through marker sleeve P1 and install in pin hole J on connector P1 using Winchester insertion tool 107-1015.

c. Crimp contact pin, part number 1015817-424, (supplied in kit) on prepared end of conductor A62 (end with ferrules) using Buchanan crimp tool MS3191-1 and positioner MS3191-20B.

d. Feed prepared end A62 through marker sleeve P1 and install in pin hole K on connector P1 using Winchester insertion tool 107-1015.

e. Remove heat shrink sleeving from E1 on wire harness A. See figure 10 for location of E1.

f. Remove splice reducer at E1 by cutting conductors as close as possible to splice reducer.

g. Strip insulation on all conductors which were attached to E1 splice reducer, 0.25 inch.

h. Route new conductors A61B and A62B to E1 area and cut off excessive length and strip insulation 0.25 inch. (Length of A61B and A62B should be the same as other E1 conductors.)

i. Obtain splice reducer, part number 1016006-002, from kit and install conductors A13B, A14B, A15B, A16, A61B, and A62B in B end of splice reducer (see figure 10) and crimp into place using Burndy Y10MRF-4 crimp tool.

VII. PROCEDURE (CONTINUED)

j. Obtain heat shrink sleeve, part number 1010490-290, from kit and mark designation "E1" on it.

k. Slide marked heat shrink sleeve over E1 splice reducer and heat shrink in place.

l. Route A61W to pin 4 of transformer T2. If conductor length is excessive, cut to required length and strip jacket length to 1.50 inch, shield length to 1.25 inch, insulation length to 0.25 inch, and tin. Install heat shrink sleeve, part number 1010490-198, over stripped area and heat shrink in place.

m. Solder A61W to pin 4 of transformer T2.

n. Route A62W to terminal board terminal 97. If conductor length is excessive, cut to required length and strip jacket length to 1.50 inch, shield length to 1.25 inch, insulation length to 0.25 inch, and tin. Install heat shrink sleeve, part number 1010490-198, over stripped area and heat shrink in place.

o. Solder A62W to terminal board terminal 97.

p. Spot tie new conductors as necessary to secure them to main trunk of wire harness A.

VII. PROCEDURE (CONTINUED)

23. Obtain identification band, part number 1016128-001, from kit wire list and mark part number "2900437" on it using nylon marking ink.

24. Remove identification band from wire harness A and replace with new identification band marked in preceding step. New identification band should be secured to harness with lacing tape.

25. Remove assembly part number "1900081" from main chassis.

26. Stamp new assembly part number "2900162-011" in same position as occupied by part number 1900081 marking on main chassis.

27. Remove schematic part number "1900341" from main chassis.

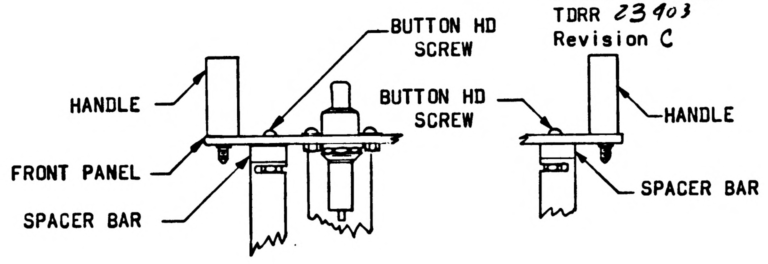
28. Stamp new schematic part number "2900253" in same position as occupied by part number 1900341 marking on main chassis.

29. Remove part number "1900401" from main chassis near reactor L2.

30. Stamp new part number "2900263" in same position on main chassis as occupied by part number "1900401" marking or nearby accessible surface.

VII. PROCEDURE (CONTINUED)

31. Perform checkout as required in procurement specification PS2900162.



BOTTOM VIEW OF DRAWER

Figure 1. SPACER BAR LOCATIONS

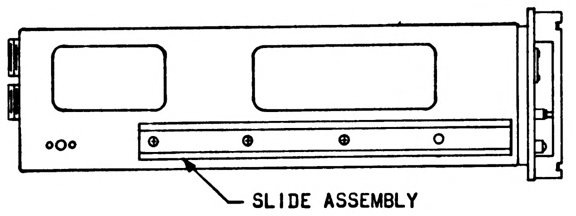


Figure 2. REPOSITIONED SLIDE ASSEMBLY

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Part No. 0102036
Date: 9 AUG 65
TDRR 23403
Revision C

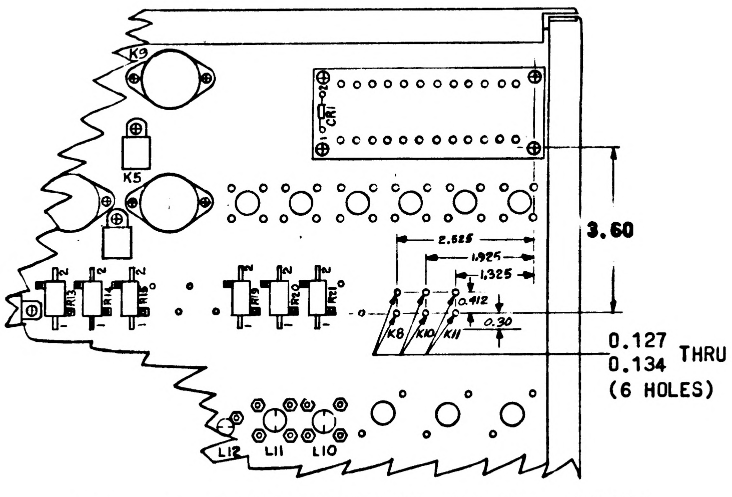
K9
K5
CR1
3.60
2.625
1.925
1.325
0.412
0.30
K8
K10
K11
0.127
0.134 THRU
(6 HOLES)
L12
L11
L10

Figure 3. LOCATION OF NEW K8, K10, K11, AND R15

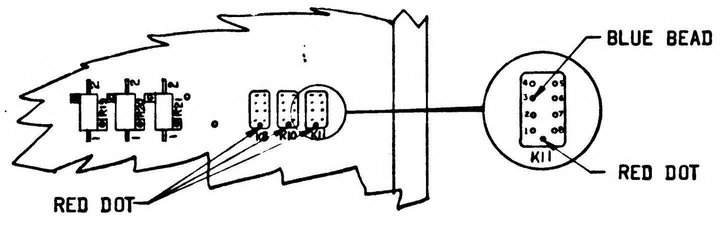
BLUE BEAD
K11
RED DOT
RED DOT

Figure 4. RELAY K8, K10, AND K11 PIN NUMBERING

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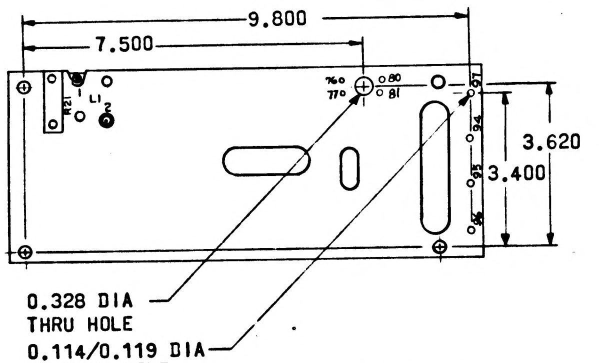
9.800
7.500
R21
L1
3.620
3.400
0.328 DIA
THRU HOLE
0.114/0.119 DIA
THRU HOLE

Figure 5. TWO NEW TERMINAL BOARD HOLES

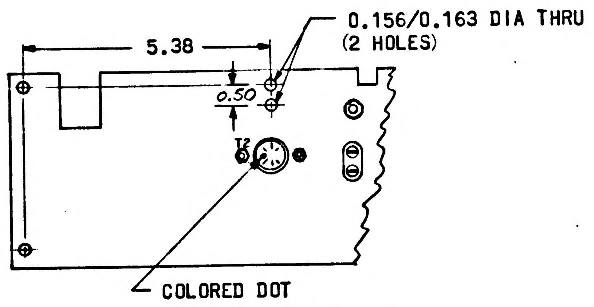
5.38
0.156/0.163 DIA THRU
(2 HOLES)
0.50
T2
COLORED DOT

Figure 6. T3 MOUNTING BRACKET HOLES

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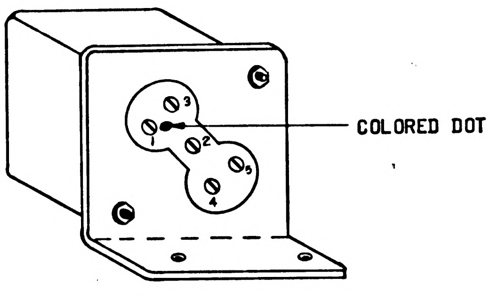
3
1
2
5
4
COLORED DOT

Figure 7. TRANSFORMER T3 MOUNTED ON BRACKET

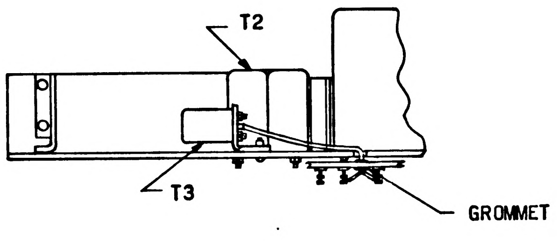
T2
T3
GROMMET

Figure 8. INSTALLATION OF NEW T3

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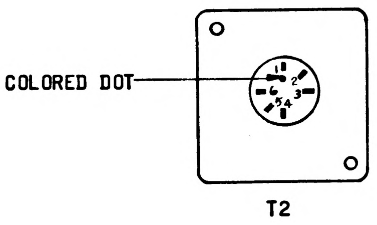
COLORED DOT
T2

Figure 9. TERMINAL NUMBERING ON NEW TRANSFORMER T2

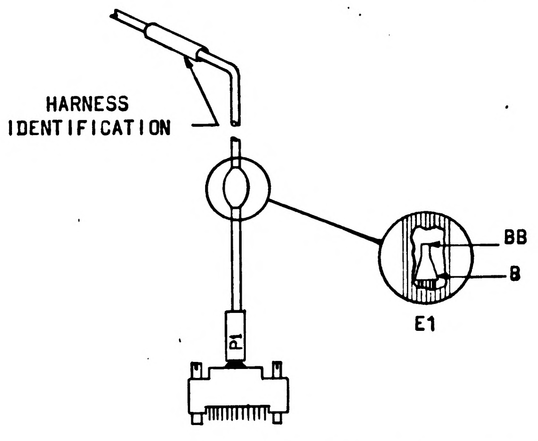
HARNESS
IDENTIFICATION
BB
B
E1
P1

Figure 10. E1 LOCATION IN WIRE HARNESS A

VIII. MODIFICATION DESIGNATION

A. Major drawing and part number changes are as follows:

Prior to Modification	Item Nomenclature	After Modification
1902375-011	Power Supply and Load Panel Assembly	2900033-011
1902377	Schematic Diagram	2900271
1902378	Wiring Diagram	2900400
1902379	Wiring Harness A	2900373
1900719	Front Panel	2900146
1900410	Terminal Board	2900275
1902376	Drawer, Power Supply and Load Panel (Inseparable Assembly)	2900261
1900081-011	*2 Volt, 3200 CPS Power Supply Assembly	2900162-011
1900341	Schematic Diagram	2900253
1900418	Wire Harness A	2900437
1901636	Wire List BB	2900436
1900400	Terminal Board (Inseparable Assembly)	2900262
1900402-011	Terminal Board Assembly	2900161-011
1900401	Bracket, Elect. Component (Inseparable Assembly) (Main Chassis)	2900263
1016176	Transformer (T2)	1897236
1015898-10	Transformer (T3)	1897244

* Item nomenclature changes to 2/28.5 Volts, 3200 CPS Power Supply Assembly after modification.

VIII. MODIFICATION DESIGNATION (CONTINUED)

B. Update the Acceptance Data Package by (1) Inserting the Kit Acceptance Data List into the Unit Acceptance Data List, (2) Making the necessary entry into the Equipment Inventory Record, and (3) Recording modification in the Unit History Record (Referencing Retrofit Instruction Bulletin).

C. If a part number change is made as a result of the modification, record performance on the existing Unit History Record sheet and start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

D. If a part number change is not made as a result of the modification, record performance on the existing Unit History Record sheet.

IX. DISPOSITION OF PARTS REMOVED

Dispose of removed parts as directed by the local customer property officer.

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR BATTERY POWER PACK ASSEMBLY, P/N 1900011-031

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	30013	ALL INITIAL RELEASE			

Prepared by D Lind Date 5 May 1966

P.C. Engineering Approval R.B. Date 16/may/66

Design Review Board Approval E A Olsen Date 5 July 66

MIT/IL Approval Date 7-5-66

NASA Approval A. C. METZGER Date______

MIT Reliability______ Date______

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Battery Power Pack Assembly, P/N 1900011-031. This modification will add the capability of using this assembly with Block II/LEM units, in conjunction with PTC P/N 1900496 as well as PTC P/N 2900060.

II. AUTHORITY

This retrofit is authorized by Block II/LEM contract NAS9-497 (CCA 497-0169).

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

RIB 0102110 and RIB 0102111.

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102205, consisting of the following items is required to modify a Battery Power Pack Assembly, P/N 1900011-031.

Qty	Part Number	Description
1	0102092	Retrofit Instruction Bulletin
1	1016024-001	Relay, armature
1	1015982-006	Relay, armature
1	1897277-001	Rectifier bridge
1	1897261	Comparator
1	1897337-101	Light indicator assembly
1	1015982-007	Relay, armature
2	F02B32V15AS	Fuse (1897099-133)
1	1004260-510	Nameplate
1	1902621	Lead set
1	1897425	Transformer
1	CL25BJ151UP3	Capacitor (1897081-320)
2	1006783-45	Screw, button head
1	2901438	Component board assembly
4	1015860-001	Spacer
10	1012525-004	Nut
4	1006783-24	Screw, button head
4	AN960C6L	Washer, flat (1897006-036)

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
4	MS35338-79	Washer, lock
6	1006783-22	Screw, button head
2	1010676-1	Terminal, stud, insulated
2	1010618-13	Screw, button head, self locking
7	AN363C1032	Nut, self locking (1016151-010)
4	1016006-002	Splice reducer
2	1016006-003	Splice reducer
4	1010490-258	Sleeving, electrical insulation
2	1010490-256	Sleeving, electrical insulation
1	1015818-616	Contact, socket
27	1015864-135	Sleeving, electrical insulation
25	1015864-137	Sleeving, electrical insulation
11	1015864-133	Sleeving, electrical insulation
9	1015864-138	Sleeving, electrical insulation
2	1016281-161	Contact, socket
1	2901441	Bracket assembly (inseparable)
1	2901442	Plate, instruction
1	1902626	Decal, functional area
1	1010490-200	Sleeving, electrical insulation
1	1016006-001	Splice reducer
1	2901443	Cable W186
1	2901444	Cable W187
1	2901445	Cable W188
1	2901447	Cable W192
32	1006783-19	Screw, button head
4	MS35338-78	Washer, lock
1	1897422-004	Connector, electrical
1	2901199	Sleeve, identification

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	2901475	Sleeve, identification
9	1897370-001	Plug, end seal
1	1016282-16	Grommet, connector strain relief
3	1016073-143	Dummy receptacle
3	1016073-163	Dummy receptacle
1	1016073-103	Dummy receptacle
1	1897424-001	Box mounting receptacle (housing only)
1	1010400-006	Cable clamp
1	MS3181-16C	Cap, protective
1	2901533	Guard, switch
2	MS35200-15	Screw, flat head
3	1016105-004	Clamp
28	1016151-004	Nut, self locking
5	1006783-44	Screw, machine
4	1016151-002	Nut, self locking
1	1006783-23	Screw, machine
1	1006151-006	Nut, self locking
4	1006783-12	Screw, machine

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
1	*ACSP 63L12A	Inductor, 3.33 (±3%) henries 300 ma ac-dc, 1 ohm max.
1	*Dale, type RH25 (Allied Catalog No.660, stock no. 26Z360C)	Resistor, 600 (±1%) ohm, 25 watt

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Dale, type RH10 (Allied Catalog no. 660, stock no. 26Z352C)	Resistor, 175 (±1%) ohm, 10 watt
AR	N/A	Primer (MIL-P-8585)
AR	N/A	Paint, semi-gloss enamel, light gray (FED-STD-595 color 26440) (TT-E-529, class B)
AR	N/A	Varnish (MIL-V-6894A, unreduced)
1	*Schwaab Stamp & Seal Co., type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
AR	N/A	Lacquer thinner (MS35626)
AR	N/A	Clear lacquer (MIL-L-73A)
AR	N/A	Black marking ink
AR	N/A	Solder (QQ-S-571, SN60WRAP)
1	*Master Appliance, G7673A	Heat gun (300°F)
1	Buchanan MS3191-A	Crimping tool
1	Buchanan MS3191-16	Positioner
1	Bendix 11-8107-16	Insertion tool
1	Bendix 11-7880-16	Extraction tool
1	Burndy Y10MRF-4	Crimping tool
AR	N/A	Lacing & tying tape (MIL-T-713C, black, type P, class 2)

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/8 inch alpha-numerical
AR	N/A	Sealing & retaining compound (MIL-S-22473, grade H & HV)
1	Buchanan MS3191-20	Positioner
AR	MIL-I-631	Filler tape, type F, form T, (black) grade A, class I, 0.62 inch wide, 0.020 inch thick
1	Any hi-speed	7/32 size twist drill
1	Any hi-speed	Number 5 twist drill
1	Any hi-speed	Number 29 twist drill
1	Any hi-speed	Number 37 twist drill
1	Any hi-speed	Number 36 twist drill
1	Any hi-speed	1/8 size twist drill
1	*Cleveland Twist Drill Co.	80° countersink
1	*General Radio Co, model W5MT3	Auto-transformer (Variac)
AR	N/A	Methy-Ethyl-Ketone (TT-M-261)
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z795C)	Resistor, 10 ohm (±5%), 100 watt
1	*Ohmite (Allied Catalog no. 660 Stock no. 25Z783C)	Resistor, 5 ohm (±5%), 50 watt
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z776C)	Resistor, 2 ohm (±5%), 25 watt

*or equivalent

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

3. Where marking is specified, hand marking is acceptable.

4. Use heatsink device when unsoldering or soldering near semi-conductors.

5. Ink markings:

   a. Markings to be removed should be removed using lacquer thinner.

   b. New markings shall be covered with a coat of clear flat lacquer after ink has dried.

6. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties will be added after all conductor rework has been completed.

VII. A. PROCEDURE (CONTINUED)

7. Delete conductors from wiring harness, when instructed, by one of the two following methods:

   a. Method One. (preferred)

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Pull conductor out of harness at most convenient point and discard.

   b. Method Two.

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Apply a drop of blue glyptal to severed ends of conductor.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove cover, P/N 1902541, from battery power pack assembly and modify as directed in paragraph C of Section VII in this RIB.

2. Open access door, P/N 1900471, on battery power pack assembly and disconnect P3 and P4 from their respective mating connectors.

3. Remove battery power pack panel assembly, P/N 1902249-021, from battery power pack assembly and set on work bench.

4. Remove two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel, P/N 1302179, to (right side) chassis support, P/N 1900475. Retain screws and nuts.

5. Remove six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel to chassis. Retain screws and nuts.

6. Remove three machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure meter bracket, P/N 1900480, to chassis. Retain screws and nuts.

VII. B. PROCEDURE (CONTINUED)

NOTE: Maneuver front panel away from chassis as required to perform following steps. Care must be taken, however, not to put undue strain on wiring and wiring connections.

CAUTION: When cutting holes in front panel and chassis during this modification, take the following necessary measures to;

1. Insure metal chips, filing and etc are not allowed to fall into or on wiring, switches and other components.

2. Insure wiring is pushed aside as necessary to prevent drilling into them.

7. Cut three new holes in front panel, P/N 1902179, as shown in figure 1. Use 1/8 size twist drill to drill two holes near ICTC POWER switch. These two holes shall be countersunk as indicated in figure 1.

8. Touch up bare metal surfaces in new holes with MIL-P-8585 primer and TT-E 529, class B, semi-gloss enamel, light gray (color 26440 of FED-STD-595) paint.

9. Obtain decal, P/N 1902626, from kit and install on front panel as shown in figure 2. Apply a bead of varnish (MIL-V-6894A unreduced), overlapping all edges 1/4 inch minimum on decal.

VII. B. PROCEDURE (CONTINUED)

10. Obtain switch guard, P/N 2901533, from kit and secure to front panel over ICTC POWER switch with two kit supplied flat head screws, P/N MS35200-15. Apply sealing and retaining compound MIL-S-22473, grade HV to threads of screws before installing.

11. Mark "DS10" on backside of front panel in location shown in figure 3. New marking should be 0.125 inch high, color black per ND 1002019.

12. Remove identification number "1902179" stamped on back side of front panel and replace with new identification number "1902629". New identification shall be in accordance with MIL-STD-130 (ES267).

13. Obtain light-indicator assembly, P/N 1897337-101, from kit and mount on front panel as indicated in the following steps while referencing figure 4.

    a. Using fingernail slots on sides, pull lens assembly out approximately 5/8 inch. (Reference figure 4, view A.)

    b. Rotate lens assembly 90 degrees. (Reference figure 4, view B.)

    c. Push lens in to release tension on index keys and then pull complete assembly out and set aside.

VII. B. PROCEDURE (CONTINUED)

d. Unscrew two screws until captive nuts reach the rear of their travel range and remove cover. (One screw and captive nut is shown in figure 4, view C.)

e. Insert indicator assembly through panel cutout from the front of panel. (Reference figure 4, view D.)

f. From rear of panel, slip cover over indicator assembly until it fits snugly against rear of panel. (Reference figure 4, view D.)

g. Tighten two screws (with attached captive nuts) to draw cover up firmly to rear of panel. (Reference figure 4, view C.)

h. Insert lens and lamp assembly (see figure 4, view E) into indicator assembly so lamp board slot is aligned with lamp board index.

i. Rotate lens assembly 90 degrees (see figure 4, view F) and push assembly into indicator assembly.

14. Remove two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure (right side) chassis support, P/N 1900475, to chassis. Retain screws and nuts for later use. Remove (right side) chassis support, P/N 1900475, and dispose of as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

14A. Remove leads A26 and A172 connected to resistor R1.

14B. Remove resistor R1 from chassis. Dispose of resistor and securing screws and nuts as directed in Section IX of this RIB.

14C. Remove marking for R1 (R1 and terminal designations 1 and 2) stamped on chassis, using lacquer thinner.

CAUTION: When performing the following steps, use care to insure CR6, R13 and leads attached to R13 are not damaged. These parts will be removed and installed on a new bracket.

14D. Remove leads A23, A29, A167, and A169 from E9. (E9 is located on electronics components assembly, P/N 1902193.)

14E. Remove lead A166 from E10.

15. Remove lead A171 from E11.

16. Unsolder lead A170 from CR6-C.

17. Remove electronics components assembly, P/N 1902193, from chassis by removing two securing machine screws and self locking nuts. Dispose of removed screws and self locking nuts as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

18. Unsolder (do not cut) green and red leads connected to E10.

19. Unsolder (do not cut) yellow lead connected to CR6-A.

20. Remove resistor R13 from electronics components assembly, P/N 1902193. Retain mounting hardware.

21. Obtain bracket, P/N 2901441, from kit and mount R13 (removed in step 20) on bracket as shown in figure 5. Use original mounting hardware to secure R13 to bracket.

22. Remove diode CR6 from electronics components assembly, P/N 1902193.

23. Utilize original mounting hardware to secure CR6 on new bracket as shown in figure 5.

24. Dispose of electronics components assembly, P/N 1902193, (less R13 and CR6) as directed in Section IX of this RIB.

25. Locate, mark and cut two new holes in chassis as shown in figure 6. Use new bracket, P/N 2901441, as a template for locating two new holes. Do not use bracket for a template when drilling, however. Use 7/32 size twist drill for drilling operation.

VII. B. PROCEDURE (CONTINUED)

26. Touch up bare metal surfaces in two hew holes in chassis with MIL-P-8585 primer.

27. Remove identification number "1902135" and associated revision marking and replace with new identification number "1902631". New marking shall be in accordance with MIL-STD-130.

28. Remove leads listed in table 1 from wiring harness A.

Table 1. Wiring Harness A Lead Deletions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Remarks
A23	CR2-C	E9	Previously removed from E9
A26	K6-6	R1-1	Previously removed from R1
A29	CR1-C	E9	Previously removed from E9
A122	T3-3	XDS3-A	
A137	XDS3-B	XDS5-A	
A138	XDS4-B	XDS5-B	
A166	K6-5	E10	Previously removed from E10
A167	J4-L	E9	Cut off at J4-L, E9 end previously removed
A169	K5-1	E9	Previously removed from E9
A170	XF5-1	CR6-C	Previously removed from CR6
A171	K6-2	E11	Previously removed from E11
A172	TB1-11	R1-2	Previously removed from R1

VII. B. PROCEDURE (CONTINUED)

29. Obtain transformer (T4), P/N 1897425, from kit and secure to new bracket, P/N 2901441, as shown in figure 5, with four kit supplied button head screws, P/N 1006783-22, lock washers, P/N MS35338-79, and flat washers, P/N AN960C6L.

30. Obtain relay (K13), P/N 1016024-001, from kit and secure to new bracket as shown in figure 5, with two kit supplied button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004.

31. Obtain comparator (AR1), P/N 1897261, from kit and secure to new bracket as shown in figure 5, with four kit supplied button head screws, P/N 1006783-19, and lock washers, P/N MS35338-78.

32. Obtain rectifier bridge (CR7), P/N 1897277-001, from kit and secure to new bracket as shown in figure 5.

33. Obtain relay(K14), P/N 1015982-006, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525-004.

34. Obtain relay (K12), P/N 1015982-007, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525-004.

VII. B. PROCEDURE (CONTINUED)

35. Obtain component board assembly (TB3), P/N 2901438, from kit and secure to new bracket as shown in figure 5, with four kit supplied spacers, P/N 1015860-001, self locking nuts, P/N 1012525-004, and button head screws, P/N 1006783-24.

36. Obtain one terminal stud (E15), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screw, P/N 1010618-13.

37. Obtain one terminal stud (E16), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screws, P/N 1010618-13.

38. Obtain capacitor (C2), P/N CL25BJ151UP3, from kit and insert in retaining clip as shown in figure 5, such that positive end is nearest E15.

39. Temporarily connect (mechanically) positive lead of C2 to E15 and negative lead to E16.

40. Temporarily connect (mechanically) the free end of yellow lead attached to R13, to TB3-9. Lead should be cut to required length, have insulation stripped 0.30 inch and tinned prior to connecting.

VII. B. PROCEDURE (CONTINUED)

41. Temporarily connect (mechanically) the free end of red lead and green lead attached to R13, to TB3-13. Leads should be cut to required length, have insulation stripped 0.30 inch and tinned prior to installing.

42. Install new wire list AA leads furnished in kit lead set, as indicated in table 2. Accessory items listed in table 2 are also furnished in kit. (Reference figure 7 for terminal identifications.)

Table 2. Wire List AA Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA35	K12-1		0.30	Yes	1015864-137	
		K13-1	0.30	Yes		See note 1
AA36	K12-5		0.30	Yes	1015864-137	
		K13-2	0.30	Yes		See note 2
AA37	XDS10-C		0.30	Yes	1015864-139	See note 3
		XDS10-A	0.30	Yes	1015864-139	
AA38	T4-4		0.30	Yes	1015864-139	
		K14-5	0.30	Yes	1015864-137	
AA40	K14-4		0.30	Yes	1015864-137	
		T4-7	0.30	Yes	1015864-139	
AA41	CR7-1		0.30	Yes	1015864-137	
		K13-4	0.30	Yes	1015864-135	See note 4
AA42	CR7-2		0.30	Yes	1015864-137	
		E15	0.30	Yes		

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA43	CR7-4		0.30	Yes	1015864-137	
		E16	0.30	Yes		
AA44	E15		0.30	Yes		
		TB3-24	0.30	Yes		
AA45	E16		0.30	Yes		
		TB3-21	0.30	Yes		See note 5
AA46	K12-3		0.30	Yes	1015864-137	
		TB3-20	0.30	Yes		See note 6
AA47	K12-7		0.30	Yes	1015864-137	
		TB3-19	0.30	Yes		
AA48	AR1-1		0.30	Yes		
		TB3-16	0.30	Yes		
AA49	AR1-4		0.30	Yes		
		TB3-10	0.30	Yes		
AA50	AR1-3		0.30	Yes		
		TB3-26	0.30	Yes		See note 6
AA51	AR1-8		0.30	Yes		
		TB3-17	0.30	Yes		
AA52	AR1-2		0.30	Yes		
		TB3-18	0.30	Yes		
AA53	AR1-6		0.30	Yes		
		TB3-25	0.30	Yes		
AA54	AR1-7		0.30	Yes		
		TB3-21	0.30	Yes		Combine with AA45

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA55	CR6-A	 TB3-9	0.30 0.30	Yes Yes	1015864-137	
AA56	TB3-20	 TB3-26	0.30 0.30	Yes Yes		Combine with AA46 Combine with AA50

Note 1 - Do not solder as another lead (A51) will be connected later.
Note 2 - Do not solder as another lead (A50) will be connected later.
Note 3 - Do not solder as another lead (A182) will be connected later.
Note 4 - Do not solder as another lead (A183) will be connected later.
Note 5 - Do not solder as another lead (AA54) will be connected later.
Note 6 - Do not solder as another lead (AA56) will be connected later.

VII. B. PROCEDURE (CONTINUED)

43. Secure new bracket, P/N 2901441, to chassis with five machine screws, P/N 1006783-45, and self locking nuts, P/N AN363C1032, retained in steps 4 and 14.

44. Revise wiring harness A lead connections as listed in table 3.

Table 3. Revised Lead Terminations In Wiring Harness A

Lead Ident	Remove From	Reconnect To	Strip Insul	Tin	Accessory Item P/N
A35	K3-D2	*K3-C2	0.30	Yes	1015864-135
A50	T3-2	K13-2	0.30	Yes	1015864-135
A51	T3-1	K13-1	0.30	Yes	1015864-135
A66	J6-C	K13-19	0.30	Yes	1015864-135
A68	J6-A	K13-13	0.30	Yes	1015864-135
A69	J6-D	K13-10	0.30	Yes	1015864-135
A70	J6-a	K13-7	0.30	Yes	1015864-135
A144	K2-D2	**K3-D2	0.30	Yes	1015864-135

*Combine with lead A120 at this point.
**Another lead (A189) will be added to this point later.

VII. B. PROCEDURE (CONTINUED)

45. Remove leads A71, A153, and A160 from E5 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

46. Remove leads A72, A154, and A161 from E6 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

47. Remove leads A73, A155, and A162 from E7 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

48. Remove leads A74, A156, and A163 from E8 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

49. Remove leads A82, A151, and A158 from E3 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

50. Obtain new wiring harness A leads from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column in table 4 can be found at the rear of the table.)

Table 4. Wiring Harness A Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A177	K1-C2	 S6SW2-NC	0.30 0.30	Yes Yes	1015864-135	 Combine with A110
A178	K1-C3	 J2-K	0.30 0.20	Yes No	1015864-135	 See note 1
A179	J2-P	 E17	0.20 0.30	No No	1016281-161	See note 3 See note 2
A180	XDS3-A	 T2-3	0.30 0.30	Yes Yes	1015864-139 1015864-139	Combine with AA8 Combine with A46
A181	K9-4	 XDS4-B	0.30 0.30	Yes Yes	1015864-135 1015864-139	Combine with A21 Combine with AA28
A182	K13-5	 XDS10-C	0.30 0.30	Yes Yes	1015864-135	 Combine with AA37
A183	T3-3	 K13-4	0.30 0.30	Yes Yes	1015864-135	Combine with A146 Combine with AA41
A184	T3-1	 K12-6	0.30 0.30	Yes Yes	1015864-135 1015864-137	Combine with A78
A185	T3-2	 K12-2	0.30 0.30	Yes Yes	1015864-135 1015864-137	Combine with A54
A186	K3-X2	 K12-4	0.30 0.30	Yes Yes	1015864-135 1015864-137	Combine with A60

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A187	J6-b		0.30	Yes	1015864-138	
		K14-3	0.30	Yes	1015864-137	
A188	K11-7		0.30	Yes	1015864-137	Combine with A77
		K14-7	0.30	Yes	1015864-137	
A189	K3-D2		0.30	Yes		Combine with A144
		XDS10-G	0.30	Yes	1015864-139	See note 4
A190	J6-a		0.30	Yes	1015864-138	
		K13-6	0.30	Yes	1015864-135	
A191	J6-D		0.30	Yes	1015864-138	
		K13-9	0.30	Yes	1015864-135	
A192	J6-A		0.30	Yes	1015864-138	
		K13-12	0.30	Yes	1015864-135	
A193	J6-C		0.30	Yes	1015864-138	
		K13-18	0.30	Yes	1015864-135	
A194	E18		0.30	No		See note 2
		J2-N	0.20	No	1016281-161	See note 2
A195	K1-B1		0.30	Yes	1015864-135	Combine with A164
		J2-T	0.20	No		See note 1
A196	J6-Z		0.30	Yes	1015864-138	
		K13-15	0.30	Yes	1015864-135	
A197	XDS5-B		0.30	Yes	1015864-139	Combine with AA17
		K13-3	0.30	Yes	1015864-135	
A198	J2-S		0.20	No		See note 1
		K13-16	0.30	Yes	1015864-135	

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A199	E12		0.30	No		See note 2
		T4-2	0.30	Yes	1015864-139	
A200	E13		0.30	No		See note 2
		K14-2	0.30	Yes	1015864-137	
A201	E14		0.30	No		See note 2
		T4-1	0.30	Yes	1015864-139	
A202	CR7-3		0.30	Yes	1015864-137	
		XDS10-G	0.30	Yes		Combine with A189
A203	K6-6		0.30	Yes	1015864-135	Combine with A27
		TB3-14	0.30	Yes		
A204	TB1-11		0.30	Yes		See note 5
		TB3-15	0.30	Yes		
A205	K6-2		0.30	Yes	1015864-137	Combine with A37
		TB3-3	0.30	Yes		
A206	XF5-1		0.30	Yes	1015864-135	Combine with A10
		CR6-C	0.30	Yes	1015864-137	
A207	CR1-C		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A208	CR2-C		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A209	J4-L		0.20	No	1015818-616	See note 3
		E20	0.30	Yes		See note 2
A210	K6-5		0.30	Yes	1015864-137	
		TB3-13	0.30	Yes		

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A211	K5-1		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A212	J6-G		0.30	Yes	1015864-138	
		TB3-11	0.30	Yes		
A213	J6-H		0.30	Yes	1015864-138	
		TB3-22	0.30	Yes		
A214	E18		0.30	No		See note 2
		K9-1	0.30	Yes	1015864-137	See note 6
A215	E19		0.30	No		See note 2
		J6-c	0.30	Yes	1015864-138	

Note 1 - Utilize blank contact in connector to make connection at this point.
Note 2 - Connection to this point will be accomplished later.
Note 3 - Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-16 positioner, extraction tool Bendix 11-7880-16, and insertion tool Bendix 11-8107-16 as required.
Note 4 - Do not solder as another lead (A202) will be connected later.

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Note 5 - Combine with leads A36, A111, and A168 at this point.
Note 6 - Remove lead A142 from K9-1 before connecting lead A214. Lead A142 will be reconnected to a new point later.

51. Obtain four electrical insulation sleeves, P/N 1010490-258, two electrical insulation sleeves, P/N 1010490-256, and one electrical insulation sleeve, P/N 1010490-200, and mark with the designation indicated in table 5. (Mark by hand with black ink.)

Table 5. Marking for Sleeves

Qty	Part Number	Identification Mark
1	1010490-258	E12
1	1010490-258	E13
1	1010490-258	E14
1	1010490-256	E17
1	1010490-258	E18
1	1010490-200	E19
1	1010490-256	E20

VII. B. PROCEDURE (CONTINUED)

52. Route loose ends of leads A142, A194, and A214 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

   a. Eliminate excessive length and strip insulation 0.30 inch on three leads. (A214 will be crimped in small end of splice reducer.)

   b. Insert leads A142 and A194 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   c. Obtain sleeve marked E18 (reference step 51) and slide over loose end of lead A214.

   d. Insert lead A214 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   e. Slide sleeve marked E18 over crimped splice reducer and heat shrink in place.

53. Route loose ends of leads A82, A151, A158, and A179 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

   a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A82 and A179 will be crimped in small end of splice reducer.)

   b. Insert leads A151 and A158 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   c. Obtain sleeve marked E17 (reference step 51) and slide over loose end of leads A82 and A179.

   d. Insert leads A82 and A179 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   e. Slide sleeve marked E17 over crimped splice reducer and heat shrink in place.

54. Route loose ends of leads A72, A74, and A201 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1006006-002, as follows:

   a. Eliminate excessive length and strip insulation 0.30 inch on three leads.

   b. Insert leads A72, A74, and A201 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

VII. B. PROCEDURE (CONTINUED)

   c. Obtain sleeve marked E14 (reference step 51) and slide over splice reducer and heat shrink in place.

55. Route loose ends of leads A154, A156, A161, A163, and A200 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

   a. Eliminate excessive length and strip insulation 0.30 inch on five leads. (A200 will be crimped in small end of splice reducer.)

   b. Insert leads A154, A156, A161, and A163 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   c. Obtain sleeve marked E13 (reference step 51) and slide over loose end of lead A200.

   d. Insert lead A200 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   e. Slide sleeve marked E13 over crimped splice reducer and heat shrink in place.

VII. B. PROCEDURE (CONTINUED)

56. Route loose ends of leads A71, A73, A153, A155, A160, A162, and A199 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer P/N 1016006-002, as follows:

   a. Eliminate excessive length and strip insulation 0.30 inch on seven leads. (A199, A71, and A73 will be crimped in small end of splice reducer.)

   b. Insert leads A153, A155, A160, and A162 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   c. Obtain sleeve marked E12 (reference step 51) and slide over loose end of leads A199, A71, and A73.

   d. Insert leads A199, A71, and A73 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

   e. Slide sleeve marked E12 over crimped splice reducer and heat shrink in place.

57. Remove leads A143, A150, and A157 from E2 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

58. Route loose end of lead A215 to former E2 location on wiring harness A. Join leads A143, A150, A157, and A215 in kit supplied splice reducer, P/N 1016006-001, as follows:

    a. Eliminate excessive length from lead A215. (A215 will be crimped in large end of splice reducer.)

    b. Strip insulation on all four leads 0.30 inch.

    c. Insert A150, A157, and A215 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    d. Obtain sleeve marked E19 (reference step 51) and slide over loose end of lead A143.

    e. Insert lead A143 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    f. Slide sleeve marked E19 over crimped splice reducer and heat shrink in place.

59. Route loose ends of leads A207, A208, A209, and A211 to common meeting place on wiring harness A. Join these leads in kit supplied reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

    a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A209 will be crimped in small end of splice reducer.)

    b. Insert leads A207, A208, and A211 in large end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E20 (reference step 51) and slide over loose end of lead A209.

    d. Insert lead A209 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E20 over crimped splice reducer and heat shrink in place.

60. Spot tie wiring harness A as required in accordance with ND 1002032,using black lacing tape.

61. Remove wiring harness A identification tag (marked "1902539") from harness. Dispose of identification tag as directed in Section IX of this RIB.

62. Obtain identification band, P/N 1016128-021, from kit lead set. If band has not been marked with "1902620" identification number, mark it with this identification at this time.

VII. B. PROCEDURE (CONTINUED)

63. Secure new identification band to wiring harness A in same location occupied by old identification tag removed in step 61. Use black lacing tape to secure it in place.

64. Remove identification "ASSY 1902249-021" and replace it with "ASSY 1902630-011". Marking shall be in accordance with MIL-STD-130 (ES267).

65. Secure front panel to chassis with six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, removed and retained in step 5.

66. Secure front panel to new bracket, P/N 2901441, with two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, supplied in kit.

67. Secure meter bracket, P/N 1900480, to chassis with three machine screws, P/N 1006783, and self locking nut, P/N AN363C1032, removed and retained in step 6.

68. Remove SPARE 15 AMP and BATTERY 15 AMP fuses and replace with two kit supplied fuses, P/N F02B32V15AS.

69. Perform continuity - resistance checks listed in table 6.

VII. B. PROCEDURE (CONTINUED)

Table 6. Continuity - Resistance Checks

FROM	TO	Indication (ohms)	Conditions
J2-K	J6-d	Less than 1	None
J2-K	J6-d	More than 100K	Press S6 (EMERGENCY HEATER POWER PRESS TO TURN OFF)
J2-C	J6-C	More than 100K	None
J2-E	J6-D	More than 100K	None
J2-F	J6-A	More than 100K	None
J2-G	J6-a	More than 100K	None
J2-S	J6-Z	More than 100K	None
J2-R	J2-M	More than 100K	None
J2-U	J2-M	More than 100K	None
J6-G	J6-H	More than 100K	None
J2-A	J2-H	Less than 1	None
J2-B	J2-J	Less than 1	None
J2-H	J6-L	Less than 1	None
J2-P	J6-N	Less than 1	None
J6-L	J6-V	Less than 1	None
J6-W	J6-K	Less than 1	None
J6-c	J6-T	Less than 1	None

70. Recalibrate potentiometer R13 as follows:

    a. Install jumper lead between TB3-3 and TB3-13.

VII. B. PROCEDURE (CONTINUED)

b. Turn R13 to clockwise limit.

c. Connect ohmmeter to pins L and N on connector J4. (Open indicates K5 is de-energized while short indicates K5 is energized.)

d. Apply 38 (±0.2) volts dc (hi) to J3-A and (lo) to J3-J.

e. Turn R13 counterclockwise to point where relay K5 energizes.

f. Decrease applied voltage to 33.5 (±0.5) volts dc.

g. Remove voltage applied to J3. Relay K5 shall de-energize.

h. Reapply 33.5 (±0.5) volts dc to same points on J3. Relay K5 shall not re-energize.

i. Slowly increase voltage at J3. Relay K5 shall energize at 38.0 (±0.2) volts dc. If relay K5 does not energize within 38.0 (±0.2) volt dc range, readjust R13 as necessary and repeat steps f through i until proper R13 setting is obtained. (Turning R13 clockwise increases voltage set point. One turn will result in approximate change of 0.25 volt.)

VII. B. PROCEDURE (CONTINUED)

j. Remove voltage applied to J3.

k. Remove ohmmeter from J4.

l. Remove jumper lead between TB3-3 and TB3-13.

71. Install jumper lead between J2-L and J2-M.

72. Connect panel power cable to 115 volt ac source.

73. Set ICTC POWER switch to ON. 115V LINE POWER and PTC OPERATING indicators shall light. (Inhibit alarm if necessary.)

74. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

75. Continuity shall exist between points listed in table 7.

Table 7. Closed Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

76. Apply 25.0 (±0.2) volts dc (hi) to J6-G and (lo) to J6-H.

77. Check to insure the following conditions exist:

a. PTC OPERATING and PTC OFF ALARM RESET indicators shall not be lighted.

b. G&N ON/PTC INHIBITED indicator shall be lighted.

c. Alarm shall not ring.

d. No voltage shall exist between J2-U and J2-R and between J2-U and J2-M.

e. No continuity shall exist between points listed in table 8.

Table 8. Open Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

78. Remove 25 volts dc applied to J6.

79. Set ICTC POWER switch to OFF.

80. Disconnect panel power cable from 115 volt ac source.

81. Remove jumper lead connected between J2-L and J2-M.

82. Connect jumper lead between J6-b and J6-F.

83. Connect 17 (±1) ohm "Load" between J6-K and J6-L, using one 10 ohm, 100 watt, resistor, one 5 ohm, 50 watt resistor, and one two ohm, 25 watt resistor.

84. Connect common input-output terminal of auto transformer (Variac) to J2-R and J2-H.

85. Connect other input terminal of variac to J2-U.

86. Connect variable output terminal of variac to J2-B.

87. Set variac for zero output.

88. Connect panel power cable to 115 volt ac source.

89. Set ICTC POWER switch to ON.

90. Adjust variac for output of 28.0 (±0.3) volts ac.

VII. B. PROCEDURE (CONTINUED)

91. Check for voltage drop of 31.5 (±1.0) volts ac across "load" resistance (added in step 83).

92. Remove panel power cable from 115 volt ac source.

93. Remove jumper lead connected between J6-b and J6-F.

94. Decrease "load" resistance to 10 (±1) ohms by removing the 5 ohm and 2 ohm resistors.

95. Connect panel power cable to 115 volt ac source.

96. Check for voltage drop of 23.5 (±1.0) volts ac across "load" resistor.

96A. Set ICTC POWER switch to OFF.

96B. Disconnect panel power cable from 115 volt ac cource.

96C. Remove "load" resistor and variac (used for testing) from battery power pack panel assembly.

VII. B. PROCEDURE (CONTINUED)

96D. Hold battery power pack panel assembly in its normal horizontal plane (position it assumes when mounted in battery power pack case) and shake vigorously. (Shaking the panel will insure no air pockets exist in the mercury pool within the ampere hour meter. Air pockets can impair proper operation of the meter.)

96E. Reinstall modified battery power pack panel assembly in battery power pack case. Insure P3 is connected to J3 and P4 is connected to J4.

96F. Transfer serial number from existing nameplate on battery power pack assembly to new nameplate, P/N 1004260-510, supplied in kit. Use 1/8 inch high character metal stamp set to imprint data.

96G. Remove existing nameplate from battery power pack assembly. Dispose of nameplate as directed in Section IX of this RIB. Retain four screws to secure new nameplate.

97. Secure new nameplate on battery power pack assembly with four screws retained in step 96G. Apply sealing and retaining compound (MIL-S-22473, grade H) to threads of four screws before installing.

98. Install jumper lead between J2-L and J2-M.

VII. B. PROCEDURE (CONTINUED)

99. Connect 20 VA load (normal inverter load) between J2-U and J2-R. 20 VA load is 775 (±1%) ohms in parallel with 3.33 (±5%) henries.

100. Connect panel power cable to 115 volt ac source.

NOTE: Inhibit alarms in following steps as necessary.

101. Set ICTC POWER switch to ON.

102. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

103. Apply 25.2 (±0.2) volt dc (hi) to J6-G and (lo) to J6-H.

104. Check to insure that 115 volts ac exists between J2-T and J2-M and zero voltage between J2-U and J2-R.

105. Disconnect panel power cable from 115 volt ac source and check for the following indications:

a. Zero voltage between J2-T and J2-M.

b. G & N ON/PTC INHIBITED indicator remains lighted.

VII. B. PROCEDURE (CONTINUED)

c. PTC OPERATING indicator not lighted.

d. No alarms ring.

e. INVERTER POWER indicator shall be lighted.

106. Remove 28 volt power applied to J6.

107. Set ICTC POWER switch to OFF.

108. Install jumper lead between J2-K and J2-N.

109. Connect panel power cable to 115 volt ac source.

110. Set ICTC POWER switch to ON.

111. Inhibit alarm bell by pressing 115V LINE POWER indicator-switch.

112. Check to insure 115 volts ac exist between J2-T and J2-M.

113. Disconnect panel power cable from 115 volt ac source and check for the following indications.

a. 115 volts ac shall not exist between J2-T and J2-M.

VII. B. PROCEDURE (CONTINUED)

b. Alarm bell shall not ring.

c. Battery voltage of 28 (+7, -3) volts dc shall exist between J2-P (hi) and J2-N (lo).

d. EMERGENCY HEATER POWER indicator-switch shall be lighted. Pressing this indicator-switch shall not turn indicator off.

114. Connect panel power cable to 115 volt ac source and check for the following indications.

a. Battery voltage of 28 (+7, -3) volts dc shall not exist between J2-P (hi) and J2-N (lo).

b. 115 volts ac shall exist between J2-T and J2-M.

c. Alarm bell shall not ring.

d. EMERGENCY HEATER POWER indicator-switch shall not be lighted.

115. Set ICTC POWER switch to OFF.

116. Disconnect panel power cable from 115 volt ac source.

VII. B. PROCEDURE (CONTINUED)

117. Remove all jumper leads.

118. Reinstall modified battery power pack cover (with cable in stored positions) on battery power pack assembly.

119. Update Acceptance Data Package as indicated in Section VIII of this RIB.

VII. PROCEDURE (CONTINUED)

C. DETAILED INSTRUCTIONS FOR MODIFICATION OF COVER, P/N 1902541. Perform modification as follows:

1. Remove cable W100, P/N 1900955, from storage location in cover and set aside.

2. Remove cable W101, P/N 1900954, from storage location in cover and modify as directed in paragraph D of Section VII in this RIB.

3. Remove dummy receptacle, P/N 1016073-183, from cover. (This dummy receptacle is located in area exposed by section view A-A in figure 8.) Retain dummy receptacle and securing hardware.

4. Enlarge one of four vacated dummy receptacle mounting holes (shown in figure 8, section view A-A) to 0.164 to 0.171 inch diameter, using number 36 twist drill.

5. Touch up inner surfaces of other three vacant mounting holes with MIL-P-8585 primer and cashmere blue enamel paint, P/N 1016194. (These three holes will not be reused for mounting parts.)

6. Locate mark and drill two 0.216 to 0.224 inch diameter through holes in top of cover as shown in figure 8. Use 7/32 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

7. Locate, mark and drill three 0.201 to 0.209 inch diameter through holes in top of cover as shown in figure 8. Use number 5 size twist drill to drill holes.

8. On side of cover where four dummy receptacles are presently mounted, perform the following:

a. Locate, mark and drill two clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view B-B. Use number 29 size twist drill to drill holes.

b. Locate, mark and drill one cluster (4 holes) of 0.102 to 0.108 inch diameter through holes as shown in figure 8, section view B-B. Use number 37 size twist drill to drill holes.

9. On side of cover opposite side containing four dummy receptacles, locate, mark and drill six clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view C-C. Use number 29 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

10. Using 1/8 inch rubber stamp and black marking ink, apply markings "W-189", "W-100", "W-186", "W-187", "W-188", and "W-192" to inner surface of cover in locations shown in figure. (W-186, W-187, and W-188 markings shall appear in two locations.)

11. Remove instruction foilcal, P/N 1902540, from inner surface of cover. Dispose of foilcal as directed in Section IX of this RIB.

WARNING: Methyl-Ethyl-Ketone is toxic and flammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

NOTE: Insure mounting surface is clean prior to applying new instruction plate.

12. Obtain instruction plate, P/N 2901442, from kit and apply methyl-ethyl-ketone to activate adhesive backing on plate. Allow activated adhesive to air dry until surface becomes tacky before performing next step.

13. Mount new instruction plate in same location as previously occupied by removed foilcal. Insure orientation of plate is as indicated in figure 8. (Bottom edge being nearest to assembly identification mark on cover.)

VII. C. PROCEDURE (CONTINUED)

14. Obtain dummy receptacle, P/N 1016073-183, and securing hardware set aside in step 3 and install on cover as shown in figure 9.

15. Obtain dummy receptacle, P/N 1016073-103, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

16. Obtain box mounting receptacle (housing only), P/N 1897424-001, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-12, and self locking nuts, P/N 1016151-002.

17. Obtain three dummy receptacles, P/N 1016073-143, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

18. Obtain three dummy receptacles, P/N 1016073-163, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

19. Obtain protective cap, P/N MS3181-16C, from kit and secure end of attached chain to hole in cover which was enlarged in step 4. Reference figures 8 and 9. Use kit supplied machine screw, P/N 1006783-23, and self locking nut, P/N 1016151-006, to secure it in place.

VII. C. PROCEDURE (CONTINUED)

20. Obtain cable clamp, P/N 1010400-006, from kit and secure to cover as shown in figure 9, using two kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N 1016151-010 (AN363C1032). Insure orientation of clamp is as shown in figure 9.

21. Obtain three clamps, P/N 1016105-004, from kit and secure to three new points on cover as shown in figure 9, using three kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N AN363C1032. Insure orientation of clamps is as shown in figure 9.

22. Remove identification mark "1902541" from inner surface of cover and replace with new identification number "1902632". Marking shall be in accordance with MIL-STD-130 (ES267).

23. Obtain and install cable W192 in cover as shown in figure 9.

24. Reinstall cable W100 in cover as shown in figure 9.

25. Obtain cables W186, W187, and W188 and mount in cover as shown in figure 9.

26. Obtain cable W189 (cable W101 becomes cable W189 after it is modified per this RIB) and mount in cover as shown in figure 9.

VII. PROCEDURE (CONTINUED)

D. DETAILED INSTRUCTIONS FOR MODIFICATION OF INTERCONNECT CABLE W101 (BPP TO IMU), P/N 1900954. Perform modification as follows:

1. Cut and remove cable identification sleeve (marked 1900954) from cable. Dispose of sleeve as directed in Section IX of this RIB.

2. Loosen two screws on connectors P1 and P2.

3. Cut and remove connector P1 and P2 identification sleeves from cable. Dispose of sleeves as directed in Section IX of this RIB.

4. Extract all leads from connector P2, using Bendix 11-7880-20 extraction tool.

5. Remove connector, grommet and telescoping bushing from P2 end of cable. Dispose of removed parts as directed in Section IX of this RIB.

6. Cut and remove tubing which covers cable. Dispose of tubing as directed in Section IX of this RIB.

7. Remove P1 telescoping bushing from cable. Retain two bushings, P/N AN3420-12A and P/N AN3420-16, for later reassembly and dispose of two bushings (with smallest inner diameter) P/N AN3420-6A and P/N AN3420-8A, as directed in Section IX of this RIB.

VII. D. PROCEDURE (CONTINUED)

8. Remove strain relief clamp, connector back shell and grommet insert from rear of connector P1 to permit access to P1 solder wells.

9. Unsolder lead A2 from P1-B and resolder to P1-Z.

10. Obtain leads A10 through A13 from kit lead set and install in cable as indicated in table 9. Accessory items are furnished in kit supplied connector, P/N 1897422-004.

Table 9. Cable Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A10	P1-G	P2-G	0.30 0.22	Yes No	MS3193A-20A	See note 1
A11	P1-H	P2-H	0.30 0.22	Yes No	MS3193A-20A	See note 1
A12	P1-F	P2-F	0.30 0.22	Yes No	MS3193A-20A	See note 1
A13	P1-b	P2-b	0.30 0.22	Yes No	MS3193A-20A	See note 1

Note 1 - Extract contact from applicable positions in kit supplied connector, using Bendix 11-7880-20 extraction tool. Crimp contact on lead using Buchanan MS3191-A crimping tool with Buchanan MS3191-20 positioner.

VII. D. PROCEDURE (CONTINUED)

11. Reinstall grommet insert and connector back shell on rear of connector P1.

12. Obtain zipper tubing, P/N 1902621-005, from kit and install on cable.

13. Obtain P1 identification sleeve, P/N 2901475, from kit and install on cable at P1. Position sleeve such that lettering reads away from P1 and that end of sleeve will lie under strain relief clamp. Heat shrink sleeve in place.

14. Reinstall at connector P1, two telescoping bushings, P/N AN3420-12A and P/N AN3420-16, removed and retained in step 7.

15. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads and that bushings and sleeves are properly positioned in strain relief clamp before tightening screws.

16. Obtain cable identification sleeve, P/N 1902621-004, from kit. If sleeve has not been marked with identification number "2901446", mark it with this identification at this time. Marking should be white and 0.25 inch high.

VII. D. PROCEDURE (CONTINUED)

17. Slide cable identification sleeve, P/N 1902621-004, on cable to approximate center location and heat shrink in place.

18. Obtain P2 identification sleeve, P/N 2901199, from kit and position on P2 end of cable such that lettering reads away from P2. Do not heat shrink in place at this time.

19. Obtain strain relief grommet, P/N 1016282-16, from kit and slide on cable.

20. Install cable leads in kit supplied connector, P/N 1897422-004, (new connector P2) as indicated in table 10.

Table 10. New Connector P2 Termination

Lead Identification	Connector P2 Termination
A1	a
A2	P
A3	N
A4	Z
A5	K
A6	X
A7	R
A8	V
A9	W
A10	G
A11	H
A12	F
A13	b

VII. D. PROCEDURE (CONTINUED)

21. Fill unused holes in connector P2 with excess contacts obtained in step 20.

22. Fill unused holes in connector P2 grommet with plug end seals, P/N 1897370-001, supplied in kit.

23. Position P2 identification sleeve such that end of sleeve will lie under strain relief clamp on P2 connector. Heat shrink sleeve in place.

24. Position strain relief grommet under P2 connector strain relief clamp.

25. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads before tightening screws.

26. Check for an indication of less than one ohm between the points listed in table 11.

Table 11. Cable W189 Continuity Check

From P1-	To P2-	From P1-	To P2-
A	N	J	V
C	a	W	R
D	Z	X	X
F	F	Z	P
G	G	a	K
H	H	b	b
I	W		

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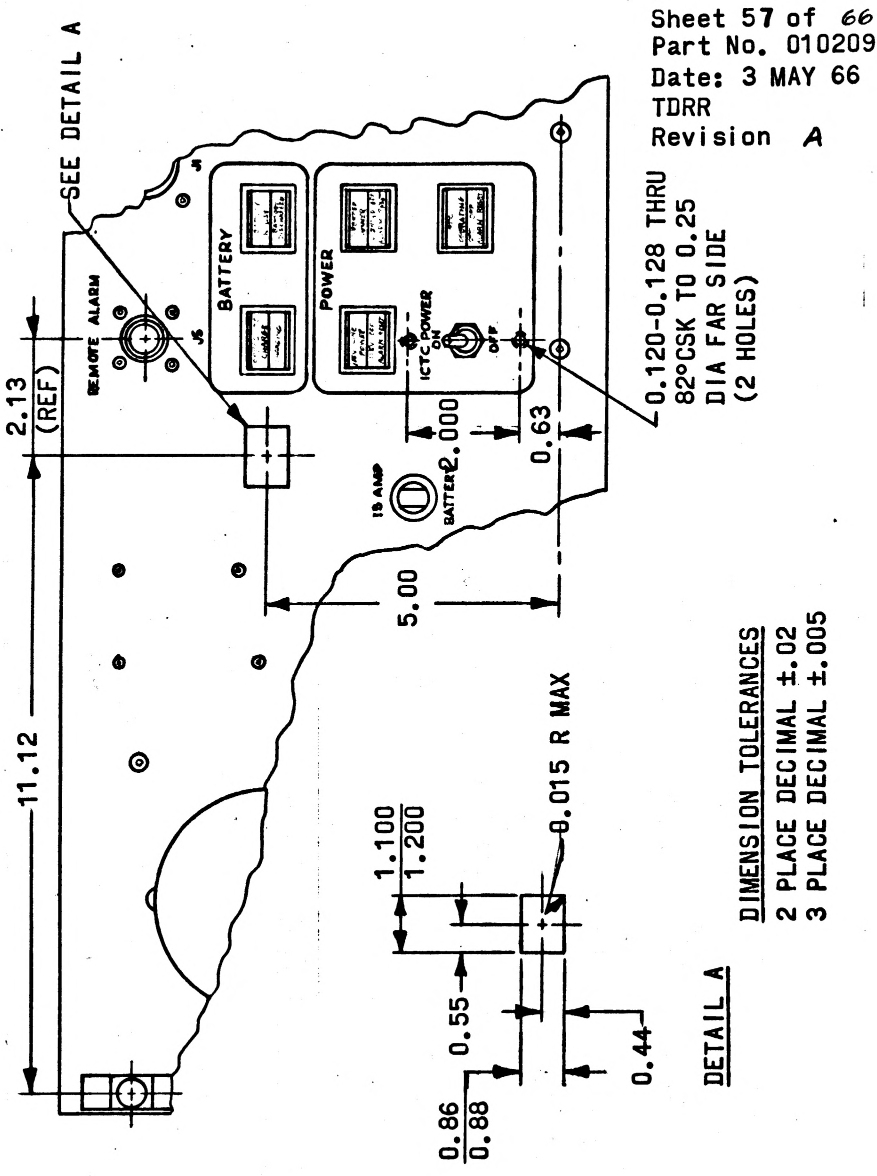
SEE DETAIL A
REMOTE ALARM
J5
BATTERY
POWER
ICTC POWER
ON
OFF
15 AMP
BATTERY
2.13
(REF)
11.12
5.00
2.000
0.63
0.120-0.128 THRU
82°CSK TO 0.25
DIA FAR SIDE
(2 HOLES)
1.100
1.200
0.015 R MAX
0.55
0.86
0.88
0.44
DETAIL A
DIMENSION TOLERANCES
2 PLACE DECIMAL ±.02
3 PLACE DECIMAL ±.005

Figure 1. NEW HOLE IN FRONT PANEL

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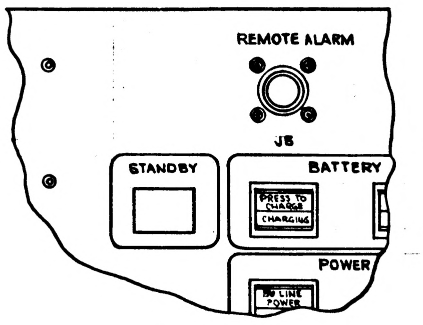
REMOTE ALARM
J5
STANDBY
BATTERY
PRESS TO CHARGE
CHARGING
POWER
LINE POWER

Figure 2. INSTALLED LAMP INDICATOR ASSEMBLY DECAL

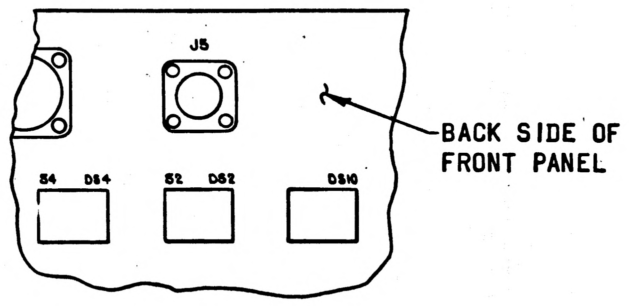
J5
BACK SIDE OF
FRONT PANEL
S4
DS4
S2
DS2
DS10

Figure 3. LAMP INDICATOR ASSEMBLY IDENTIFICATION

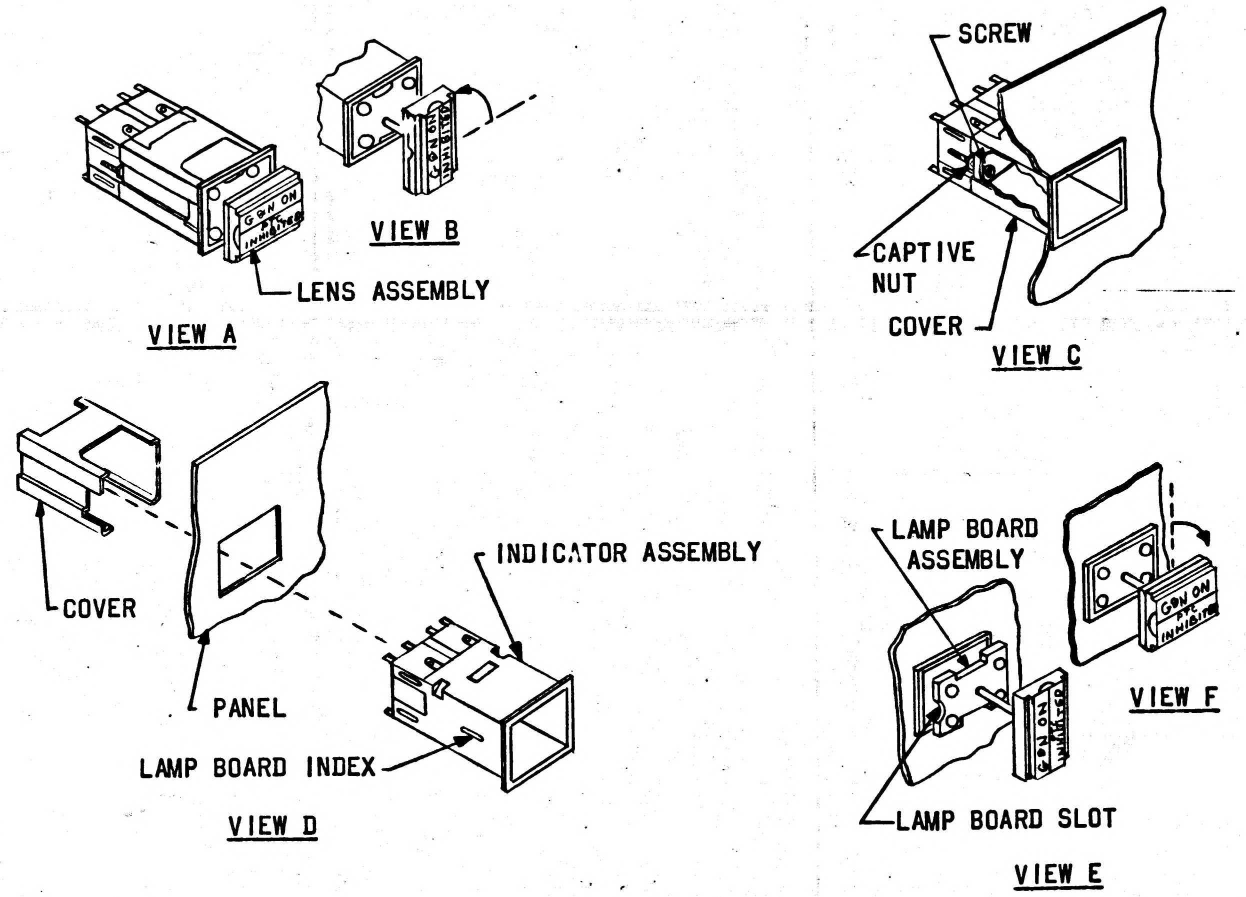
VIEW A
LENS ASSEMBLY
VIEW B
SCREW
CAPTIVE NUT
COVER
VIEW C
COVER
PANEL
INDICATOR ASSEMBLY
LAMP BOARD INDEX
VIEW D
LAMP BOARD ASSEMBLY
VIEW F
LAMP BOARD SLOT
VIEW E

Figure 4. INSTALLATION OF LIGHT-INDICATOR ASSEMBLY

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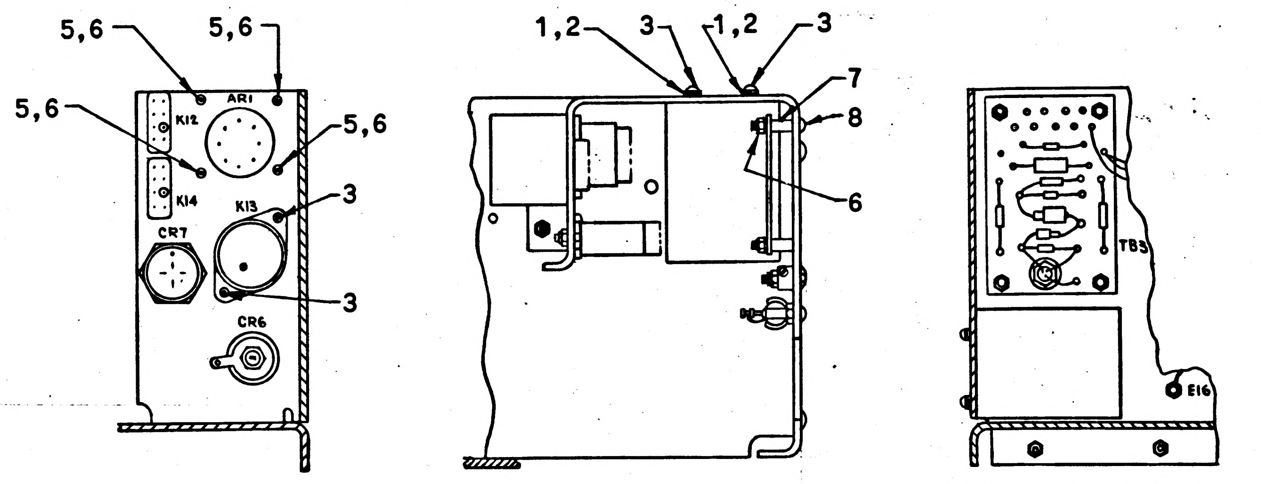
5,6
5,6
5,6
5,6
AR1
K12
K14
K13
3
CR7
3
CR6
1,2
3
1,2
3
7
8
6
TB5
E16

PARTIAL SECTION A-A

PARTIAL SECTION B-B

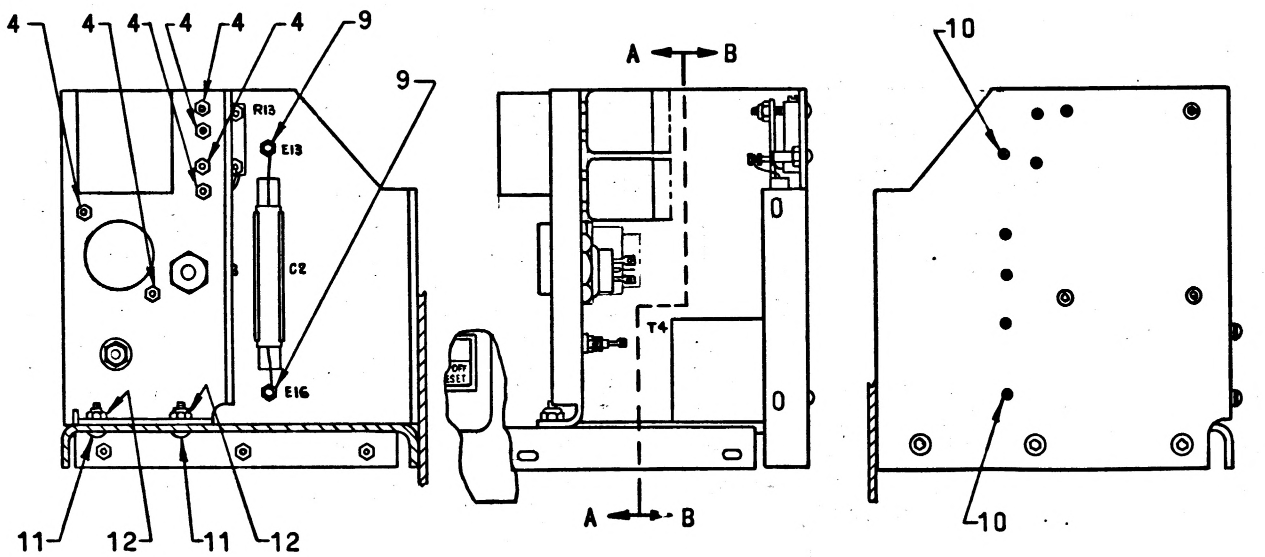
4
4
4
4
4
9
9
R13
E13
C2
E16
11
12
11
12
A
B
T4
A
B
10
10

Figure 5. NEW BRACKET AND ATTACHED PARTS

LEGEND

1. LOCK WASHER, P/N MS35338-79
2. FLAT WASHER, P/N AN960C6L
3. BUTTON HD SCREW, P/N 1006783-22
4. SELF LOCKING NUT, P/N 1012525-004
5. BUTTON HD SCREW, P/N 1006783-19
6. LOCKWASHER, P/N MS35338-78
7. SPACER, P/N 1015860-001
8. BUTTON HD SCREW, P/N 1006783-24
9. TERMINAL STUD, P/N 1010676-1
10. BUTTON HD SCREW, P/N 1010618-13
11. MACHINE SCREW, P/N 1006783-45
12. SELF LOCKING NUTS, P/N AN363C1032

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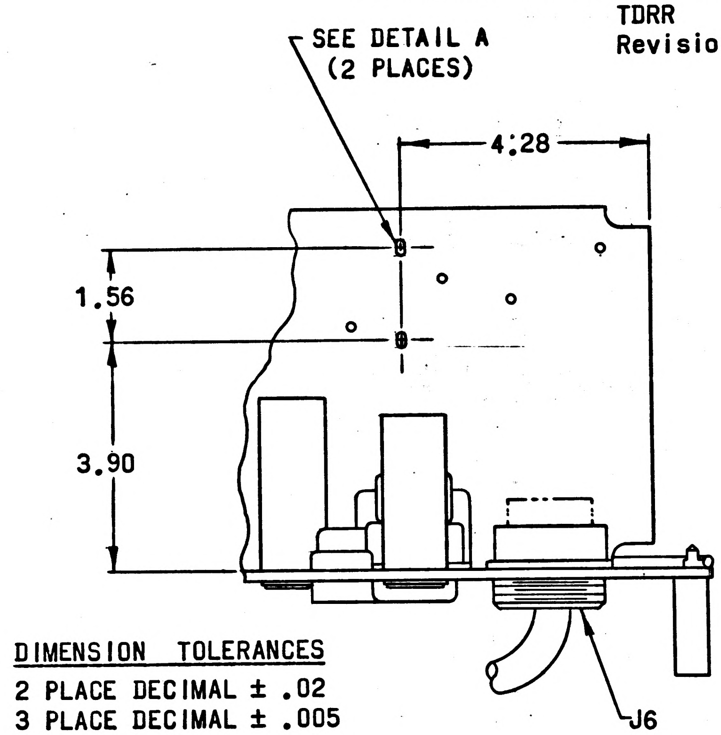
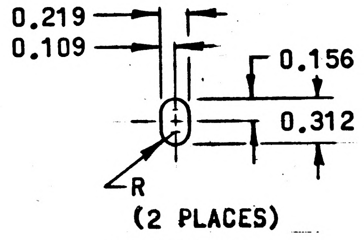

SEE DETAIL A
(2 PLACES)
4.28
1.56
3.90
J6

DIMENSION TOLERANCES
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005


0.219
0.109
0.156
0.312
R
(2 PLACES)

DETAIL A

Figure 6. NEW HOLES IN CHASSIS (TOP VIEW)

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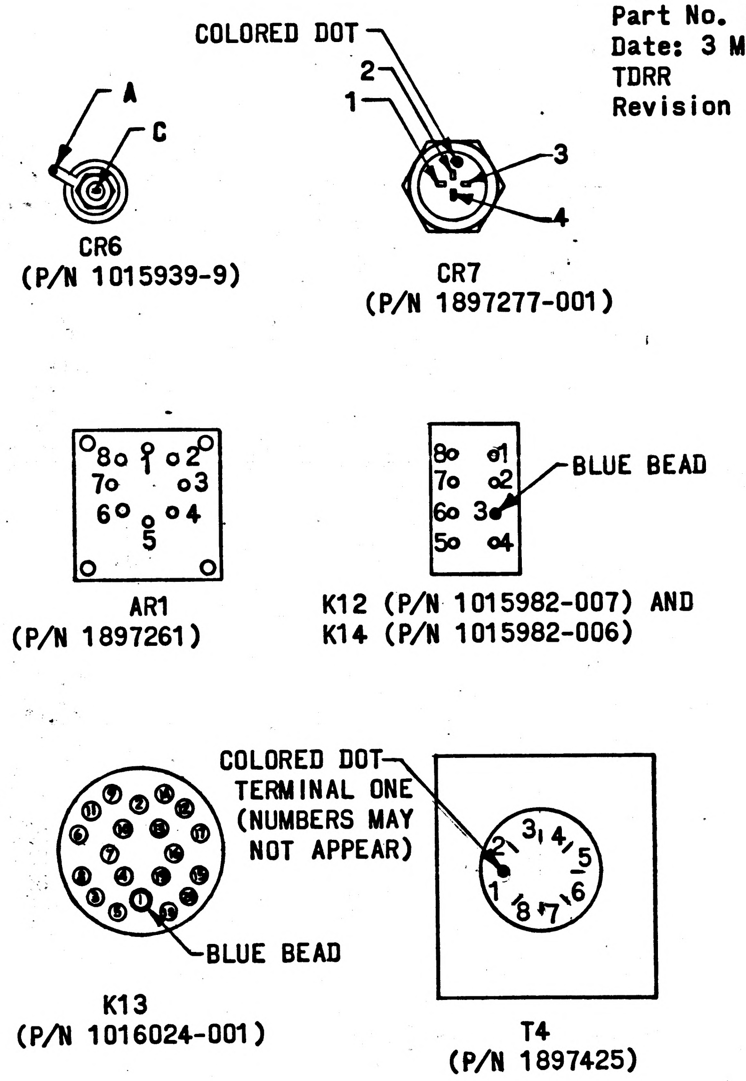
A
C
CR6
(P/N 1015939-9)
COLORED DOT
2
1
3
4
CR7
(P/N 1897277-001)
8 1 2
7 3
6 5 4
AR1
(P/N 1897261)
8 1
7 2
6 3
5 4
BLUE BEAD
K12 (P/N 1015982-007) AND
K14 (P/N 1015982-006)
COLORED DOT-
TERMINAL ONE
(NUMBERS MAY
NOT APPEAR)
BLUE BEAD
K13
(P/N 1016024-001)
1 2 3 4 5 6 7 8
T4
(P/N 1897425)

Figure 7. TERMINATION IDENTIFICATIONS

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DIMENSION TOLERANCES
(UNLESS OTHERWISE SPECIFIED)
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005

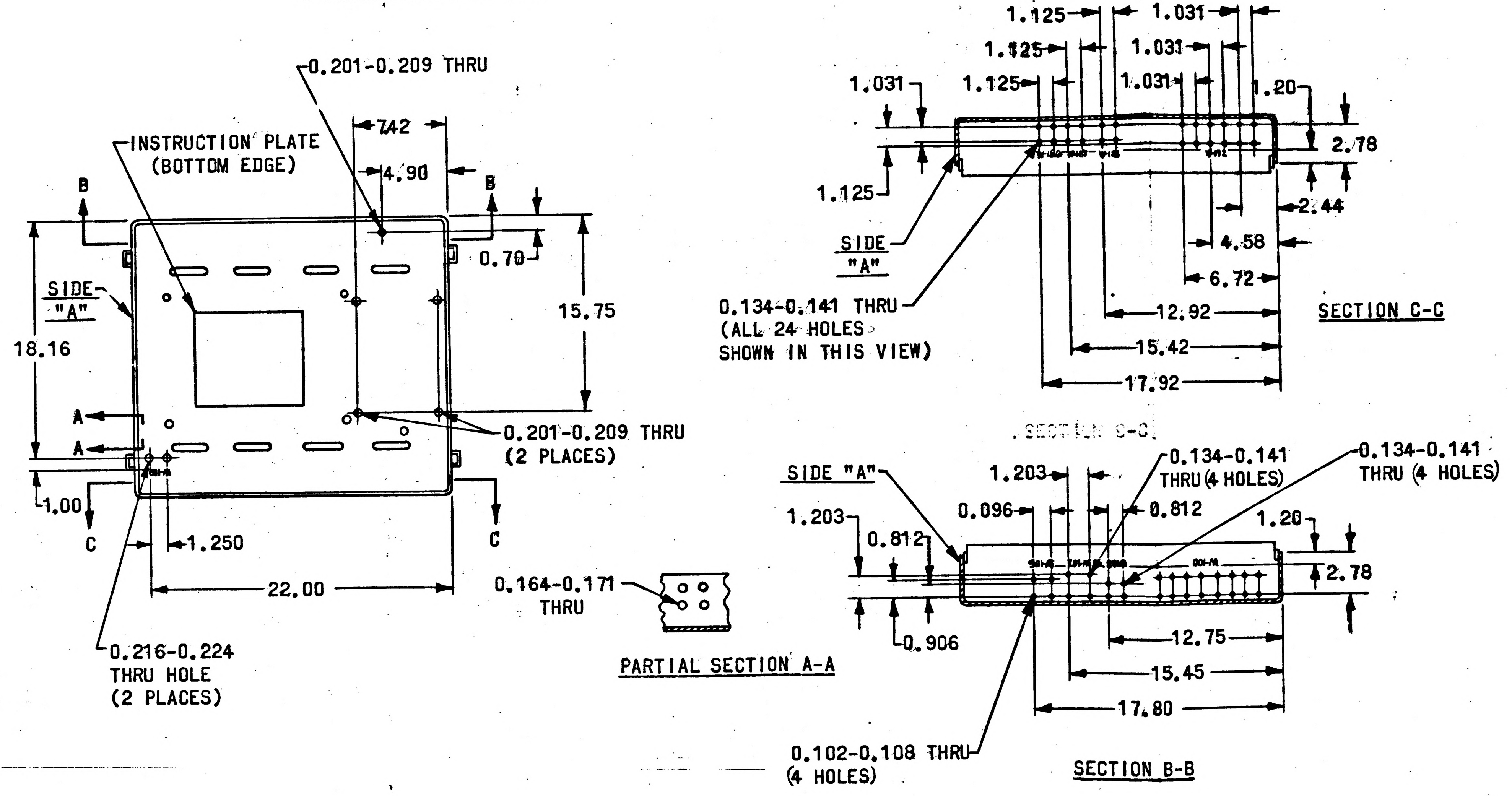
0.201-0.209 THRU
INSTRUCTION PLATE (BOTTOM EDGE)
7.42
4.90
B
B
0.70
15.75
SIDE "A"
18.16
A
A
1.00
C
C
1.250
22.00
0.201-0.209 THRU (2 PLACES)
0.216-0.224 THRU HOLE (2 PLACES)
0.164-0.171 THRU
PARTIAL SECTION A-A
1.125
1.031
1.125
1.031
1.125
1.031
1.031
1.20
2.78
1.125
1.125
2.44
4.58
6.72
SIDE "A"
0.134-0.141 THRU (ALL 24 HOLES SHOWN IN THIS VIEW)
12.92
15.42
17.92
SECTION C-C
SIDE "A"
1.203
0.134-0.141 THRU (4 HOLES)
0.134-0.141 THRU (4 HOLES)
1.203
0.096
0.812
0.812
1.20
2.78
0.906
12.75
15.45
17.80
0.102-0.108 THRU (4 HOLES)
SECTION B-B

Figure 8. BATTERY POWER PACK COVER

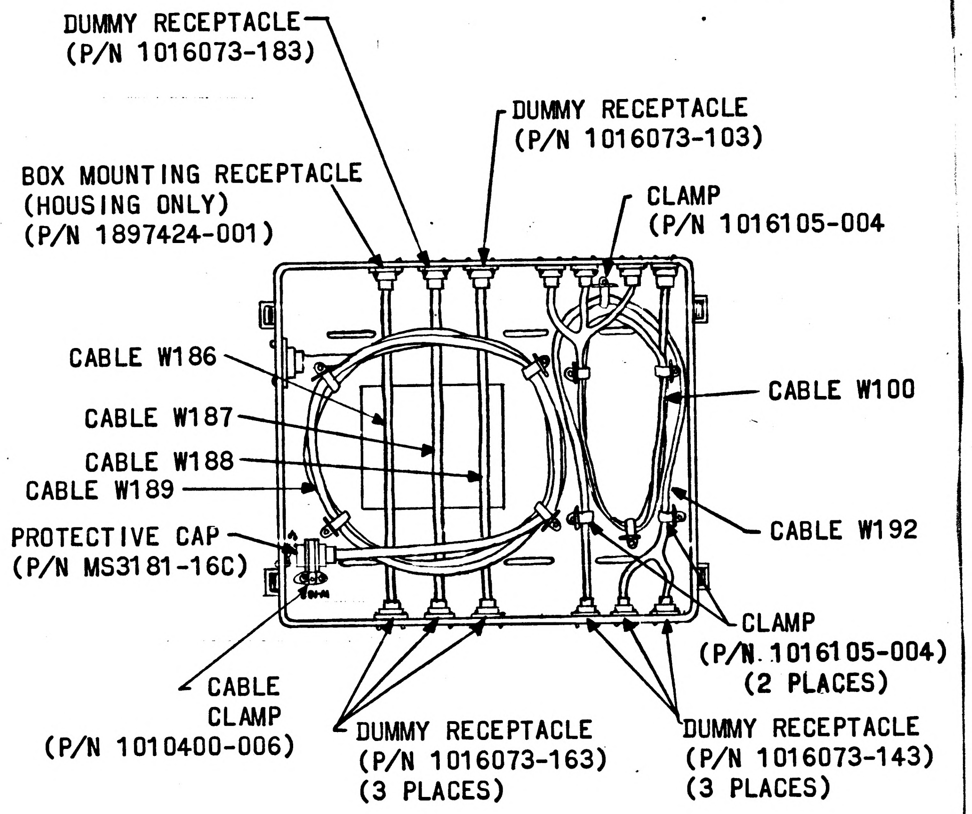
DUMMY RECEPTACLE (P/N 1016073-183)
DUMMY RECEPTACLE (P/N 1016073-103)
BOX MOUNTING RECEPTACLE (HOUSING ONLY) (P/N 1897424-001)
CLAMP (P/N 1016105-004
CABLE W186
CABLE W187
CABLE W188
CABLE W189
CABLE W100
PROTECTIVE CAP (P/N MS3181-16C)
CABLE W192
CLAMP (P/N 1016105-004) (2 PLACES)
CABLE CLAMP (P/N 1010400-006)
DUMMY RECEPTACLE (P/N 1016073-163) (3 PLACES)
DUMMY RECEPTACLE (P/N 1016073-143) (3 PLACES)

Figure 9. MODIFIED COVER WITH CABLES IN STOWED POSITIONS

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.
2. Make necessary entry in the Equipment Inventory Record.
3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

B. The significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041
Battery Power Pack Panel Assembly	1902249-021	1902630-011
Front Panel	1902179	1902629
Chassis	1902135	1902631
Wiring Harness A	1902539	1902620

VIII. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Wire List AA	1902190	1902622
Battery Power Pack Cover	1902541	1902632
*Cable Interconnect W101 (BPP to IMU)	1900954	2901446

*Cable name changes to "Cable Interconnect W189 (BPP to IMU)" upon completion of modification.

IX. DISPOSITION OF PARTS REMOVED

A. One connector-plug, P/N MS3126F18-32SX, (1897092-322) and two fuses, P/N F02A32V15AS, (1897099-117) shall be returned to stock as spares per AC Electronics, Logistics (Department 38-09) direction.

B. One resistor, P/N RE75G2490, (1896892-327) shall be transferred to full custody of the government via DD543 form (Inventory Schedule).

C. Scrap all parts not listed above, via AC Electronics form MIL-127 or equivalent.

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Revision B

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR BATTERY POWER PACK ASSEMBLY, P/N 1900011-031

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

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Part No. 0102092
Date: 3 MAY 66
TDRR
Revision A

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Battery Power Pack Assembly, P/N 1900011-031. This modification will add the capability of using this assembly with Block II/LEM units, in conjunction with PTC P/N 1900496 as well as PTC P/N 2900060.

II. AUTHORITY

This retrofit is authorized by Block II/LEM contract NAS9-497 (CCA 497-0169).

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041

IV. PRIORITY CHANGES

Not applicable.

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V. RELATED CHANGES

RIB 0102110 and RIB 0102111.

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102205, consisting of the following items is required to modify a Battery Power Pack Assembly, P/N 1900011-031.

Qty	Part Number	Description
1	0102092	Retrofit Instruction Bulletin
1	1016024-001	Relay, armature
1	1015982-006	Relay, armature
1	1897277-001	Rectifier bridge
1	1897261	Comparator
1	1897337-101	Light indicator assembly
1	1015982-007	Relay, armature
2	F02B32V15AS	Fuse (1897099-133)
1	1004260-510	Nameplate
1	1902621	Lead set
1	1897425	Transformer
1	CL25BJ151UP3	Capacitor (1897081-320)
2	1006783-45	Screw, button head
1	2901438	Component board assembly
4	1015860-001	Spacer
10	1012525-004	Nut
4	1006783-24	Screw, button head
4	AN960C6L	Washer, flat (1897006-036)

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VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
4	MS35338-79	Washer, lock
6	1006783-22	Screw, button head
2	1010676-1	Terminal, stud, insulated
2	1010618-13	Screw, button head, self locking
7	AN363C1032	Nut, self locking (1016151-010)
4	1016006-002	Splice reducer
2	1016006-003	Splice reducer
4	1010490-258	Sleeving, electrical insulation
2	1010490-256	Sleeving, electrical insulation
1	1015818-616	Contact, socket
27	1015864-135	Sleeving, electrical insulation
25	1015864-137	Sleeving, electrical insulation
11	1015864-139	Sleeving, electrical insulation
9	1015864-138	Sleeving, electrical insulation
2	1016281-181	Contact, socket
1	2901441	Bracket assembly (inseparable)
1	2901442	Plate, instruction
1	1902626	Decal, functional area
1	1010490-200	Sleeving, electrical insulation
1	1016006-001	Splice reducer
1	2901443	Cable W186
1	2901444	Cable W187
1	2901445	Cable W188
1	2901447	Cable W192
32	1006783-19	Screw, button head
4	MS35338-78	Washer, lock
1	1897422-004	Connector, electrical
1	2901199	Sleeve, identification

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	2901475	Sleeve, identification
9	1897370-001	Plug, end seal
1	1016282-16	Grommet, connector strain relief
3	1016073-143	Dummy receptacle
3	1016073-163	Dummy receptacle
1	1016073-103	Dummy receptacle
1	1897424-001	Box mounting receptacle (housing only)
1	1010400-006	Cable clamp
1	MS3181-16C	Cap, protective
1	2901533	Guard, switch
2	MS35200-15	Screw, flat head
3	1016105-004	Clamp
28	1016151-004	Nut, self locking
5	1006783-44	Screw, machine
4	1016151-002	Nut, self locking
1	1006783-23	Screw, machine
1	1006151-006	Nut, self locking
4	1006783-12	Screw, machine

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
1	*ACSP 63L12A	Inductor, 3.33 (±3%) henries 300 ma ac-dc, 1 ohm max.
1	*Dale, type RH25 (Allied Catalog No.660, stock no. 26Z360C)	Resistor, 600 (±1%) ohm, 25 watt

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Dale, type RH10 (Allied Catalog no. 660, stock no. 26Z352C)	Resistor, 175 (±1%) ohm, 10 watt
AR	N/A	Primer (MIL-P-8585)
AR	N/A	Paint, semi-gloss enamel, light gray (FED-STD-595 color 26440) (TT-E-529, class B)
AR	N/A	Varnish (MIL-V-6894A, unreduced)
1	*Schwaab Stamp & Seal Co., type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
AR	N/A	Lacquer thinner (MS35626)
AR	N/A	Clear lacquer (MIL-L-73A)
AR	N/A	Black marking ink
AR	N/A	Solder (QQ-S-571, SN60WRAP)
1	*Master Appliance, G7673A	Heat gun (300°F)
1	Buchanan MS3191-A	Crimping tool
1	Bendix 11-7758	Positioner
1	Bendix 11-8107-16	Insertion tool
1	Bendix 11-7880-16	Extraction tool
1	Burndy Y10MRF-4	Crimping tool
AR	N/A	Lacing & tying tape (MIL-T-713C, black, type P, class 2)

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/8 inch alpha-numerical
AR	N/A	Sealing & retaining compound (MIL-S-22473, grade H & HV)
1	Buchanan MS3191-20	Positioner
AR	MIL-I-631	Filler tape, type F, form T, (black) grade A, class I, 0.62 inch wide, 0.020 inch thick
1	Any hi-speed	7/32 size twist drill
1	Any hi-speed	Number 5 twist drill
1	Any hi-speed	Number 29 twist drill
1	Any hi-speed	Number 37 twist drill
1	Any hi-speed	Number 36 twist drill
1	Any hi-speed	1/8 size twist drill
1	*Cleveland Twist Drill Co.	80° countersink
1	*General Radio Co, model W5MT3	Auto-transformer (Variac)
AR	N/A	Methy-Ethyl-Ketone (TT-M-261)
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z795C)	Resistor, 10 ohm (±5%), 100 watt
1	*Ohmite (Allied Catalog no. 660 Stock no. 25Z783C)	Resistor, 5 ohm (±5%), 50 watt
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z776C)	Resistor, 2 ohm (±5%), 25 watt

*or equivalent

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

3. Where marking is specified, hand marking is acceptable.

4. Use heatsink device when unsoldering or soldering near semi-conductors.

5. Ink markings:

   a. Markings to be removed should be removed using lacquer thinner.

   b. New markings shall be covered with a coat of clear flat lacquer after ink has dried.

6. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties will be added after all conductor rework has been completed.

VII. A. PROCEDURE (CONTINUED)

7. Delete conductors from wiring harness, when instructed, by one of the two following methods:

   a. Method One. (preferred)

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Pull conductor out of harness at most convenient point and discard.

   b. Method Two.

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Apply a drop of blue glyptal to severed ends of conductor.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove cover, P/N 1902541, from battery power pack assembly and modify as directed in paragraph C of Section VII in this RIB.

2. Open access door, P/N 1900471, on battery power pack assembly and disconnect P3 and P4 from their respective mating connectors.

3. Remove battery power pack panel assembly, P/N 1902249-021, from battery power pack assembly and set on work bench.

4. Remove two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel, P/N 1902179, to (right side) chassis support, P/N 1900475. Retain screws and nuts.

5. Remove six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel to chassis. Retain screws and nuts.

6. Remove three machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure meter bracket, P/N 1900480, to chassis. Retain screws and nuts.

VII. B. PROCEDURE (CONTINUED)

NOTE: Maneuver front panel away from chassis as required to perform following steps. Care must be taken, however, not to put undue strain on wiring and wiring connections.

CAUTION: When cutting holes in front panel and chassis during this modification, take the following necessary measures to;

1. Insure metal chips, filing and etc are not allowed to fall into or on wiring, switches and other components.

2. Insure wiring is pushed aside as necessary to prevent drilling into them.

7. Cut three new holes in front panel, P/N 1902179, as shown in figure 1. Use 1/8 size twist drill to drill two holes near ICTC POWER switch. These two holes shall be countersunk as indicated in figure 1.

8. Touch up bare metal surfaces in new holes with MIL-P-8585 primer and TT-E 529, class B, semi-gloss enamel, light gray (color 26440 of FED-STD-595) paint.

9. Obtain decal, P/N 1902626, from kit and install on front panel as shown in figure 2. Apply a bead of varnish (MIL-V-6894A unreduced), overlapping all edges 1/4 inch minimum on decal.

VII. B. PROCEDURE (CONTINUED)

10. Obtain switch guard, P/N 2901533, from kit and secure to front panel over ICTC POWER switch with two kit supplied flat head screws, P/N MS35200-15. Apply sealing and retaining compound MIL-S-22473, grade HV to threads of screws before installing.

11. Mark "DS10" on backside of front panel in location shown in figure 3. New marking should be 0.125 inch high, color black per ND 1002019.

12. Remove identification number "1902179" stamped on back side of front panel and replace with new identification number "1902629". New identification shall be in accordance with MIL-STD-130 (ES267).

13. Obtain light-indicator assembly, P/N 1897337-101, from kit and mount on front panel as indicated in the following steps while referencing figure 4.

    a. Using fingernail slots on sides, pull lens assembly out approximately 5/8 inch. (Reference figure 4, view A.)

    b. Rotate lens assembly 90 degrees. (Reference figure 4, view B.)

    c. Push lens in to release tension on index keys and then pull complete assembly out and set aside.

VII. B. PROCEDURE (CONTINUED)

d. Unscrew two screws until captive nuts reach the rear of their travel range and remove cover. (One screw and captive nut is shown in figure 4, view C.)

e. Insert indicator assembly through panel cutout from the front of panel. (Reference figure 4, view D.)

f. From rear of panel, slip cover over indicator assembly until it fits snugly against rear of panel. (Reference figure 4, view D.)

g. Tighten two screws (with attached captive nuts) to draw cover up firmly to rear of panel. (Reference figure 4, view C.)

h. Insert lens and lamp assembly (see figure 4, view E) into indicator assembly so lamp board slot is aligned with lamp board index.

i. Rotate lens assembly 90 degrees (see figure 4, view F) and push assembly into indicator assembly.

14. Remove two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure (right side) chassis support, P/N 1900475, to chassis. Retain screws and nuts for later use. Remove (right side) chassis support, P/N 1900475, and dispose of as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

14A. Remove leads A26 and A172 connected to resistor R1.

14B. Remove resistor R1 from chassis. Dispose of resistor and securing screws and nuts as directed in Section IX of this RIB.

14C. Remove marking for R1 (R1 and terminal designations 1 and 2) stamped on chassis, using lacquer thinner.

CAUTION: When performing the following steps, use care to insure CR6, R13 and leads attached to R13 are not damaged. These parts will be removed and installed on a new bracket.

14D. Remove leads A23, A29, A167, and A169 from E9. (E9 is located on electronics components assembly, P/N 1902193.)

14E. Remove lead A166 from E10.

15. Remove lead A171 from E11.

16. Unsolder lead A170 from CR6-C.

17. Remove electronics components assembly, P/N 1902193, from chassis by removing two securing machine screws and self locking nuts. Dispose of removed screws and self locking nuts as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

18. Unsolder (do not cut) green and red leads connected to E10.

19. Unsolder (do not cut) yellow lead connected to CR6-A.

20. Remove resistor R13 from electronics components assembly, P/N 1902193. Retain mounting hardware.

21. Obtain bracket, P/N 2901441, from kit and mount R13 (removed in step 20) on bracket as shown in figure 5. Use original mounting hardware to secure R13 to bracket.

22. Remove diode CR6 from electronics components assembly, P/N 1902193.

23. Utilize original mounting hardware to secure CR6 on new bracket as shown in figure 5.

24. Dispose of electronics components assembly, P/N 1902193, (less R13 and CR6) as directed in Section IX of this RIB.

25. Locate, mark and cut two new holes in chassis as shown in figure 6. Use new bracket, P/N 2901441, as a template for locating two new holes. Do not use bracket for a template when drilling, however. Use 7/32 size twist drill for drilling operation.

VII. B. PROCEDURE (CONTINUED)

26. Touch up bare metal surfaces in two hew holes in chassis with MIL-P-8585 primer.

27. Remove identification number "1902135" and associated revision marking and replace with new identification number "1902631". New marking shall be in accordance with MIL-STD-130.

28. Remove leads listed in table 1 from wiring harness A.

Table 1. Wiring Harness A Lead Deletions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Remarks
A23	CR2-C	E9	Previously removed from E9
A26	K6-6	R1-1	Previously removed from R1
A29	CR1-C	E9	Previously removed from E9
A122	T3-3	XDS3-A	
A137	XDS3-B	XDS5-A	
A138	XDS4-B	XDS5-B	
A166	K6-5	E10	Previously removed from E10
A167	J4-L	E9	Cut off at J4-L, E9 end previously removed
A169	K5-1	E9	Previously removed from E9
A170	XF5-1	CR6-C	Previously removed from CR6
A171	K6-2	E11	Previously removed from E11
A172	TB1-11	R1-2	Previously removed from R1

VII. B. PROCEDURE (CONTINUED)

29. Obtain transformer (T4), P/N 1897425, from kit and secure to new bracket, P/N 2901441, as shown in figure 5, with four kit supplied button head screws, P/N 1006783-22, lock washers, P/N MS35338-79, and flat washers, P/N AN960C6L.

30. Obtain relay (K13), P/N 1016024-001, from kit and secure to new bracket as shown in figure 5, with two kit supplied button head screws, P/N 1006783 -22, and self locking nuts, P/N 1012525-004.

31. Obtain comparator (AR1), P/N 1897261, from kit and secure to new bracket as shown in figure 5, with four kit supplied button head screws, P/N 1006783 -19, and lock washers, P/N MS35338-78.

32. Obtain rectifier bridge (CR7), P/N 1897277-001, from kit and secure to new bracket as shown in figure 5.

33. Obtain relay(K14), P/N 1015982-006, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525 -004.

34. Obtain relay (K12), P/N 1015982-007, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525 -004.

VII. B. PROCEDURE (CONTINUED)

35. Obtain component board assembly (TB3), P/N 2901438, from kit and secure to new bracket as shown in figure 5, with four kit supplied spacers, P/N 1015860-001, self locking nuts, P/N 1012525-004, and button head screws, P/N 1006783-24.

36. Obtain one terminal stud (E15), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screw, P/N 1010618-13.

37. Obtain one terminal stud (E16), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screws, P/N 1010618-13.

38. Obtain capacitor (C2), P/N CL25BJ151UP3, from kit and insert in retaining clip as shown in figure 5, such that positive end is nearest E15.

39. Temporarily connect (mechanically) positive lead of C2 to E15 and negative lead to E16.

40. Temporarily connect (mechanically) the free end of yellow lead attached to R13, to TB3-9. Lead should be cut to required length, have insulation stripped 0.30 inch and tinned prior to connecting.

VII. B. PROCEDURE (CONTINUED)

41. Temporarily connect (mechanically) the free end of red lead and green lead attached to R13, to TB3-13. Leads should be cut to required length, have insulation stripped 0.30 inch and tinned prior to installing.

42. Install new wire list AA leads furnished in kit lead set, as indicated in table 2. Accessory items listed in table 2 are also furnished in kit. (Reference figure 7 for terminal identifications.)

Table 2. Wire List AA Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA35	K12-1	K13-1	0.30 0.30	Yes Yes	1015864-137	See note 1
AA36	K12-5	K13-2	0.30 0.30	Yes Yes	1015864-137	See note 2
AA37	XDS10-C	XDS10-A	0.30 0.30	Yes Yes	1015864-139 1015864-139	See note 3
AA38	T4-4	K14-5	0.30 0.30	Yes Yes	1015864-139 1015864-137	
AA40	K14-4	T4-7	0.30 0.30	Yes Yes	1015864-137 1015864-139	
AA41	CR7-1	K13-4	0.30 0.30	Yes Yes	1015864-137 1015864-135	See note 4
AA42	CR7-2	E15	0.30 0.30	Yes Yes	1015864-137	

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA43	CR7-4	E16	0.30 0.30	Yes Yes	1015864-137	
AA44	E15	TB3-24	0.30 0.30	Yes Yes		
AA45	E16	TB3-21	0.30 0.30	Yes Yes		See note 5
AA46	K12-3	TB3-20	0.30 0.30	Yes Yes	1015864-137	See note 6
AA47	K12-7	TB3-19	0.30 0.30	Yes Yes	1015864-137	
AA48	AR1-1	TB3-16	0.30 0.30	Yes Yes		
AA49	AR1-4	TB3-10	0.30 0.30	Yes Yes		
AA50	AR1-3	TB3-26	0.30 0.30	Yes Yes		See note 6
AA51	AR1-8	TB3-17	0.30 0.30	Yes Yes		
AA52	AR1-2	TB3-18	0.30 0.30	Yes Yes		
AA53	AR1-6	TB3-25	0.30 0.30	Yes Yes		
AA54	AR1-7	TB3-21	0.30 0.30	Yes Yes		Combine with AA45

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA55	CR6-A		0.30	Yes	1015864-137	
		TB3-9	0.30	Yes		
AA56	TB3-20		0.30	Yes		Combine with AA46
		TB3-26	0.30	Yes		Combine with AA50

Note 1 - Do not solder as another lead (A51) will be connected later.
Note 2 - Do not solder as another lead (A50) will be connected later.
Note 3 - Do not solder as another lead (A182) will be connected later.
Note 4 - Do not solder as another lead (A183) will be connected later.
Note 5 - Do not solder as another lead (AA54) will be connected later.
Note 6 - Do not solder as another lead (AA56) will be connected later.

VII. B. PROCEDURE (CONTINUED)

43. Secure new bracket, P/N 2901441, to chassis with five machine screws, P/N 1006783-45, and self locking nuts, P/N AN363C1032, retained in steps 4 and 14.

44. Revise wiring harness A lead connections as listed in table 3.

Table 3. Revised Lead Terminations In Wiring Harness A

Lead Ident	Remove From	Reconnect To	Strip Insul	Tin	Accessory Item P/N
A35	K3-D2	*K3-C2	0.30	Yes	1015864-135
A50	T3-2	K13-2	0.30	Yes	1015864-135
A51	T3-1	K13-1	0.30	Yes	1015864-135
A66	J6-C	K13-19	0.30	Yes	1015864-135
A68	J6-A	K13-13	0.30	Yes	1015864-135
A69	J6-D	K13-10	0.30	Yes	1015864-135
A70	J6-a	K13-7	0.30	Yes	1015864-135
A144	K2-D2	**K3-D2	0.30	Yes	1015864-135

*Combine with lead A120 at this point.
**Another lead (A189) will be added to this point later.

VII. B. PROCEDURE (CONTINUED)

45. Remove leads A71, A153, and A160 from E5 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

46. Remove leads A72, A154, and A161 from E6 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

47. Remove leads A73, A155, and A162 from E7 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

48. Remove leads A74, A156, and A163 from E8 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

49. Remove leads A82, A151, and A158 from E3 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

50. Obtain new wiring harness A leads from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column in table 4 can be found at the rear of the table.)

Table 4. Wiring Harness A Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A177	K1-C2		0.30	Yes	1015864-135	
		S6SW2-NC	0.30	Yes		Combine with A110
A178	K1-C3		0.30	Yes	1015864-135	
		J2-K	0.20	No		See note 1
A179	J2-P		0.20	No	1016281-181	See note 3
		E17	0.30	No		See note 2
A180	XDS3-A		0.30	Yes	1015864-139	Combine with AA8
		T2-3	0.30	Yes	1015864-139	Combine with A46
A181	K9-4		0.30	Yes	1015864-135	Combine with A21
		XDS4-B	0.30	Yes	1015864-139	Combine with AA28
A182	K13-5		0.30	Yes	1015864-135	
		XDS10-C	0.30	Yes		Combine with AA37
A183	T3-3		0.30	Yes	1015864-135	Combine with A146
		K13-4	0.30	Yes		Combine with AA41
A184	T3-1		0.30	Yes	1015864-135	Combine with A78
		K12-6	0.30	Yes	1015864-137	
A185	T3-2		0.30	Yes	1015864-135	Combine with A54
		K12-2	0.30	Yes	1015864-137	
A186	K3-X2		0.30	Yes	1015864-135	Combine with A60
		K12-4	0.30	Yes	1015864-137	

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A187	J6-b		0.30	Yes	1015864-138	
		K14-3	0.30	Yes	1015864-137	
A188	K11-7		0.30	Yes	1015864-137	Combine with A77
		K14-7	0.30	Yes	1015864-137	
A189	K3-D2		0.30	Yes		Combine with A144
		XDS10-G	0.30	Yes	1015864-139	See note 4
A190	J6-a		0.30	Yes	1015864-138	
		K13-6	0.30	Yes	1015864-135	
A191	J6-D		0.30	Yes	1015864-138	
		K13-9	0.30	Yes	1015864-135	
A192	J6-A		0.30	Yes	1015864-138	
		K13-12	0.30	Yes	1015864-135	
A193	J6-C		0.30	Yes	1015864-138	
		K13-18	0.30	Yes	1015864-135	
A194	E18		0.30	No		See note 2
		J2-N	0.20	No	1016281-181	See note 2
A195	K1-B1		0.30	Yes	1015864-135	Combine with A164
		J2-T	0.20	No		See note 1
A196	J6-Z		0.30	Yes	1015864-138	
		K13-15	0.30	Yes	1015864-135	
A197	XDS5-B		0.30	Yes	1015864-139	Combine with AA17
		K13-3	0.30	Yes	1015864-135	
A198	J2-S		0.20	No		See note 1
		K13-16	0.30	Yes	1015864-135	

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A199	E12		0.30	No		See note 2
		T4-2	0.30	Yes	1015864-139	
A200	E13		0.30	No		See note 2
		K14-2	0.30	Yes	1015864-137	
A201	E14		0.30	No		See note 2
		T4-1	0.30	Yes	1015864-139	
A202	CR7-3		0.30	Yes	1015864-137	
		XDS10-G	0.30	Yes		Combine with A189
A203	K6-6		0.30	Yes	1015864-135	Combine with A27
		TB3-14	0.30	Yes		
A204	TB1-11		0.30	Yes		See note 5
		TB3-15	0.30	Yes		
A205	K6-2		0.30	Yes	1015864-137	Combine with A37
		TB3-3	0.30	Yes		
A206	XF5-1		0.30	Yes	1015864-135	Combine with A10
		CR6-C	0.30	Yes	1015864-137	
A207	CR1-C		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A208	CR2-C		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A209	J4-L		0.20	No	1015818-616	See note 3
		E20	0.30	Yes		See note 2
A210	K6-5		0.30	Yes	1015864-137	
		TB3-13	0.30	Yes		

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A211	K5-1		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A212	J6-G		0.30	Yes	1015864-138	
		TB3-11	0.30	Yes		
A213	J6-H		0.30	Yes	1015864-138	
		TB3-22	0.30	Yes		
A214	E18		0.30	No		See note 2
		K9-1	0.30	Yes	1015864-137	See note 6
A215	E19		0.30	No		See note 2
		J6-c	0.30	Yes	1015864-138	

Note 1 - Utilize blank contact in connector to make connection at this point.
Note 2 - Connection to this point will be accomplished later.
Note 3 - Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-16 positioner, extraction tool Bendix 11-7880-16, and insertion tool Bendix 11-8107-16 as required.
Note 4 - Do not solder as another lead (A202) will be connected later.

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Note 5 - Combine with leads A36, A111, and A168 at this point.
Note 6 - Remove lead A142 from K9-1 before connecting lead A214. Lead A142 will be reconnected to a new point later.

51. Obtain four electrical insulation sleeves, P/N 1010490-258, two electrical insulation sleeves, P/N 1010490-256, and one electrical insulation sleeve, P/N 1010490-200, and mark with the designation indicated in table 5. (Mark by hand with black ink.)

Table 5. Marking for Sleeves

Qty	Part Number	Identification Mark
1	1010490-258	E12
1	1010490-258	E13
1	1010490-258	E14
1	1010490-256	E17
1	1010490-258	E18
1	1010490-200	E19
1	1010490-256	E20

VII. B. PROCEDURE (CONTINUED)

52. Route loose ends of leads A142, A194, and A214 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

 a. Eliminate excessive length and strip insulation 0.30 inch on three leads. (A214 will be crimped in small end of splice reducer.)

 b. Insert leads A142 and A194 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 c. Obtain sleeve marked E18 (reference step 51) and slide over loose end of lead A214.

 d. Insert lead A214 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 e. Slide sleeve marked E18 over crimped splice reducer and heat shrink in place.

53. Route loose ends of leads A82, A151, A158, and A179 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

 a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A82 and A179 will be crimped in small end of splice reducer.)

 b. Insert leads A151 and A158 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 c. Obtain sleeve marked E17 (reference step 51) and slide over loose end of leads A82 and A179.

 d. Insert leads A82 and A179 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 e. Slide sleeve marked E17 over crimped splice reducer and heat shrink in place.

54. Route loose ends of leads A72, A74, and A201 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1006006-002, as follows:

 a. Eliminate excessive length and strip insulation 0.30 inch on three leads.

 b. Insert leads A72, A74, and A201 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

VII. B. PROCEDURE (CONTINUED)

 c. Obtain sleeve marked E14 (reference step 51) and slide over splice reducer and heat shrink in place.

55. Route loose ends of leads A154, A156, A161, A163, and A200 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

 a. Eliminate excessive length and strip insulation 0.30 inch on five leads. (A200 will be crimped in small end of splice reducer.)

 b. Insert leads A154, A156, A161, and A163 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 c. Obtain sleeve marked E13 (reference step 51) and slide over loose end of lead A200.

 d. Insert lead A200 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 e. Slide sleeve marked E13 over crimped splice reducer and heat shrink in place.

VII. B. PROCEDURE (CONTINUED)

56. Route loose ends of leads A71, A73, A153, A155, A160, A162, and A199 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer P/N 1016006-002, as follows:

 a. Eliminate excessive length and strip insulation 0.30 inch on seven leads. (A199, A71, and A73 will be crimped in small end of splice reducer.)

 b. Insert leads A153, A155, A160, and A162 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 c. Obtain sleeve marked E12 (reference step 51) and slide over loose end of leads A199, A71, and A73.

 d. Insert leads A199, A71, and A73 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

 e. Slide sleeve marked E12 over crimped splice reducer and heat shrink in place.

57. Remove leads A143, A150, and A157 from E2 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

58. Route loose end of lead A215 to former E2 location on wiring harness A. Join leads A143, A150, A157, and A215 in kit supplied splice reducer, P/N 1016006-001, as follows:

    a. Eliminate excessive length from lead A215. (A215 will be crimped in large end of splice reducer.)

    b. Strip insulation on all four leads 0.30 inch.

    c. Insert A150, A157, and A215 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    d. Obtain sleeve marked E19 (reference step 51) and slide over loose end of lead A143.

    e. Insert lead A143 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    f. Slide sleeve marked E19 over crimped splice reducer and heat shrink in place.

59. Route loose ends of leads A207, A208, A209, and A211 to common meeting place on wiring harness A. Join these leads in kit supplied reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

    a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A209 will be crimped in small end of splice reducer.)

    b. Insert leads A207, A208, and A211 in large end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E20 (reference step 51) and slide over loose end of lead A209.

    d. Insert lead A209 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E20 over crimped splice reducer and heat shrink in place.

60. Spot tie wiring harness A as required in accordance with ND 1002032,using black lacing tape.

61. Remove wiring harness A identification tag (marked "1902539") from harness. Dispose of identification tag as directed in Section IX of this RIB.

62. Obtain identification band, P/N 1016128-021, from kit lead set. If band has not been marked with "1902620" identification number, mark it with this identification at this time.

VII. B. PROCEDURE (CONTINUED)

63. Secure new identification band to wiring harness A in same location occupied by old identification tag removed in step 61. Use black lacing tape to secure it in place.

64. Remove identification "ASSY 1902249-021" and replace it with "ASSY 1902630-011". Marking shall be in accordance with MIL-STD-130 (ES267).

65. Secure front panel to chassis with six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, removed and retained in step 5.

66. Secure front panel to new bracket, P/N 2901441, with two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, supplied in kit.

67. Secure meter bracket, P/N 1900480, to chassis with three machine screws, P/N 1006783, and self locking nut, P/N AN363C1032, removed and retained in step 6.

68. Remove SPARE 15 AMP and BATTERY 15 AMP fuses and replace with two kit supplied fuses, P/N F02B32V15AS.

69. Perform continuity - resistance checks listed in table 6.

VII. B. PROCEDURE (CONTINUED)

Table 6. Continuity - Resistance Checks

FROM	TO	Indication (ohms)	Conditions
J2-K	J6-d	Less than 1	None
J2-K	J6-d	More than 100K	Press S6 (EMERGENCY HEATER POWER PRESS TO TURN OFF)
J2-C	J6-C	More than 100K	None
J2-E	J6-D	More than 100K	None
J2-F	J6-A	More than 100K	None
J2-G	J6-a	More than 100K	None
J2-S	J6-Z	More than 100K	None
J2-R	J2-M	More than 100K	None
J2-U	J2-M	More than 100K	None
J6-G	J6-H	More than 100K	None
J2-A	J2-H	Less than 1	None
J2-B	J2-J	Less than 1	None
J2-H	J6-L	Less than 1	None
J2-P	J6-N	Less than 1	None
J6-L	J6-V	Less than 1	None
J6-W	J6-K	Less than 1	None
J6-c	J6-T	Less than 1	None

70. Recalibrate potentiometer R13 as follows:

    a. Install jumper lead between TB3-3 and TB3-13.

VII. B. PROCEDURE (CONTINUED)

b. Turn R13 to clockwise limit.

c. Connect ohmmeter to pins L and N on connector J4. (Open indicates K5 is de-energized while short indicates K5 is energized.)

d. Apply 38 (±0.2) volts dc (hi) to J3-A and (lo) to J3-J.

e. Turn R13 counterclockwise to point where relay K5 energizes.

f. Decrease applied voltage to 33.5 (±0.5) volts dc.

g. Remove voltage applied to J3. Relay K5 shall de-energize.

h. Reapply 33.5 (±0.5) volts dc to same points on J3. Relay K5 shall not re-energize.

i. Slowly increase voltage at J3. Relay K5 shall energize at 38.0 (±0.2) volts dc. If relay K5 does not energize within 38.0 (±0.2) volt dc range, readjust R13 as necessary and repeat steps f through i until proper R13 setting is obtained. (Turning R13 clockwise increases voltage set point. One turn will result in approximate change of 0.25 volt.)

VII. B. PROCEDURE (CONTINUED)

j. Remove voltage applied to J3.

k. Remove ohmmeter from J4.

l. Remove jumper lead between TB3-3 and TB3-13.

71. Install jumper lead between J2-L and J2-M.

72. Connect panel power cable to 115 volt ac source.

73. Set ICTC POWER switch to ON. 115V LINE POWER and PTC OPERATING indicators shall light. (Inhibit alarm if necessary.)

74. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

75. Continuity shall exist between points listed in table 7.

Table 7. Closed Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

76. Apply 25.0 (±0.2) volts dc (hi) to J6-G and (lo) to J6-H.

77. Check to insure the following conditions exist:

a. PTC OPERATING and PTC OFF ALARM RESET indicators shall not be lighted.

b. G&N ON/PTC INHIBITED indicator shall be lighted.

c. Alarm shall not ring.

d. No voltage shall exist between J2-U and J2-R and between J2-U and J2-M.

e. No continuity shall exist between points listed in table 8.

Table 8. Open Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

78. Remove 25 volts dc applied to J6.

79. Set ICTC POWER switch to OFF.

80. Disconnect panel power cable from 115 volt ac source.

81. Remove jumper lead connected between J2-L and J2-M.

82. Connect jumper lead between J6-b and J6-F.

83. Connect 17 (±1) ohm "Load" between J6-K and J6-L, using one 10 ohm, 100 watt, resistor, one 5 ohm, 50 watt resistor, and one two ohm, 25 watt resistor.

84. Connect common input-output terminal of auto transformer (Variac) to J2-R and J2-H.

85. Connect other input terminal of variac to J2-U.

86. Connect variable output terminal of variac to J2-B.

87. Set variac for zero output.

88. Connect panel power cable to 115 volt ac source.

89. Set ICTC POWER switch to ON.

90. Adjust variac for output of 28.0 (±0.3) volts ac.

VII. B. PROCEDURE (CONTINUED)

91. Check for voltage drop of 31.5 (±1.0) volts ac across "load" resistance (added in step 83).

92. Remove panel power cable from 115 volt ac source.

93. Remove jumper lead connected between J6-b and J6-F.

94. Decrease "load" resistance to 10 (±1) ohms by removing the 5 ohm and 2 ohm resistors.

95. Connect panel power cable to 115 volt ac source.

96. Check for voltage drop of 23.5 (±1.0) volts ac across "load" resistor.

96A. Set ICTC POWER switch to OFF.

96B. Disconnect panel power cable from 115 volt ac cource.

96C. Remove "load" resistor and variac (used for testing) from battery power pack panel assembly.

VII. B. PROCEDURE (CONTINUED)

96D. Hold battery power pack panel assembly in its normal horizontal plane (position it assumes when mounted in battery power pack case) and shake vigorously. (Shaking the panel will insure no air pockets exist in the mercury pool within the ampere hour meter. Air pockets can impair proper operation of the meter.)

96E. Reinstall modified battery power pack panel assembly in battery power pack case. Insure P3 is connected to J3 and P4 is connected to J4.

96F. Transfer serial number from existing nameplate on battery power pack assembly to new nameplate, P/N 1004260-510, supplied in kit. Use 1/8 inch high character metal stamp set to imprint data.

96G. Remove existing nameplate from battery power pack assembly. Dispose of nameplate as directed in Section IX of this RIB. Retain four screws to secure new nameplate.

97. Secure new nameplate on battery power pack assembly with four screws retained in step 96G. Apply sealing and retaining compound (MIL-S-22473, grade H) to threads of four screws before installing.

98. Install jumper lead between J2-L and J2-M.

VII. B. PROCEDURE (CONTINUED)

99. Connect 20 VA load (normal inverter load) between J2-U and J2-R. 20 VA load is 775 (±1%) ohms in parallel with 3.33 (±5%) henries.

100. Connect panel power cable to 115 volt ac source.

NOTE: Inhibit alarms in following steps as necessary.

101. Set ICTC POWER switch to ON.

102. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

103. Apply 25.2 (±0.2) volt dc (hi) to J6-G and (lo) to J6-H.

104. Check to insure that 115 volts ac exists between J2-T and J2-M and zero voltage between J2-U and J2-R.

105. Disconnect panel power cable from 115 volt ac source and check for the following indications:

a. Zero voltage between J2-T and J2-M.

b. G & N ON/PTC INHIBITED indicator remains lighted.

VII. B. PROCEDURE (CONTINUED)

c. PTC OPERATING indicator not lighted.

d. No alarms ring.

e. INVERTER POWER indicator shall be lighted.

106. Remove 28 volt power applied to J6.

107. Set ICTC POWER switch to OFF.

108. Install jumper lead between J2-K and J2-N.

109. Connect panel power cable to 115 volt ac source.

110. Set ICTC POWER switch to ON.

111. Inhibit alarm bell by pressing 115V LINE POWER indicator-switch.

112. Check to insure 115 volts ac exist between J2-T and J2-M.

113. Disconnect panel power cable from 115 volt ac source and check for the following indications.

a. 115 volts ac shall not exist between J2-T and J2-M.

VII. B. PROCEDURE (CONTINUED)

b. Alarm bell shall not ring.

c. Battery voltage of 28 (+7, -3) volts dc shall exist between J2-P (hi) and J2-N (lo).

d. EMERGENCY HEATER POWER indicator-switch shall be lighted. Pressing this indicator-switch shall not turn indicator off.

114. Connect panel power cable to 115 volt ac source and check for the following indications.

a. Battery voltage of 28 (+7, -3) volts dc shall not exist between J2-P (hi) and J2-N (lo).

b. 115 volts ac shall exist between J2-T and J2-M.

c. Alarm bell shall not ring.

d. EMERGENCY HEATER POWER indicator-switch shall not be lighted.

115. Set ICTC POWER switch to OFF.

116. Disconnect panel power cable from 115 volt ac source.

VII. B. PROCEDURE (CONTINUED)

117. Remove all jumper leads.

118. Reinstall modified battery power pack cover (with cable in stored positions) on battery power pack assembly.

119. Update Acceptance Data Package as indicated in Section VIII of this RIB.

VII. PROCEDURE (CONTINUED)

C. DETAILED INSTRUCTIONS FOR MODIFICATION OF COVER, P/N 1902541. Perform modification as follows:

1. Remove cable W100, P/N 1900955, from storage location in cover and set aside.

2. Remove cable W101, P/N 1900954, from storage location in cover and modify as directed in paragraph D of Section VII in this RIB.

3. Remove dummy receptacle, P/N 1016073-183, from cover. (This dummy receptacle is located in area exposed by section view A-A in figure 8.) Retain dummy receptacle and securing hardware.

4. Enlarge one of four vacated dummy receptacle mounting holes (shown in figure 8, section view A-A) to 0.164 to 0.171 inch diameter, using number 36 twist drill.

5. Touch up inner surfaces of other three vacant mounting holes with MIL-P-8585 primer and cashmere blue enamel paint, P/N 1016194. (These three holes will not be reused for mounting parts.)

6. Locate mark and drill two 0.216 to 0.224 inch diameter through holes in top of cover as shown in figure 8. Use 7/32 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

7. Locate, mark and drill three 0.201 to 0.209 inch diameter through holes in top of cover as shown in figure 8. Use number 5 size twist drill to drill holes.

8. On side of cover where four dummy receptacles are presently mounted, perform the following:

a. Locate, mark and drill two clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view B-B. Use number 29 size twist drill to drill holes.

b. Locate, mark and drill one cluster (4 holes) of 0.102 to 0.108 inch diameter through holes as shown in figure 8, section view B-B. Use number 37 size twist drill to drill holes.

9. On side of cover opposite side containing four dummy receptacles, locate, mark and drill six clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view C-C. Use number 29 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

10. Using 1/8 inch rubber stamp and black marking ink, apply markings "W-189", "W-100", "W-186", "W-187", "W-188", and "W-192" to inner surface of cover in locations shown in figure. (W-186, W-187, and W-188 markings shall appear in two locations.)

11. Remove instruction foilcal, P/N 1902540, from inner surface of cover. Dispose of foilcal as directed in Section IX of this RIB.

WARNING: Methyl-Ethyl-Ketone is toxic and flammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

NOTE: Insure mounting surface is clean prior to applying new instruction plate.

12. Obtain instruction plate, P/N 2901442, from kit and apply methyl-ethyl-ketone to activate adhesive backing on plate. Allow activated adhesive to air dry until surface becomes tacky before performing next step.

13. Mount new instruction plate in same location as previously occupied by removed foilcal. Insure orientation of plate is as indicated in figure 8. (Bottom edge being nearest to assembly identification mark on cover.)

VII. C. PROCEDURE (CONTINUED)

14. Obtain dummy receptacle, P/N 1016073-183, and securing hardware set aside in step 3 and install on cover as shown in figure 9.

15. Obtain dummy receptacle, P/N 1016073-103, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

16. Obtain box mounting receptacle (housing only), P/N 1897424-001, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-12, and self locking nuts, P/N 1016151-002.

17. Obtain three dummy receptacles, P/N 1016073-143, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

18. Obtain three dummy receptacles, P/N 1016073-163, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

19. Obtain protective cap, P/N MS3181-16C, from kit and secure end of attached chain to hole in cover which was enlarged in step 4. Reference figures 8 and 9. Use kit supplied machine screw, P/N 1006783-23, and self locking nut, P/N 1016151-006, to secure it in place.

VII. C. PROCEDURE (CONTINUED)

20. Obtain cable clamp, P/N 1010400-006, from kit and secure to cover as shown in figure 9, using two kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N 1016151-010 (AN363C1032). Insure orientation of clamp is as shown in figure 9.

21. Obtain three clamps, P/N 1016105-004, from kit and secure to three new points on cover as shown in figure 9, using three kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N AN363C1032. Insure orientation of clamps is as shown in figure 9.

22. Remove identification mark "1902541" from inner surface of cover and replace with new identification number "1902632". Marking shall be in accordance with MIL-STD-130 (ES267).

23. Obtain and install cable W192 in cover as shown in figure 9.

24. Reinstall cable W100 in cover as shown in figure 9.

25. Obtain cables W186, W187, and W188 and mount in cover as shown in figure 9.

26. Obtain cable W189 (cable W101 becomes cable W189 after it is modified per this RIB) and mount in cover as shown in figure 9.

VII. PROCEDURE (CONTINUED)

D. DETAILED INSTRUCTIONS FOR MODIFICATION OF INTERCONNECT CABLE W101 (BPP TO IMU), P/N 1900954. Perform modification as follows:

1. Cut and remove cable identification sleeve (marked 1900954) from cable. Dispose of sleeve as directed in Section IX of this RIB.

2. Loosen two screws on connectors P1 and P2.

3. Cut and remove connector P1 and P2 identification sleeves from cable. Dispose of sleeves as directed in Section IX of this RIB.

4. Extract all leads from connector P2, using Bendix 11-7880-20 extraction tool.

5. Remove connector, grommet and telescoping bushing from P2 end of cable. Dispose of removed parts as directed in Section IX of this RIB.

6. Cut and remove tubing which covers cable. Dispose of tubing as directed in Section IX of this RIB.

7. Remove P1 telescoping bushing from cable. Retain two bushings, P/N AN3420-12A and P/N AN3420-16, for later reassembly and dispose of two bushings (with smallest inner diameter) P/N AN3420-6A and P/N AN3420-8A, as directed in Section IX of this RIB.

VII. D. PROCEDURE (CONTINUED)

8. Remove strain relief clamp, connector back shell and grommet insert from rear of connector P1 to permit access to P1 solder wells.

9. Unsolder lead A2 from P1-B and resolder to P1-Z.

10. Obtain leads A10 through A13 from kit lead set and install in cable as indicated in table 9. Accessory items are furnished in kit supplied connector, P/N 1897422-004.

Table 9. Cable Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A10	P1-G	P2-G	0.30 0.22	Yes No	MS3193A-20A	See note 1
A11	P1-H	P2-H	0.30 0.22	Yes No	MS3193A-20A	See note 1
A12	P1-F	P2-F	0.30 0.22	Yes No	MS3193A-20A	See note 1
A13	P1-b	P2-b	0.30 0.22	Yes No	MS3193A-20A	See note 1

Note 1 - Extract contact from applicable positions in kit supplied connector, using Bendix 11-7880-20 extraction tool. Crimp contact on lead using Buchanan MS3191-A crimping tool with Buchanan MS3191-20 positioner.

VII. D. PROCEDURE (CONTINUED)

11. Reinstall grommet insert and connector back shell on rear of connector P1.

12. Obtain zipper tubing, P/N 1902621-005, from kit and install on cable.

13. Obtain P1 identification sleeve, P/N 2901475, from kit and install on cable at P1. Position sleeve such that lettering reads away from P1 and that end of sleeve will lie under strain relief clamp. Heat shrink sleeve in place.

14. Reinstall at connector P1, two telescoping bushings, P/N AN3420-12A and P/N AN3420-16, removed and retained in step 7.

15. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads and that bushings and sleeves are properly positioned in strain relief clamp before tightening screws.

16. Obtain cable identification sleeve, P/N 1902621-004, from kit. If sleeve has not been marked with identification number "2901446", mark it with this identification at this time. Marking should be white and 0.25 inch high.

VII. D. PROCEDURE (CONTINUED)

17. Slide cable identification sleeve, P/N 1902621-004, on cable to approximate center location and heat shrink in place.

18. Obtain P2 identification sleeve, P/N 2901199, from kit and position on P2 end of cable such that lettering reads away from P2. Do not heat shrink in place at this time.

19. Obtain strain relief grommet, P/N 1016282-16, from kit and slide on cable.

20. Install cable leads in kit supplied connector, P/N 1897422-004, (new connector P2) as indicated in table 10.

Table 10. New Connector P2 Termination

Lead Identification	Connector P2 Termination
A1	a
A2	P
A3	N
A4	Z
A5	K
A6	X
A7	R
A8	V
A9	W
A10	G
A11	H
A12	F
A13	b

VII. D. PROCEDURE (CONTINUED)

21. Fill unused holes in connector P2 with excess contacts obtained in step 20.

22. Fill unused holes in connector P2 grommet with plug end seals, P/N 1897370-001, supplied in kit.

23. Position P2 identification sleeve such that end of sleeve will lie under strain relief clamp on P2 connector. Heat shrink sleeve in place.

24. Position strain relief grommet under P2 connector strain relief clamp.

25. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads before tightening screws.

26. Check for an indication of less than one ohm between the points listed in table 11.

Table 11. Cable W189 Continuity Check

From P1-	To P2-
A	N
C	a
D	Z
F	F
G	G
H	H
I	W

From P1-	To P2-
J	V
W	R
X	X
Z	P
a	K
b	b

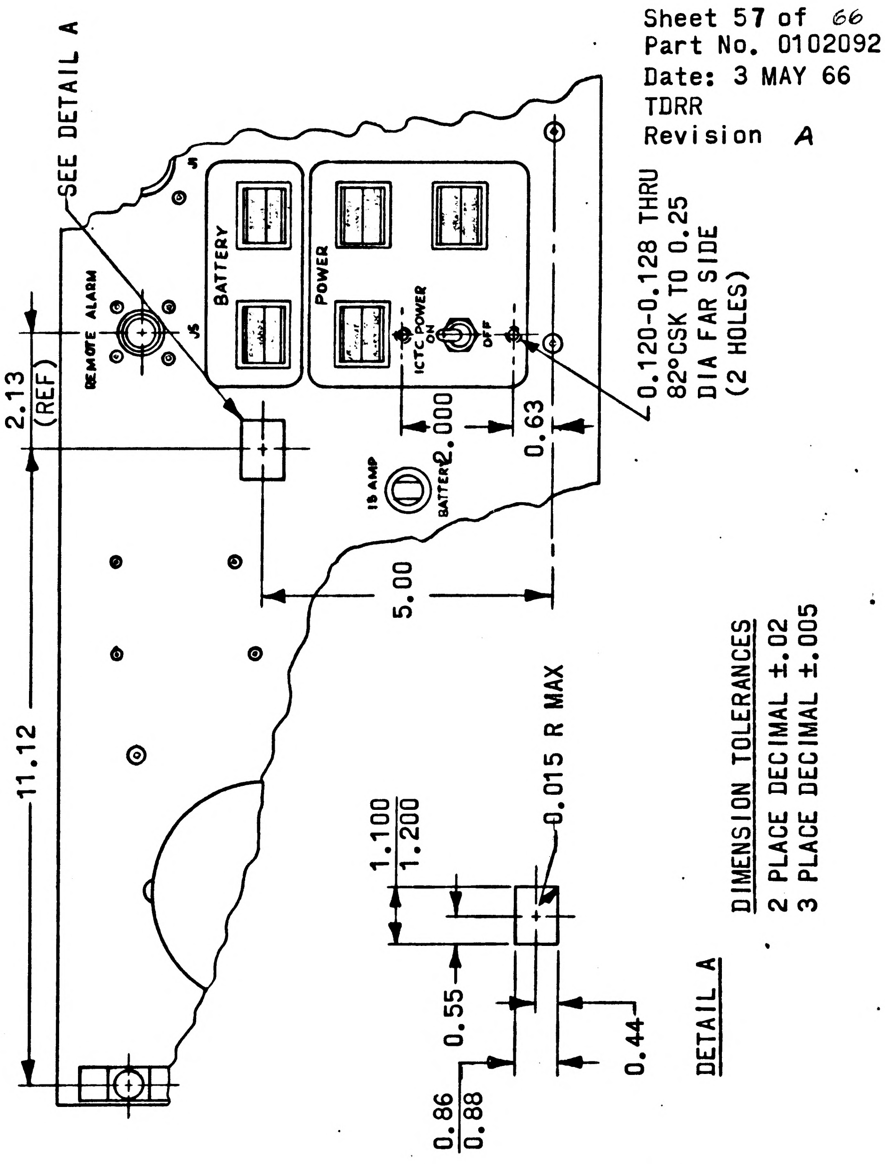
SEE DETAIL A
0.120-0.128 THRU
82°CSK TO 0.25
DIA FAR SIDE
(2 HOLES)
REMOTE ALARM
J5
BATTERY
POWER
ICTC POWER
ON
OFF
15 AMP
BATTERY
2.000
0.63
2.13
(REF)
5.00
11.12
1.100
1.200
0.015 R MAX
0.55
0.86
0.88
0.44
DETAIL A
DIMENSION TOLERANCES
2 PLACE DECIMAL ±.02
3 PLACE DECIMAL ±.005

Figure 1. NEW HOLE IN FRONT PANEL

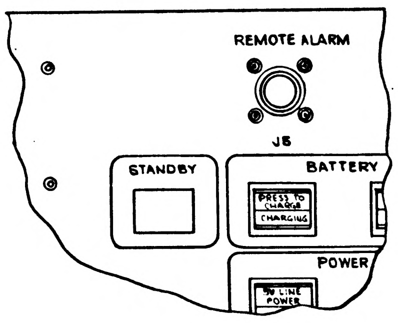
REMOTE ALARM
J5
STANDBY
BATTERY
PRESS TO CHARGE
CHARGING
POWER
LINE POWER

Figure 2. INSTALLED LAMP INDICATOR ASSEMBLY DECAL

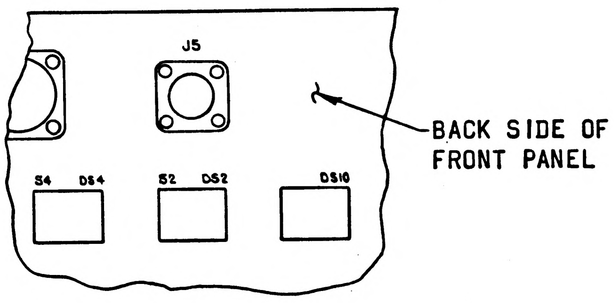
J5
S4
DS4
S2
DS2
DS10
BACK SIDE OF
FRONT PANEL

Figure 3. LAMP INDICATOR ASSEMBLY IDENTIFICATION

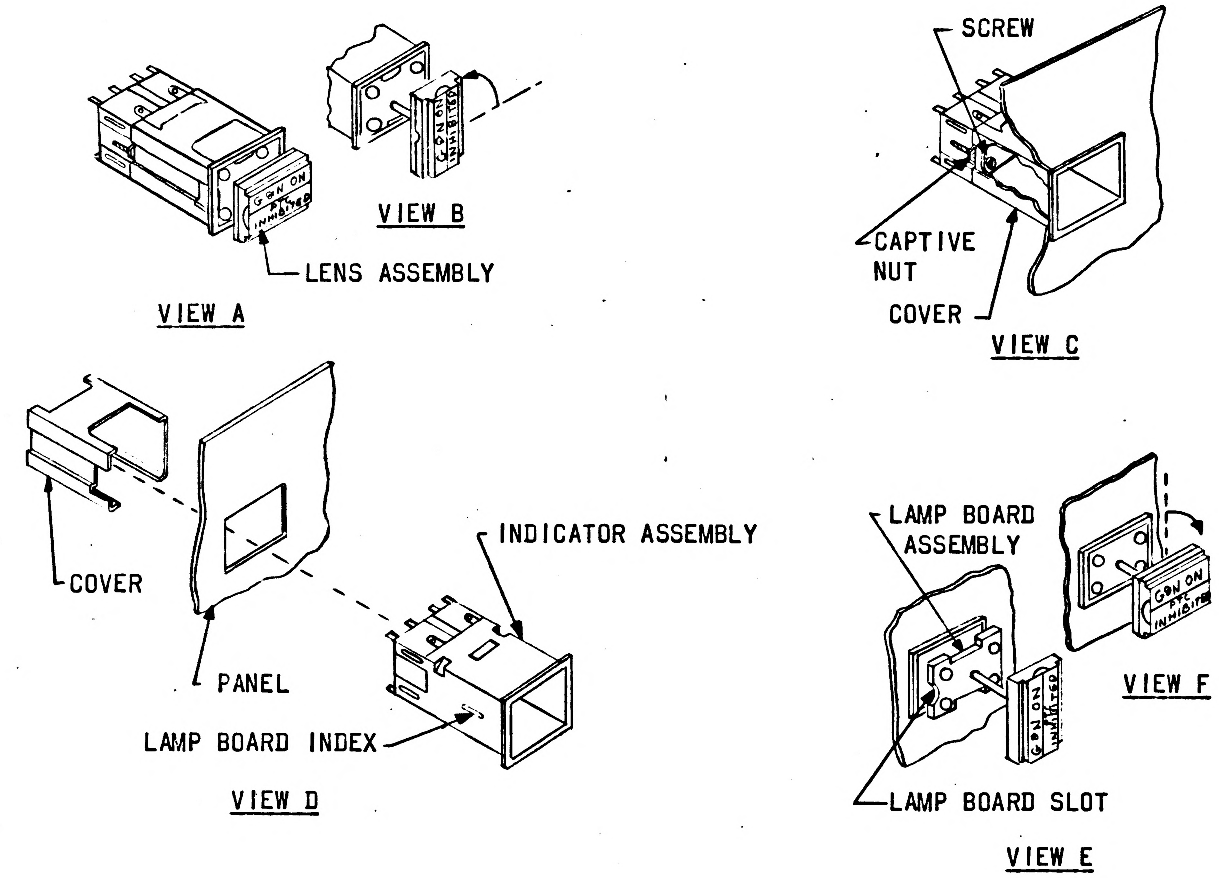
LENS ASSEMBLY
VIEW A
VIEW B
SCREW
CAPTIVE NUT
COVER
VIEW C
COVER
PANEL
INDICATOR ASSEMBLY
LAMP BOARD INDEX
VIEW D
LAMP BOARD ASSEMBLY
LAMP BOARD SLOT
VIEW E
VIEW F

Figure 4. INSTALLATION OF LIGHT-INDICATOR ASSEMBLY

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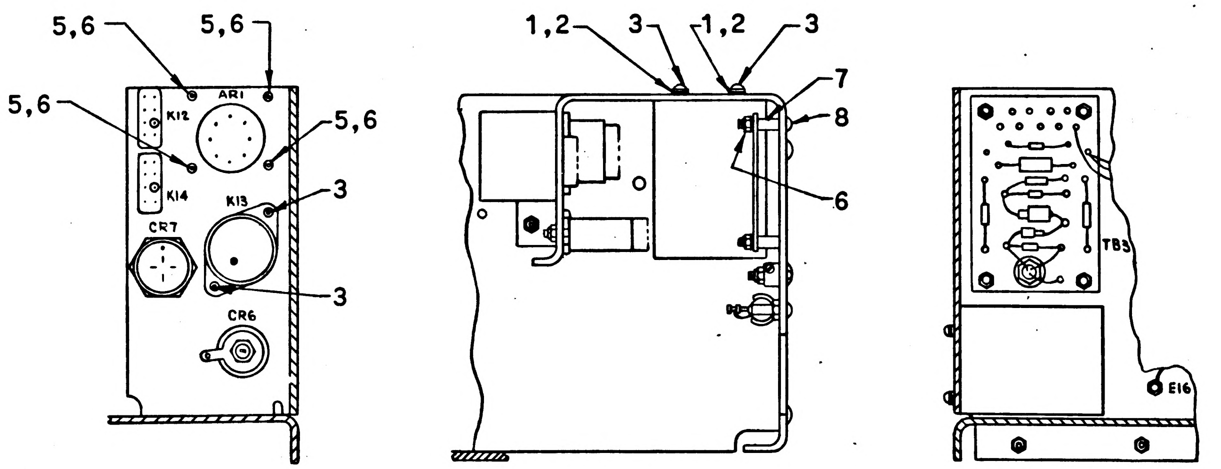
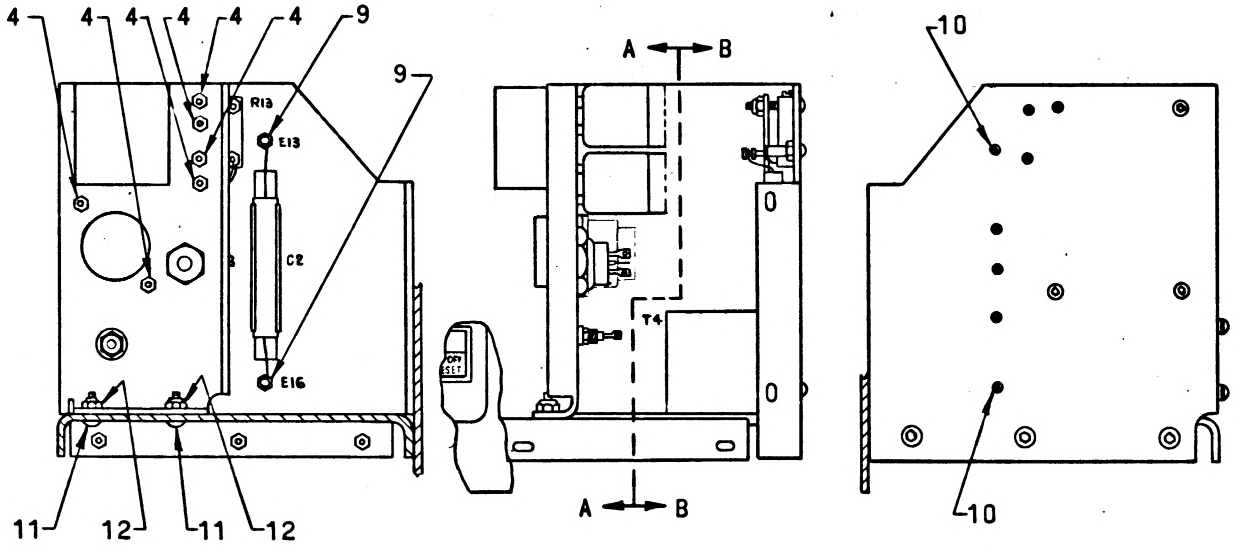
Part No. 0102092
Date: 3 MAY 66
TDRR
Revision *A*



5,6
5,6
5,6
5,6
AR1
K12
K14
K13
CR7
CR6
3
3
1,2
3
1,2
3
7
8
6
TB3
E16

PARTIAL SECTION A-A

PARTIAL SECTION B-B

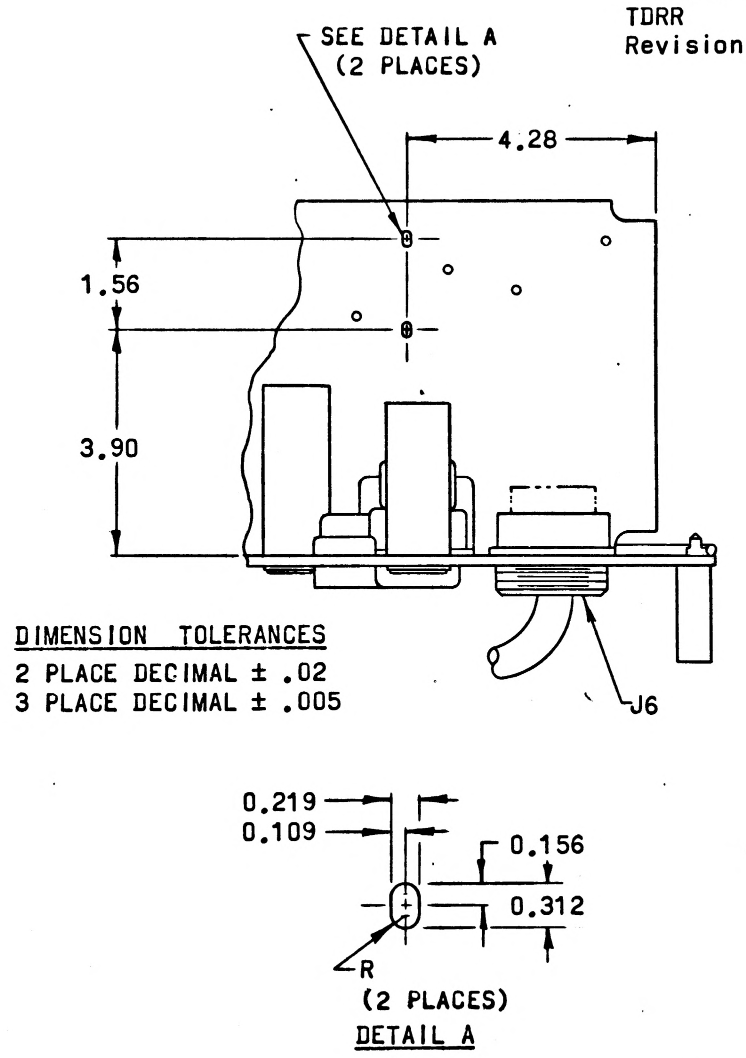


4
4
4
4
4
4
9
9
R13
E13
C2
E16
11
12
11
12
A
B
A
B
T4
10
10

Figure 5. NEW BRACKET AND ATTACHED PARTS

LEGEND

1. LOCK WASHER, P/N MS35338-79
2. FLAT WASHER, P/N AN960C6L
3. BUTTON HD SCREW, P/N 1006783-22
4. SELF LOCKING NUT, P/N 1012525-004
5. BUTTON HD SCREW, P/N 1006783-19
6. LOCKWASHER, P/N MS35338-78
7. SPACER, P/N 1015860-001
8. BUTTON HD SCREW, P/N 1006783-24
9. TERMINAL STUD, P/N 1010676-1
10. BUTTON HD SCREW, P/N 1010618-13
11. MACHINE SCREW, P/N 1006783-45
12. SELF LOCKING NUTS, P/N AN363C1032


SEE DETAIL A
(2 PLACES)
4.28
1.56
3.90
J6
0.219
0.109
0.156
0.312
R
(2 PLACES)
DETAIL A

DIMENSION TOLERANCES
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005

Figure 6. NEW HOLES IN CHASSIS (TOP VIEW)

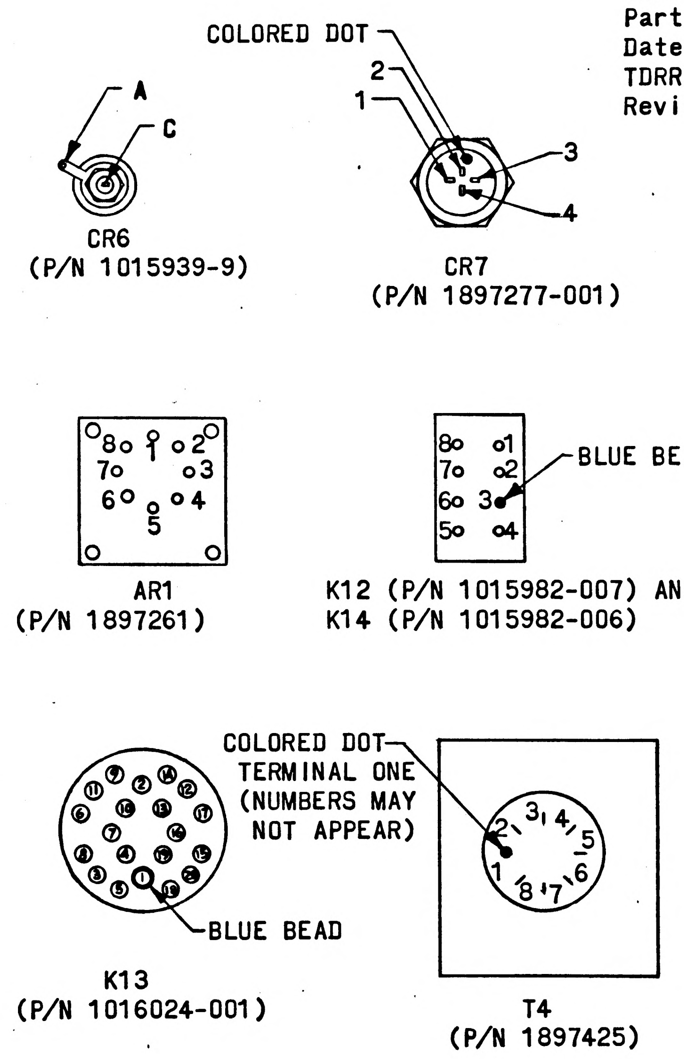

COLORED DOT
A
C
CR6
(P/N 1015939-9)
2
1
3
4
CR7
(P/N 1897277-001)
8 1 2
7 3
6 4
5
AR1
(P/N 1897261)
8 1
7 2
6 3
5 4
BLUE BEAD
K12 (P/N 1015982-007) AND
K14 (P/N 1015982-006)
COLORED DOT—TERMINAL ONE
(NUMBERS MAY NOT APPEAR)
BLUE BEAD
K13
(P/N 1016024-001)
1 2 3 4 5 6 7 8
T4
(P/N 1897425)

Figure 7. TERMINATION IDENTIFICATIONS

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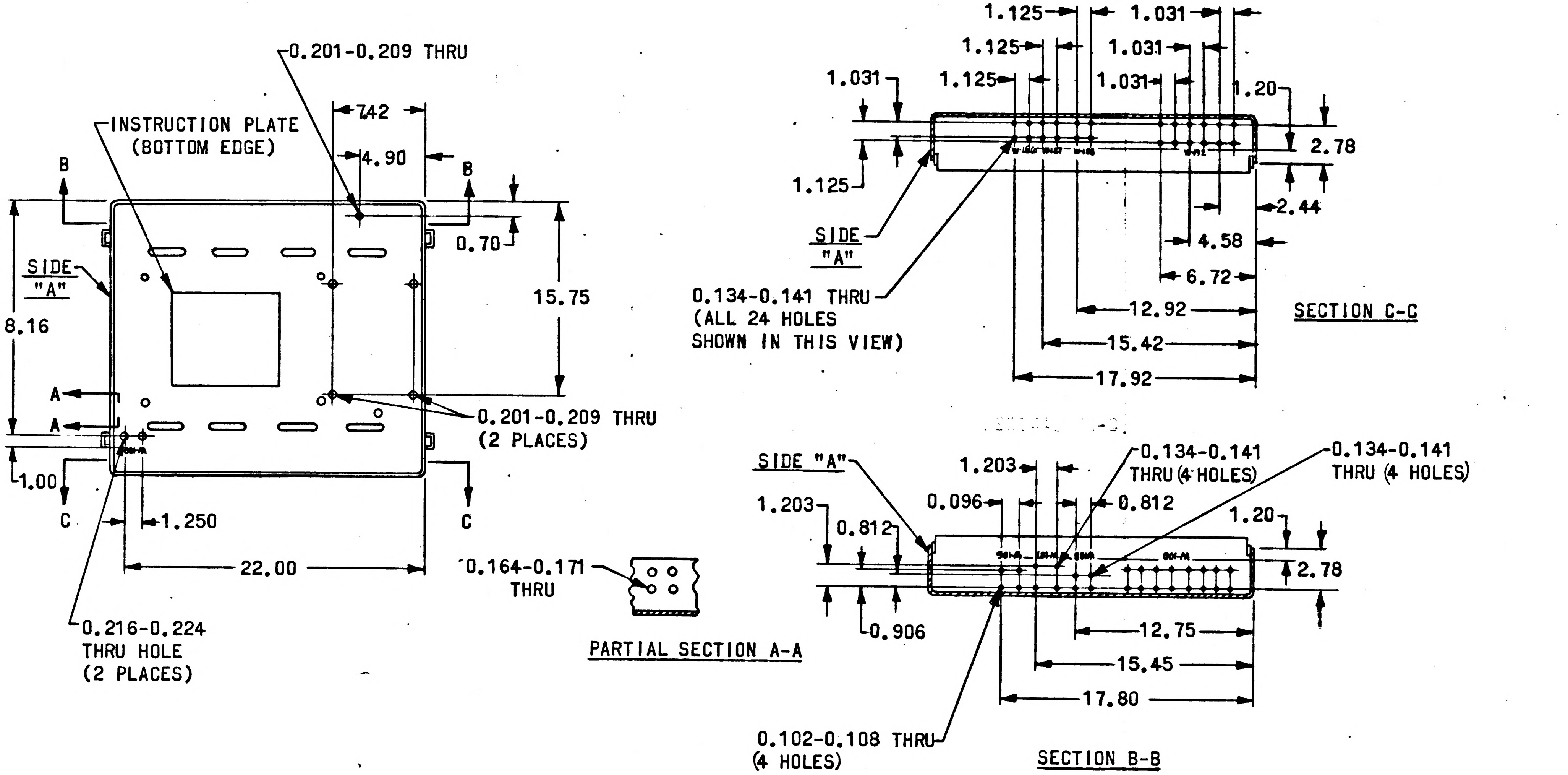
TDRR
Revision A

DIMENSION TOLERANCES
(UNLESS OTHERWISE SPECIFIED)
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005



0.201-0.209 THRU
INSTRUCTION PLATE
(BOTTOM EDGE)
7.42
4.90
B
B
0.70
SIDE "A"
18.16
15.75
A
A
0.201-0.209 THRU
(2 PLACES)
1.00
C
1.250
C
22.00
0.216-0.224
THRU HOLE
(2 PLACES)
0.164-0.171
THRU
PARTIAL SECTION A-A
1.125
1.031
1.125
1.031
1.031
1.125
1.031
1.20
2.78
1.125
2.44
SIDE "A"
4.58
6.72
0.134-0.141 THRU
(ALL 24 HOLES
SHOWN IN THIS VIEW)
12.92
15.42
17.92
SECTION C-C
SIDE "A"
1.203
0.134-0.141
THRU (4 HOLES)
0.134-0.141
THRU (4 HOLES)
1.203
0.096
0.812
0.812
1.20
2.78
0.906
12.75
15.45
17.80
0.102-0.108 THRU
(4 HOLES)
SECTION B-B

Figure 8. BATTERY POWER PACK COVER

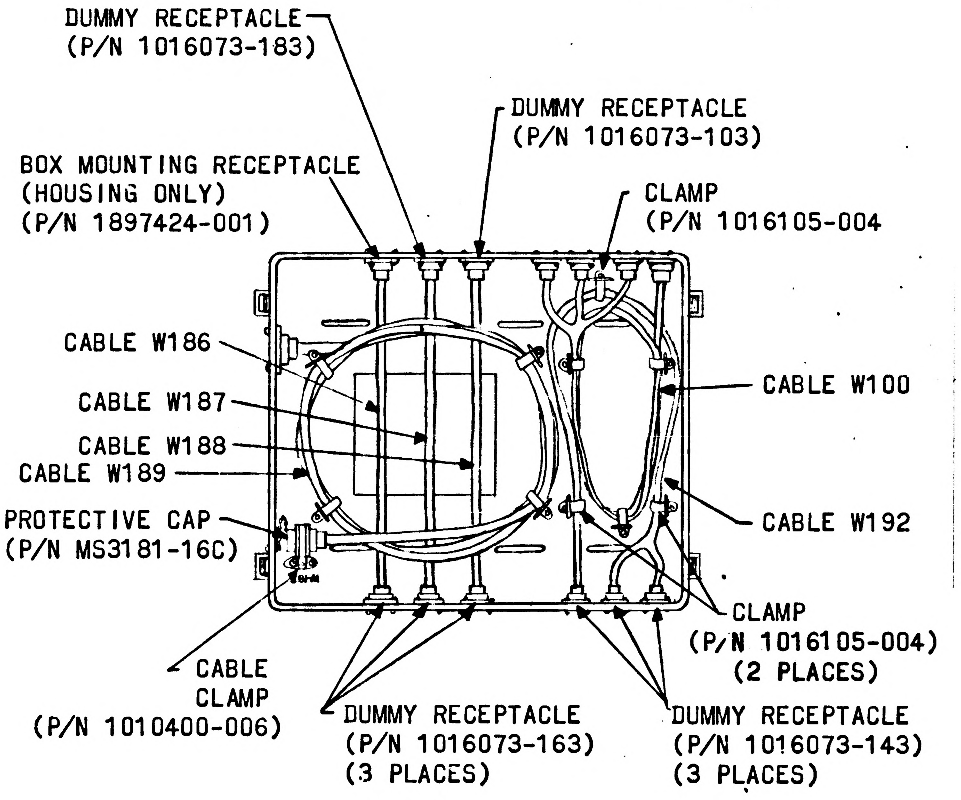

DUMMY RECEPTACLE
(P/N 1016073-183)
DUMMY RECEPTACLE
(P/N 1016073-103)
BOX MOUNTING RECEPTACLE
(HOUSING ONLY)
(P/N 1897424-001)
CLAMP
(P/N 1016105-004
CABLE W186
CABLE W187
CABLE W188
CABLE W189
CABLE W100
PROTECTIVE CAP
(P/N MS3181-16C)
CABLE W192
CLAMP
(P/N 1016105-004)
(2 PLACES)
CABLE
CLAMP
(P/N 1010400-006)
DUMMY RECEPTACLE
(P/N 1016073-163)
(3 PLACES)
DUMMY RECEPTACLE
(P/N 1016073-143)
(3 PLACES)

Figure 9. MODIFIED COVER WITH CABLES IN STOWED POSITIONS

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

B. The significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041
Battery Power Pack Panel Assembly	1902249-021	1902630-011
Front Panel	1902179	1902629
Chassis	1902135	1902631
Wiring Harness A	1902539	1902620

VIII. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Wire List AA	1902190	1902622
Battery Power Pack Cover	1902541	1902632
*Cable Interconnect W101 (BPP to IMU)	1900954	2901446

*Cable name changes to "Cable Interconnect W189 (BPP to IMU)" upon completion of modification.

IX. DISPOSITION OF PARTS REMOVED

A. One connector-plug, P/N MS3126F18-32SX, (1897092-322) and two fuses, P/N F02A32V15AS, (1897099-117) shall be returned to stock as spares per AC Electronics, Logistics (Department 38-09) direction.

B. One resistor, P/N RE75G2490, (1896892-327) shall be transferred to full custody of the government via DD543 form (Inventory Schedule).

C. Scrap all parts not listed above, via AC Electronics form MIL-127 or equivalent.

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR BATTERY POWER PACK ASSEMBLY, P/N 1900011-031

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	30013	ALL INITIAL RELEASE			
B	30002	1,4,6,24,25			14 JUL 66
C	30502	1,35,35A			10 AUG 66

Prepared by ____________ Date 5 May 1966

P.C. Engineering Approval R.B. ____________ Date 16/May/66

Design Review Board Approval ____________ Date 5 July 66

MIT/IL Approval ____________ Date 7-5-66

NASA Approval A. C. METZGER Date ________

MIT Reliability ____________ Date ________

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Battery Power Pack Assembly, P/N 1900011-031. This modification will add the capability of using this assembly with Block II/LEM units, in conjunction with PTC P/N 1900496 as well as PTC P/N 2900060.

II. AUTHORITY

This retrofit is authorized by Block II/LEM contract NAS9-497 (CCA 497-0169).

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

RIB 0102110 and RIB 0102111.

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102205, consisting of the following items is required to modify a Battery Power Pack Assembly, P/N 1900011-031.

Qty	Part Number	Description
1	0102092	Retrofit Instruction Bulletin
1	1016024-001	Relay, armature
1	1015982-006	Relay, armature
1	1897277-001	Rectifier bridge
1	1897261	Comparator
1	1897337-101	Light indicator assembly
1	1015982-007	Relay, armature
2	F02B32V15AS	Fuse (1897099-133)
1	1004260-510	Nameplate
1	1902621	Lead set
1	1897425	Transformer
1	CL25BJ151UP3	Capacitor (1897081-320)
2	1006783-45	Screw, button head
1	2901438	Component board assembly
4	1015860-001	Spacer
10	1012525-004	Nut
4	1006783-24	Screw, button head
4	AN960C6L	Washer, flat (1897006-036)

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
4	MS35338-79	Washer, lock
6	1006783-22	Screw, button head
2	1010676-1	Terminal, stud, insulated
2	1010618-13	Screw, button head, self locking
7	AN363C1032	Nut, self locking (1016151-010)
4	1016006-002	Splice reducer
2	1016006-003	Splice reducer
4	1010490-258	Sleeving, electrical insulation
2	1010490-256	Sleeving, electrical insulation
1	1015818-616	Contact, socket
27	1015864-135	Sleeving, electrical insulation
25	1015864-137	Sleeving, electrical insulation
11	1015864-139	Sleeving, electrical insulation
9	1015864-138	Sleeving, electrical insulation
2	1016281-181	Contact, socket
1	2901441	Bracket assembly (inseparable)
1	2901442	Plate, instruction
1	1902626	Decal, functional area
1	1010490-200	Sleeving, electrical insulation
1	1016006-001	Splice reducer
1	2901443	Cable W186
1	2901444	Cable W187
1	2901445	Cable W188
1	2901447	Cable W192
32	1006783-19	Screw, button head
4	MS35338-78	Washer, lock
1	1897422-004	Connector, electrical
1	2901199	Sleeve, identification

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	2901475	Sleeve, identification
9	1897370-001	Plug, end seal
1	1016282-16	Grommet, connector strain relief
3	1016073-143	Dummy receptacle
3	1016073-163	Dummy receptacle
1	1016073-103	Dummy receptacle
1	1897424-001	Box mounting receptacle (housing only)
1	1010400-006	Cable clamp
1	MS3181-16C	Cap, protective
1	2901533	Guard, switch
2	MS35200-15	Screw, flat head
3	1016105-004	Clamp
28	1016151-004	Nut, self locking
5	1006783-44	Screw, machine
4	1016151-002	Nut, self locking
1	1006783-23	Screw, machine
1	1006151-006	Nut, self locking
4	1006783-12	Screw, machine

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
1	*ACSP 63L12A	Inductor, 3.33 (±3%) henries 300 ma ac-dc, 1 ohm max.
1	*Dale, type RH25 (Allied Catalog No.660, stock no. 26Z360C)	Resistor, 600 (±1%) ohm, 25 watt

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Dale, type RH10 (Allied Catalog no. 660, stock no. 26Z352C)	Resistor, 175 (±1%) ohm, 10 watt
AR	N/A	Primer (MIL-P-8585)
AR	N/A	Paint, semi-gloss enamel, light gray (FED-STD-595 color 26440) (TT-E-529, class B)
AR	N/A	Varnish (MIL-V-6894A, unreduced)
1	*Schwaab Stamp & Seal Co., type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
AR	N/A	Lacquer thinner (MS35626)
AR	N/A	Clear lacquer (MIL-L-73A)
AR	N/A	Black marking ink
AR	N/A	Solder (QQ-S-571, SN60WRAP)
1	*Master Appliance, G7673A	Heat gun (300°F)
1	Buchanan MS3191-A	Crimping tool
1	Bendix 11-7758	Positioner
1	Bendix 11-8107-16	Insertion tool
1	Bendix 11-7880-16	Extraction tool
1	Burndy Y10MRF-4	Crimping tool
AR	N/A	Lacing & tying tape (MIL-T-713C, black, type P, class 2)

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/8 inch alpha-numerical
AR	N/A	Sealing & retaining compound (MIL-S-22473, grade H & HV)
1	Buchanan MS3191-20	Positioner
AR	MIL-I-631	Filler tape, type F, form T, (black) grade A, class I, 0.62 inch wide, 0.020 inch thick
1	Any hi-speed	7/32 size twist drill
1	Any hi-speed	Number 5 twist drill
1	Any hi-speed	Number 29 twist drill
1	Any hi-speed	Number 37 twist drill
1	Any hi-speed	Number 36 twist drill
1	Any hi-speed	1/8 size twist drill
1	*Cleveland Twist Drill Co.	80° countersink
1	*General Radio Co, model W5MT3	Auto-transformer (Variac)
AR	N/A	Methy-Ethyl-Ketone (TT-M-261)
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z795C)	Resistor, 10 ohm (±5%), 100 watt
1	*Ohmite (Allied Catalog no. 660 Stock no. 25Z783C)	Resistor, 5 ohm (±5%), 50 watt
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z776C)	Resistor, 2 ohm (±5%), 25 watt

*or equivalent

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

3. Where marking is specified, hand marking is acceptable.

4. Use heatsink device when unsoldering or soldering near semi-conductors.

5. Ink markings:

   a. Markings to be removed should be removed using lacquer thinner.

   b. New markings shall be covered with a coat of clear flat lacquer after ink has dried.

6. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties will be added after all conductor rework has been completed.

VII. A. PROCEDURE (CONTINUED)

7. Delete conductors from wiring harness, when instructed, by one of the two following methods:

   a. Method One. (preferred)

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Pull conductor out of harness at most convenient point and discard.

   b. Method Two.

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Apply a drop of blue glyptal to severed ends of conductor.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove cover, P/N 1902541, from battery power pack assembly and modify as directed in paragraph C of Section VII in this RIB.

2. Open access door, P/N 1900471, on battery power pack assembly and disconnect P3 and P4 from their respective mating connectors.

3. Remove battery power pack panel assembly, P/N 1902249-021, from battery power pack assembly and set on work bench.

4. Remove two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel, P/N 1902179, to (right side) chassis support, P/N 1900475. Retain screws and nuts.

5. Remove six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel to chassis. Retain screws and nuts.

6. Remove three machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure meter bracket, P/N 1900480, to chassis. Retain screws and nuts.

VII. B. PROCEDURE (CONTINUED)

NOTE: Maneuver front panel away from chassis as required to perform following steps. Care must be taken, however, not to put undue strain on wiring and wiring connections.

CAUTION: When cutting holes in front panel and chassis during this modification, take the following necessary measures to;

1. Insure metal chips, filing and etc are not allowed to fall into or on wiring, switches and other components.

2. Insure wiring is pushed aside as necessary to prevent drilling into them.

7. Cut three new holes in front panel, P/N 1902179, as shown in figure 1. Use 1/8 size twist drill to drill two holes near ICTC POWER switch. These two holes shall be countersunk as indicated in figure 1.

8. Touch up bare metal surfaces in new holes with MIL-P-8585 primer and TT-E 529, class B, semi-gloss enamel, light gray (color 26440 of FED-STD-595) paint.

9. Obtain decal, P/N 1902626, from kit and install on front panel as shown in figure 2. Apply a bead of varnish (MIL-V-6894A unreduced), overlapping all edges 1/4 inch minimum on decal.

VII. B. PROCEDURE (CONTINUED)

10. Obtain switch guard, P/N 2901533, from kit and secure to front panel over ICTC POWER switch with two kit supplied flat head screws, P/N MS35200-15. Apply sealing and retaining compound MIL-S-22473, grade HV to threads of screws before installing.

11. Mark "DS10" on backside of front panel in location shown in figure 3. New marking should be 0.125 inch high, color black per ND 1002019.

12. Remove identification number "1902179" stamped on back side of front panel and replace with new identification number "1902629". New identification shall be in accordance with MIL-STD-130 (ES267).

13. Obtain light-indicator assembly, P/N 1897337-101, from kit and mount on front panel as indicated in the following steps while referencing figure 4.

    a. Using fingernail slots on sides, pull lens assembly out approximately 5/8 inch. (Reference figure 4, view A.)

    b. Rotate lens assembly 90 degrees. (Reference figure 4, view B.)

    c. Push lens in to release tension on index keys and then pull complete assembly out and set aside.

VII. B. PROCEDURE (CONTINUED)

d. Unscrew two screws until captive nuts reach the rear of their travel range and remove cover. (One screw and captive nut is shown in figure 4, view C.)

e. Insert indicator assembly through panel cutout from the front of panel. (Reference figure 4, view D.)

f. From rear of panel, slip cover over indicator assembly until it fits snugly against rear of panel. (Reference figure 4, view D.)

g. Tighten two screws (with attached captive nuts) to draw cover up firmly to rear of panel. (Reference figure 4, view C.)

h. Insert lens and lamp assembly (see figure 4, view E) into indicator assembly so lamp board slot is aligned with lamp board index.

i. Rotate lens assembly 90 degrees (see figure 4, view F) and push assembly into indicator assembly.

14. Remove two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure (right side) chassis support, P/N 1900475, to chassis. Retain screws and nuts for later use. Remove (right side) chassis support, P/N 1900475, and dispose of as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

14A. Remove leads A26 and A172 connected to resistor R1.

14B. Remove resistor R1 from chassis. Dispose of resistor and securing screws and nuts as directed in Section IX of this RIB.

14C. Remove marking for R1 (R1 and terminal designations 1 and 2) stamped on chassis, using lacquer thinner.

CAUTION: When performing the following steps, use care to insure CR6, R13 and leads attached to R13 are not damaged. These parts will be removed and installed on a new bracket.

14D. Remove leads A23, A29, A167, and A169 from E9. (E9 is located on electronics components assembly, P/N 1902193.)

14E. Remove lead A166 from E10.

15. Remove lead A171 from E11.

16. Unsolder lead A170 from CR6-C.

17. Remove electronics components assembly, P/N 1902193, from chassis by removing two securing machine screws and self locking nuts. Dispose of removed screws and self locking nuts as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

18. Unsolder (do not cut) green and red leads connected to E10.

19. Unsolder (do not cut) yellow lead connected to CR6-A.

20. Remove resistor R13 from electronics components assembly, P/N 1902193. Retain mounting hardware.

21. Obtain bracket, P/N 2901441, from kit and mount R13 (removed in step 20) on bracket as shown in figure 5. Use original mounting hardware to secure R13 to bracket.

22. Remove diode CR6 from electronics components assembly, P/N 1902193.

23. Utilize original mounting hardware to secure CR6 on new bracket as shown in figure 5.

24. Dispose of electronics components assembly, P/N 1902193, (less R13 and CR6) as directed in Section IX of this RIB.

25. Locate, mark and cut two new holes in chassis as shown in figure 6. Use new bracket, P/N 2901441, as a template for locating two new holes. Do not use bracket for a template when drilling, however. Use 7/32 size twist drill for drilling operation.

VII. B. PROCEDURE (CONTINUED)

26. Touch up bare metal surfaces in two hew holes in chassis with MIL-P-8585 primer.

27. Remove identification number "1902135" and associated revision marking and replace with new identification number "1902631". New marking shall be in accordance with MIL-STD-130.

28. Remove leads listed in table 1 from wiring harness A.

Table 1. Wiring Harness A Lead Deletions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Remarks
A23	CR2-C	E9	Previously removed from E9
A26	K6-6	R1-1	Previously removed from R1
A29	CR1-C	E9	Previously removed from E9
A122	T3-3	XDS3-A	
A137	XDS3-B	XDS5-A	
A138	XDS4-B	XDS5-B	
A166	K6-5	E10	Previously removed from E10
A167	J4-L	E9	Cut off at J4-L, E9 end previously removed
A169	K5-1	E9	Previously removed from E9
A170	XF5-1	CR6-C	Previously removed from CR6
A171	K6-2	E11	Previously removed from E11
A172	TB1-11	R1-2	Previously removed from R1

VII. B. PROCEDURE (CONTINUED)

29. Obtain transformer (T4), P/N 1897425, from kit and secure to new bracket, P/N 2901441, as shown in figure 5, with four kit supplied button head screws, P/N 1006783-22, lock washers, P/N MS35338-79, and flat washers, P/N AN960C6L.

30. Obtain relay (K13), P/N 1016024-001, from kit and secure to new bracket as shown in figure 5, with two kit supplied button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004.

31. Obtain comparator (AR1), P/N 1897261, from kit and secure to new bracket as shown in figure 5, with four kit supplied button head screws, P/N 1006783-19, and lock washers, P/N MS35338-78.

32. Obtain rectifier bridge (CR7), P/N 1897277-001, from kit and secure to new bracket as shown in figure 5.

33. Obtain relay(K14), P/N 1015982-006, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525-004.

34. Obtain relay (K12), P/N 1015982-007, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525-004.

VII. B. PROCEDURE (CONTINUED)

35. Obtain component board assembly (TB3), P/N 2901438, from kit and secure to new bracket as shown in figure 5, with four kit supplied spacers, P/N 1015860-001, self locking nuts, P/N 1012525-004, and button head screws, P/N 1006783-24.

36. Obtain one terminal stud (E15), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screw, P/N 1010618-13.

37. Obtain one terminal stud (E16), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screws, P/N 1010618-13.

38. Obtain capacitor (C2), P/N CL25BJ151UP3, from kit and insert in retaining clip as shown in figure 5, such that positive end is nearest E15.

39. Temporarily connect (mechanically) positive lead of C2 to E15 and negative lead to E16.

40. Temporarily connect (mechanically) the free end of yellow lead attached to R13, to TB3-9. Lead should be cut to required length, have insulation stripped 0.30 inch and tinned prior to connecting.

VII. B. PROCEDURE (CONTINUED)

41. Temporarily connect (mechanically) the free end of red lead and green lead attached to R13, to TB3-13. Leads should be cut to required length, have insulation stripped 0.30 inch and tinned prior to installing.

42. Install new wire list AA leads furnished in kit lead set, as indicated in table 2. Accessory items listed in table 2 are also furnished in kit. (Reference figure 7 for terminal identifications.)

Table 2. Wire List AA Additions

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA35	K12-1		0.30	Yes	1015864-137	
		K13-1	0.30	Yes		See note 1
AA36	K12-5		0.30	Yes	1015864-137	
		K13-2	0.30	Yes		See note 2
AA37	XDS10-C		0.30	Yes	1015864-139	See note 3
		XDS10-A	0.30	Yes	1015864-139	
AA38	T4-4		0.30	Yes	1015864-139	
		K14-5	0.30	Yes	1015864-137	
AA40	K14-4		0.30	Yes	1015864-137	
		T4-7	0.30	Yes	1015864-139	
AA41	CR7-1		0.30	Yes	1015864-137	
		K13-4	0.30	Yes	1015864-135	See note 4
AA42	CR7-2		0.30	Yes	1015864-137	
		E15	0.30	Yes		

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA43	CR7-4		0.30	Yes	1015864-137	
		E16	0.30	Yes		
AA44	E15		0.30	Yes		
		TB3-24	0.30	Yes		
AA45	E16		0.30	Yes		
		TB3-21	0.30	Yes		See note 5
AA46	K12-3		0.30	Yes	1015864-137	
		TB3-20	0.30	Yes		See note 6
AA47	K12-7		0.30	Yes	1015864-137	
		TB3-19	0.30	Yes		
AA48	AR1-1		0.30	Yes		
		TB3-16	0.30	Yes		
AA49	AR1-4		0.30	Yes		
		TB3-10	0.30	Yes		
AA50	AR1-3		0.30	Yes		
		TB3-26	0.30	Yes		See note 6
AA51	AR1-8		0.30	Yes		
		TB3-17	0.30	Yes		
AA52	AR1-2		0.30	Yes		
		TB3-18	0.30	Yes		
AA53	AR1-6		0.30	Yes		
		TB3-25	0.30	Yes		
AA54	AR1-7		0.30	Yes		
		TB3-21	0.30	Yes		Combine with AA45

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA55	CR6-A		0.30	Yes	1015864-137	
		TB3-9	0.30	Yes		
AA56	TB3-20		0.30	Yes		Combine with AA46
		TB3-26	0.30	Yes		Combine with AA50

Note 1 - Do not solder as another lead (A51) will be connected later.
Note 2 - Do not solder as another lead (A50) will be connected later.
Note 3 - Do not solder as another lead (A182) will be connected later.
Note 4 - Do not solder as another lead (A183) will be connected later.
Note 5 - Do not solder as another lead (AA54) will be connected later.
Note 6 - Do not solder as another lead (AA56) will be connected later.

VII. B. PROCEDURE (CONTINUED)

43. Secure new bracket, P/N 2901441, to chassis with five machine screws, P/N 1006783-45, and self locking nuts, P/N AN363C1032, retained in steps 4 and 14.

44. Revise wiring harness A lead connections as listed in table 3.

Table 3. Revised Lead Terminations In Wiring Harness A

Lead Ident	Remove From	Reconnect To	Strip Insul	Tin	Accessory Item P/N
A35	K3-D2	*K3-C2	0.30	Yes	1015864-135
A50	T3-2	K13-2	0.30	Yes	1015864-135
A51	T3-1	K13-1	0.30	Yes	1015864-135
A66	J6-C	K13-19	0.30	Yes	1015864-135
A68	J6-A	K13-13	0.30	Yes	1015864-135
A69	J6-D	K13-10	0.30	Yes	1015864-135
A70	J6-a	K13-7	0.30	Yes	1015864-135
A144	K2-D2	**K3-D2	0.30	Yes	1015864-135

*Combine with lead A120 at this point.
**Another lead (A189) will be added to this point later.

VII. B. PROCEDURE (CONTINUED)

45. Remove leads A71, A153, and A160 from E5 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

46. Remove leads A72, A154, and A161 from E6 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

47. Remove leads A73, A155, and A162 from E7 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

48. Remove leads A74, A156, and A163 from E8 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

49. Remove leads A82, A151, and A158 from E3 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

50. Obtain new wiring harness A leads from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column in table 4 can be found at the rear of the table.)

Table 4. Wiring Harness A Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A177	K1-C2		0.30	Yes	1015864-135	
		S6SW2-NC	0.30	Yes		Combine with A110
A178	K1-C3		0.30	Yes	1015864-135	
		J2-K	0.20	No		See note 1
A179	J2-P		0.20	No	1016281-181	See note 3
		E17	0.30	No		See note 2
A180	XDS3-A		0.30	Yes	1015864-139	Combine with AA8
		T2-3	0.30	Yes	1015864-139	Combine with A46
A181	K9-4		0.30	Yes	1015864-135	Combine with A21
		XDS4-B	0.30	Yes	1015864-139	Combine with AA28
A182	K13-5		0.30	Yes	1015864-135	
		XDS10-C	0.30	Yes		Combine with AA37
A183	T3-3		0.30	Yes	1015864-135	Combine with A146
		K13-4	0.30	Yes		Combine with AA41
A184	T3-1		0.30	Yes	1015864-135	Combine with A78
		K12-6	0.30	Yes	1015864-137	
A185	T3-2		0.30	Yes	1015864-135	Combine with A54
		K12-2	0.30	Yes	1015864-137	
A186	K3-X2		0.30	Yes	1015864-135	Combine with A60
		K12-4	0.30	Yes	1015864-137	

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A187	J6-b		0.30	Yes	1015864-138	
		K14-3	0.30	Yes	1015864-137	
A188	K11-7		0.30	Yes	1015864-137	Combine with A77
		K14-7	0.30	Yes	1015864-137	
A189	K3-D2		0.30	Yes		Combine with A144
		XDS10-G	0.30	Yes	1015864-139	See note 4
A190	J6-a		0.30	Yes	1015864-138	
		K13-6	0.30	Yes	1015864-135	
A191	J6-D		0.30	Yes	1015864-138	
		K13-9	0.30	Yes	1015864-135	
A192	J6-A		0.30	Yes	1015864-138	
		K13-12	0.30	Yes	1015864-135	
A193	J6-C		0.30	Yes	1015864-138	
		K13-18	0.30	Yes	1015864-135	
A194	E18		0.30	No		See note 2
		J2-N	0.20	No	1016281-181	See note 2
A195	K1-B1		0.30	Yes	1015864-135	Combine with A164
		J2-T	0.20	No		See note 1
A196	J6-Z		0.30	Yes	1015864-138	
		K13-15	0.30	Yes	1015864-135	
A197	XDS5-B		0.30	Yes	1015864-139	Combine with AA17
		K13-3	0.30	Yes	1015864-135	
A198	J2-S		0.20	No		See note 1
		K13-16	0.30	Yes	1015864-135	

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A199	E12		0.30	No		See note 2
		T4-2	0.30	Yes	1015864-139	
A200	E13		0.30	No		See note 2
		K14-2	0.30	Yes	1015864-137	
A201	E14		0.30	No		See note 2
		T4-1	0.30	Yes	1015864-139	
A202	CR7-3		0.30	Yes	1015864-137	
		XDS10-G	0.30	Yes		Combine with A189
A203	K6-6		0.30	Yes	1015864-135	Combine with A27
		TB3-14	0.30	Yes		
A204	TB1-11		0.30	Yes		See note 5
		TB3-15	0.30	Yes		
A205	K6-2		0.30	Yes	1015864-137	Combine with A37
		TB3-3	0.30	Yes		
A206	XF5-1		0.30	Yes	1015864-135	Combine with A10
		CR6-C	0.30	Yes	1015864-137	
A207	CR1-C		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A208	CR2-C		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A209	J4-L		0.20	No	1015818-616	See note 3
		E20	0.30	Yes		See note 2
A210	K6-5		0.30	Yes	1015864-137	
		TB3-13	0.30	Yes		

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A211	K5-1		0.30	Yes	1015864-137	
		E20	0.30	Yes		See note 2
A212	J6-G		0.30	Yes	1015864-138	
		TB3-11	0.30	Yes		
A213	J6-H		0.30	Yes	1015864-138	
		TB3-22	0.30	Yes		
A214	E18		0.30	No		See note 2
		K9-1	0.30	Yes	1015864-137	See note 6
A215	E19		0.30	No		See note 2
		J6-c	0.30	Yes	1015864-138	

Note 1 - Utilize blank contact in connector to make connection at this point.
Note 2 - Connection to this point will be accomplished later.
Note 3 - Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-16 positioner, extraction tool Bendix 11-7880-16, and insertion tool Bendix 11-8107-16 as required.
Note 4 - Do not solder as another lead (A202) will be connected later.

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Note 5 - Combine with leads A36, A111, and A168 at this point.
Note 6 - Remove lead A142 from K9-1 before connecting lead A214. Lead A142 will be reconnected to a new point later.

51. Obtain four electrical insulation sleeves, P/N 1010490-258, two electrical insulation sleeves, P/N 1010490-256, and one electrical insulation sleeve, P/N 1010490-200, and mark with the designation indicated in table 5. (Mark by hand with black ink.)

Table 5. Marking for Sleeves

Qty	Part Number	Identification Mark
1	1010490-258	E12
1	1010490-258	E13
1	1010490-258	E14
1	1010490-256	E17
1	1010490-258	E18
1	1010490-200	E19
1	1010490-256	E20

VII. B. PROCEDURE (CONTINUED)

52. Route loose ends of leads A142, A194, and A214 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

a. Eliminate excessive length and strip insulation 0.30 inch on three leads. (A214 will be crimped in small end of splice reducer.)

b. Insert leads A142 and A194 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

c. Obtain sleeve marked E18 (reference step 51) and slide over loose end of lead A214.

d. Insert lead A214 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

e. Slide sleeve marked E18 over crimped splice reducer and heat shrink in place.

53. Route loose ends of leads A82, A151, A158, and A179 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A82 and A179 will be crimped in small end of splice reducer.)

b. Insert leads A151 and A158 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

c. Obtain sleeve marked E17 (reference step 51) and slide over loose end of leads A82 and A179.

d. Insert leads A82 and A179 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

e. Slide sleeve marked E17 over crimped splice reducer and heat shrink in place.

54. Route loose ends of leads A72, A74, and A201 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1006006-002, as follows:

a. Eliminate excessive length and strip insulation 0.30 inch on three leads.

b. Insert leads A72, A74, and A201 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

VII. B. PROCEDURE (CONTINUED)

c. Obtain sleeve marked E14 (reference step 51) and slide over splice reducer and heat shrink in place.

55. Route loose ends of leads A154, A156, A161, A163, and A200 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

a. Eliminate excessive length and strip insulation 0.30 inch on five leads. (A200 will be crimped in small end of splice reducer.)

b. Insert leads A154, A156, A161, and A163 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

c. Obtain sleeve marked E13 (reference step 51) and slide over loose end of lead A200.

d. Insert lead A200 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

e. Slide sleeve marked E13 over crimped splice reducer and heat shrink in place.

VII. B. PROCEDURE (CONTINUED)

56. Route loose ends of leads A71, A73, A153, A155, A160, A162, and A199 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer P/N 1016006-002, as follows:

a. Eliminate excessive length and strip insulation 0.30 inch on seven leads. (A199, A71, and A73 will be crimped in small end of splice reducer.)

b. Insert leads A153, A155, A160, and A162 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

c. Obtain sleeve marked E12 (reference step 51) and slide over loose end of leads A199, A71, and A73.

d. Insert leads A199, A71, and A73 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

e. Slide sleeve marked E12 over crimped splice reducer and heat shrink in place.

57. Remove leads A143, A150, and A157 from E2 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

58. Route loose end of lead A215 to former E2 location on wiring harness A. Join leads A143, A150, A157, and A215 in kit supplied splice reducer, P/N 1016006-001, as follows:

    a. Eliminate excessive length from lead A215. (A215 will be crimped in large end of splice reducer.)

    b. Strip insulation on all four leads 0.30 inch.

    c. Insert A150, A157, and A215 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    d. Obtain sleeve marked E19 (reference step 51) and slide over loose end of lead A143.

    e. Insert lead A143 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    f. Slide sleeve marked E19 over crimped splice reducer and heat shrink in place.

59. Route loose ends of leads A207, A208, A209, and A211 to common meeting place on wiring harness A. Join these leads in kit supplied reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

    a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A209 will be crimped in small end of splice reducer.)

    b. Insert leads A207, A208, and A211 in large end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E20 (reference step 51) and slide over loose end of lead A209.

    d. Insert lead A209 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E20 over crimped splice reducer and heat shrink in place.

60. Spot tie wiring harness A as required in accordance with ND 1002032,using black lacing tape.

61. Remove wiring harness A identification tag (marked "1902539") from harness. Dispose of identification tag as directed in Section IX of this RIB.

62. Obtain identification band, P/N 1016128-021, from kit lead set. If band has not been marked with "1902620" identification number, mark it with this identification at this time.

VII. B. PROCEDURE (CONTINUED)

63. Secure new identification band to wiring harness A in same location occupied by old identification tag removed in step 61. Use black lacing tape to secure it in place.

64. Remove identification "ASSY 1902249-021" and replace it with "ASSY 1902630-011". Marking shall be in accordance with MIL-STD-130 (ES267).

65. Secure front panel to chassis with six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, removed and retained in step 5.

66. Secure front panel to new bracket, P/N 2901441, with two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, supplied in kit.

67. Secure meter bracket, P/N 1900480, to chassis with three machine screws, P/N 1006783, and self locking nut, P/N AN363C1032, removed and retained in step 6.

68. Remove SPARE 15 AMP and BATTERY 15 AMP fuses and replace with two kit supplied fuses, P/N F02B32V15AS.

VII. B. PROCEDURE (CONTINUED)

68A. Locate Ampere Hour Meter, P/N 1900314, M1, and remove four (4) screws holding plastic dust cover to meter. Retain screws.

68B. Carefully remove plastic dust cover to ensure no damage occurs to gasket.

68C. Lift red pointer until disengaged from inner dial.

68D. Rotate inner dial to gear tooth closest to 30 and engage red pointer to inner dial.

68E. Carefully replace plastic dust cover removed in step 68B using screws removed in step 68A.

69. Perform continuity - resistance checks listed in table 6.

VII. B. PROCEDURE (CONTINUED)

Table 6. Continuity - Resistance Checks

FROM	TO	Indication (ohms)	Conditions
J2-K	J6-d	Less than 1	None
J2-K	J6-d	More than 100K	Press S6 (EMERGENCY HEATER POWER PRESS TO TURN OFF)
J2-C	J6-C	More than 100K	None
J2-E	J6-D	More than 100K	None
J2-F	J6-A	More than 100K	None
J2-G	J6-a	More than 100K	None
J2-S	J6-Z	More than 100K	None
J2-R	J2-M	More than 100K	None
J2-U	J2-M	More than 100K	None
J6-G	J6-H	More than 100K	None
J2-A	J2-H	Less than 1	None
J2-B	J2-J	Less than 1	None
J2-H	J6-L	Less than 1	None
J2-P	J6-N	Less than 1	None
J6-L	J6-V	Less than 1	None
J6-W	J6-K	Less than 1	None
J6-c	J6-T	Less than 1	None

70. Recalibrate potentiometer R13 as follows:

a. Install jumper lead between TB3-3 and TB3-13.

VII. B. PROCEDURE (CONTINUED)

b. Turn R13 to clockwise limit.

c. Connect ohmmeter to pins L and N on connector J4. (Open indicates K5 is de-energized while short indicates K5 is energized.)

d. Apply 38 (±0.2) volts dc (hi) to J3-A and (lo) to J3-J.

e. Turn R13 counterclockwise to point where relay K5 energizes.

f. Decrease applied voltage to 33.5 (±0.5) volts dc.

g. Remove voltage applied to J3. Relay K5 shall de-energize.

h. Reapply 33.5 (±0.5) volts dc to same points on J3. Relay K5 shall not re-energize.

i. Slowly increase voltage at J3. Relay K5 shall energize at 38.0 (±0.2) volts dc. If relay K5 does not energize within 38.0 (±0.2) volt dc range, readjust R13 as necessary and repeat steps f through i until proper R13 setting is obtained. (Turning R13 clockwise increases voltage set point. One turn will result in approximate change of 0.25 volt.)

VII. B. PROCEDURE (CONTINUED)

j. Remove voltage applied to J3.

k. Remove ohmmeter from J4.

l. Remove jumper lead between TB3-3 and TB3-13.

71. Install jumper lead between J2-L and J2-M.

72. Connect panel power cable to 115 volt ac source.

73. Set ICTC POWER switch to ON. 115V LINE POWER and PTC OPERATING indicators shall light. (Inhibit alarm if necessary.)

74. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

75. Continuity shall exist between points listed in table 7.

Table 7. Closed Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

76. Apply 25.0 (±0.2) volts dc (hi) to J6-G and (lo) to J6-H.

77. Check to insure the following conditions exist:

a. PTC OPERATING and PTC OFF ALARM RESET indicators shall not be lighted.

b. G&N ON/PTC INHIBITED indicator shall be lighted.

c. Alarm shall not ring.

d. No voltage shall exist between J2-U and J2-R and between J2-U and J2-M.

e. No continuity shall exist between points listed in table 8.

Table 8. Open Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

78. Remove 25 volts dc applied to J6.

79. Set ICTC POWER switch to OFF.

80. Disconnect panel power cable from 115 volt ac source.

81. Remove jumper lead connected between J2-L and J2-M.

82. Connect jumper lead between J6-b and J6-F.

83. Connect 17 (±1) ohm "Load" between J6-K and J6-L, using one 10 ohm, 100 watt, resistor, one 5 ohm, 50 watt resistor, and one two ohm, 25 watt resistor.

84. Connect common input-output terminal of auto transformer (Variac) to J2-R and J2-H.

85. Connect other input terminal of variac to J2-U.

86. Connect variable output terminal of variac to J2-B.

87. Set variac for zero output.

88. Connect panel power cable to 115 volt ac source.

89. Set ICTC POWER switch to ON.

90. Adjust variac for output of 28.0 (±0.3) volts ac.

VII. B. PROCEDURE (CONTINUED)

91. Check for voltage drop of 31.5 (±1.0) volts ac across "load" resistance (added in step 83).

92. Remove panel power cable from 115 volt ac source.

93. Remove jumper lead connected between J6-b and J6-F.

94. Decrease "load" resistance to 10 (±1) ohms by removing the 5 ohm and 2 ohm resistors.

95. Connect panel power cable to 115 volt ac source.

96. Check for voltage drop of 23.5 (±1.0) volts ac across "load" resistor.

96A. Set ICTC POWER switch to OFF.

96B. Disconnect panel power cable from 115 volt ac cource.

96C. Remove "load" resistor and variac (used for testing) from battery power pack panel assembly.

VII. B. PROCEDURE (CONTINUED)

96D. Hold battery power pack panel assembly in its normal horizontal plane (position it assumes when mounted in battery power pack case) and shake vigorously. (Shaking the panel will insure no air pockets exist in the mercury pool within the ampere hour meter. Air pockets can impair proper operation of the meter.)

96E. Reinstall modified battery power pack panel assembly in battery power pack case. Insure P3 is connected to J3 and P4 is connected to J4.

96F. Transfer serial number from existing nameplate on battery power pack assembly to new nameplate, P/N 1004260-510, supplied in kit. Use 1/8 inch high character metal stamp set to imprint data.

96G. Remove existing nameplate from battery power pack assembly. Dispose of nameplate as directed in Section IX of this RIB. Retain four screws to secure new nameplate.

97. Secure new nameplate on battery power pack assembly with four screws retained in step 96G. Apply sealing and retaining compound (MIL-S-22473, grade H) to threads of four screws before installing.

98. Install jumper lead between J2-L and J2-M.

VII. B. PROCEDURE (CONTINUED)

99. Connect 20 VA load (normal inverter load) between J2-U and J2-R. 20 VA load is 775 (±1%) ohms in parallel with 3.33 (±5%) henries.

100. Connect panel power cable to 115 volt ac source.

NOTE: Inhibit alarms in following steps as necessary.

101. Set ICTC POWER switch to ON.

102. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

103. Apply 25.2 (±0.2) volt dc (hi) to J6-G and (lo) to J6-H.

104. Check to insure that 115 volts ac exists between J2-T and J2-M and zero voltage between J2-U and J2-R.

105. Disconnect panel power cable from 115 volt ac source and check for the following indications:

a. Zero voltage between J2-T and J2-M.

b. G & N ON/PTC INHIBITED indicator remains lighted.

VII. B. PROCEDURE (CONTINUED)

c. PTC OPERATING indicator not lighted.

d. No alarms ring.

e. INVERTER POWER indicator shall be lighted.

106. Remove 28 volt power applied to J6.

107. Set ICTC POWER switch to OFF.

108. Install jumper lead between J2-K and J2-N.

109. Connect panel power cable to 115 volt ac source.

110. Set ICTC POWER switch to ON.

111. Inhibit alarm bell by pressing 115V LINE POWER indicator-switch.

112. Check to insure 115 volts ac exist between J2-T and J2-M.

113. Disconnect panel power cable from 115 volt ac source and check for the following indications.

a. 115 volts ac shall not exist between J2-T and J2-M.

VII. B. PROCEDURE (CONTINUED)

b. Alarm bell shall not ring.

c. Battery voltage of 28 (+7, -3) volts dc shall exist between J2-P (hi) and J2-N (lo).

d. EMERGENCY HEATER POWER indicator-switch shall be lighted. Pressing this indicator-switch shall not turn indicator off.

114. Connect panel power cable to 115 volt ac source and check for the following indications.

a. Battery voltage of 28 (+7, -3) volts dc shall not exist between J2-P (hi) and J2-N (lo).

b. 115 volts ac shall exist between J2-T and J2-M.

c. Alarm bell shall not ring.

d. EMERGENCY HEATER POWER indicator-switch shall not be lighted.

115. Set ICTC POWER switch to OFF.

116. Disconnect panel power cable from 115 volt ac source.

VII. B. PROCEDURE (CONTINUED)

117. Remove all jumper leads.

118. Reinstall modified battery power pack cover (with cable in stored positions) on battery power pack assembly.

119. Update Acceptance Data Package as indicated in Section VIII of this RIB.

VII. PROCEDURE (CONTINUED)

C. DETAILED INSTRUCTIONS FOR MODIFICATION OF COVER, P/N 1902541. Perform modification as follows:

1. Remove cable W100, P/N 1900955, from storage location in cover and set aside.

2. Remove cable W101, P/N 1900954, from storage location in cover and modify as directed in paragraph D of Section VII in this RIB.

3. Remove dummy receptacle, P/N 1016073-183, from cover. (This dummy receptacle is located in area exposed by section view A-A in figure 8.) Retain dummy receptacle and securing hardware.

4. Enlarge one of four vacated dummy receptacle mounting holes (shown in figure 8, section view A-A) to 0.164 to 0.171 inch diameter, using number 36 twist drill.

5. Touch up inner surfaces of other three vacant mounting holes with MIL-P-8585 primer and cashmere blue enamel paint, P/N 1016194. (These three holes will not be reused for mounting parts.)

6. Locate mark and drill two 0.216 to 0.224 inch diameter through holes in top of cover as shown in figure 8. Use 7/32 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

7. Locate, mark and drill three 0.201 to 0.209 inch diameter through holes in top of cover as shown in figure 8. Use number 5 size twist drill to drill holes.

8. On side of cover where four dummy receptacles are presently mounted, perform the following:

   a. Locate, mark and drill two clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view B-B. Use number 29 size twist drill to drill holes.

   b. Locate, mark and drill one cluster (4 holes) of 0.102 to 0.108 inch diameter through holes as shown in figure 8, section view B-B. Use number 37 size twist drill to drill holes.

9. On side of cover opposite side containing four dummy receptacles, locate, mark and drill six clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view C-C. Use number 29 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

10. Using 1/8 inch rubber stamp and black marking ink, apply markings "W-189", "W-100", "W-186", "W-187", "W-188", and "W-192" to inner surface of cover in locations shown in figure. (W-186, W-187, and W-188 markings shall appear in two locations.)

11. Remove instruction foilcal, P/N 1902540, from inner surface of cover. Dispose of foilcal as directed in Section IX of this RIB.

    WARNING: Methyl-Ethyl-Ketone is toxic and flammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

    NOTE: Insure mounting surface is clean prior to applying new instruction plate.

12. Obtain instruction plate, P/N 2901442, from kit and apply methyl-ethyl-ketone to activate adhesive backing on plate. Allow activated adhesive to air dry until surface becomes tacky before performing next step.

13. Mount new instruction plate in same location as previously occupied by removed foilcal. Insure orientation of plate is as indicated in figure 8. (Bottom edge being nearest to assembly identification mark on cover.)

VII. C. PROCEDURE (CONTINUED)

14. Obtain dummy receptacle, P/N 1016073-183, and securing hardware set aside in step 3 and install on cover as shown in figure 9.

15. Obtain dummy receptacle, P/N 1016073-103, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

16. Obtain box mounting receptacle (housing only), P/N 1897424-001, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-12, and self locking nuts, P/N 1016151-002.

17. Obtain three dummy receptacles, P/N 1016073-143, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

18. Obtain three dummy receptacles, P/N 1016073-163, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

19. Obtain protective cap, P/N MS3181-16C, from kit and secure end of attached chain to hole in cover which was enlarged in step 4. Reference figures 8 and 9. Use kit supplied machine screw, P/N 1006783-23, and self locking nut, P/N 1016151-006, to secure it in place.

VII. C. PROCEDURE (CONTINUED)

20. Obtain cable clamp, P/N 1010400-006, from kit and secure to cover as shown in figure 9, using two kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N 1016151-010 (AN363C1032). Insure orientation of clamp is as shown in figure 9.

21. Obtain three clamps, P/N 1016105-004, from kit and secure to three new points on cover as shown in figure 9, using three kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N AN363C1032. Insure orientation of clamps is as shown in figure 9.

22. Remove identification mark "1902541" from inner surface of cover and replace with new identification number "1902632". Marking shall be in accordance with MIL-STD-130 (ES267).

23. Obtain and install cable W192 in cover as shown in figure 9.

24. Reinstall cable W100 in cover as shown in figure 9.

25. Obtain cables W186, W187, and W188 and mount in cover as shown in figure 9.

26. Obtain cable W189 (cable W101 becomes cable W189 after it is modified per this RIB) and mount in cover as shown in figure 9.

VII. PROCEDURE (CONTINUED)

D. DETAILED INSTRUCTIONS FOR MODIFICATION OF INTERCONNECT CABLE W101 (BPP TO IMU), P/N 1900954. Perform modification as follows:

1. Cut and remove cable identification sleeve (marked 1900954) from cable. Dispose of sleeve as directed in Section IX of this RIB.
2. Loosen two screws on connectors P1 and P2.
3. Cut and remove connector P1 and P2 identification sleeves from cable. Dispose of sleeves as directed in Section IX of this RIB.
4. Extract all leads from connector P2, using Bendix 11-7880-20 extraction tool.
5. Remove connector, grommet and telescoping bushing from P2 end of cable. Dispose of removed parts as directed in Section IX of this RIB.
6. Cut and remove tubing which covers cable. Dispose of tubing as directed in Section IX of this RIB.
7. Remove P1 telescoping bushing from cable. Retain two bushings, P/N AN3420-12A and P/N AN3420-16, for later reassembly and dispose of two bushings (with smallest inner diameter) P/N AN3420-6A and P/N AN3420-8A, as directed in Section IX of this RIB.

VII. D. PROCEDURE (CONTINUED)

8. Remove strain relief clamp, connector back shell and grommet insert from rear of connector P1 to permit access to P1 solder wells.
9. Unsolder lead A2 from P1-B and resolder to P1-Z.
10. Obtain leads A10 through A13 from kit lead set and install in cable as indicated in table 9. Accessory items are furnished in kit supplied connector, P/N 1897422-004.

Table 9. Cable Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A10	P1-G	P2-G	0.30 0.22	Yes No	MS3193A-20A	See note 1
A11	P1-H	P2-H	0.30 0.22	Yes No	MS3193A-20A	See note 1
A12	P1-F	P2-F	0.30 0.22	Yes No	MS3193A-20A	See note 1
A13	P1-b	P2-b	0.30 0.22	Yes No	MS3193A-20A	See note 1

Note 1 - Extract contact from applicable positions in kit supplied connector, using Bendix 11-7880-20 extraction tool. Crimp contact on lead using Buchanan MS3191-A crimping tool with Buchanan MS3191-20 positioner.

VII. D. PROCEDURE (CONTINUED)

11. Reinstall grommet insert and connector back shell on rear of connector P1.
12. Obtain zipper tubing, P/N 1902621-005, from kit and install on cable.
13. Obtain P1 identification sleeve, P/N 2901475, from kit and install on cable at P1. Position sleeve such that lettering reads away from P1 and that end of sleeve will lie under strain relief clamp. Heat shrink sleeve in place.
14. Reinstall at connector P1, two telescoping bushings, P/N AN3420-12A and P/N AN3420-16, removed and retained in step 7.
15. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads and that bushings and sleeves are properly positioned in strain relief clamp before tightening screws.
16. Obtain cable identification sleeve, P/N 1902621-004, from kit. If sleeve has not been marked with identification number "2901446", mark it with this identification at this time. Marking should be white and 0.25 inch high.

VII. D. PROCEDURE (CONTINUED)

17. Slide cable identification sleeve, P/N 1902621-004, on cable to approximate center location and heat shrink in place.
18. Obtain P2 identification sleeve, P/N 2901199, from kit and position on P2 end of cable such that lettering reads away from P2. Do not heat shrink in place at this time.
19. Obtain strain relief grommet, P/N 1016282-16, from kit and slide on cable.
20. Install cable leads in kit supplied connector, P/N 1897422-004, (new connector P2) as indicated in table 10.

Table 10. New Connector P2 Termination

Lead Identification	Connector P2 Termination
A1	a
A2	P
A3	N
A4	Z
A5	K
A6	X
A7	R
A8	V
A9	W
A10	G
A11	H
A12	F
A13	b

VII. D. PROCEDURE (CONTINUED)

21. Fill unused holes in connector P2 with excess contacts obtained in step 20.

22. Fill unused holes in connector P2 grommet with plug end seals, P/N 1897370-001, supplied in kit.

23. Position P2 identification sleeve such that end of sleeve will lie under strain relief clamp on P2 connector. Heat shrink sleeve in place.

24. Position strain relief grommet under P2 connector strain relief clamp.

25. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads before tightening screws.

26. Check for an indication of less than one ohm between the points listed in table 11.

Table 11. Cable W189 Continuity Check

From P1-	To P2-
A	N
C	a
D	Z
F	F
G	G
H	H
I	W

From P1-	To P2-
J	V
W	R
X	X
Z	P
a	K
b	b

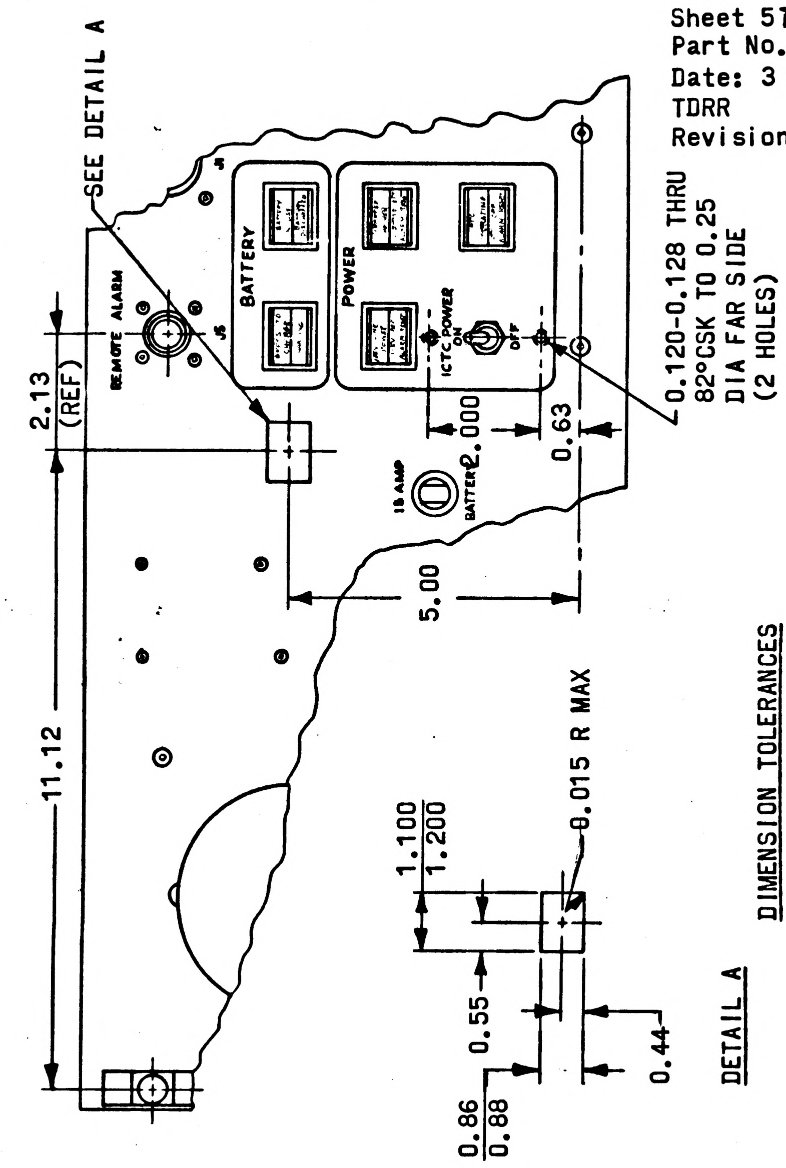

SEE DETAIL A
REMOTE ALARM
J5
BATTERY
POWER
ICTC POWER
ON
OFF
15 AMP
BATTERY
2.000
0.63
0.120-0.128 THRU
82°CSK TO 0.25
DIA FAR SIDE
(2 HOLES)
2.13
(REF)
5.00
11.12
1.100
1.200
0.015 R MAX
0.55
0.86
0.88
0.44
DETAIL A
DIMENSION TOLERANCES
2 PLACE DECIMAL ±.02
3 PLACE DECIMAL ±.005

Figure 1. NEW HOLE IN FRONT PANEL

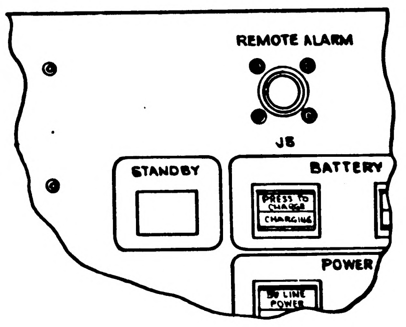

REMOTE ALARM
J5
STANDBY
BATTERY
PRESS TO CHARGE
CHARGING
POWER
LINE POWER

Figure 2. INSTALLED LAMP INDICATOR ASSEMBLY DECAL

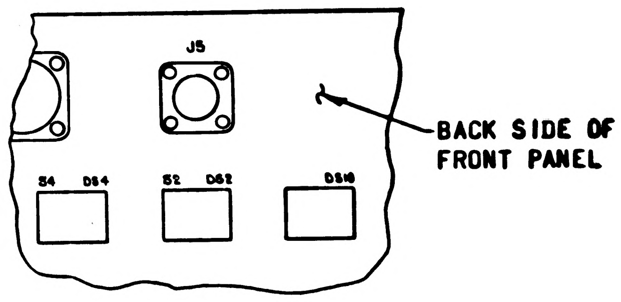

J5
S4
DS4
S2
DS2
DS16
BACK SIDE OF
FRONT PANEL

Figure 3. LAMP INDICATOR ASSEMBLY IDENTIFICATION

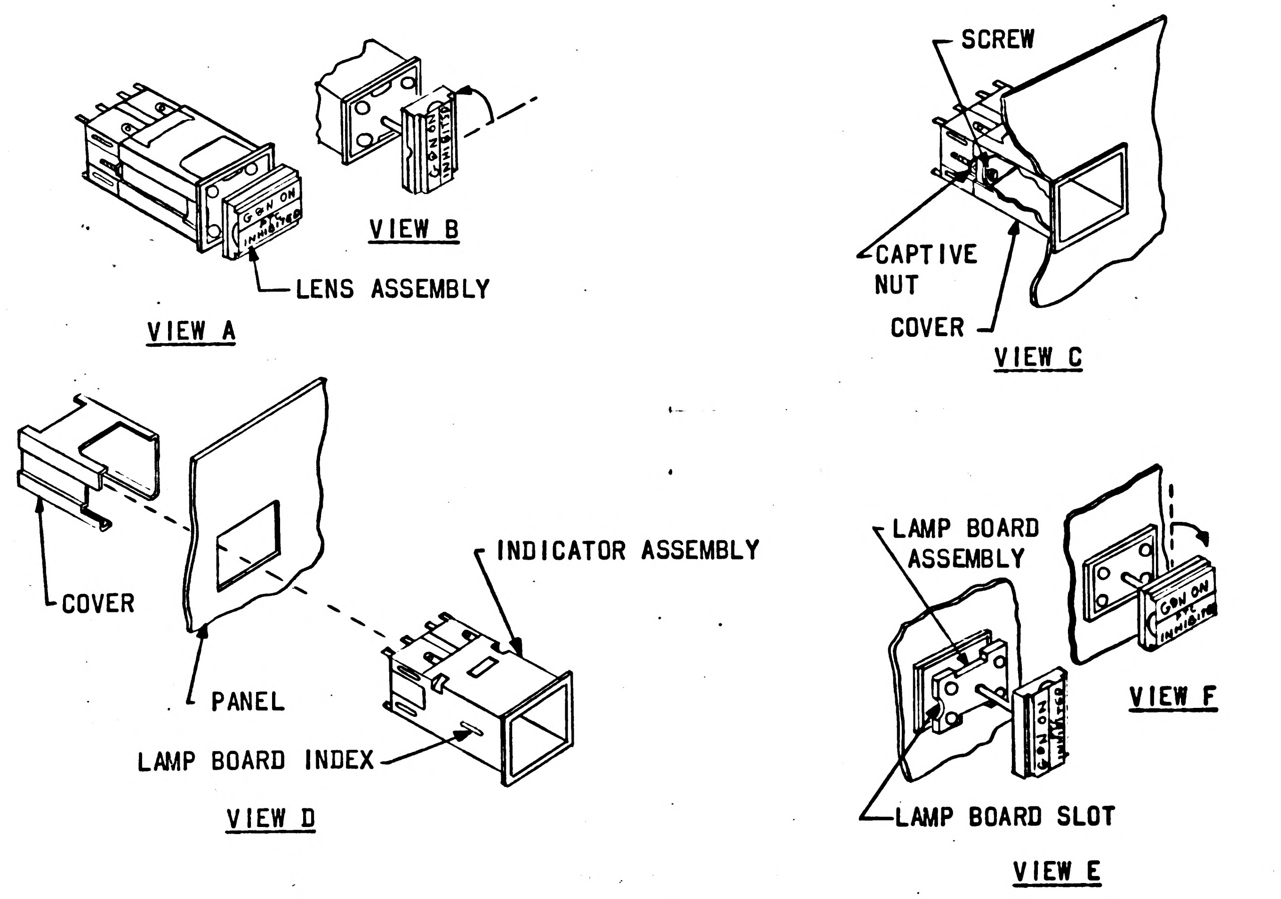

VIEW B
LENS ASSEMBLY
VIEW A
SCREW
CAPTIVE NUT
COVER
VIEW C
INDICATOR ASSEMBLY
COVER
PANEL
LAMP BOARD INDEX
VIEW D
LAMP BOARD ASSEMBLY
VIEW F
LAMP BOARD SLOT
VIEW E

Figure 4. INSTALLATION OF LIGHT-INDICATOR ASSEMBLY

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TDRR
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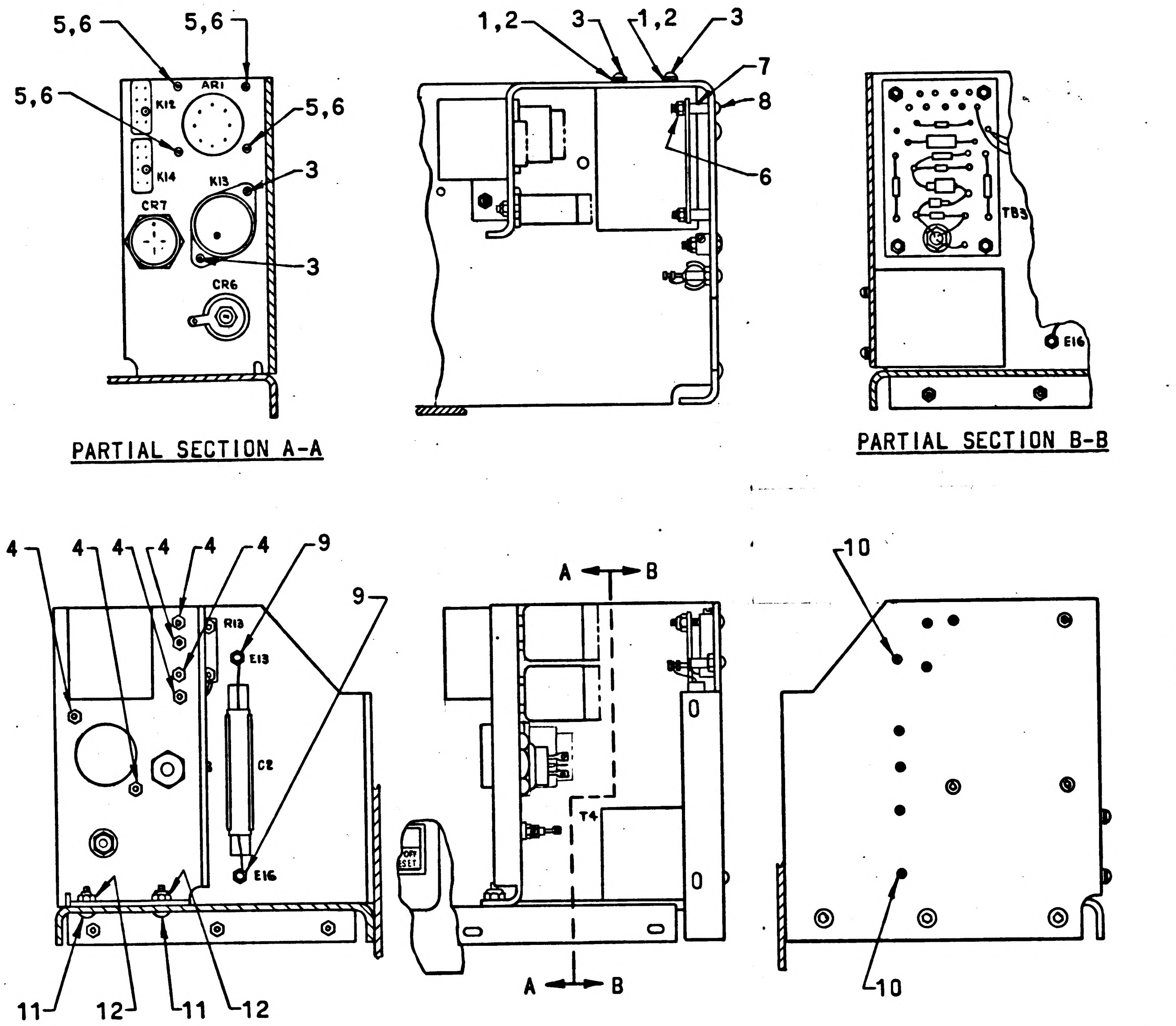
5,6
5,6
5,6
5,6
AR1
K12
K14
K13
CR7
CR6
3
3
PARTIAL SECTION A-A
1,2
3
1,2
3
7
8
6
TB3
E16
PARTIAL SECTION B-B
4
4
4
4
4
4
9
9
R13
E13
C2
E16
11
12
11
12
A
B
T4
A
B
10
10

Figure 5. NEW BRACKET AND ATTACHED PARTS

LEGEND

1. LOCK WASHER, P/N MS35338-79
2. FLAT WASHER, P/N AN960C6L
3. BUTTON HD SCREW, P/N 1006783-22
4. SELF LOCKING NUT, P/N 1012525-004
5. BUTTON HD SCREW, P/N 1006783-19
6. LOCKWASHER, P/N MS35338-78
7. SPACER, P/N 1015860-001
8. BUTTON HD SCREW, P/N 1006783-24
9. TERMINAL STUD, P/N 1010676-1
10. BUTTON HD SCREW, P/N 1010618-13
11. MACHINE SCREW, P/N 1006783-45
12. SELF LOCKING NUTS, P/N AN363C1032

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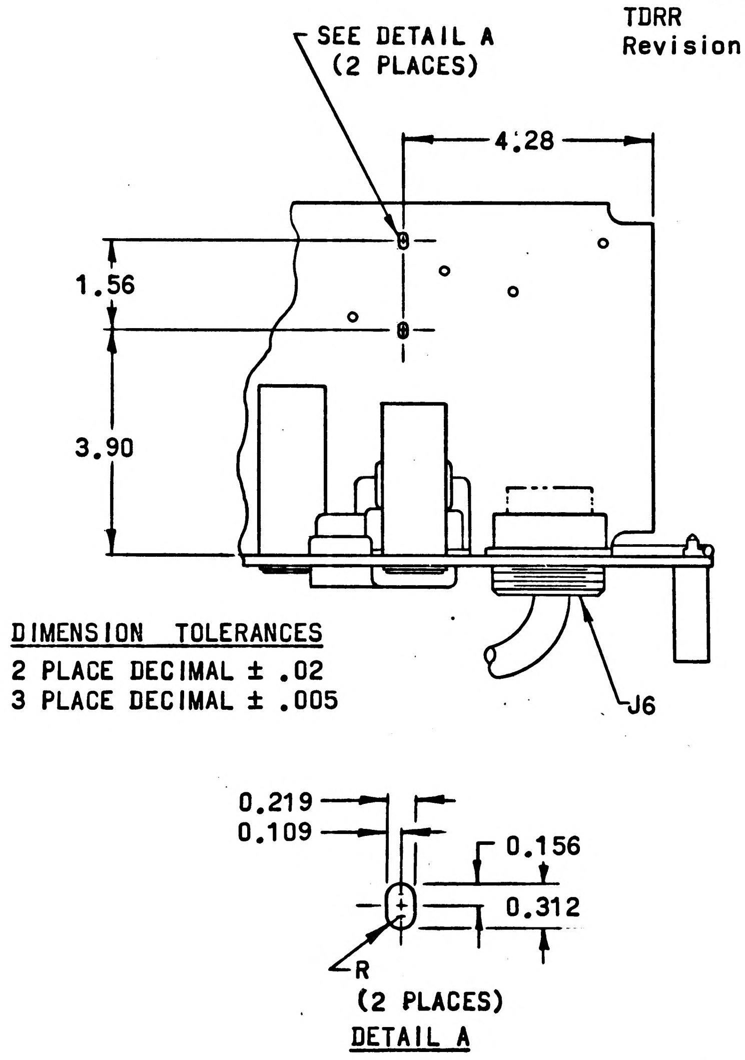
SEE DETAIL A
(2 PLACES)
4.28
1.56
3.90
J6
DIMENSION TOLERANCES
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005
0.219
0.109
0.156
0.312
R
(2 PLACES)
DETAIL A

Figure 6. NEW HOLES IN CHASSIS (TOP VIEW)

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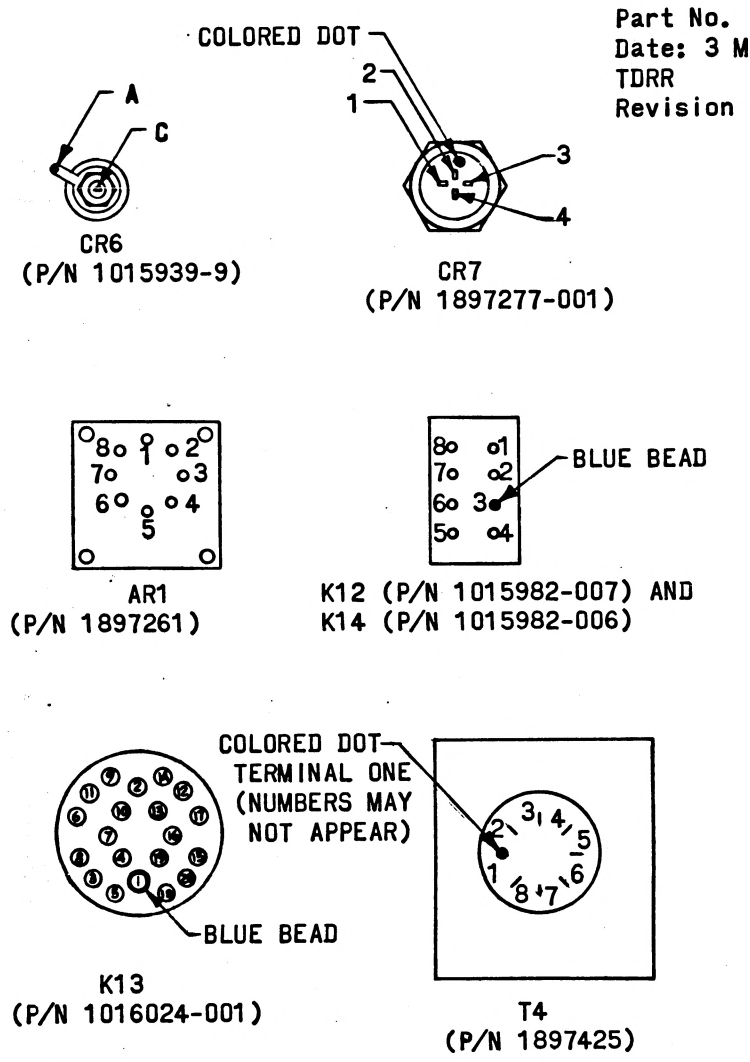
A
C
CR6
(P/N 1015939-9)
COLORED DOT
2
1
3
4
CR7
(P/N 1897277-001)
8 1 2
7 3
6 4
5
AR1
(P/N 1897261)
8 1
7 2
6 3
5 4
BLUE BEAD
K12 (P/N 1015982-007) AND
K14 (P/N 1015982-006)
BLUE BEAD
K13
(P/N 1016024-001)
COLORED DOT
TERMINAL ONE
(NUMBERS MAY
NOT APPEAR)
1 2 3 4 5 6 7 8
T4
(P/N 1897425)

Figure 7. TERMINATION IDENTIFICATIONS

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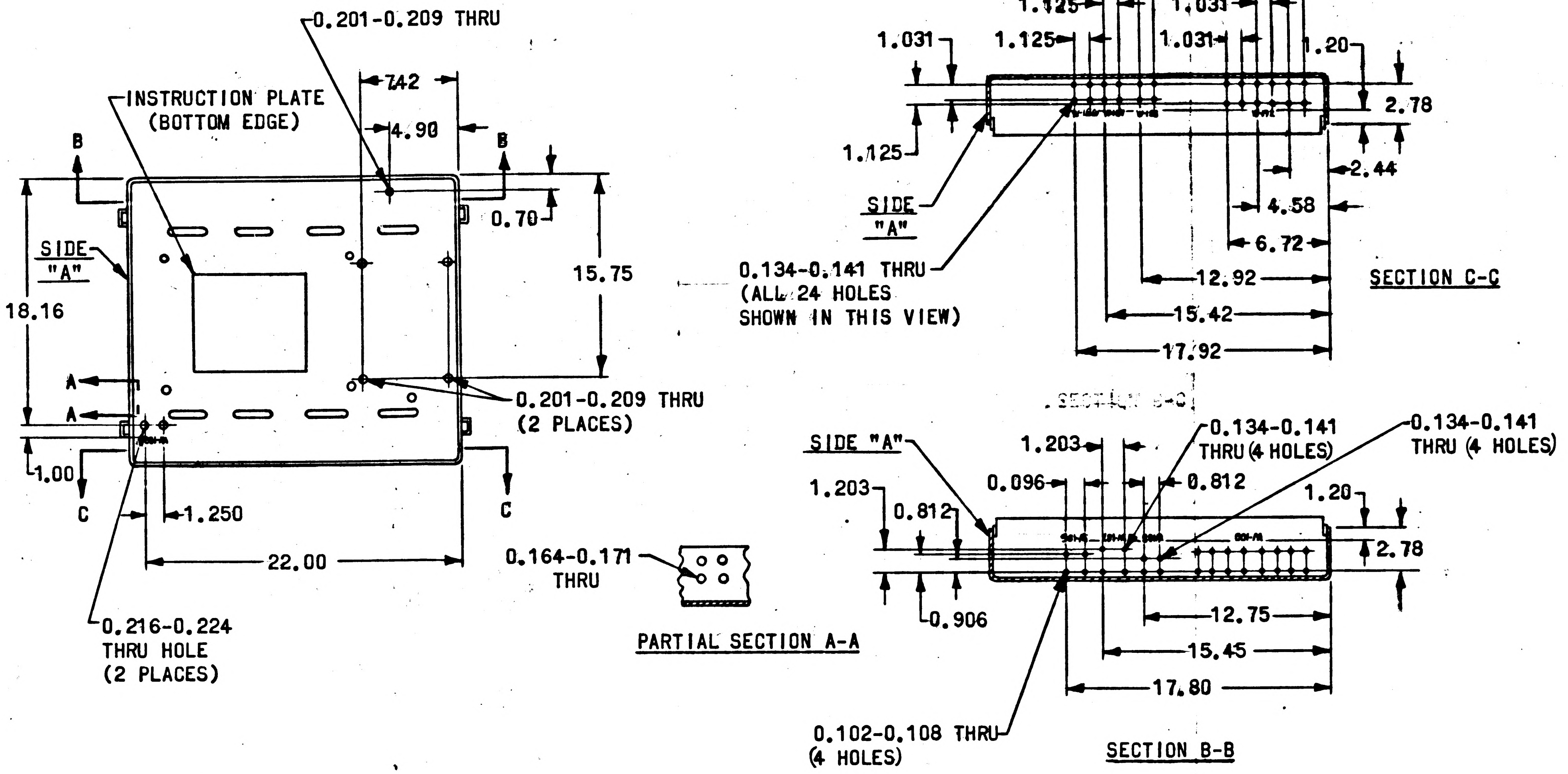
DIMENSION TOLERANCES
(UNLESS OTHERWISE SPECIFIED)
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005



0.201-0.209 THRU
INSTRUCTION PLATE
(BOTTOM EDGE)
7.42
4.90
B
B
0.70
SIDE
"A"
18.16
15.75
A
A
1.00
C
C
1.250
22.00
0.201-0.209 THRU
(2 PLACES)
0.216-0.224
THRU HOLE
(2 PLACES)
0.164-0.171
THRU
PARTIAL SECTION A-A
1.125
1.031
1.125
1.031
1.031
1.125
1.031
1.20
2.78
1.125
2.44
SIDE
"A"
4.58
6.72
0.134-0.141 THRU
(ALL 24 HOLES
SHOWN IN THIS VIEW)
12.92
15.42
17.92
SECTION C-C
SIDE "A"
1.203
0.134-0.141
THRU (4 HOLES)
0.134-0.141
THRU (4 HOLES)
0.096
0.812
1.203
0.812
1.20
2.78
0.906
12.75
15.45
17.80
0.102-0.108 THRU
(4 HOLES)
SECTION B-B

Figure 8. BATTERY POWER PACK COVER

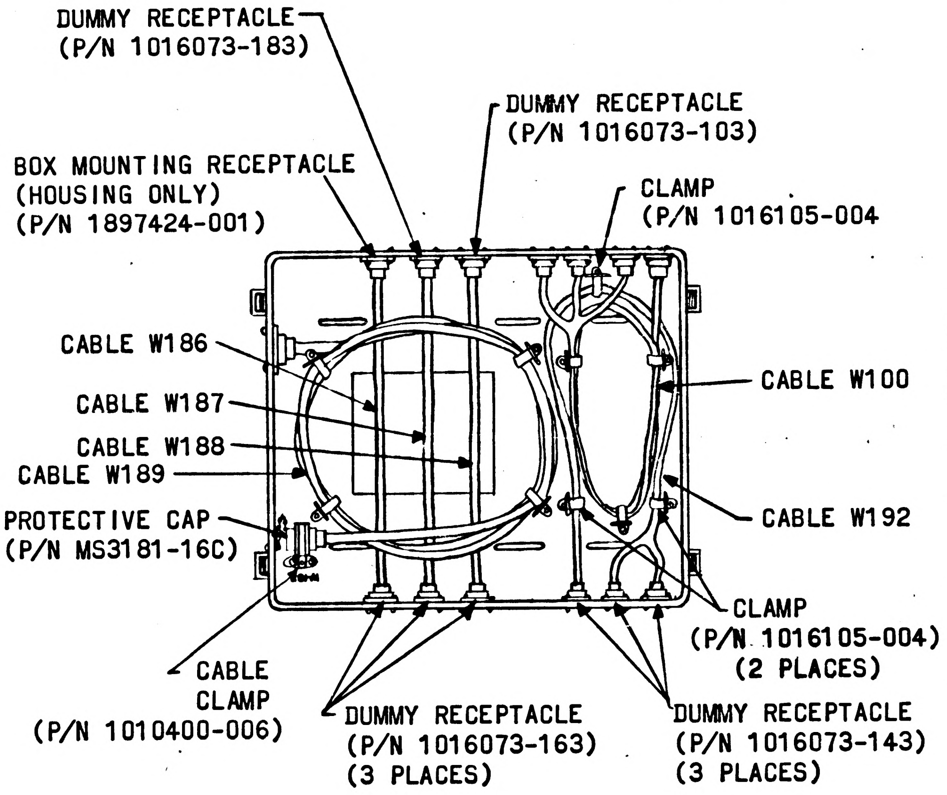

DUMMY RECEPTACLE
(P/N 1016073-183)
DUMMY RECEPTACLE
(P/N 1016073-103)
BOX MOUNTING RECEPTACLE
(HOUSING ONLY)
(P/N 1897424-001)
CLAMP
(P/N 1016105-004
CABLE W186
CABLE W187
CABLE W188
CABLE W189
CABLE W100
PROTECTIVE CAP
(P/N MS3181-16C)
CABLE W192
CLAMP
(P/N 1016105-004)
(2 PLACES)
CABLE
CLAMP
(P/N 1010400-006)
DUMMY RECEPTACLE
(P/N 1016073-163)
(3 PLACES)
DUMMY RECEPTACLE
(P/N 1016073-143)
(3 PLACES)

Figure 9. MODIFIED COVER WITH CABLES IN STOWED POSITIONS

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.
2. Make necessary entry in the Equipment Inventory Record.
3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

B. The significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041
Battery Power Pack Panel Assembly	1902249-021	1902630-011
Front Panel	1902179	1902629
Chassis	1902135	1902631
Wiring Harness A	1902539	1902620

VIII. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Wire List AA	1902190	1902622
Battery Power Pack Cover	1902541	1902632
*Cable Interconnect W101 (BPP to IMU)	1900954	2901446

*Cable name changes to "Cable Interconnect W189 (BPP to IMU)" upon completion of modification.

IX. DISPOSITION OF PARTS REMOVED

A. One connector-plug, P/N MS3126F18-32SX, (1897092-322) and two fuses, P/N F02A32V15AS, (1897099-117) shall be returned to stock as spares per AC Electronics, Logistics (Department 38-09) direction.

B. One resistor, P/N RE75G2490, (1896892-327) shall be transferred to full custody of the government via DD543 form (Inventory Schedule).

C. Scrap all parts not listed above, via AC Electronics form MIL-127 or equivalent.

Sheet 1 of 66
Part No. 0102092
Date: 3 MAY 66
TDRR 30013
Revision D

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR BATTERY POWER PACK ASSEMBLY, P/N 1900011-031

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	30013	ALL INITIAL RELEASE			
Ⓜ B	30002	1, 4, 6, 24, 25			14 JUL 66
Ⓜ C	30502	1, 35, 35A			10 AUG 66
D	32258	1, 5, 7, 10, 13, 22, 24, 25, 27, 35, 43, 44, 47, 48, 63			16 DEC 66

Prepared by D Lund Date 5 May 1966

P.C. Engineering Approval R.B. Bruckman Date 16/May/66

Design Review Board Approval E A Olson Date 5 July 66

MIT/IL Approval M C Muly Date 7-5-66

NASA Approval A. C. METZGER Date

MIT Reliability Date

Sheet 2 of 66
Part No. 0102092
Date: 3 MAY 66
TDRR
Revision A

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Battery Power Pack Assembly, P/N 1900011-031. This modification will add the capability of using this assembly with Block II/LEM units, in conjunction with PTC P/N 1900496 as well as PTC P/N 2900060.

II. AUTHORITY

This retrofit is authorized by Block II/LEM contract NAS9-497 (CCA 497-0169).

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041

IV. PRIORITY CHANGES

Not applicable.

Sheet 3 of 66
Part No. 0102092
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Revision A

V. RELATED CHANGES

RIB 0102110 and RIB 0102111.

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102205, consisting of the following items is required to modify a Battery Power Pack Assembly, P/N 1900011-031.

Qty	Part Number	Description
1	0102092	Retrofit Instruction Bulletin
1	1016024-001	Relay, armature
1	1015982-006	Relay, armature
1	1897277-001	Rectifier bridge
1	1897261	Comparator
1	1897337-101	Light indicator assembly
1	1015982-007	Relay, armature
2	F02B32V15AS	Fuse (1897099-133)
1	1004260-510	Nameplate
1	1902621	Lead set
1	1897425	Transformer
1	CL25BJ151UP3	Capacitor (1897081-320)
2	1006783-45	Screw, button head
1	2901438	Component board assembly
4	1015860-001	Spacer
10	1012525-004	Nut
4	1006783-24	Screw, button head
4	AN960C6L	Washer, flat (1897006-036)

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VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
4	MS35338-79	Washer, lock
6	1006783-22	Screw, button head
2	1010676-1	Terminal, stud, insulated
2	1010618-13	Screw, button head, self locking
7	AN363C1032	Nut, self locking (1016151-010)
4	1016006-002	Splice reducer
2	1016006-003	Splice reducer
4	1010490-258	Sleeving, electrical insulation
2	1010490-256	Sleeving, electrical insulation
1	1015818-616	Contact, socket
27	1015864-135	Sleeving, electrical insulation
25	1015864-137	Sleeving, electrical insulation
11	1015864-139	Sleeving, electrical insulation
9	1015864-138	Sleeving, electrical insulation
2	1016281-181	Contact, socket
1	2901441	Bracket assembly (inseparable)
1	2901442	Plate, instruction
1	1902626	Decal, functional area
1	1010490-200	Sleeving, electrical insulation
1	1016006-001	Splice reducer
1	2901443	Cable W186
1	2901444	Cable W187
1	2901445	Cable W188
1	2901447	Cable W192
32	1006783-19	Screw, button head
4	MS35338-78	Washer, lock
1	1897422-004	Connector, electrical
1	2901199	Sleeve, identification

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	2901475	Sleeve, identification
9	1897370-001	Plug, end seal
1	1016282-16	Grommet, connector strain relief
3	1016073-143	Dummy receptacle
3	1016073-163	Dummy receptacle
1	1016073-103	Dummy receptacle
1	1897424-001	Box mounting receptacle (housing only)
1	1010400-006	Cable clamp
1	MS3181-16C	Cap, protective
1	2901533	Guard, switch
2	MS35200-15	Screw, flat head
3	1016105-004	Clamp
28	1016151-004	Nut, self locking
5	1006783-44	Screw, machine
4	1016151-002	Nut, self locking
1	1006783-23	Screw, machine
1	1036151-006	Nut, self locking
4	1006783-12	Screw, machine

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
1	*ACSP 63L12A	Inductor, 3.33 (±3%) henries 300 ma ac-dc, 1 ohm max.
1	*Dale, type RH25 (Allied Catalog No.660, stock no. 26Z360C)	Resistor, 600 (±1%) ohm, 25 watt

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Dale, type RH10 (Allied Catalog no. 660, stock no. 26Z352C)	Resistor, 175 (±1%) ohm, 10 watt
AR	N/A	Primer (MIL-P-8585)
AR	N/A	Paint, semi-gloss enamel, light gray (FED-STD-595 color 26440) (TT-E-529, class B)
AR	N/A	Varnish (MIL-V-6894A, unreduced)
1	*Schwaab Stamp & Seal Co., type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
AR	N/A	Lacquer thinner (MS35626)
AR	N/A	Clear lacquer (MIL-L-73A)
AR	N/A	Black marking ink
AR	N/A	Solder (QQ-S-571, SN60WRAP)
1	*Master Appliance, G7673A	Heat gun (300°F)
1	Buchanan MS3191-A	Crimping tool
1	Bendix 11-7758	Positioner
1	Bendix 11-8107-16	Insertion tool
1	Bendix 11-7880-16	Extraction tool
1	Burndy Y10MRF-4	Crimping tool
AR	N/A	Lacing & tying tape (MIL-T-713C, black, type P, class 2)

*or equivalent

VI. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/8 inch alphanumerical
AR	N/A	Sealing & retaining compound (MIL-S-22473, grade H & HV)
1	Buchanan MS3191-20	Positioner
AR	MIL-I-631	Filler tape, type F, form T, (black) grade A, class I, 0.62 inch wide, 0.020 inch thick
1	Any hi-speed	7/32 size twist drill
1	Any hi-speed	Number 5 twist drill
1	Any hi-speed	Number 29 twist drill
1	Any hi-speed	Number 37 twist drill
1	Any hi-speed	Number 39 twist drill
1	Any hi-speed	1/8 size twist drill
1	*Cleveland Twist Drill Co.	80° countersink
1	*General Radio Co, model W5MT3	Auto-transformer (Variac)
AR	N/A	Methy-Ethyl-Ketone (TT-M-261)
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z795C)	Resistor, 10 ohm (±5%), 100 watt
1	*Ohmite (Allied Catalog no. 660 Stock no. 25Z783C)	Resistor, 5 ohm (±5%), 50 watt
1	*Ohmite (Allied Catalog no. 660, Stock no. 25Z776C)	Resistor, 2 ohm (±5%), 25 watt

*or equivalent

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

3. Where marking is specified, hand marking is acceptable.

4. Use heatsink device when unsoldering or soldering near semi-conductors.

5. Ink markings:

   a. Markings to be removed should be removed using lacquer thinner.

   b. New markings shall be covered with a coat of clear flat lacquer after ink has dried.

6. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties will be added after all conductor rework has been completed.

VII. A. PROCEDURE (CONTINUED)

7. Delete conductors from wiring harness, when instructed, by one of the two following methods:

   a. Method One. (preferred)

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Pull conductor out of harness at most convenient point and discard.

   b. Method Two.

      (1) Disconnect conductor from its termination points.

      (2) Clip attached termination hardware and/or exposed tinned tip(s) from all conductor ends and discard.

      (3) Apply a drop of blue glyptal to severed ends of conductor.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove cover, P/N 1902541, from battery power pack assembly and modify as directed in paragraph C of Section VII in this RIB.

2. Open access door, P/N 1900471, on battery power pack assembly and disconnect P3 and P4 from their respective mating connectors.

3. Remove battery power pack panel assembly, P/N 1902249-021, from battery power pack assembly and set on work bench.

4. Remove two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel, P/N 1902179, to (right side) chassis support, P/N 1900475. Retain screws and nuts.

5. Remove six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure front panel to chassis. Retain screws and nuts.

6. Remove two(2) machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure meter bracket, P/N 1900480, to chassis. Retain screws and nuts. (Removal of CR5 from meter bracket and wires from E1 on chassis will facilitate separation of chassis and panel assemblies.)

VII. B. PROCEDURE (CONTINUED)

NOTE: Maneuver front panel away from chassis as required to perform following steps. Care must be taken, however, not to put undue strain on wiring and wiring connections.

CAUTION: When cutting holes in front panel and chassis during this modification, take the following necessary measures to;

1. Insure metal chips, filing and etc are not allowed to fall into or on wiring, switches and other components.

2. Insure wiring is pushed aside as necessary to prevent drilling into them.

7. Cut three new holes in front panel, P/N 1902179, as shown in figure 1. Use 1/8 size twist drill to drill two holes near ICTC POWER switch. These two holes shall be countersunk as indicated in figure 1.

8. Touch up bare metal surfaces in new holes with MIL-P-8585 primer and TT-E 529, class B, semi-gloss enamel, light gray (color 26440 of FED-STD-595) paint.

9. Obtain decal, P/N 1902626, from kit and install on front panel as shown in figure 2. Apply a bead of varnish (MIL-V-6894A unreduced), overlapping all edges 1/4 inch minimum on decal.

VII. B. PROCEDURE (CONTINUED)

10. Obtain switch guard, P/N 2901533, from kit and secure to front panel over ICTC POWER switch with two kit supplied flat head screws, P/N MS35200-15. Apply sealing and retaining compound MIL-S-22473, grade HV to threads of screws before installing.

11. Mark "DS10" on backside of front panel in location shown in figure 3. New marking should be 0.125 inch high, color black per ND 1002019.

12. Remove identification number "1902179" stamped on back side of front panel and replace with new identification number "1902629". New identification shall be in accordance with MIL-STD-130 (ES267).

13. Obtain light-indicator assembly, P/N 1897337-101, from kit and mount on front panel as indicated in the following steps while referencing figure 4.

    a. Using fingernail slots on sides, pull lens assembly out approximately 5/8 inch. (Reference figure 4, view A.)

    b. Rotate lens assembly 90 degrees. (Reference figure 4, view B.)

    c. Push lens in to release tension on index keys and then pull complete assembly out and set aside.

VII. B. PROCEDURE (CONTINUED)

d. Unscrew two screws until captive nuts reach the rear of their travel range and remove cover. (One screw and captive nut is shown in figure 4, view C.)

e. Insert indicator assembly through panel cutout from the front of panel. (Reference figure 4, view D.)

f. From rear of panel, slip cover over indicator assembly until it fits snugly against rear of panel. (Reference figure 4, view D.)

g. Tighten two screws (with attached captive nuts) to draw cover up firmly to rear of panel. (Reference figure 4, view C.)

h. Insert lens and lamp assembly (see figure 4, view E) into indicator assembly so lamp board slot is aligned with lamp board index.

i. Rotate lens assembly 90 degrees (see figure 4, view F) and push assembly into indicator assembly.

14. Remove three machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, which secure (right side) chassis support, P/N 1900475, to chassis. Retain screws and nuts for later use. Remove (right side) chassis support, P/N 1900475, and dispose of as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

14A. Remove leads A26 and A172 connected to resistor R1.

14B. Remove resistor R1 from chassis. Dispose of resistor and securing screws and nuts as directed in Section IX of this RIB.

14C. Remove marking for R1 (R1 and terminal designations 1 and 2) stamped on chassis, using lacquer thinner.

CAUTION: When performing the following steps, use care to insure CR6, R13 and leads attached to R13 are not damaged. These parts will be removed and installed on a new bracket.

14D. Remove leads A23, A29, A167, and A169 from E9. (E9 is located on electronics components assembly, P/N 1902193.)

14E. Remove lead A166 from E10.

15. Remove lead A171 from E11.

16. Unsolder lead A170 from CR6-C.

17. Remove electronics components assembly, P/N 1902193, from chassis by removing two securing machine screws and self locking nuts. Dispose of removed screws and self locking nuts as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

18. Unsolder (do not cut) green and red leads connected to E10.

19. Unsolder (do not cut) yellow lead connected to CR6-A.

20. Remove resistor R13 from electronics components assembly, P/N 1902193. Retain mounting hardware.

21. Obtain bracket, P/N 2901441, from kit and mount R13 (removed in step 20) on bracket as shown in figure 5. Use original mounting hardware to secure R13 to bracket.

22. Remove diode CR6 from electronics components assembly, P/N 1902193.

23. Utilize original mounting hardware to secure CR6 on new bracket as shown in figure 5.

24. Dispose of electronics components assembly, P/N 1902193, (less R13 and CR6) as directed in Section IX of this RIB.

25. Locate, mark and cut two new holes in chassis as shown in figure 6. Use new bracket, P/N 2901441, as a template for locating two new holes. Do not use bracket for a template when drilling, however. Use 7/32 size twist drill for drilling operation.

VII. B. PROCEDURE (CONTINUED)

26. Touch up bare metal surfaces in two new holes in chassis with MIL-P-8585 primer.

27. Remove identification number "1902135" and associated revision marking and replace with new identification number "1902631". New marking shall be in accordance with MIL-STD-130.

28. Remove leads listed in table 1 from wiring harness A.

Table 1. Wiring Harness A Lead Deletions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Remarks
A23	CR2-C	E9	Previously removed from E9
A26	K6-6	R1-1	Previously removed from R1
A29	CR1-C	E9	Previously removed from E9
A122	T3-3	XDS3-A	
A137	XDS3-B	XDS5-A	
A138	XDS4-B	XDS5-B	
A166	K6-5	E10	Previously removed from E10
A167	J4-L	E9	Cut off at J4-L. E9 end previously removed
A169	K5-1	E9	Previously removed from E9
A170	XF5-1	CR6-C	Previously removed from CR6
A171	K6-2	E11	Previously removed from E11
A172	TB1-11	R1-2	Previously removed from R1

VII. B. PROCEDURE (CONTINUED)

29. Obtain transformer (T4), P/N 1897425, from kit and secure to new bracket, P/N 2901441, as shown in figure 5, with four kit supplied button head screws, P/N 1006783-22, lock washers, P/N MS35338-79, and flat washers, P/N AN960C6L.

30. Obtain relay (K13), P/N 1016024-001, from kit and secure to new bracket as shown in figure 5, with two kit supplied button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004.

31. Obtain comparator (AR1), P/N 1897261, from kit and secure to new bracket as shown in figure 5, with four kit supplied button head screws, P/N 1006783-19, and lock washers, P/N MS35338-78.

32. Obtain rectifier bridge (CR7), P/N 1897277-001, from kit and secure to new bracket as shown in figure 5.

33. Obtain relay (K14), P/N 1015982-006, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525-004.

34. Obtain relay (K12), P/N 1015982-007, from kit and secure to new bracket as shown in figure 5, with two kit supplied self locking nuts, P/N 1012525-004.

VII. B. PROCEDURE (CONTINUED)

35. Obtain component board assembly (TB3), P/N 2901438, from kit and secure to new bracket as shown in figure 5, with four kit supplied spacers, P/N 1015860-001, self locking nuts, P/N 1012525-004, and button head screws, P/N 1006783-24.

36. Obtain one terminal stud (E15), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screw, P/N 1010618-13.

37. Obtain one terminal stud (E16), P/N 1010676-1, from kit and secure to new bracket as shown in figure 5, with kit supplied button head screws, P/N 1010618-13.

38. Obtain capacitor (C2), P/N CL25BJ151UP3, from kit and insert in retaining clip as shown in figure 5, such that positive end is nearest E15.

39. Temporarily connect (mechanically) positive lead of C2 to E15 and negative lead to E16.

40. Temporarily connect (mechanically) the free end of yellow lead attached to R13, to TB3-9. Lead should be cut to required length, have insulation stripped 0.30 inch and tinned prior to connecting.

VII. B. PROCEDURE (CONTINUED)

41. Temporarily connect (mechanically) the free end of red lead and green lead attached to R13, to TB3-13. Leads should be cut to required length, have insulation stripped 0.30 inch and tinned prior to installing.

42. Install new wire list AA leads furnished in kit lead set, as indicated in table 2. Accessory items listed in table 2 are also furnished in kit. (Reference figure 7 for terminal identifications.)

Table 2. Wire List AA Additions

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA35	K12-1	K13-1	0.30 0.30	Yes Yes	1015864-137	See note 1
AA36	K12-5	K13-2	0.30 0.30	Yes Yes	1015864-137	See note 2
AA37	XDS10-C	XDS10-A	0.30 0.30	Yes Yes	1015864-139 1015864-139	See note 3
AA38	T4-4	K14-5	0.30 0.30	Yes Yes	1015864-139 1015864-137	
AA40	K14-4	T4-7	0.30 0.30	Yes Yes	1015864-137 1015864-139	
AA41	CR7-1	K13-4	0.30 0.30	Yes Yes	1015864-137 1015864-135	See note 4
AA42	CR7-2	E15	0.30 0.30	Yes Yes	1015864-137	

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt. Pt.	TO Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA43	CR7-4	E16	0.30 0.30	Yes Yes	1015864-137	
AA44	E15	TB3-24	0.30 0.30	Yes Yes		
AA45	E16	TB3-21	0.30 0.30	Yes Yes		See note 5
AA46	K12-3	TB3-20	0.30 0.30	Yes Yes	1015864-137	See note 6
AA47	K12-7	TB3-19	0.30 0.30	Yes Yes	1015864-137	
AA48	AR1-1	TB3-16	0.30 0.30	Yes Yes		
AA49	AR1-4	TB3-10	0.30 0.30	Yes Yes		
AA50	AR1-3	TB3-26	0.30 0.30	Yes Yes		See note 6
AA51	AR1-8	TB3-17	0.30 0.30	Yes Yes		
AA52	AR1-2	TB3-18	0.30 0.30	Yes Yes		
AA53	AR1-6	TB3-25	0.30 0.30	Yes Yes		
AA54	AR1-7	TB3-21	0.30 0.30	Yes Yes		Combine with AA45

VII. B. PROCEDURE (CONTINUED)

Table 2. Wire List AA Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA55	CR6-A	 TB3-9	0.30 0.30	Yes Yes	1015864-137	
AA56	TB3-20	 TB3-26	0.30 0.30	Yes Yes		Combine with AA46 Combine with AA50

Note 1 - Do not solder as another lead (A51) will be connected later.
Note 2 - Do not solder as another lead (A50) will be connected later.
Note 3 - Do not solder as another lead (A182) will be connected later.
Note 4 - Do not solder as another lead (A183) will be connected later.
Note 5 - Do not solder as another lead (AA54) will be connected later.
Note 6 - Do not solder as another lead (AA56) will be connected later.

VII. B. PROCEDURE (CONTINUED)

43. Secure new bracket, P/N 2901441, to chassis with five machine screws, P/N 1006783-45, and self locking nuts, P/N AN363C1032, retained in steps 4 and 14.

44. Revise wiring harness A lead connections as listed in table 3. See Figure 7 for terminal identification.

Table 3. Revised Lead Terminations in Wiring Harness A

Lead Ident	Remove From	Reconnect To	Strip Insul	Tin	Accessory Item P/N
A35	K3-D2	*K3-C2	0.30	Yes	1015864-135
A50	T3-2	K13-2	0.30	Yes	1015864-135
A51	T3-1	K13-1	0.30	Yes	1015864-135
A66	J6-C	K13-19	0.30	Yes	1015864-135
A68	J6-A	K13-13	0.30	Yes	1015864-135
A69	J6-D	K13-10	0.30	Yes	1015864-135
A70	J6-a	K13-7	0.30	Yes	1015864-135
A144	K2-D2	**K3-D2	0.30	Yes	1015864-135

*Combine with lead A120 at this point.
**Another lead (A189) will be added to this point later.

VII. B. PROCEDURE (CONTINUED)

45. Remove leads A71, A153, and A160 from E5 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

46. Remove leads A72, A154, and A161 from E6 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

47. Remove leads A73, A155, and A162 from E7 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

48. Remove leads A74, A156, and A163 from E8 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

49. Remove leads A82, A151, and A158 from E3 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

50. Obtain new wiring harness A leads from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column in table 4 can be found at the rear of the table.) See figure 7 for terminal identification.

Table 4. Wiring Harness A Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A177	K1-C2	 S6SW2-NC	0.30 0.30	Yes Yes	1015864-135	 Combine with A110
A178	K1-C3	 J2-K	0.30 0.20	Yes No	1015864-135	 See note 1
A179	J2-P	 E17	0.20 0.30	No No	1016281-181	See note 3 See note 2
A180	XDS3-A	 T2-3	0.30 0.30	Yes Yes	1015864-139 1015864-139	Combine with AA8 Combine with A46
A181	K9-4	 XDS4-B	0.30 0.30	Yes Yes	1015864-135 1015864-139	Combine with A21 Combine with AA28
A182	K13-5	 XDS10-C	0.30 0.30	Yes Yes	1015864-135	 Combine with AA37
A183	T3-3	 K13-4	0.30 0.30	Yes Yes	1015864-135	Combine with A146 Combine with AA41
A184	T3-1	 K12-6	0.30 0.30	Yes Yes	1015864-135 1015864-137	Combine with A78
A185	T3-2	 K12-2	0.30 0.30	Yes Yes	1015864-135 1015864-137	Combine with A54
A186	K3-X2	 K12-4	0.30 0.30	Yes Yes	1015864-135 1015864-137	Combine with A60

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A187	J6-b	K14-3	0.30 0.30	Yes Yes	1015864-138 1015864-137	
A188	K11-7	K14-7	0.30 0.30	Yes Yes	1015864-137 1015864-137	Combine with A77
A189	K3-D2	XDS10-G	0.30 0.30	Yes Yes	1015864-139	Combine with A144 See note 4
A190	J6-a	K13-6	0.30 0.30	Yes Yes	1015864-138 1015864-135	
A191	J6-D	K13-9	0.30 0.30	Yes Yes	1015864-138 1015864-135	
A192	J6-A	K13-12	0.30 0.30	Yes Yes	1015864-138 1015864-135	
A193	J6-C	K13-18	0.30 0.30	Yes Yes	1015864-138 1015864-135	
A194	E18	J2-N	0.30 0.20	No No	1016281-181	See note 2 See note 3
A195	K1-B1	J2-T	0.30 0.20	Yes No	1015864-135	Combine with A164 See note 1
A196	J6-Z	K13-15	0.30 0.30	Yes Yes	1015864-138 1015864-135	
A197	XDS5-B	K13-3	0.30 0.30	Yes Yes	1015864-139 1015864-135	Combine with AA17
A198	J2-S	K13-16	0.20 0.30	No Yes	1015864-135	See note 1

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A199	E12	T4-2	0.30 0.30	No Yes	1015864-139	See note 2
A200	E13	K14-2	0.30 0.30	No Yes	1015864-137	See note 2
A201	E14	T4-1	0.30 0.30	No Yes	1015864-139	See note 2
A202	CR7-3	XDS10-G	0.30 0.30	Yes Yes	1015864-137	Combine with A189
A203	K6-6	TB3-14	0.30 0.30	Yes Yes	1015864-135	Combine with A27
A204	TB1-11	TB3-15	0.30 0.30	Yes Yes		See note 5
A205	K6-2	TB3-3	0.30 0.30	Yes Yes	1015864-137	Combine with A37
A206	XF5-1	CR6-C	0.30 0.30	Yes Yes	1015864-135 1015864-137	Combine with A10
A207	CR1-C	E20	0.30 0.30	Yes Yes	1015864-137	See note 2
A208	CR2-C	E20	0.30 0.30	Yes Yes	1015864-137	See note 2
A209	J4-L	E20	0.20 0.30	No Yes	1015818-616	See note 3 See note 2
A210	K6-5	TB3-13	0.30 0.30	Yes Yes	1015864-137	

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A211	K5-1	E20	0.30 0.30	Yes Yes	1015864-137	See note 2
A212	J6-G	TB3-11	0.30 0.30	Yes Yes	1015864-138	
A213	J6-H	TB3-22	0.30 0.30	Yes Yes	1015864-138	
A214	E18	K9-1	0.30 0.30	No Yes	1015864-137	See note 2 See note 6
A215	E19	J6-c	0.30 0.30	No Yes	1015864-138	See note 2

Note 1 - Utilize blank contact in connector to make connection at this point.
Note 2 - Connection to this point will be accomplished later.
Note 3 - Use Buchanan MS3191-1 crimping tool with Bendix 11-7758 positioner, extraction tool Bendix 11-7880-16, and insertion tool Bendix 11-8107-16 as required.
Note 4 - Do not solder as another lead (A202) will be connected later.

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions (continued)

Note 5 - Combine with leads A36, A111, and A168 at this point.
Note 6 - Remove lead A142 from K9-1 before connecting lead A214. Lead A142 will be reconnected to a new point later.

51. Obtain four electrical insulation sleeves, P/N 1010490-258, two electrical insulation sleeves, P/N 1010490-256, and one electrical insulation sleeve, P/N 1010490-200, and mark with the designation indicated in table 5. (Mark by hand with black ink.)

Table 5. Marking for Sleeves

Qty	Part Number	Identification Mark
1	1010490-258	E12
1	1010490-258	E13
1	1010490-258	E14
1	1010490-256	E17
1	1010490-258	E18
1	1010490-200	E19
1	1010490-256	E20

VII. B. PROCEDURE (CONTINUED)

52. Route loose ends of leads A142, A194, and A214 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

    a. Eliminate excessive length and strip insulation 0.30 inch on three leads. (A214 will be crimped in small end of splice reducer.)

    b. Insert leads A142 and A194 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E18 (reference step 51) and slide over loose end of lead A214.

    d. Insert lead A214 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E18 over crimped splice reducer and heat shrink in place.

53. Route loose ends of leads A82, A151, A158, and A179 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

    a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A82 and A179 will be crimped in small end of splice reducer.)

    b. Insert leads A151 and A158 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E17 (reference step 51) and slide over loose end of leads A82 and A179.

    d. Insert leads A82 and A179 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E17 over crimped splice reducer and heat shrink in place.

54. Route loose ends of leads A72, A74, and A201 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1006006-002, as follows:

    a. Eliminate excessive length and strip insulation 0.30 inch on three leads.

    b. Insert leads A72, A74, and A201 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

VII. B. PROCEDURE (CONTINUED)

    c. Obtain sleeve marked E14 (reference step 51) and slide over splice reducer and heat shrink in place.

55. Route loose ends of leads A154, A156, A161, A163, and A200 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer, P/N 1016006-002, as follows:

    a. Eliminate excessive length and strip insulation 0.30 inch on five leads. (A200 will be crimped in small end of splice reducer.)

    b. Insert leads A154, A156, A161, and A163 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E13 (reference step 51) and slide over loose end of lead A200.

    d. Insert lead A200 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E13 over crimped splice reducer and heat shrink in place.

VII. B. PROCEDURE (CONTINUED)

56. Route loose ends of leads A71, A73, A153, A155, A160, A162, and A199 to common meeting place on wiring harness A. Join these leads in kit supplied splice reducer P/N 1016006-002, as follows:

    a. Eliminate excessive length and strip insulation 0.30 inch on seven leads. (A199, A71, and A73 will be crimped in small end of splice reducer.)

    b. Insert leads A153, A155, A160, and A162 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E12 (reference step 51) and slide over loose end of leads A199, A71, and A73.

    d. Insert leads A199, A71, and A73 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E12 over crimped splice reducer and heat shrink in place.

57. Remove leads A143, A150, and A157 from E2 by clipping off leads as close as possible to body of splice reducer. Dispose of splice reducer and associated sleeve as directed in Section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

58. Route loose end of lead A215 to former E2 location on wiring harness A. Join leads A143, A150, A157, and A215 in kit supplied splice reducer, P/N 1016006-001, as follows:

    a. Eliminate excessive length from lead A215. (A215 will be crimped in large end of splice reducer.)

    b. Strip insulation on all four leads 0.30 inch.

    c. Insert A150, A157, and A215 in large barrel end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    d. Obtain sleeve marked E19 (reference step 51) and slide over loose end of lead A143.

    e. Insert lead A143 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    f. Slide sleeve marked E19 over crimped splice reducer and heat shrink in place.

59. Route loose ends of leads A207, A208, A209, and A211 to common meeting place on wiring harness A. Join these leads in kit supplied reducer, P/N 1016006-003, as follows:

VII. B. PROCEDURE (CONTINUED)

    a. Eliminate excessive length and strip insulation 0.30 inch on four leads. (A209 will be crimped in small end of splice reducer.)

    b. Insert leads A207, A208, and A211 in large end (B) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    c. Obtain sleeve marked E20 (reference step 51) and slide over loose end of lead A209.

    d. Insert lead A209 in small barrel end (BB) of splice reducer and crimp in place with Burndy Y10MRF-4 crimping tool.

    e. Slide sleeve marked E20 over crimped splice reducer and heat shrink in place.

60. Spot tie wiring harness A as required in accordance with ND 1002032,using black lacing tape.

61. Remove wiring harness A identification tag (marked "1902539") from harness. Dispose of identification tag as directed in Section IX of this RIB.

62. Obtain identification band, P/N 1016128-021, from kit lead set. If band has not been marked with "1902620" identification number, mark it with this identification at this time.

VII. B. PROCEDURE (CONTINUED)

63. Secure new identification band to wiring harness A in same location occupied by old identification tag removed in step 61. Use black lacing tape to secure it in place.

64. Remove identification "ASSY 1902249-021" and replace it with "ASSY 1902630-011". Marking shall be in accordance with MIL-STD-130 (ES267).

65. Secure front panel to chassis with six machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, removed and retained in step 5.

66. Secure front panel to new bracket, P/N 2901441, with two machine screws, P/N 1006783, and self locking nuts, P/N AN363C1032, supplied in kit.

67. Secure meter bracket, P/N 1900480, to chassis with two machine screws, P/N 1006783, and self locking nuts,P/N AN363C1032, removed and retained in step 6. (Reinstall CR5 and wires on E1 if these items were removed in step 6.)
68. Remove SPARE 15 AMP and BATTERY 15 AMP fuses and replace with two kit supplied fuses, P/N F02B32V15AS.

VII. B. PROCEDURE (CONTINUED)

68A. Locate Ampere Hour Meter, P/N 1900314, M1, and remove four (4) screws holding plastic dust cover to meter. Retain screws.

68B. Carefully remove plastic dust cover to ensure no damage occurs to gasket.

68C. Lift red pointer until disengaged from inner dial.

68D. Rotate inner dial to gear tooth closest to 30 and engage red pointer to inner dial.

68E. Carefully replace plastic dust cover removed in step 68B using screws removed in step 68A.

69. Perform continuity - resistance checks listed in table 6.

VII. B. PROCEDURE (CONTINUED)

Table 6. Continuity - Resistance Checks

FROM	TO	Indication (ohms)	Conditions
J2-K	J6-d	Less than 1	None
J2-K	J6-d	More than 100K	Press S6 (EMERGENCY HEATER POWER PRESS TO TURN OFF)
J2-C	J6-C	More than 100K	None
J2-E	J6-D	More than 100K	None
J2-F	J6-A	More than 100K	None
J2-G	J6-a	More than 100K	None
J2-S	J6-Z	More than 100K	None
J2-R	J2-M	More than 100K	None
J2-U	J2-M	More than 100K	None
J6-G	J6-H	More than 100K	None
J2-A	J2-H	Less than 1	None
J2-B	J2-J	Less than 1	None
J2-H	J6-L	Less than 1	None
J2-P	J6-N	Less than 1	None
J6-L	J6-V	Less than 1	None
J6-W	J6-K	Less than 1	None
J6-c	J6-T	Less than 1	None

70. Recalibrate potentiometer R13 as follows:

a. Install jumper lead between TB3-3 and TB3-13.

VII. B. PROCEDURE (CONTINUED)

b. Turn R13 to clockwise limit.

c. Connect ohmmeter to pins L and N on connector J4. (Open indicates K5 is de-energized while short indicates K5 is energized.)

d. Apply 38 (±0.2) volts dc (hi) to J3-A and (lo) to J3-J.

e. Turn R13 counterclockwise to point where relay K5 energizes.

f. Decrease applied voltage to 33.5 (±0.5) volts dc.

g. Remove voltage applied to J3. Relay K5 shall de-energize.

h. Reapply 33.5 (±0.5) volts dc to same points on J3. Relay K5 shall not re-energize.

i. Slowly increase voltage at J3. Relay K5 shall energize at 38.0 (±0.2) volts dc. If relay K5 does not energize within 38.0 (±0.2) volt dc range, readjust R13 as necessary and repeat steps f through i until proper R13 setting is obtained. (Turning R13 clockwise increases voltage set point. One turn will result in approximate change of 0.25 volt.)

VII. B. PROCEDURE (CONTINUED)

j. Remove voltage applied to J3.

k. Remove ohmmeter from J4.

l. Remove jumper lead between TB3-3 and TB3-13.

71. Install jumper lead between J2-L and J2-M.

72. Connect panel power cable to 115 volt ac source.

73. Set ICTC POWER switch to ON. 115V LINE POWER and PTC OPERATING indicators shall light. (Inhibit alarm if necessary.)

74. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

75. Continuity shall exist between points listed in table 7.

Table 7. Closed Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

76. Apply 25.0 (±0.2) volts dc (hi) to J6-G and (lo) to J6-H.

77. Check to insure the following conditions exist:

a. PTC OPERATING and PTC OFF ALARM RESET indicators shall not be lighted.

b. G&N ON/PTC INHIBITED indicator shall be lighted.

c. Alarm shall not ring.

d. No voltage shall exist between J2-U and J2-R and between J2-U and J2-M.

e. No continuity shall exist between points listed in table 8.

Table 8. Open Circuits

FROM	TO
J2-C	J6-C
J2-E	J6-D
J2-F	J6-A
J2-G	J6-a
J2-S	J6-Z

VII. B. PROCEDURE (CONTINUED)

78. Remove 25 volts dc applied to J6.

79. Set ICTC POWER switch to OFF.

80. Disconnect panel power cable from 115 volt ac source.

81. Remove jumper lead connected between J2-L and J2-M.

82. Connect jumper lead between J6-b and J6-F.

83. Connect 17 (±1) ohm "Load" between J6-K and J6-L, using one 10 ohm, 100 watt, resistor, one 5 ohm, 50 watt resistor, and one two ohm, 25 watt resistor.

84. Connect common input-output terminal of auto transformer (Variac) to J2-R and J2-H.

85. Connect other input terminal of variac to J2-U.

86. Connect variable output terminal of variac to J2-B.

87. Set variac for zero output.

88. Connect panel power cable to 115 volt ac source.

89. Set ICTC POWER switch to ON.

90. Adjust variac for output of 28.0 (±0.3) volts ac.

VII. B. PROCEDURE (CONTINUED)

91. Check for voltage drop of 31.5 (±1.0) volts ac across "load" resistance (added in step 83).

92. Remove panel power cable from 115 volt ac source.

93. Remove jumper lead connected between J6-b and J6-F.

94. Decrease "load" resistance to 10 (±1) ohms by removing the 5 ohm and 2 ohm resistors.

95. Connect panel power cable to 115 volt ac source.

96. Check for voltage drop of 23.5 (±1.0) volts ac across "load" resistor.

96A. Set ICTC POWER switch to OFF.

96B. Disconnect panel power cable from 115 volt ac cource.

96C. Remove "load" resistor and variac (used for testing) from battery power pack panel assembly.

VII. B. PROCEDURE (CONTINUED)

96D. Hold battery power pack panel assembly in its normal horizontal plane (position it assumes when mounted in battery power pack case) and shake vigorously. (Shaking the panel will insure no air pockets exist in the mercury pool within the ampere hour meter. Air pockets can impair proper operation of the meter.)

96E. Reinstall modified battery power pack panel assembly in battery power pack case. Insure P3 is connected to J3 and P4 is connected to J4.

96F. Transfer serial number from existing nameplate on battery power pack assembly to new nameplate, P/N 1004260-510, supplied in kit. Use 1/8 inch high character metal stamp set to imprint data.

96G. Remove existing nameplate from battery power pack assembly. Dispose of nameplate as directed in Section IX of this RIB. Retain four screws to secure new nameplate.

97. Secure new nameplate on battery power pack assembly with four screws retained in step 96G. Apply sealing and retaining compound (MIL-S-22473, grade H) to threads of four screws before installing.

98. Install jumper lead between J2-L and J2-M.

VII. B. PROCEDURE (CONTINUED)

99. Connect 20 VA load (normal inverter load) between J2-U and J2-R. 20 VA load is 775 (±1%) ohms in parallel with 3.33 (±5%) henries.

100. Connect panel power cable to 115 volt ac source.

NOTE: Inhibit alarms in following steps as necessary.

101. Set ICTC POWER switch to ON.

102. Check to insure that 115 volts ac exists between J2-U and J2-R and between J2-T and J2-M.

103. Apply 25.2 (±0.2) volt dc (hi) to J6-G and (lo) to J6-H.

104. Check to insure that 115 volts ac exists between J2-T and J2-M and zero voltage between J2-U and J2-R.

105. Disconnect panel power cable from 115 volt ac source and check for the following indications:

a. 1 volt max between J2-T and J2-M. with a 1K resistor connected between these two pins.
b. G & N ON/PTC INHIBITED indicator remains lighted.

VII. B. PROCEDURE (CONTINUED)

c. PTC OPERATING indicator not lighted.

d. Bell shall ring; inhibit bell by pressing 115V LINE POWER indicator-switch.

e. INVERTER POWER indicator shall be lighted.

106. Remove 28 volt power applied to J6.

107. Set ICTC POWER switch to OFF.

108. Install jumper lead between J2-K and J2-N.

109. Connect panel power cable to 115 volt ac source.

110. Set ICTC POWER switch to ON.

111. Inhibit alarm bell by pressing 115V LINE POWER indicator-switch.

112. Check to insure 115 volts ac exist between J2-T and J2-M.

113. Disconnect panel power cable from 115 volt ac source and check for the following indications.

a. 115 volts ac shall not exist between J2-T and J2-M.

VII. B. PROCEDURE (CONTINUED)

b. Alarm bell shall not ring.

c. Battery voltage of 28 (+7, -3) volts dc shall exist between J2-P (hi) and J2-N (lo).

d. EMERGENCY HEATER POWER indicator-switch shall be lighted. Pressing this indicator-switch shall not turn indicator off.

114. Connect panel power cable to 115 volt ac source and check for the following indications.

a. Battery voltage of 28 (+7, -3) volts dc shall not exist between J2-P (hi) and J2-N (lo).

b. 115 volts ac shall exist between J2-T and J2-M.

c. Alarm bell shall not ring.

d. EMERGENCY HEATER POWER indicator-switch shall not be lighted.

115. Set ICTC POWER switch to OFF.

116. Disconnect panel power cable from 115 volt ac source.

VII. B. PROCEDURE (CONTINUED)

117. Remove all jumper leads.

118. Reinstall modified battery power pack cover (with cable in stored positions) on battery power pack assembly.

119. Update Acceptance Data Package as indicated in Section VIII of this RIB.

VII. PROCEDURE (CONTINUED)

C. DETAILED INSTRUCTIONS FOR MODIFICATION OF COVER, P/N 1902541. Perform modification as follows:

1. Remove cable W100, P/N 1900955, from storage location in cover and set aside.

2. Remove cable W101, P/N 1900954, from storage location in cover and modify as directed in paragraph D of Section VII in this RIB.

3. Remove dummy receptacle, P/N 1016073-183, from cover. (This dummy receptacle is located in area exposed by section view A-A in figure 8.) Retain dummy receptacle and securing hardware.

4. Enlarge one of four vacated dummy receptacle mounting holes (shown in figure 8, section view A-A) to 0.164 to 0.171 inch diameter, using number 19 twist drill.

5. Touch up inner surfaces of other three vacant mounting holes with MIL-P-8585 primer and cashmere blue enamel paint, P/N 1016194. (These three holes will not be reused for mounting parts.)

6. Locate mark and drill two 0.216 to 0.224 inch diameter through holes in top of cover as shown in figure 8. Use 7/32 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

7. Locate, mark and drill three 0.201 to 0.209 inch diameter through holes in top of cover as shown in figure 8. Use number 5 size twist drill to drill holes.

8. On side of cover where four dummy receptacles are presently mounted, perform the following:

   a. Locate, mark and drill two clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view B-B. Use number 29 size twist drill to drill holes.

   b. Locate, mark and drill one cluster (4 holes) of 0.102 to 0.108 inch diameter through holes as shown in figure 8, section view B-B. Use number 37 size twist drill to drill holes.

9. On side of cover opposite side containing four dummy receptacles, locate, mark and drill six clusters (4 holes per cluster) of 0.134 to 0.141 inch diameter through holes as shown in figure 8, section view C-C. Use number 29 size twist drill to drill holes.

VII. C. PROCEDURE (CONTINUED)

10. Using 1/8 inch rubber stamp and black marking ink, apply markings "W-189", "W-100", "W-186", "W-187", "W-188", and "W-192" to inner surface of cover in locations shown in figure. (W-186, W-187, and W-188 markings shall appear in two locations.)

11. Remove instruction foilcal, P/N 1902540, from inner surface of cover. Dispose of foilcal as directed in Section IX of this RIB.

    WARNING: Methyl-Ethyl-Ketone is toxic and flammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

    NOTE: Insure mounting surface is clean prior to applying new instruction plate.

12. Obtain instruction plate, P/N 2901442, from kit and apply methyl-ethyl-ketone to activate adhesive backing on plate. Allow activated adhesive to air dry until surface becomes tacky before performing next step.

13. Mount new instruction plate in same location as previously occupied by removed foilcal. Insure orientation of plate is as indicated in figure 8. (Bottom edge being nearest to assembly identification mark on cover.)

VII. C. PROCEDURE (CONTINUED)

14. Obtain dummy receptacle, P/N 1016073-183, and securing hardware set aside in step 3 and install on cover as shown in figure 9.

15. Obtain dummy receptacle, P/N 1016073-103, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

16. Obtain box mounting receptacle (housing only), P/N 1897424-001, from kit and secure to cover as shown in figure 9, using four kit supplied machine screws, P/N 1006783-12,and self locking nuts, P/N 1016151-002.

17. Obtain three dummy receptacles, P/N 1016073-143, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

18. Obtain three dummy receptacles, P/N 1016073-163, from kit and secure to cover as shown in figure 9, using 12 kit supplied machine screws, P/N 1006783-19, and self locking nuts, P/N 1016151-004.

19. Obtain protective cap, P/N MS3181-16C, from kit and secure end of attached chain to hole in cover which was enlarged in step 4. Reference figures 8 and 9. Use kit supplied machine screw, P/N 1006783-23,and self locking nut, P/N 1016151-006, to secure it in place.

VII. C. PROCEDURE (CONTINUED)

20. Obtain cable clamp, P/N 1010400-006, from kit and secure to cover as shown in figure 9, using two kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N 1016151-010 (AN363C1032). Insure orientation of clamp is as shown in figure 9.

21. Obtain three clamps, P/N 1016105-004, from kit and secure to three new points on cover as shown in figure 9, using three kit supplied machine screws, P/N 1006783-44, and self locking nuts, P/N AN363C1032. Insure orientation of clamps is as shown in figure 9.

22. Remove identification mark "1902541" from inner surface of cover and replace with new identification number "1902632". Marking shall be in accordance with MIL-STD-130 (ES267).

23. Obtain and install cable W192 in cover as shown in figure 9.

24. Reinstall cable W100 in cover as shown in figure 9.

25. Obtain cables W186, W187, and W188 and mount in cover as shown in figure 9.

26. Obtain cable W189 (cable W101 becomes cable W189 after it is modified per this RIB) and mount in cover as shown in figure 9.

VII. PROCEDURE (CONTINUED)

D. DETAILED INSTRUCTIONS FOR MODIFICATION OF INTERCONNECT CABLE W101 (BPP TO IMU), P/N 1900954. Perform modification as follows:

1. Cut and remove cable identification sleeve (marked 1900954) from cable. Dispose of sleeve as directed in Section IX of this RIB.

2. Loosen two screws on connectors P1 and P2.

3. Cut and remove connector P1 and P2 identification sleeves from cable. Dispose of sleeves as directed in Section IX of this RIB.

4. Extract all leads from connector P2, using Bendix 11-7880-20 extraction tool.

5. Remove connector, grommet and telescoping bushing from P2 end of cable. Dispose of removed parts as directed in Section IX of this RIB.

6. Cut and remove tubing which covers cable. Dispose of tubing as directed in Section IX of this RIB.

7. Remove P1 telescoping bushing from cable. Retain two bushings, P/N AN3420-12A and P/N AN3420-16, for later reassembly and dispose of two bushings (with smallest inner diameter) P/N AN3420-6A and P/N AN3420-8A, as directed in Section IX of this RIB.

VII. D. PROCEDURE (CONTINUED)

8. Remove strain relief clamp, connector back shell and grommet insert from rear of connector P1 to permit access to P1 solder wells.

9. Unsolder lead A2 from P1-B and resolder to P1-Z.

10. Obtain leads A10 through A13 from kit lead set and install in cable as indicated in table 9. Accessory items are furnished in kit supplied connector, P/N 1897422-004.

Table 9. Cable Lead Additions

Lead Ident	FROM Ckt.Pt.	TO Ckt.Pt.	Strip Insul.	Tin	Accessory Item P/N	Remarks
A10	P1-G P2-G		0.30 0.22	Yes No	MS3193A-20A	See note 1
A11	P1-H	P2-H	0.30 0.22	Yes No	MS3193A-20A	See note 1
A12	P1-F	P2-F	0.30 0.22	Yes No	MS3193A-20A	See note 1
A13	P1-b	P2-b	0.30 0.22	Yes No	MS3193A-20A	See note 1

Note 1 - Extract contact from applicable positions in kit supplied connector, using Bendix 11-7880-20 extraction tool. Crimp contact on lead using Buchanan MS3191-A crimping tool with Buchanan MS3191-20 positioner.

VII. D. PROCEDURE (CONTINUED)

11. Reinstall grommet insert and connector back shell on rear of connector P1.

12. Obtain zipper tubing, P/N 1902621-005, from kit and install on cable.

13. Obtain P1 identification sleeve, P/N 2901475, from kit and install on cable at P1. Position sleeve such that lettering reads away from P1 and that end of sleeve will lie under strain relief clamp. Heat shrink sleeve in place.

14. Reinstall at connector P1, two telescoping bushings, P/N AN3420-12A and P/N AN3420-16, removed and retained in step 7.

15. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads and that bushings and sleeves are properly positioned in strain relief clamp before tightening screws.

16. Obtain cable identification sleeve, P/N 1902621-004, from kit. If sleeve has not been marked with identification number "2901446", mark it with this identification at this time. Marking should be white and 0.25 inch high.

VII. D. PROCEDURE (CONTINUED)

17. Slide cable identification sleeve, P/N 1902621-004, on cable to approximate center location and heat shrink in place.

18. Obtain P2 identification sleeve, P/N 2901199, from kit and position on P2 end of cable such that lettering reads away from P2. Do not heat shrink in place at this time.

19. Obtain strain relief grommet, P/N 1016282-16, from kit and slide on cable.

20. Install cable leads in kit supplied connector, P/N 1897422-004, (new connector P2) as indicated in table 10.

Table 10. New Connector P2 Termination

Lead Identification	Connector P2 Termination
A1	a
A2	P
A3	N
A4	Z
A5	K
A6	X
A7	R
A8	V
A9	W
A10	G
A11	H
A12	F
A13	b

VII. D. PROCEDURE (CONTINUED)

21. Fill unused holes in connector P2 with excess contacts obtained in step 20.

22. Fill unused holes in connector P2 grommet with plug end seals, P/N 1897370-001, supplied in kit.

23. Position P2 identification sleeve such that end of sleeve will lie under strain relief clamp on P2 connector. Heat shrink sleeve in place.

24. Position strain relief grommet under P2 connector strain relief clamp.

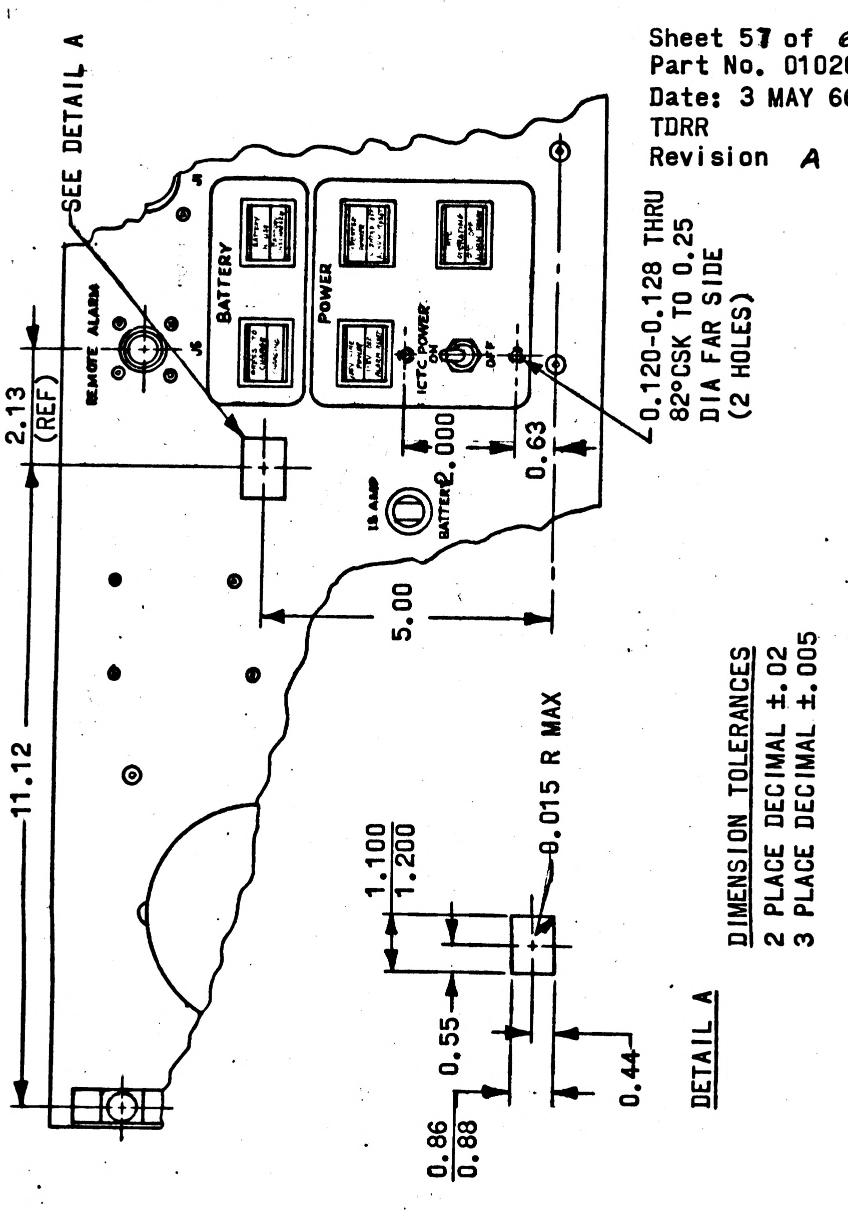
25. Secure strain relief clamp in place on cable. Insure adequate slack exists in cable leads before tightening screws.

26. Check for an indication of less than one ohm between the points listed in table 11.

Table 11. Cable W189 Continuity Check

From P1-	To P2-
A	N
C	a
D	Z
F	F
G	G
H	H
I	W

From P1-	To P2-
J	V
W	R
X	X
Z	P
a	K
b	b


SEE DETAIL A
REMOTE ALARM
J5
BATTERY
POWER
ICTC POWER
ON
OFF
15 AMP
BATTERY
2.13
(REF)
11.12
5.00
2.000
0.63
0.120-0.128 THRU
82°CSK TO 0.25
DIA FAR SIDE
(2 HOLES)
1.100
1.200
0.015 R MAX
0.55
0.86
0.88
0.44
DETAIL A

DIMENSION TOLERANCES
2 PLACE DECIMAL ±.02
3 PLACE DECIMAL ±.005

Figure 1. NEW HOLE IN FRONT PANEL

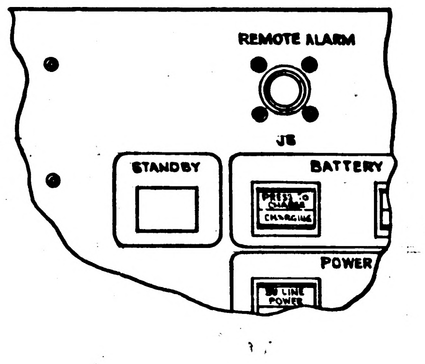

REMOTE ALARM
J5
STANDBY
BATTERY
POWER

Figure 2. INSTALLED LAMP INDICATOR ASSEMBLY DECAL

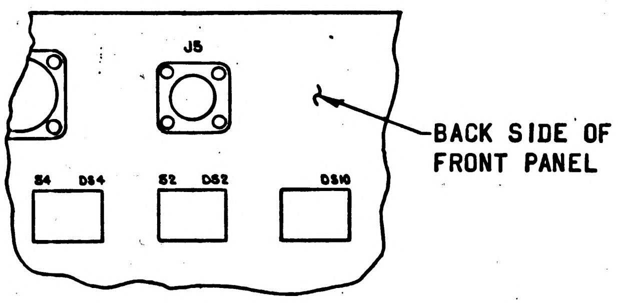

J5
S4
DS4
S2
DS2
DS10
BACK SIDE OF
FRONT PANEL

Figure 3. LAMP INDICATOR ASSEMBLY IDENTIFICATION

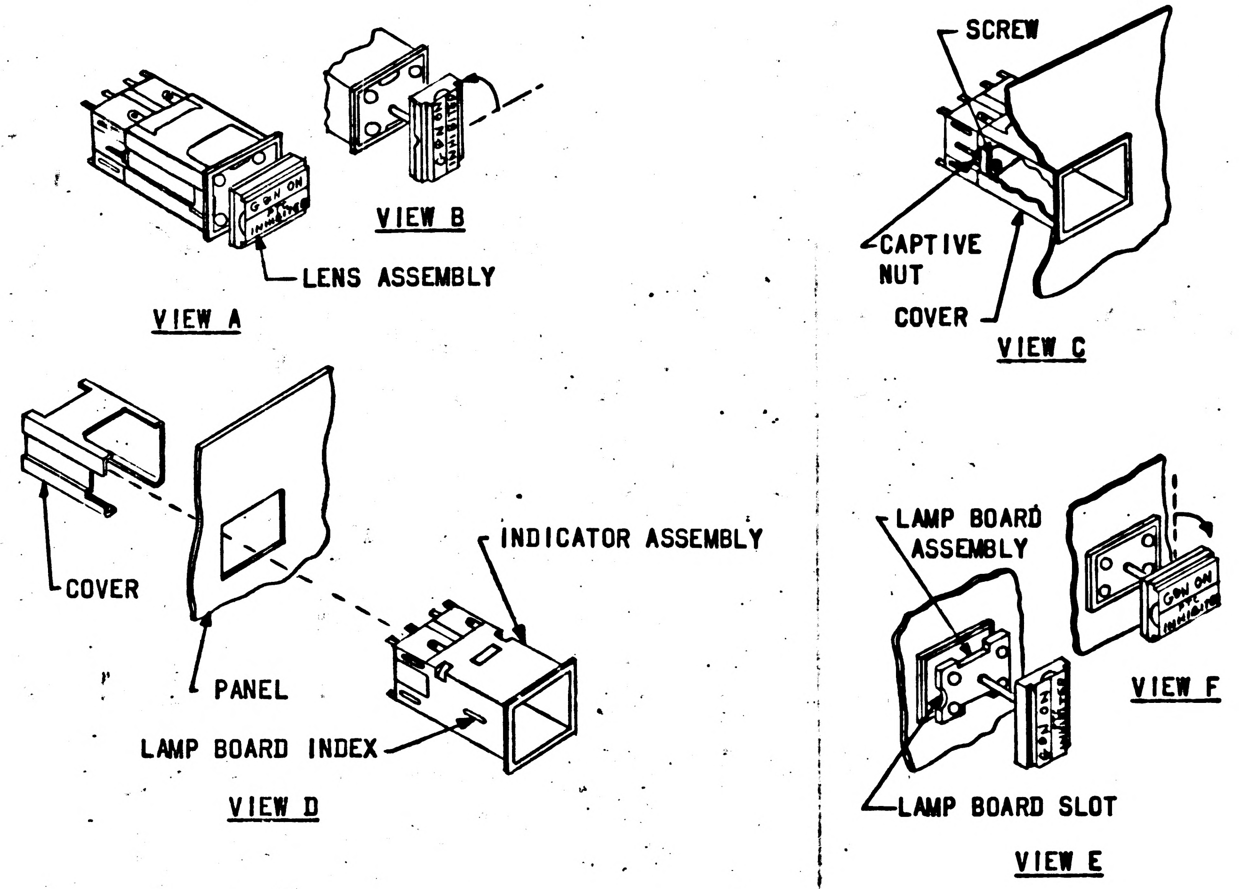

VIEW A
LENS ASSEMBLY
VIEW B
SCREW
CAPTIVE NUT
COVER
VIEW C
COVER
PANEL
INDICATOR ASSEMBLY
LAMP BOARD INDEX
VIEW D
LAMP BOARD ASSEMBLY
LAMP BOARD SLOT
VIEW E
VIEW F

Figure 4. INSTALLATION OF LIGHT-INDICATOR ASSEMBLY

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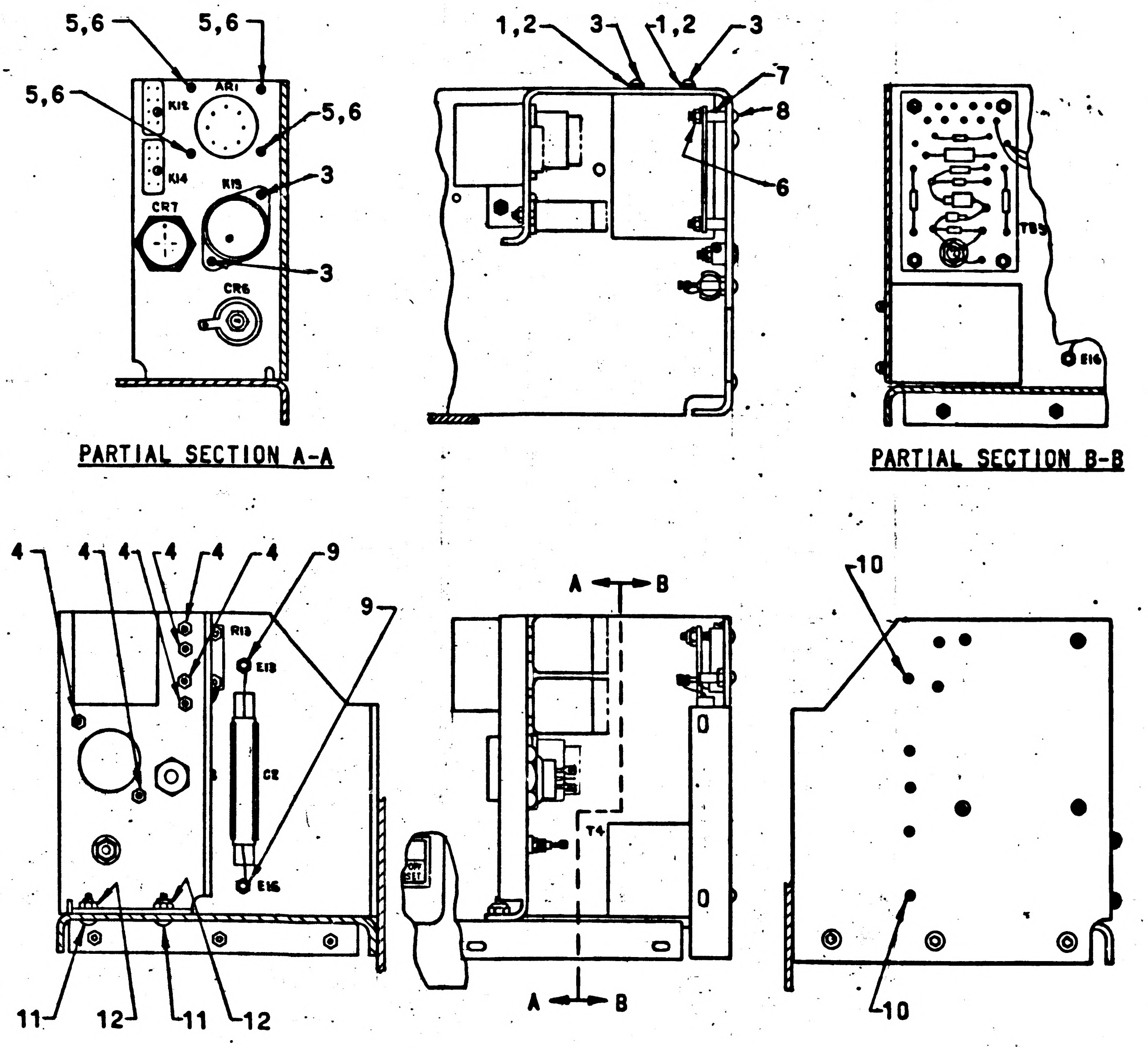
5,6
5,6
5,6
5,6
K12
AR1
K14
R15
3
3
CR7
CR6
PARTIAL SECTION A-A
1,2
3
1,2
3
7
8
6
TB3
E16
PARTIAL SECTION B-B
4
4
4
4
4
4
9
9
R13
E13
C2
E15
11
12
11
12
A
B
T4
A
B
10
10

Figure 5. NEW BRACKET AND ATTACHED PARTS

LEGEND

1. LOCK WASHER, P/N MS35338-79
2. FLAT WASHER, P/N AN960C6L
3. BUTTON HD SCREW, P/N 1006783-22
4. SELF LOCKING NUT, P/N 1012525-004
5. BUTTON HD SCREW, P/N 1006783-19
6. LOCKWASHER, P/N MS35338-78
7. SPACER, P/N 1015860-001
8. BUTTON HD SCREW, P/N 1006783-24
9. TERMINAL STUD, P/N 1010676-1
10. BUTTON HD SCREW, P/N 1010618-13
11. MACHINE SCREW, P/N 1006783-45
12. SELF LOCKING NUTS, P/N AN363C1032

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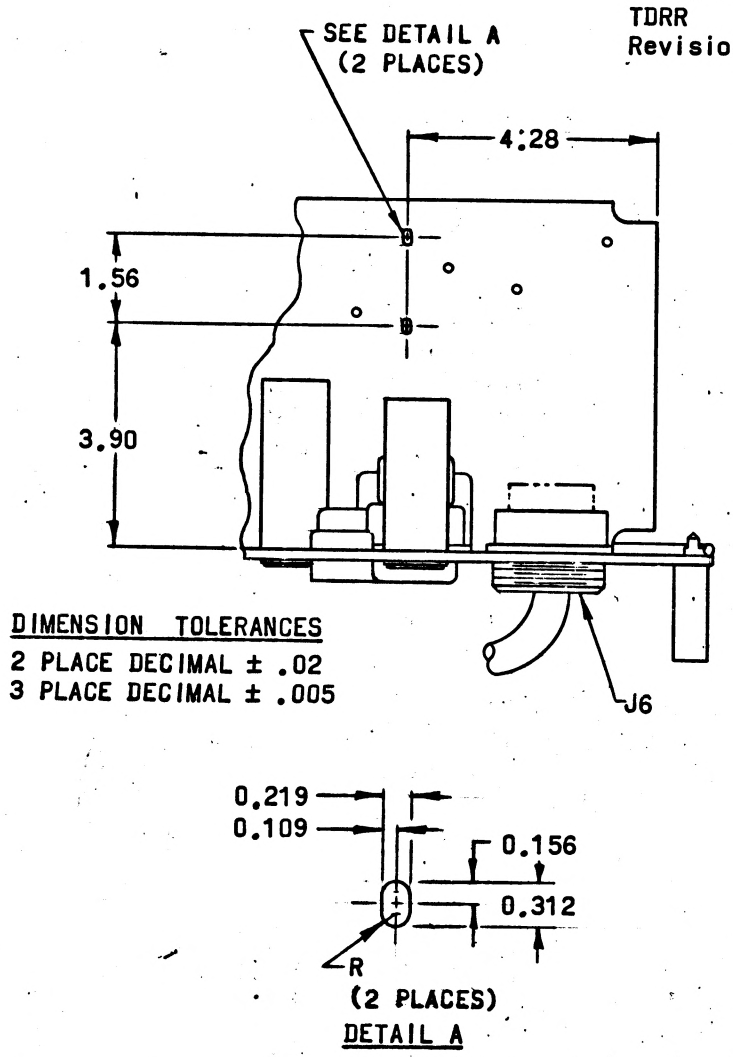
SEE DETAIL A
(2 PLACES)
4.28
1.56
3.90
J6
0.219
0.109
0.156
0.312
R
(2 PLACES)
DETAIL A

DIMENSION TOLERANCES
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005

Figure 6. NEW HOLES IN CHASSIS (TOP VIEW)

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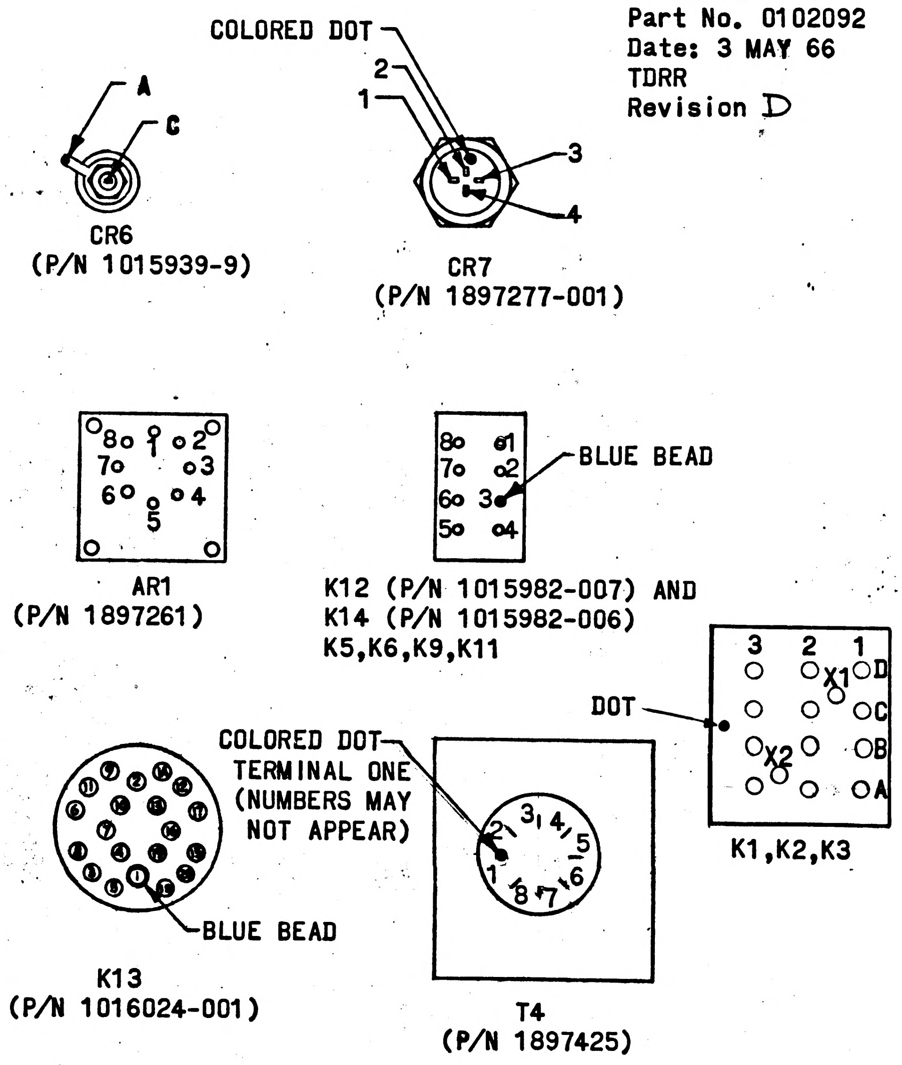
A
C
CR6
(P/N 1015939-9)
COLORED DOT
2
1
3
4
CR7
(P/N 1897277-001)
8 1 2
7 3
6 4
5
AR1
(P/N 1897261)
8 1
7 2
6 3
5 4
BLUE BEAD
K12 (P/N 1015982-007) AND
K14 (P/N 1015982-006)
K5,K6,K9,K11
3 2 1
X1
X2
D
C
B
A
DOT
K1,K2,K3
COLORED DOT-
TERMINAL ONE
(NUMBERS MAY
NOT APPEAR)
1 2 3 4 5 6 7 8
T4
(P/N 1897425)
BLUE BEAD
K13
(P/N 1016024-001)

Figure 7. TERMINATION IDENTIFICATIONS

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DIMENSION TOLERANCES
(UNLESS OTHERWISE SPECIFIED)
2 PLACE DECIMAL ± .02
3 PLACE DECIMAL ± .005

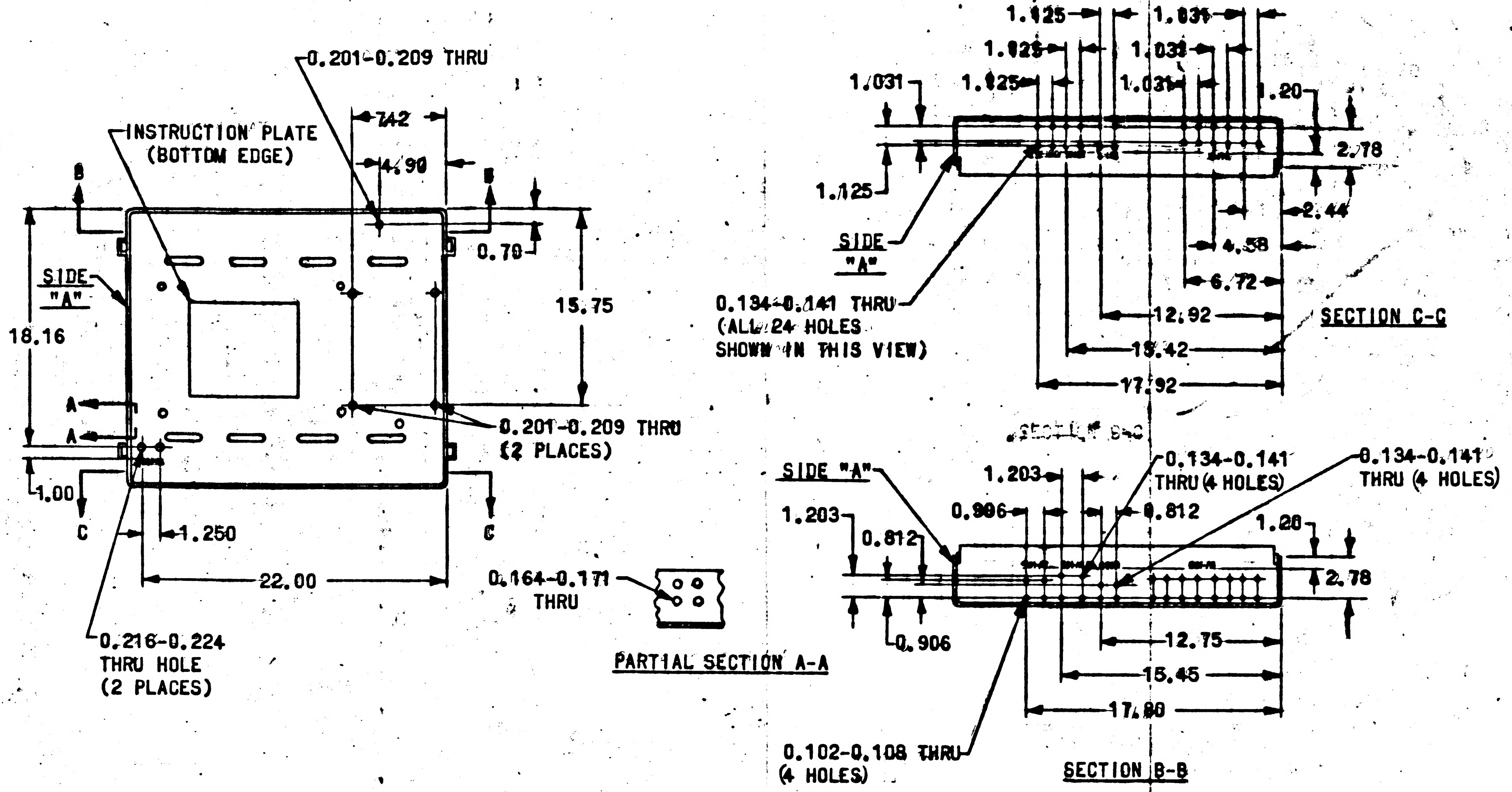
0.201-0.209 THRU
INSTRUCTION PLATE (BOTTOM EDGE)
7.42
4.90
B
B
0.79
15.75
SIDE "A"
18.16
A
A
0.201-0.209 THRU (2 PLACES)
1.00
C
1.250
C
22.00
0.216-0.224 THRU HOLE (2 PLACES)
0.164-0.171 THRU
PARTIAL SECTION A-A
1.125
1.125
1.031
1.031
1.125
1.031
1.031
1.20
2.78
1.125
2.44
SIDE "A"
4.58
6.72
0.134-0.141 THRU (ALL 24 HOLES SHOWN IN THIS VIEW)
12.92
SECTION C-C
15.42
17.92
SIDE "A"
1.203
0.134-0.141 THRU (4 HOLES)
0.134-0.141 THRU (4 HOLES)
1.203
0.906
0.812
1.20
0.812
2.78
0.906
12.75
15.45
17.80
0.102-0.108 THRU (4 HOLES)
SECTION B-B

Figure 8. BATTERY POWER PACK COVER

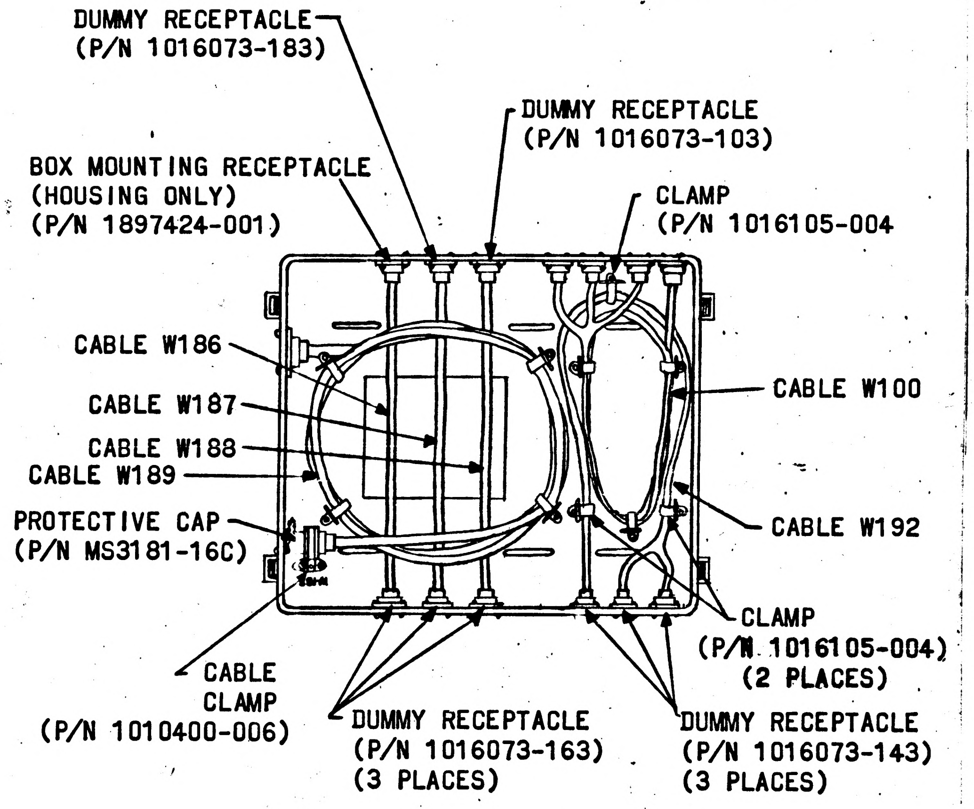
DUMMY RECEPTACLE (P/N 1016073-183)
DUMMY RECEPTACLE (P/N 1016073-103)
BOX MOUNTING RECEPTACLE (HOUSING ONLY) (P/N 1897424-001)
CLAMP (P/N 1016105-004
CABLE W186
CABLE W100
CABLE W187
CABLE W188
CABLE W189
PROTECTIVE CAP (P/N MS3181-16C)
CABLE W192
CLAMP (P/N 1016105-004) (2 PLACES)
CABLE CLAMP (P/N 1010400-006)
DUMMY RECEPTACLE (P/N 1016073-163) (3 PLACES)
DUMMY RECEPTACLE (P/N 1016073-143) (3 PLACES)

Figure 9. MODIFIED COVER WITH CABLES IN STOWED POSITIONS

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.
2. Make necessary entry in the Equipment Inventory Record.
3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

B. The significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Battery Power Pack Assembly	1900011-031	1900011-041
Battery Power Pack Panel Assembly	1902249-021	1902630-011
Front Panel	1902179	1902629
Chassis	1902135	1902631
Wiring Harness A	1902539	1902620

VIII. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Wire List AA	1902190	1902622
Battery Power Pack Cover	1902541	1902632
*Cable Interconnect W101 (BPP to IMU)	1900954	2901446

*Cable name changes to "Cable Interconnect W189 (BPP to IMU)" upon completion of modification.

IX. DISPOSITION OF PARTS REMOVED

A. One connector-plug, P/N MS3126F18-32SX, (1897092-322) and two fuses, P/N F02A32V15AS, (1897099-117) shall be returned to stock as spares per AC Electronics, Logistics (Department 38-09) direction.

B. One resistor, P/N RE75G2490, (1896892-327) shall be transferred to full custody of the government via DD543 form (Inventory Schedule).

C. Scrap all parts not listed above, via AC Electronics form MIL-127 or equivalent.

Sheet 1 of 50
Part No. 0102115
Date: 11 OCT 66
TDRR 32123
Revision B

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR PORTABLE TEMPERATURE CONTROLLER, P/N 2900060-011

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CO[redacted]	NASA	
A	MYC 215759	1,4,6,14,15,16			21 OCT 66
B	32123	ALL INITIAL RELEASE	EwA	—	11/28/66

Prepared by Earl Cox Date 10/13/66

P.C. Engineering Approval Date 10/13/66

Design Review Board Approval Date 11-18-66

MIT/IL Approval Date

NASA Approval Date 11/22/66

MIT Reliability Date

Sheet 2 of 50
Part No. 0102115
Date: 11 OCT 66
TDRR
Revision B

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Portable Temperature Controller (PTC), P/N 2900060-011. This modification will accomplish the following:

1. Insure a power fail alarm occurs when the 28 volt input fuse is blown and power is supplied from 115V source.
2. Stabilize bridge excitation voltage when line voltage is low.
3. Enable operation of Block I IMU without changing the temperature adjustment for Block II.
4. Add filter and change to charging circuit to improve critical battery cutoff operation.
5. Change hot alarm trip point to exclude normal operating range.
6. Provide external means of initiating bridge excitation failure test.
7. Provide external means of monitoring battery voltage.
8. Improve the temp failure latching circuit for loss of external power.
9. Reroute 115V fuse wiring for safer operation.

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II. AUTHORITY

This retrofit is authorized by Marriage Kit 3.
NASA 9-497 SA-42

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

Not applicable.

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102250, consisting of the following is required to modify Portable Temperature Controller, P/N 2900060-011.

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VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	0102115	Retrofit Instruction Bulletin
1	2901542	Lead set
1	1015982-007	Relay, armature
3	1N459	Diode (1896966-291)
2	1N3029B	Diode (1896966-069)
1	RC20GF301J	Resistor (1896952-036)
1	RC20GF431J	Resistor (1896952-040)
1	1016053-024	Resistor
1	1016053-029	Resistor
1	1004260-535	Nameplate
2	1016151-006	Nut, self locking
6	1015864-135	Sleeving, electrical insulation
1	1015864-137	Sleeving, electrical insulation
2	1015864-140	Sleeving, electrical insulation
1	1015864-163	Sleeving, electrical insulation
1	AN960 C6	Flat washer (1897006-026)
1	CL25BL700UP3	Capacitor (1897081-324)
2	1896962-003	Terminal stud
2	MS35233-12	Pan head screw
4	1006783-95	Button head screw
1	RW55V201	Resistor (1896928-068)
1	1015832-318	Relay
1	1897260-008	Resistor, variable
1	1N2976B	Diode (1896966-075)
1	2901555	Pin, straight, headed
1	2901556	Bracket, electronic component
1	2901586	Decal, Functional Area

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in the retrofit kit are as follows:

Qty	Part Number	Description
AR	N/A	Clean lacquer
AR	N/A	Lacquer thinner
AR	N/A	Chemical film (MIL-C-5541A, type 1, grade B, class 2)
AR	N/A	Sealing and retaining compound (MIL-S-22473), grades C and H
AR	N/A	Black marking ink
AR	N/A	Black lacing tape (MIL-T-713B, Type P, class 2)
AR	N/A	Solder (QQ-S-571, SN60 WRAP)
1	Any hi-speed	Number 19 size twist drill
1	*Schwaab Stamp and Seal Co.Type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
1	*Schwaab Stamp and Seal Co.Type AAG-0X	Rubber stamp, 1/12 inch, thirteen band, alpha-numerical
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/16 inch alpha-numerical
1	Buchanan MS3191-1	Crimping tool
1	Buchanan MS3191-20	Positioner
1	Bendix 11-7880-20	Extraction tool
1	Bendix 11-8107-20	Insertion tool
AR	1010748	Epoxy resin
AR	1010750	Curing agent
AR	1010749	Calcium carbonate filler

*or equivalent

VI. B. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
2	Single pole, single throw	switch
1	HP-428B	DC ammeter
2	Fluke 803B	Differential voltmeter
1	HP-412A Alternate:HP-410C	Voltohmmeter
2	General Radio 1432X Alternate:Rubicon 2015	Decade resistance box
1	Harrison Labs 808A	Power supply
1	Ohmite, 15 ohms, variable, 100 watts minimum	Resistor
AR	MIL-V-6894A unreduced	Varnish

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard AC-STD-1, dated 15 January, 1965.

3. Ink markings:

   a. Markings to be removed should be removed with lacquer thinner.

   b. New markings shall be covered with a coat of clear lacquer, after ink has dried.

4. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties shall be added after all conductor rework has been completed.

5. Use heatsink device when unsoldering or soldering near semiconductors.

6. Where marking is specified, hand marking is acceptable.

7. When disassembling the PTC, reinstall loose hardware on major part to insure proper placement and usage of attached hardware upon reassembly.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove top cover from PTC and set aside.

2. Remove six flat head screws, P/N 1010630-38, which secure panel assembly, P/N 2900835-011, to PTC case, P/N 2900525-011. Retain screws for later reassembly.

3. Carefully lift panel assembly out of PTC case and place along side of PTC case.

4. Remove five button head screws, P/N 1006783-22, which secure electronic component assembly, P/N 2900521-011, to bottom of PTC case. See figure 1. Retain screws for later reassembly.

5. Remove four button head screws, P/N 1006783-26, flat washers, P/N AN960-C8, and lock washers, P/N MS35338-80, which secure transformer T1 to bottom of PTC case. See figure 1. Retain all hardware for later reassembly.

6. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure capacitor C3 to side of PTC case. See figure 1. Retain screws and nuts for later reassembly.

VII. B. PROCEDURE (CONTINUED)

7. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and two button head screws, P/N 1006783-22 with self locking nuts, P/N 1012525-004.

8. Disconnect lead A11 from positive terminal on BT1 and lead A82 from negative terminal on BT8. Temporarily insulate leads A11 and A82 with electrical tape.

9. Reinstall battery retainer cover on battery retainer with original two flat head screws and retain the two button head screws for later installation.

10. Remove two button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure lower edge of TB2 to PTC case. See figure 1. Retain all hardware for later reassembly.

11. Remove two button head screws, P/N 1006783-104, four self locking nuts, P/N 1012525-004, and two spacers, P/N 1015860-026, which secure upper edge of TB2 and two cable clamps to PTC case. See figure 1. Retain all hardware for later reassembly.

12. Remove one button head screw, P/N 1006783-104, two self locking nuts, P/N 1012525-004, and one spacer, P/N 2025860-026, which secure cable clamp and TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

VII. B. PROCEDURE (CONTINUED)

13. Remove three button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

14. Remove one button head screw, P/N 1006783-23, and two self locking nuts, P/N 1012525-004, which secure one cable clamp and electronic component bracket, P/N 2900795, (containing AR1 through AR4) to PTC case. See figure 1. Retain all hardware for later reassembly.

15. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure electronic component bracket, P/N 2900795, to PTC case. See figure 1. Retain all hardware for later reassembly.

16. Remove four button head screws, P/N 1006783-22, which secure relay assembly to PTC case. See figure 1. Retain screws for later reassembly.

17. Remove one button head screw, P/N 1006783-26, and lock washer, P/N MS35338-80, which secure relay assembly to nut sleeve, P/N 2900512-001, and electronic component assembly, P/N 2900521-011.

VII. B. PROCEDURE (CONTINUED)

18. Remove two button head screws, P/N 1006783-23, which secure two sections of each retainer strap on capacitor C3. Remove top section of each retainer strap to permit removal of C3. Retain screws and retainer straps for later reassembly.

19. Remove two button head screws, P/N 1006783-047, spacers, P/N 1015860-017, and self locking nuts, P/N 1016151-010, which secure bell assembly to PTC case. Retain all hardware for later reassembly.

20. Carefully remove wiring harness A, loose parts and assemblies from PTC case and place of workbench.

   a. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and retain the screws for later installation.

   b. Connect a 15 ohm variable resistor with an ammeter in series between BT1-(+) and BT8-(-) and proceed with the following steps.

      1) Discharge the battery at a 2.0 ± 0.1 ampere rate.

      2) Monitor individual module voltages; they shall not drop below 3.0 volts, during the first 30 minutes.

VII. B. PROCEDURE (CONTINUED)

      3) Discontinue discharge when total voltage drops below 18 volts or when voltage for individual module drops below 1.8 volts, whichever occurs first.

      4) Recharge at the rate of 100 ma to a cutoff voltage of 4.65 ± 0.05 volts/module, removing each module from the circuit as it attains its cutoff value.

      5) If the 1/2-hour minimum was not obtained in step 2) above, repeat steps 1 through 4.

   c. Reinstall battery retainer cover with original flat head screws.

21. Visually check rotary switch S1 to determine if detent disc has "U" or "V" type notches in its periphery. See figures 2 and 3. If detent disc has "V" type notches, obtain straight headed pin, P/N 2901555, from kit and dispose of as directed in section IX of this RIB, and then proceed to step 22. If detent disc has "U" type notches, perform the following:

   a. Remove rotary switch S1 from panel assembly. Retain all parts.

VII. B. PROCEDURE (CONTINUED)

b. Remove threaded spacer shown in figure 2 which is located adjacent to mid-point of roller arms as follows:

1) Remove flat head screw which secures threaded spacer to square top plate. Retain screw.

2) Loosen other screw from bottom of switch assembly and pull out only far enough to enable removal of threaded spacer. Remove and retain threaded spacer.

c. Disconnect spring from end of roller arms.

d. Swing roller arms out and away from switch assembly.

e. Press roller pin out of detent roller and replace with straight headed pin, P/N 2901555, supplied in kit. New pin shall be installed such that head of pin will be nearest to square top plate. Dispose of removed roller pin as directed in section IX of this RIB.

f. Reconnect spring to roller arms.

g. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws removed previously from threaded spacer.

VII. B. PROCEDURE (CONTINUED)

h. Insert threaded spacer in original position on switch assembly and thread screw from bottom of switch assembly into threaded spacer.

i. Reinstall flat head screw through square top plate into threaded spacer.

j. Reinstall switch assembly on panel assembly.

22. Remove resistor soldered between terminals 2 and 3 on fuseholder XF1. See figure 4. Dispose of resistor as directed in section IX of this RIB.

23. Replace resistor R16 with resistor 1897260-008, and replace all wires on the same respective terminals (see table 1). Dispose of R16 as directed in section IX of this RIB.

a. Obtain the decal, P/N 2901586 from the kit; remove the paper from the gummed back of the decal; and place it over the "135°" label on the 135° temperature calibration switch.

b. Apply a bead of varnish (MIL-V-6894A unreduced) over the decal.

c. Remove the number 2900501 from the panel and replace it with 2901585.

VII. B. PROCEDURE (CONTINUED)

24. Remove "-011" portion of identification mark "ASSY 2900835-011" on panel assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

25. Remove all leads from relay K4, P/N 1015802-004.

26. Remove relay K4 from relay assembly and dispose of as directed in section IX of this RIB.

27. Replace relay K4 with relay, 1015832-318, and replace all wires on respective terminals. (See table 2). Dispose of K4 as directed in section IX of this RIB.

28. Replace diode CR7 with 1N2976B (1896966-075), being careful to connect the cathode and anode in the same manner that they were for CR7. (See table 2). Dispose of CR7 as directed in section IX of this RIB.

29. Remove "-011" portion of identification mark "ASSY 2900777-011" on relay assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

30. Locate, mark and drill one 0.164 to 0.172 inch diameter through hole in electronic component assembly, P/N 2900521-011, as shown in figure 5. Use number 19 size twist drill to drill hole.

31. Apply MIL-C-5541 chemical film to bare metal on inner surface of newly drilled hole.

VII. B. PROCEDURE (CONTINUED)

32. Mark "K18" on electronic component assembly in location shown in figure 5. Use 1/8 inch high character rubber stamp and black marking ink for new marking.

33. Remove identification mark "2900505" on electronic component assembly and replace with identification mark "2901544". New marking shall be per MIL-STD-130 (ES267).

34. Remove "-011" portion of identification mark "ASSY 2900521-011" and replace with new dash number "-021". New marking shall be per MIL-STD-130, (ES267)

NOTE: When performing next step, insure that relay is positioned such that the shoulder on the relay stud which will protrude through the larger of two holes, sufficiently grips the bracket material. Improper relay positioning will cause the shoulder to be drawn into the hole when the self-locking nuts are tightened.

35. Obtain relay, P/N 1015982-007, two self locking nuts, P/N 1016151-006, and one flat washer, P/N AN960 C6, from kit and secure to electronic component assembly as shown in figure 6.

36. Stamp "CR30" between terminals 3 and 10 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

VII. B. PROCEDURE (CONTINUED)

37. Stamp "CR31" between terminals 3 and 11 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

38. Stamp "R63" between terminals 20 and 25 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

39. Obtain two 1N459 diodes from kit and install one between terminals 3 and 10 and the other between terminals 2 and 11 on TB2, as shown in figure 7. Observe proper anode and cathode connections as shown in figure 7.

40. Obtain resistor, P/N RC20GF431J, from kit and install between terminals 20 and 25 on TB2 as shown in figure 7.

41. Remove resistor R11, P/N RC32GF101J, located between terminals 28 and 37 on TB2. Dispose of resistor as directed in Section IX of this RIB.

42. Obtain resistor, P/N RC20GF301J, from kit and install between terminals 28 and 37 on TB2.

43. Using care not to damage sleeving on resistor R10 remove resistor R10, P/N 1016053-003, from between terminals 50 and 58 on TB2. Retain two insulation sleeves from R10 and dispose of R10 as directed in section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

44. Obtain resistor, P/N 1016053-029, from kit and install two sleeves, retained in step 43, on resistor leads. Solder resistor, between terminals 50 and 58 on TB2 as shown in figure 7.

45. Remove resistor R14, P/N RC42GF101J, from between terminals 19 and 30 on TB2. Retain insulation sleeve from R14 and dispose of R14 as directed in section IX of this RIB. Replace R61 with resistor P/N 1016053-024, between terminals 5 and 14 on TB-2. Dispose of old R61 as directed in section IX of this RIB.

46. Obtain resistor, RW55V201 (1896928-068), from kit and install between terminals 19 and 30 on TB2. Insulation sleeve retained in step 45 shall be placed on resistor lead which will be soldered to terminal 30. Reference figure 7.

47. Change wire A135 from terminal 18 to terminal 19 on TB2.

48. Remove diodes CR9 and CR10 which are identical, from terminals 18, 19, and 29 on TB2. Retain CR9 for later use and dispose of CR10 (P/N 1896966-187), as directed in section IX of this RIB. Delete letters CR9 and CR10 from TB2.

49. Remove "-011" portion of identification mark "ASSY 2900778-011" on TB2 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

VII. B. PROCEDURE (CONTINUED)

50. If terminal board (inseparable assembly) (TB2), is marked, P/N 2900519" re-identify as "P/N 2901545". Identification shall be in accordance with MIL-STD-130 (ES267).

51. Bond resistors R10 and R14 to terminal board TB2 per ND 1002203, using epoxy resin, P/N 1010748, curing agent, P/N 1010750, and calcium carbonate filter, P/N 1010749.

52. Remove 1N3030B diodes CR13 and CR14 from TB1-50, 56, and 58, and dispose of as directed in section IX of this RIB. Reference figure 8.

53. Obtain two 1N3029B diodes from kit and install one between terminals 50 and 56 and the other between terminals 50 and 58 on TB1, as shown in figure 8. Observe proper anode and cathode connections shown in figure 8.

54. Remove "-011" portion of identification mark "ASSY 2900513-011" on TB1 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

55. Obtain electronic component bracket, P/N 2901556, two terminal studs, P/N 1896962-003, and two pan head screws, P/N MS35233-12, from kit. Secure terminal studs to component bracket with pan head screws as shown in figure 9. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws prior to installing.

VII. B. PROCEDURE (CONTINUED)

56. Obtain capacitor, P/N CL25BL700UP3, from kit and install between E32 and E33 on electronic component bracket, P/N 2901556, as shown in figure 9. Insure positive lead of capacitor is connected to E32.

57. Remove four button head screws, P/N 1006783-18, flat washers, AN960 C4, and lock washers, P/N MS35338-78, which secure one side of comparators AR1 and AR2 to inner edge of electronic components bracket, P/N 2900795. (Removal of these four screws and associated washers will permit installation of new component bracket as shown in figure 9.) Retain all washers and dispose of four screws as directed in section IX of this RIB.

58. Secure electronic component bracket, P/N 2901556, to electronic component bracket, P/N 2900795, as shown in figure 9, using four button head screws, P/N 1006783-95, (supplied in kit) and washers retained in step 53.

59. Remove capacitor C4 from terminals 37 and 38 of TB3. Dispose of the capacitor as directed in section IX of this RIB. Retain the sleeving for later use.

60. Remove wire AA105 from terminals 47 and 31 of TB3.

VII. B. PROCEDURE (CONTINUED)

61. Move wire B32 of the B harness from terminal 47 to terminal 31 of TB3.

62. Move wire A32 of the A harness from terminal 47 to terminal 31 of TB3.

63. Move wire B36 of the B harness from terminal 38 to terminal 47 of TB3.

64. Remove the "C4" marking on electronic component assembly and replace it with "CR9". Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

65. Install diode CR9 which was removed in step 51, between terminals 38 and 47 of TB3 with cathode end attached to terminal 47. Install sleeving removed in step 59.

66. Interchange wires AA18 and A34 on fuseholder XF2. (See table 2.)

67. Interchange wires AA22 and A35 on fuseholder XF3. (See table 2.)

68. Remove "-011" portion of identification "ASSY 2900522-011" and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

VII. B. PROCEDURE (CONTINUED)

NOTE: If P/N 2901523 is marked on the inseparable assembly, the marking shall be removed and replaced with "P/N 2901583".

69. Remove jumper wire AA118 from between TB3-7 and TB3-8.

70. Change lead on diode CR27 from TB3-8 to TB3-7.

71. Change wire B7 from TB3-8 to TB3-7.

72. Change wire A53 from TB3-15 to TB3-9.

73. Remove the "CR27" marking from the inseparable assembly and replace it with "CR10". Marking shall be 0.09 inch high per ND 1002019 and black in color.

74. Add diode CR10 (1N459) between TB3-15 and TB3-8 with the cathode at TB3-15. This is a new CR10 and is not to be confused with the one that was removed in step 29.

75. Change wire A145 from TB3-9 to TB3-8.

VII. B. PROCEDURE (CONTINUED)

76. Completely remove leads listed in table 1. Do not remove any other leads which may be connected to the listed termination points in table 1.

Table 1. PTC Lead Deletions

Lead Ident.	From Ckt. Pt.	To Ckt. Pt.	Remarks
AA84	CR1-C	E1	
AA85	K1-4	E1	
AA119	TB3-14	TB3-15	
AA120	TB3-15	TB3-16	
A85	E17	TB3-9	
A122	TB2-37	K2-7	Previously removed from K2-7.
B3	TB3-9	K5-3	
B31	TB3-14	K2-3	Previously removed from K2-3.
B46	K2-2	K8-8	Previously removed from K2-2.
AA105	TB3-47	TB3-31	

VII. B. PROCEDURE (CONTINUED)

77. Revise lead connections as listed in table 2. Required accessory items are supplied in the kit.

Table 2. Revised PTC Lead Terminations

Lead Ident.	Removed From	Reconnect To	Strip Insul.	Tin	Accessoty Item P/N
AA73	E18	*E3	0.30	Yes	
B5	TB3-15	TB3-14	0.30	Yes	
B47	**K2-2	K8-8	0.30	Yes	1015864-140
A4	TB3-9	K5-3	0.30	Yes	1015864-140
A33	CR1-A	***E1	0.30	Yes	
A53	**K2-4	****TB3-15	0.30	Yes	
B36	R16-1	TB3-38	0.30		
A135	R16-2	TB2-18	0.30		
B29	K4-1	TB3-38	0.30		
A136	K4-19	TB2-19	0.30		
B50	K4-5	K6-2	0.30		
B51	K4-5	K14-8	0.30		
AA140	K4-6	K5-4	0.30		
A34	XF2-1	S1A-10	0.30		
AA18	XF2-2	T1-3	0.30		
A35	XF3-1	S1A-16	0.30		
AA22	XF3-2	T1-1	0.30		
B4	CR7-A	TB3-16			
B30	CR7-C	TB3-11			

*One more lead (AA163) will be added to this point later.
**Lead was previously removed from this point.
***Two more leads (AA154 and AA156) will be added to this point later.
****One more lead (A144) will be added to this point later.

VII. B. PROCEDURE (CONTINUED)

78. Obtain new wire list AA leads and required accessory items from kit lead set and install as indicated in table 3. (Notes referenced in the remarks column of table 3 can be found at the end of the table.)

Table 3. Wire List AA Lead Additions

Lead Ident.	From Ckt.Pt.	To Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA154	E1		0.20	Yes		See note 1
		K18-2	0.20	Yes	1015864-135	
AA155	K18-5		0.20	Yes	1015864-135	
		K1-4	0.20	Yes	1015864-135	
AA156	E1		0.20	Yes		See note 2
		K18-3	0.20	Yes	1015864-135	See note 3
AA157	K18-6		0.20	Yes	1015864-135	
		E3	0.20	Yes		See note 4
AA158	CR1-A		0.20	Yes	1015864-137	See note 5
		E17	0.20	Yes		See note 6
AA159	TB2-11		0.20	Yes		
		TB2-37	0.20	Yes		
AA160	J1-J		0.20	No		See note 7
		S7SW2-NO	0.30	Yes		Combine with AA43
AA161	TB3-14		0.30	Yes		Combine with B6
		TB3-16	0.30	Yes		Combine with A86
AA162	J1-H		0.20	No		See note 7
		S1A-24	0.30	Yes		Combine with AA25
AA163	E18		0.30	Yes		See note 8
		E3	0.30	Yes		See note 9

VII. B. PROCEDURE (CONTINUED)

Table 3. Wire List AA Lead Additions (Continued)

Note 1 - One more lead (AA156) will be added to this point.
Note 2 - Solder on E1 with leads A33, A79, and AA154.
Note 3 - One more lead (A147) will be added to this point.
Note 4 - One more lead (AA163) will be added to this point.
Note 5 - One more lead (A150) will be added to this point.
Note 6 - Solder on E17 with leads AA66, AA68, and AA69.
Note 7 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 8 - Solder on E18 with leads A70 and AA72.
Note 9 - Solder on E3 with leads AA73 and AA157.

79. Obtain new wiring harness A leads and required accessory items from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column of table 4 can be found at the end of the table.)

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions

Lead Ident.	From Ckt.Pt.	To Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A144	K18-8		0.30	Yes	1015864-135	
		TB3-15	0.30	Yes		See note 1
A145	TB2-25		0.30	Yes		
		TB3-9	0.30	Yes		
A146	TB2-20		0.30	Yes		See note 2
		XF1-3	0.30	Yes		See note 3
A147	K18-3		0.30	Yes		Combine with AA156
		TB2-10	0.30	Yes		
A148	K18-7		0.30	Yes	1015864-135	
		TB2-3	0.30	Yes		
A149	K5-2		0.30	Yes		Combine with B5
		CR1-C	0.30	Yes	1015864-163	
A150	CR1-A		0.30	Yes		Combine with AA158
		K5-3	0.30	Yes		Combine with A4
A151	J2-C		0.20	No		See notes 4 and 5
		TB1-58	0.30	Yes		
A152	TB2-30		0.30	Yes		See note 6
		E32	0.30	Yes		
A153	TB2-53		0.30	Yes		See note 6
		E33	0.30	Yes		

Note 1 - Combine with leads A53 and B5 at this point.
Note 2 - Route lead along harness branch near TB3.
Note 3 - See figure 4 for terminal information.
Note 4 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 5 - Route lead along harness branch near TB2 and TB3.
Note 6 - Route lead along harness branch near TB1.

VII. B. PROCEDURE (CONTINUED)

80. Wrap and spot tie black lacing tape over terminal 3 on fuseholder XF1 (see figure 4) to secure the terminal to the body of the fuseholder. The wrapping should pass over terminal 1 and also cover a small portion of the lead attached to terminal 3.

81. Spot tie new and rerouted leads into applicable harness as necessary, using black lacing tape.

82. Remove identification band marked "2900654" from wiring harness A and replace with kit supplied identification band marked "2901546". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in section IX of this RIB.

83. Remove identification band marked "2900655" from wiring harness B and replace with kit supplied identification band marked "2901549". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in Section IX of this RIB.

84. Transfer serial number from nameplate on PTC case to new nameplate supplied in kit. Use 1/16 inch high character metal stamp set to imprint data.

85. Remove nameplate from PTC case and dispose of as directed in section IX of this RIB. Retain four screws.

VII. B. PROCEDURE (CONTINUED)

86. Secure new nameplate to PTC case with four screws retained in preceding step. Apply MIL-H-22473, grade H, sealing and retaining compound to threads of four screws prior to installation.

87. Carefully place wiring harness A, attached parts and assemblies into PTC case.

88. Secure bell assembly to PTC case in original position with hardware retained in step 19. Reference figure 1.

89. Secure capacitor C3 to PTC case in original position with hardware retained in steps 6 and 18. Reference figure 1.

90. Secure transformer T1 to PTC case in original position with hardware retained in step 5. Reference figure 1.

91. Secure electronics component assembly, P/N 2900521 -021, to PTC case in original position with hardware retained in step 4. Reference figure 1.

92. Secure electronic component bracket, P/N 2900795, to PTC case in original position with hardware retained in steps 14 and 15. Insure cable clamp is located above and between AR4 and AR3. Reference figure 1.

VII. B. PROCEDURE (CONTINUED)

93. Secure TB1 to PTC case in original position with hardware retained in step 13. Do not secure upper left corner (next to R13) to PTC case. Reference figure 1.

94. Install hardware retained in step 12 to upper left corner of TB1.

95. Secure two lower corners of TB2 to PTC case with hardware retained in step 10. Reference figure 1.

96. Install hardware retained in step 11 to two upper corners of TB2.

VII. B. PROCEDURE (CONTINUED)

97. Perform continuity and resistance checks per table 5.

Table 5. Continuity-Resistance Checks

From	To	Indication	Remarks
J1-J	J1-L	<1 OHM	All readings shall be less than 1 ohm
J2-C	TB1-58	↓	
J1-H	S1A-24	↓	
J1-B	J1-L	↓	

98. Using a razor blade and india ink, make the following changes to the decal on the inside of the PTC cover:

a. Change the schematic drawing number in the upper left-hand corner of the decal from 2900133 to 2901543.

b. Adjacent to the "28 VDC INPUT J1", change TEMP FAIL-ILTC to TEMP FAIL-LTC. Change POWER FAIL-ILTC to POWER FAIL-LTC. After M GROUND, add H BATT HI and J BATT LO.

c. Cover all new lettering with clear lacquer.

VII. PROCEDURE (CONTINUED)

C. RETEST PROCEDURES.

1. Recalibration of bridge excitation voltages.

NOTE: Relay assembly has to be swung up to make potentiometers accessable. Maintain isolation between assembly and case.

a. Make the test setup as indicated in figure 10.

b. Set control decade to 1560.0 ohms and the indicating decade to 2504.5 ohms.

NOTE: Apply only 28 ± 1 VDC power.

2. Control Bridge.

a. Set TEMP. ADJUST potentiometer to center position (11 turns from clockwise). See figure 1.

b. Connect differential voltmeter number 1 to TB2-56 (hi) and TB2-12 (lo).

c. Connect differential voltmeter number 2 to TB2-42 (hi) and TB2-12 (lo).

d. Adjust R33 and R35 on the relay assembly to obtain simultaneous voltages of 1.950 ± 0.020 VDC on differential voltmeter number 1 and 17.4 ± 0.174 VDC on meter number 2.

VII. C. PROCEDURE (CONTINUED)

3. Indicating Bridge.

   a. Connect differential voltmeter number 1 to TB2-52 (hi) and TB2-45 (lo).

   b. Connect differential voltmeter number 2 to TB2-39 (hi) and TB2-54 (lo).

   c. Adjust R18 and R19 to obtain simultaneous voltages of 1.610 ± 0.016 VDC on voltmeter number 1 and 17.6 ± 0.176 VDC on voltmeter number 2.

   d. Turn selector switch on the panel assembly to OFF.

OFF

4. Recalibration of battery cutoff voltage.

   a. Remove electrical tape from lead A11 and connect to the high side of the voltohmmeter with the low side connected to TP2. Remove the electrical tape from lead A82 and connect it to the negative terminal on BT8.

   b. Turn R16 full clockwise. Turn the selector switch to ON.

   c. Apply 36.8 ± 0.1 VDC to TB2-19 high and TP2 low.

VII. C. PROCEDURE (CONTINUED)

   d. Slowly turn R16 counterclockwise until VTVM voltage drops to 28V source voltage. Decrease cutoff supply voltage from 36.8 to approximately 30 volts and momentarily remove the supply voltage.

   e. Slowly increase the cutoff supply voltage and varify that the switchover point is 36.8 ± 0.1 VDC. Adjust R16 and repeat these procedures if necessary.

   f. Remove the cutoff supply voltage; set the selector switch to OFF. Connect lead A11 to the positive terminal of BT1. Apply 115 VAC at J2-M and J2-J. Turn selector switch to ON. Monitor current through A11 with clip-on ammeter. Verify that the charging current drops to zero at a battery terminal voltage at J1-H high and J1-J low of 36.7 ± 0.3 VDC and that individual module (8) voltages do not exceed 4.75 VDC.

   g. Set selector switch to OFF. Reinstall the battery retainer cover on battery retainer with original two flat-head screws and two button-head screws with self-locking nuts that were removed in step 7.

VII. C. PROCEDURE (CONTINUED)

   h. Secure relay assembly to PTC case in original position with hardware retained in step 16. Reference figure 1.

   i. Secure relay assembly to nut sleeve located between relay assembly and electronic component assembly, P/N 2900521-021, with screw retained in step 17.

   j. Place panel assembly in original mounting position in PTC case and secure with six screws retained in step 2.

5. Recalibration of hot alarm set point.

   a. Set selector switch to ON. Set the HI ALARM LIMIT ADJUST potentiometer full clockwisw and monitor pins J3-A and J3-B.

   b. Set indicating decade box to 2225 ohms.

   c. Slowly turn the HI ALARM LIMIT ADJUST potentiomiter counterclockwise until continuity exists at J3-A and J3-B.

   d. Set the indicator decade box to 2500 and press ALARM INHIBITED (SYSTEM RESET) pushbutton to silence the bell and stop the flashing light.

VII. C. PROCEDURE (CONTINUED)

   e. Set the indicator decade box to 2240 ohms, and slowly decrease resistance in 1-ohm steps. Between 2230 and 2220 ohms the bell shall ring, the IMU HOT lamp shall flash, and continuity shall exist at J3-A and J3-B.

   f. Press and hold the ALARM INHIBITED (SYSTEM RESET) pushbutton for this paragraph. Slowly increase the resistance in 1-ohm steps. Before 2270 ohms, the IMU HOT lamp shall extinguish and continuity shall exist at J3-B and J3-C.

   g. Set indicator decade box at 2254.1 ohms. Set the selector to OFF for 5 seconds. Upon reapplication of power, the IMU HOT lamp shall not be flashing.

   h. Adjust HI TEMP ALARM ADJUST to meet conditions of steps e and g above if necessary.

   i. Set indicator decade box to 2201.3 ohms. The alarm bell shall ring, IMU HOT lamp shall flash, and the meter shall read 138.0 ± 0.5°F with or without the 138° CAL pushbutton depressed. Release the 138° CAL pushbutton and set the decade box to 2500 ohms. Return to normal operation by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

VII. C. PROCEDURE (CONTINUED)

5. Temperature Alarm Memory

a. With the 125° CAL pushbutton held in the depressed position, the bell shall ring and the IMU COLD lamp shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release the 125° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU COLD light shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

→ lamp
[illegible]

b. With the 138° CAL pushbutton held in the depressed position, the bell shall ring and the IMU HOT lamp shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release 138° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU HOT ligh shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

6. Power Output.

a. Apply 25.2 VDC and remove 115VAC. Inhibit the alarm or open the switch S2 for loss of 115VAC. Set the control decade box to 1530 ohms. Multiply the readings of the output ammeter and the output voltage. The results shall be 60 watts minimum.

VII. C. PROCEDURE (CONTINUED)

7. Indicating Bridge Failure.

a. Apply 115 VAC to J2-M and J2-J. Set control decade box so that PTC meter reads 1.5 ± 0.5 amperes. Jumper J2-C to TP4. IMU HOT and IMU COLD lamps shall flash, the alarm bell shall ring, and the PTC meter shall read 1.5 ± 0.5 amps. Remove jumper and reset system by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

8. 28V Line Fuse Indication.

a. Remove the 28V fuse with holder. Bell shall ring and POWER FAIL lamp shall light. Reinsert holder without fuse. Lamp in holder shall light. Open switch S1. Bell shall stop ringing and POWER FAIL lamp shall go out, holder lamp shall continue to indicate. Reinsert fuse in fuseholder.

→ S
ging

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record.

3. Record performance of the modification on the existing Unit History Record sheet (referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain the old Unit History Record sheet in the Acceptance Data Package.

B. Significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021
Panel Assembly	2900835-011	2900835-021
Electronic Component Assembly	2900521-011	2900521-021
Electronic Components Heatsink (Inseparable Assembly)	2900505	2901544

VIII. B. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Relay Assembly	2900777-011	2900777-021
Electronic Components Assembly	2900513-011	2900513-021
Electronic Components Assembly	2900778-011	2900778-021
Terminal Board (Inseparable Assembly)	2900519	2901545
Terminal Board (Inseparable Assembly)	2900523	2901583
Wiring Harness A	2900654	2901546
Wiring Harness B	2900655	2901549
Lead Set AA	2900656	2901550
Electronic Components Assembly	2900522-011	2900522-021

IX. DISPOSITION OF PARTS REMOVED

A. Send relay (K2), P/N 1015802-004, to AC Electronics, Logistics Department, bondroom. Logistics shall utilize this item as a spare.

B. Transfer the following items to full custody of the government via DD543 form (Inventory Schedule).

IX. DISPOSITION OF PARTS REMOVED

Qty	Part Number	Description
2	1N3030B	Semiconductor (1896966-070) (formerly CR13 and CR14)
1	1016053-003	Resistor (formerly R10)
1	1897260-005	Resistor (formerly R16)
1	RC32GF101J	Resistor (1896953-039) (formerly R11)
1	RC42GF101J	Resistor (1896951-025) (formerly R14)
1	Not assigned	Resistor, 420 ohm (formerly attached to XF1)
1	1016053-001	Resistor, (formerly R61)
1	1015832-312	Relay, (formerly K4)

C. Scrap all other items via AC Electronics form MIL-127 or equivalent.

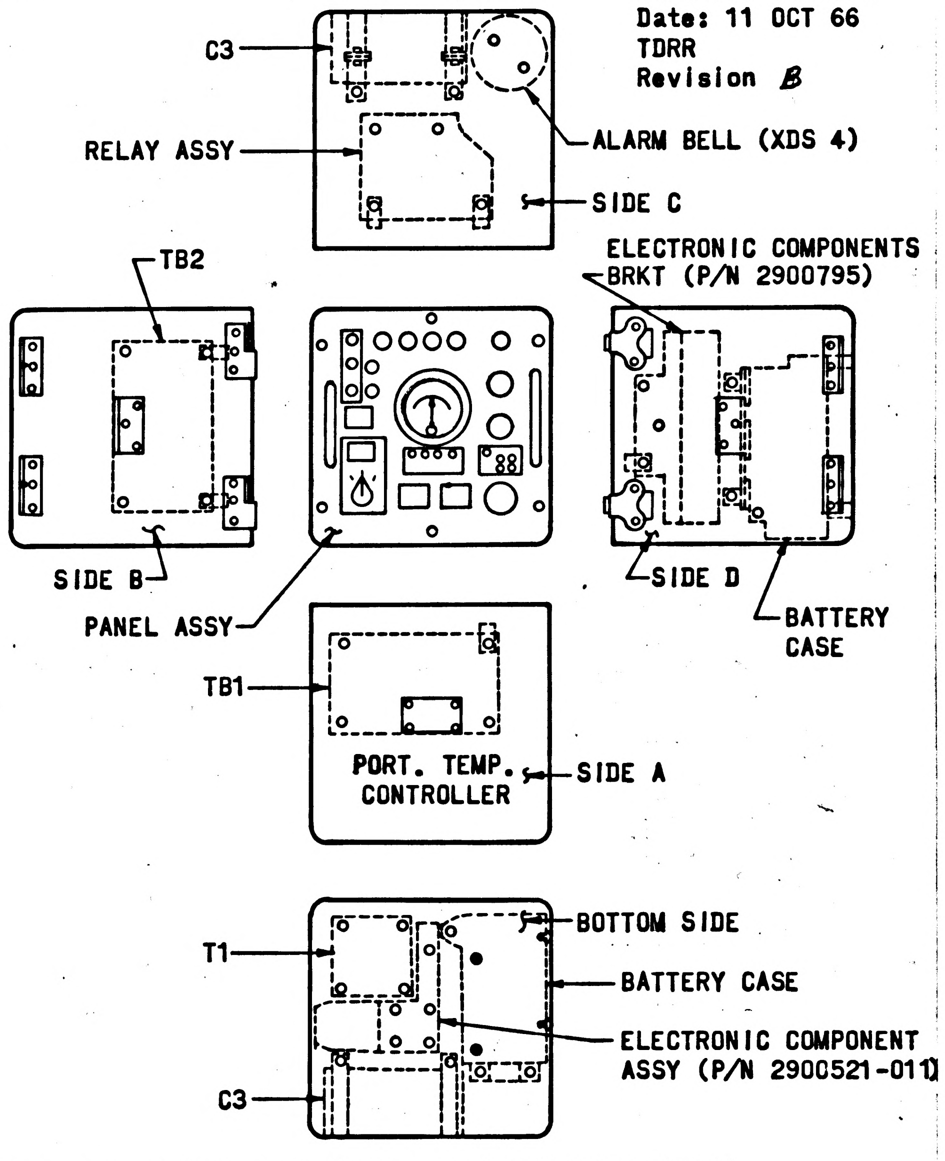
C3
RELAY ASSY
ALARM BELL (XDS 4)
SIDE C
TB2
ELECTRONIC COMPONENTS BRKT (P/N 2900795)
SIDE B
PANEL ASSY
SIDE D
BATTERY CASE
TB1
PORT. TEMP. CONTROLLER
SIDE A
T1
BOTTOM SIDE
BATTERY CASE
ELECTRONIC COMPONENT ASSY (P/N 2900521-011)
C3

Figure 1. LOWER SECTION OF PTC (SIMPLIFIED VIEWS)

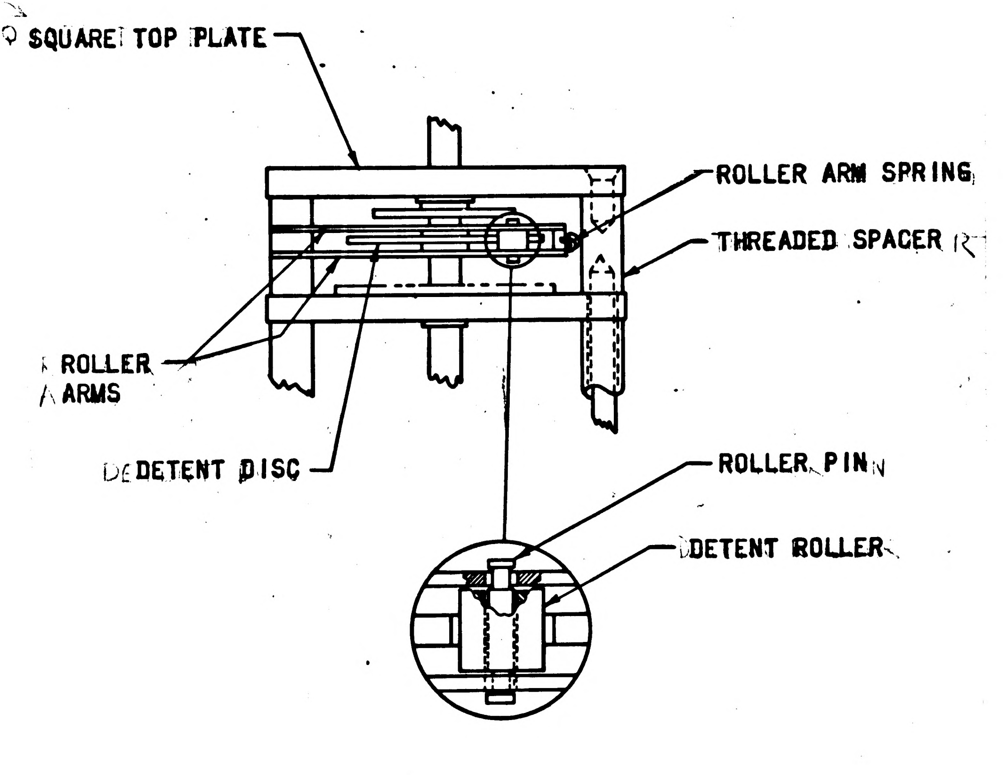
SQUARE TOP PLATE
ROLLER ARM SPRING
THREADED SPACER
ROLLER ARMS
DETENT DISC
ROLLER PIN
DETENT ROLLER

Figure 2. ROTARY SWITCH WITH "U" NOTCH TYPE DETENT DISC BEFORE MODIFICATION (SIMPLIFIER PARTIAL VIEW)

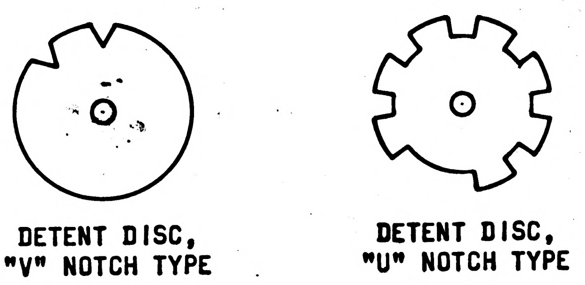
DETENT DISC, "V" NOTCH TYPE
DETENT DISC, "U" NOTCH TYPE

Figure 3. DETENT DISC TYPES

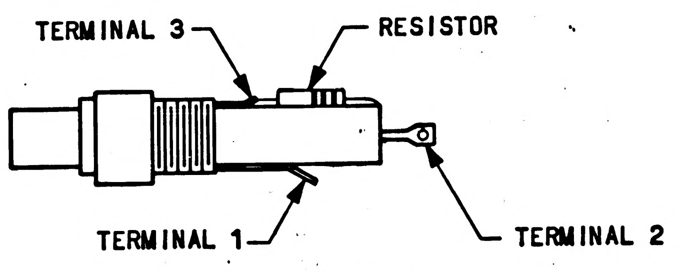
TERMINAL 3
RESISTOR
TERMINAL 1
TERMINAL 2

Figure 4. FUSEHOLDER TERMINALS

KNOLL

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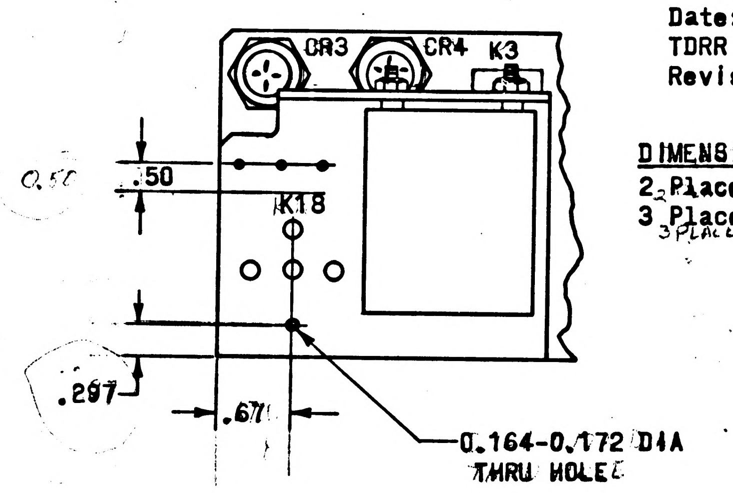
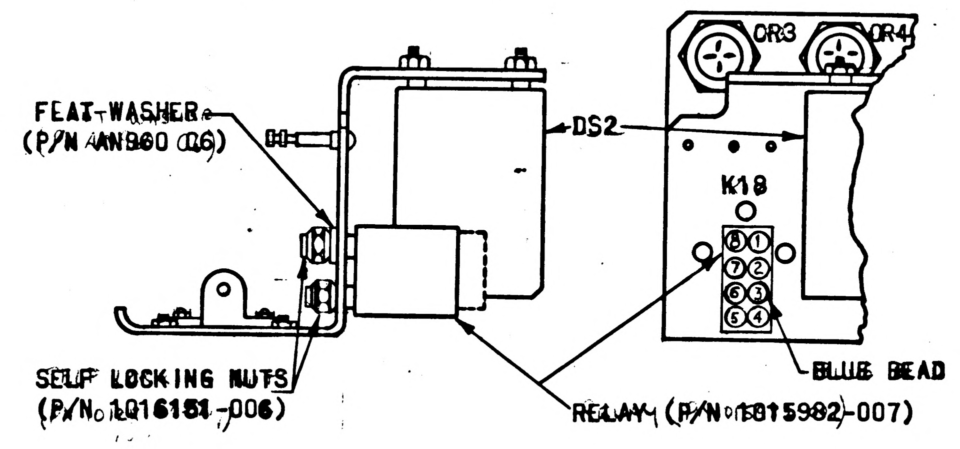
DIMENSION TOLERANCES
2 Place Decimal ±.02
3 Place Decimal ±.005



CR3
CR4
K3
K18
0.50
.50
.297
.671
0.164-0.172 DIA
THRU HOLE

Figure 5. NEW HOLE IN ELECTRONIC COMPONENT ASSEMBLY, P/N 2900521-011



FLAT WASHER
(P/N AN960 C6)
SELF LOCKING NUTS
(P/N 1016151-006)
DS2
CR3
CR4
K18
8
1
7
2
6
3
5
4
BLUE BEAD
RELAY (P/N 1015982-007)

Figure 6. NEW RELAY K18 IN MOUNTED POSITION

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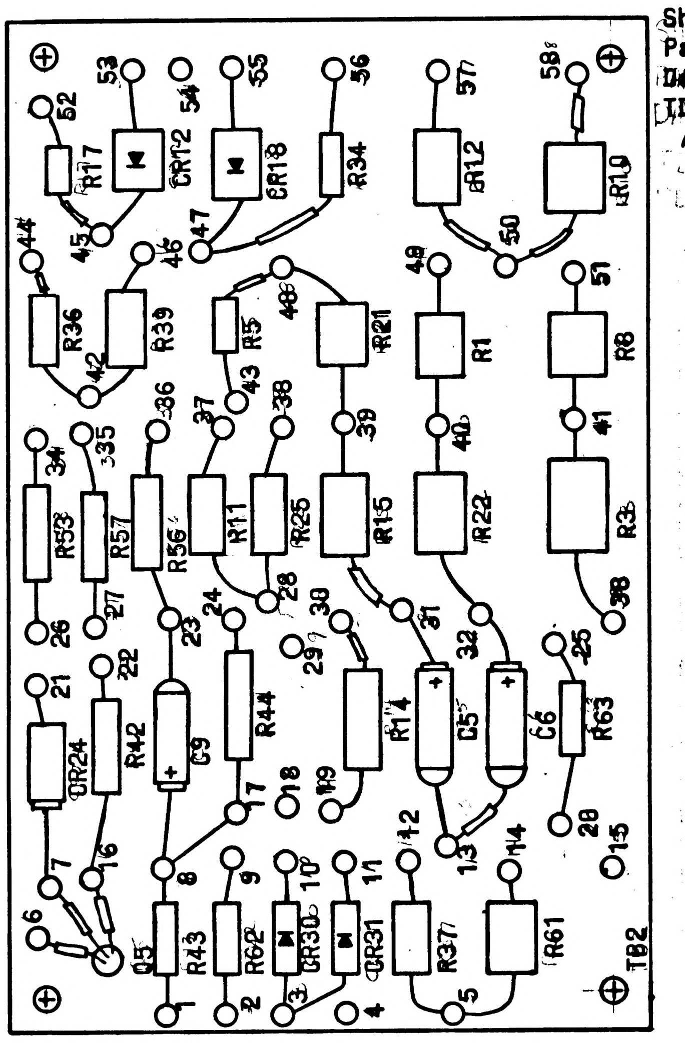

R17
CR12
CR18
R34
R12
R10
R36
R39
R5
R21
R1
R8
R53
R57
R56
R11
R25
R15
R22
R3
CR24
R42
C9
R44
R14
C5
C6
R63
R43
R62
CR30
CR31
R37
R61
TB2

Figure 7. ELECTRICAL COMPONENTS ASSEMBLY (TB2) AFTER MODIFICATION

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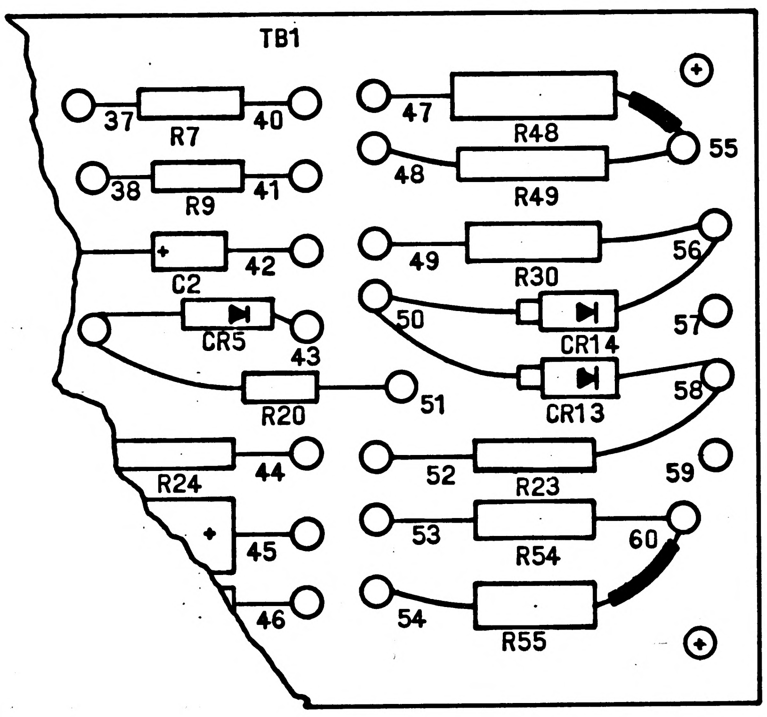

TB1
R7
R9
C2
CR5
R20
R24
R48
R49
R30
CR14
CR13
R23
R54
R55
37
38
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Figure 8. ELECTRICAL COMPONENTS ASSEMBLY (TB1) AFTER MODIFICATION

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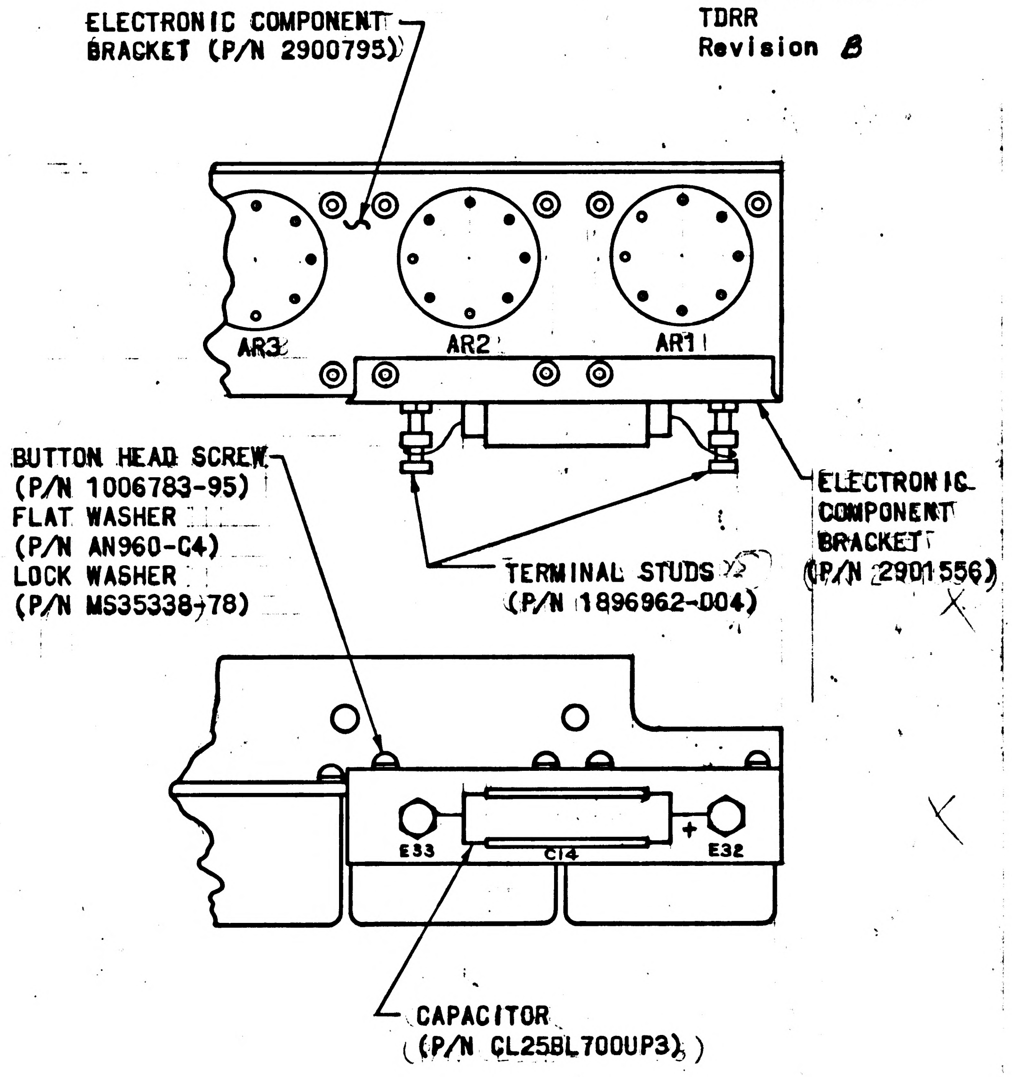

ELECTRONIC COMPONENT BRACKET (P/N 2900795)
AR3
AR2
AR1
BUTTON HEAD SCREW (P/N 1006783-95)
FLAT WASHER (P/N AN960-C4)
LOCK WASHER (P/N MS35338-78)
TERMINAL STUDS (P/N 1896962-004)
ELECTRONIC COMPONENT BRACKET (P/N 2901556)
E33
C14
E32
CAPACITOR (P/N CL25BL700UP3)

Figure 9. NEW COMPONENT BRACKET

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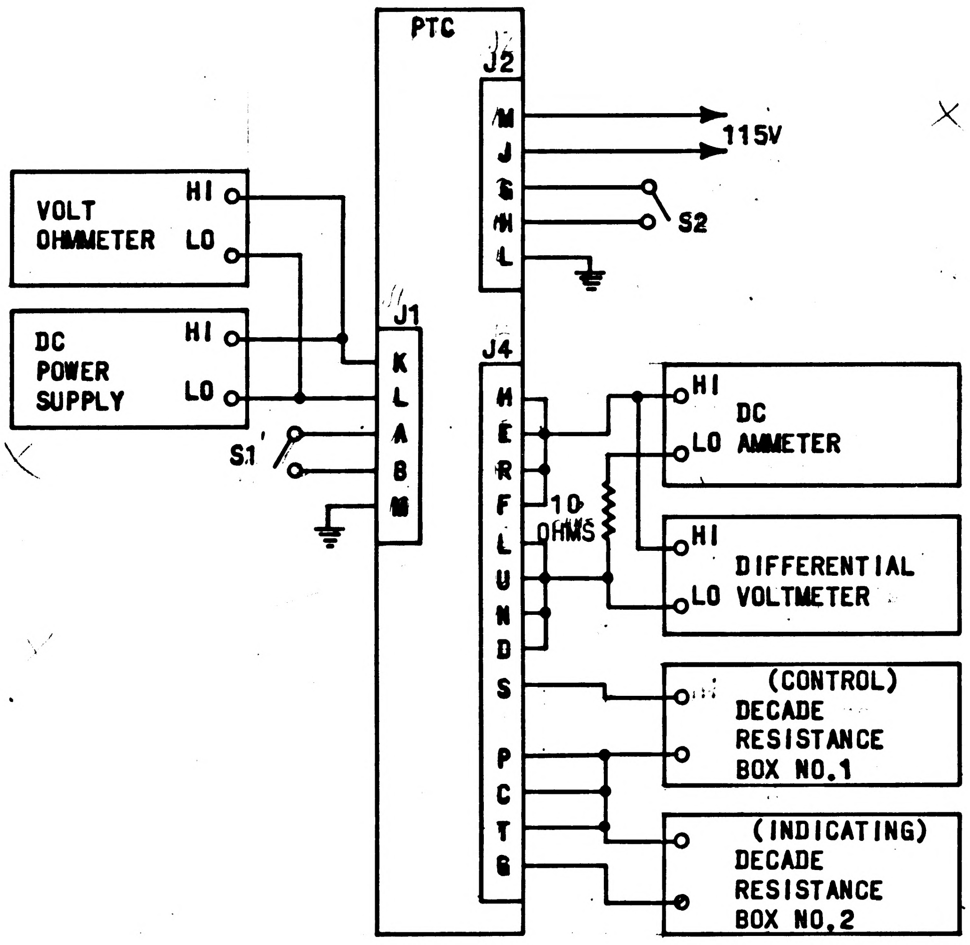
PTC
J1
K
L
A
B
M
J2
M
J
G
H
L
115V
S2
J4
M
E
R
F
L
U
N
D
S
P
C
T
G
VOLT OHMMETER
HI
LO
DC POWER SUPPLY
HI
LO
S1
HI
LO
DC AMMETER
10 OHMS
HI
LO
DIFFERENTIAL VOLTMETER
(CONTROL) DECADE RESISTANCE BOX NO.1
(INDICATING) DECADE RESISTANCE BOX NO.2

Figure 10. TEST SETUP

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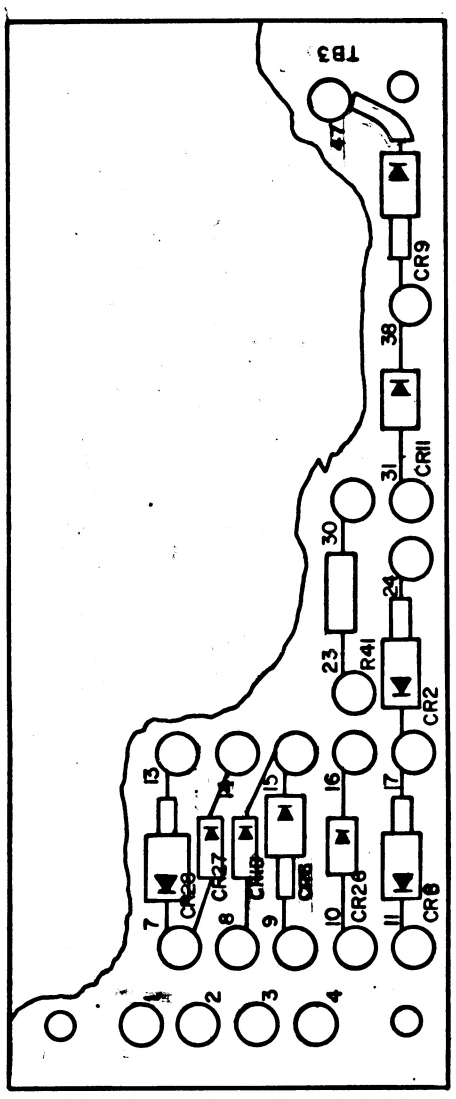
TB3
47
CR9
38
CR11
31
30
24
23
R41
CR2
13
14
15
16
17
7
8
9
10
11
CR28
CR27
CR18
CR26
CR8
2
3
4

Figure 11. ELECTRICAL COMPONENTS ASSEMBLY (TB3)
AFTER MODIFICATION

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Revision C

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR PORTABLE TEMPERATURE CONTROLLER, P/N 2900060-011

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CCB[redacted]	NASA	
A	MXC 213759	1,4,6,14,15,16			21 OCT 66
Ⓜ B	32123	ALL INITIAL RELEASE		—	4/28/66
C	32732	1,2A,4A,7,12,12A,15,17,17A,33,34,41,46,50			24 JAN 67

Prepared by Earl Cox Date 10/13/66
P.C. Engineering Approval Date 10/13/66
Design Review Board Approval Date 11-18-66
MIT/IL Approval Date
NASA Approval Date 11/22/66
MIT Reliability Date

Sheet 2 of 50
Part No. 0102115
Date: 11 OCT 66
TDRR
Revision B

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Portable Temperature Controller (PTC), P/N 2900060-011. This modification will accomplish the following:

1. Insure a power fail alarm occurs when the 28 volt input fuse is blown and power is supplied from 115V source.
2. Stabilize bridge excitation voltage when line voltage is low.
3. Enable operation of Block I IMU without changing the temperature adjustment for Block II.
4. Add filter and change to charging circuit to improve critical battery cutoff operation.
5. Change hot alarm trip point to exclude normal operating range.
6. Provide external means of initiating bridge excitation failure test.
7. Provide external means of monitoring battery voltage.
8. Improve the temp failure latching circuit for loss of external power.
9. Reroute 115V fuse wiring for safer operation.

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I. PURPOSE

10. To make the batteries more accessible and provide for more mechanical support.
11. To reduce power to two lamps and relays to rated values.

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II. AUTHORITY

This retrofit is authorized by Marriage Kit 3.
NASA 9-497 SA-42

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

Not applicable.

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102250, consisting of the following is required to modify Portable Temperature Controller, P/N 2900060-011.

VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	0102115	Retrofit Instruction Bulletin
1	2901542	Lead set
1	1015982-007	Relay, armature
3	1N459	Diode (1896966-291)
2	1N3029B	Diode (1896966-069)
1	RC20GF301J	Resistor (1896952-036)
1	RC20GF431J	Resistor (1896952-040)
1	1016053-024	Resistor
1	1016053-029	Resistor
1	1004260-535	Nameplate
2	1016151-006	Nut, self locking
6	1015864-135	Sleeving, electrical insulation
1	1015864-137	Sleeving, electrical insulation
2	1015864-140	Sleeving, electrical insulation
1	1015864-163	Sleeving, electrical insulation
1	AN960 C6	Flat washer (1897006-026)
1	CL25BL700UP3	Capacitor (1897081-324)
2	1896962-003	Terminal stud
2	MS35233-12	Pan head screw
4	1006783-95	Button head screw
1	RW55V201	Resistor (1896928-068)
1	1015832-318	Relay
1	1897260-008	Resistor, variable
1	1N2976B	Diode (1896966-075)
1	2901555	Pin, straight, headed
1	2901556	Bracket, electronic component
1	2901586	Decal, Functional Area

VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	RC32GF271J	Resistor (1896953-049)
1	RC42GF750J	Resistor (1896951-022)
2	RC42GF121J	Resistor (1896951-027)
1	2901587	Bracket, batt. retainer cover
1	2901588-001	Pad, cushioning
1	2901588-002	Pad, cushioning

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in the retrofit kit are as follows:

Qty	Part Number	Description
AR	N/A	Clean lacquer
AR	N/A	Lacquer thinner
AR	N/A	Chemical film (MIL-C-5541A, type 1, grade B, class 2)
AR	N/A	Sealing and retaining compound (MIL-S-22473), grades C and H
AR	N/A	Black marking ink
AR	N/A	Black lacing tape (MIL-T-713B, Type P, class 2)
AR	N/A	Solder (QQ-S-571, SN60 WRAP)
1	Any hi-speed	Number 19 size twist drill
1	*Schwaab Stamp and Seal Co.Type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
1	*Schwaab Stamp and Seal Co.Type AAG-0X	Rubber stamp, 1/12 inch, thirteen band, alpha-numerical
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/16 inch alpha-numerical
1	Buchanan MS3191-1	Crimping tool
1	Buchanan MS3191-20	Positioner
1	Bendix 11-7880-20	Extraction tool
1	Bendix 11-8107-20	Insertion tool
AR	1010748	Epoxy resin
AR	1010750	Curing agent
AR	1010749	Calcium carbonate filler

*or equivalent

VI. B. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
2	Single pole, single throw	switch
1	HP-428B	DC ammeter
2	Fluke 803B	Differential voltmeter
1	HP-412A Alternate:HP-410C	Voltohmmeter
2	General Radio 1432X Alternate:Rubicon 2015	Decade resistance box
1	Harrison Labs 808A	Power supply
1	Ohmite, 15 ohms, variable, 100 watts minimum	Resistor
AR	MIL-V-6894A unreduced	Varnish

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard AC-STD-1, dated 15 January, 1965.

3. Ink markings:

   a. Markings to be removed should be removed with lacquer thinner.

   b. New markings shall be covered with a coat of clear lacquer, after ink has dried.

4. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties shall be added after all conductor rework has been completed.

5. Use heatsink device when unsoldering or soldering near semiconductors.

6. Where marking is specified, hand marking is acceptable.

7. When disassembling the PTC, reinstall loose hardware on major part to insure proper placement and usage of attached hardware upon reassembly. Discard the two nuts. Remove two brackets, P/N 2900510, fastened with two screws, P/N 1010630-13 and two nuts, P/N 1016151-004. Discard brackets, screws and nuts.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove top cover from PTC and set aside.

2. Remove six flat head screws, P/N 1010630-38, which secure panel assembly, P/N 2900835-011, to PTC case, P/N 2900525-011. Retain screws for later reassembly.

3. Carefully lift panel assembly out of PTC case and place along side of PTC case.

4. Remove five button head screws, P/N 1006783-22, which secure electronic component assembly, P/N 2900521-011, to bottom of PTC case. See figure 1. Retain screws for later reassembly.

5. Remove four button head screws, P/N 1006783-26, flat washers, P/N AN960-C8, and lock washers, P/N MS35338-80, which secure transformer T1 to bottom of PTC case. See figure 1. Retain all hardware for later reassembly.

6. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure capacitor C3 to side of PTC case. See figure 1. Retain screws and nuts for later reassembly.

VII. B. PROCEDURE (CONTINUED)

7. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and two button head screws, P/N 1006783-22 with self locking nuts, P/N 1012525-004.

8. Disconnect lead A11 from positive terminal on BT1 and lead A82 from negative terminal on BT8. Temporarily insulate leads A11 and A82 with electrical tape.

9. Reinstall battery retainer cover on battery retainer with original two flat head screws and retain the two button head screws for later installation.

10. Remove two button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure lower edge of TB2 to PTC case. See figure 1. Retain all hardware for later reassembly.

11. Remove two button head screws, P/N 1006783-104, four self locking nuts, P/N 1012525-004, and two spacers, P/N 1015860-026, which secure upper edge of TB2 and two cable clamps to PTC case. See figure 1. Retain all hardware for later reassembly.

12. Remove one button head screw, P/N 1006783-104, two self locking nuts, P/N 1012525-004, and one spacer, P/N 2025860-026, which secure cable clamp and TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

VII. B. PROCEDURE (CONTINUED)

13. Remove three button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

14. Remove one button head screw, P/N 1006783-23, and two self locking nuts, P/N 1012525-004, which secure one cable clamp and electronic component bracket, P/N 2900795, (containing AR1 through AR4) to PTC case. See figure 1. Retain all hardware for later reassembly.

15. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure electronic component bracket, P/N 2900795, to PTC case. See figure 1. Retain all hardware for later reassembly.

16. Remove four button head screws, P/N 1006783-22, which secure relay assembly to PTC case. See figure 1. Retain screws for later reassembly.

17. Remove one button head screw, P/N 1006783-26, and lock washer, P/N MS35338-80, which secure relay assembly to nut sleeve, P/N 2900512-001, and electronic component assembly, P/N 2900521-011.

VII. B. PROCEDURE (CONTINUED)

18. Remove two button head screws, P/N 1006783-23, which secure two sections of each retainer strap on capacitor C3. Remove top section of each retainer strap to permit removal of C3. Retain screws and retainer straps for later reassembly.

19. Remove two button head screws, P/N 1006783-047, spacers, P/N 1015860-017, and self locking nuts, P/N 1016151-010, which secure bell assembly to PTC case. Retain all hardware for later reassembly.

20. Carefully remove wiring harness A, loose parts and assemblies from PTC case and place of workbench.

    a. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and retain the screws for later installation.

    b. Connect a 15 ohm variable resistor with an ammeter in series between BT1-(+) and BT8-(-) and proceed with the following steps.

        1) Discharge the battery at a 2.0 ± 0.1 ampere rate.

        2) Monitor individual module voltages; they shall not drop below 3.0 volts, during the first 30 minutes.

VII. B. PROCEDURE (CONTINUED)

        3) Discontinue discharge when total voltage drop below 18 volts or when voltage for individual module drops below 1.8 volts, whichever occurs first.

        4) Recharge at the rate of 100 ma to a cutoff voltage of 4.65 ± 0.05 volts/module, removing each module from the circuit as it attains its cutoff value.

        5) If the 1/2-hour minimum was not obtained in step 2) above, repeat steps 1 through 4.

    c. Install two brackets, P/N 2901587 from kit using two button head screws retained in step B.7.

    d. Remove three screws, P/N 1006783-26 and three washers, P/N MS35338-80 from battery retainer bracket, P/N 2900508. Obtain two cushioning pads from kit, P/N 2901588-002 and place one at each end end of the battery (use only one pad if there is insufficient room for both) and reinstall retainer bracket. Secure bracket using only two screws and washers, leaving the hole vacant directly under the amplifier bracket, P/N 2900795. Discard one screw and one washer.

    e. Reinstall battery retainer cover with original flat head screws.

VII. B. PROCEDURE (CONTINUED)

21. Visually check rotary switch S1 to determine if detent disc has "U" or "V" type notches in its periphery. See figures 2 and 3. If detent disc has "V" type notches, obtain straight headed pin, P/N 2901555, from kit and dispose of as directed in section IX of this RIB, and then proceed to step 22. If detent disc has "U" type notches, perform the following:

    a. Remove rotary switch S1 from panel assembly. . Retain all parts.

VII. B. PROCEDURE (CONTINUED)

    b. Remove threaded spacer shown in figure 2 which is located adjacent to mid-point of roller arms as follows:

        1) Remove flat head screw which secures threaded spacer to square top plate. Retain screw.

        2) Loosen other screw from bottom of switch assembly and pull out only far enough to enable removal of threaded spacer. Remove and retain threaded spacer.

    c. Disconnect spring from end of roller arms.

    d. Swing roller arms out and away from switch assembly.

    e. Press roller pin out of detent roller and replace with straight headed pin, P/N 2901555, supplied in kit. New pin shall be installed such that head of pin will be nearest to square top plate. Dispose of removed roller pin as directed in section IX of this RIB.

    f. Reconnect spring to roller arms.

    g. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws removed previously from threaded spacer.

VII. B. PROCEDURE (CONTINUED)

h. Insert threaded spacer in original position on switch assembly and thread screw from bottom of switch assembly into threaded spacer.

i. Reinstall flat head screw through square top plate into threaded spacer.

j. Reinstall switch assembly on panel assembly.

22. Remove resistor soldered between terminals 2 and 3 on fuseholder XF1. See figure 4. Dispose of resistor as directed in section IX of this RIB.

23. Replace resistor R16 with resistor 1897260-008, and replace all wires on the same respective terminals (see table 1). Dispose of R16 as directed in section IX of this RIB.

a. Obtain the decal, P/N 2901586 from the kit; remove the paper from the gummed back of the decal; and place it over the "135°" label on the 135° temperature calibration switch.

b. Apply a bead of varnish (MIL-V-6894A unreduced) over the decal.

c. Remove the number 2900501 from the panel and replace it with 2901585.

VII. B. PROCEDURE (CONTINUED)

24. Remove "-011" portion of identification mark "ASSY 2900835-011" on panel assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

25. Remove all leads from relay K4, P/N 1015802-004.

26. Remove relay K4 from relay assembly and dispose of as directed in section IX of this RIB.

27. Replace relay K4 with relay, 1015832-318, and replace all wires on respective terminals. (See table 2).

28. Replace diode CR7 with 1N2976B (1896966-075), being careful to connect the cathode and anode in the same manner that they were for CR7. (See table 2). Dispose of CR7 as directed in section IX of this RIB.

29. Remove "-011" portion of identification mark "ASSY 2900777-011" on relay assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

30. Locate, mark and drill one 0.164 to 0.172 inch diameter through hole in electronic component assembly, P/N 2900521-011, as shown in figure 5. Use number 19 size twist drill to drill hole.

31. Apply MIL-C-5541 chemical film to bare metal on inner surface of newly drilled hole.

VII. B. PROCEDURE (CONTINUED)

32. Mark "K18" on electronic component assembly in location shown in figure 5. Use 1/8 inch high character rubber stamp and black marking ink for new marking.

33. Remove identification mark "2900505" on electronic component assembly and replace with identification mark "2901544". New marking shall be per MIL-STD-130 (ES267).

34. Remove "-011" portion of identification mark "ASSY 2900521-011" and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267)

NOTE: When performing next step, insure that relay is positioned such that the shoulder on the relay stud which will protrude through the larger of two holes, sufficiently grips the bracket material. Improper relay positioning will cause the shoulder to be drawn into the hole when the self-locking nuts are tightened.

35. Obtain relay, P/N 1015982-007, two self locking nuts, P/N 1016161-006, and one flat washer, P/N AN960 C6, from kit and secure to electronic component assembly as shown in figure 6.

36. Stamp "CR30" between terminals 3 and 10 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

VII. B. PROCEDURE (CONTINUED)

37. Stamp "CR31" between terminals 3 and 11 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

38. Stamp "R63" between terminals 20 and 25 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

39. Obtain two 1N459 diodes from kit and install one between terminals 3 and 10 and the other between terminals 2 and 11 on TB2, as shown in figure 7. Observe proper anode and cathode connections as shown in figure 7.

40. Obtain resistor, P/N RC20GF431J, from kit and install between terminals 20 and 25 on TB2 as shown in figure 7.

41. Remove resistors as follows:

a. Remove resistor R53, P/N RC32GF510J, located between terminals 26 and 34 on TB2.

b. Remove resistor R57, P/N RC32GF510J, located between terminals 27 and 35 on TB2.

c. Remove resistor R56, P/N RC42GF510J, located between terminals 23 and 26 on TB2.

VII. B. PROCEDURE (CONTINUED)

d. Remove resistor R11, P/N RC32GF101J, located between terminals 28 and 37 on TB2.

e. Remove resistor R25, P/N RC32GF101J, located between terminals 28 and 38 on TB2.

f. Dispose of resistors as directed in section IX of this RIB.

42. Obtain and install the following resistors:

a. Resistor RC42GF121J install between terminals 26 and 34 on TB2.

b. Resistor RC42GF121J install between terminals 27 and 35 on TB2.

c. Resistor RC42GF750J install between terminals 23 and 36 on TB2.

d. Resistor RC20GF301J install between terminals 28 and 37 on TB2.

e. Resistor RC32GF271J install between terminals 28 and 38 on TB2.

43. Using care not to damage sleeving on resistor R10 remove resistor R10, P/N 1016053-003, from between terminals 50 and 58 on TB2. Retain two insulation sleeves from R10 and dispose of R10 as directed in section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

44. Obtain resistor, P/N 1016053-029, from kit and install two sleeves, retained in step 43, on resistor leads. Solder resistor, between terminals 50 and 58 on TB2 as shown in figure 7.

45. Remove resistor R14, P/N RC42GF101J, from between terminals 19 and 30 on TB2. Retain insulation sleeve from R14 and dispose of R14 as directed in section IX of this RIB. Replace R61 with resistor P/N 1016053-024, between terminals 5 and 14 on TB-2. Dispose of old R61 as directed in section IX of this RIB.

46. Obtain resistor, RW55V201 (1896928-068), from kit and install between terminals 19 and 30 on TB2. Insulation sleeve retained in step 45 shall be placed on resistor lead which will be soldered to terminal 30. Reference figure 7.

47. Change wire A135 from terminal 18 to terminal 19 on TB2.

48. Remove diodes CR9 and CR10 which are identical, from terminals 18, 19, and 29 on TB2. Retain CR9 for later use and dispose of CR10 (P/N 1896966-187), as directed in section IX of this RIB. Delete letters CR9 and CR10 from TB2.

49. Remove "-011" portion of identification mark "ASSY 2900778-011" on TB2 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

VII. B. PROCEDURE (CONTINUED)

50. If terminal board (inseparable assembly) (TB2), is marked, P/N 2900519" re-identify as "P/N 2901545". Identification shall be in accordance with MIL-STD-130 (ES267).

51. Bond resistors R10 and R14 to terminal board TB2 per ND 1002203, using epoxy resin, P/N 1010748, curing agent, P/N 1010750, and calcium carbonate filter, P/N 1010749.

52. Remove 1N3030B diodes CR13 and CR14 from TB1-50, 56, and 58, and dispose of as directed in section IX of this RIB. Reference figure 8.

53. Obtain two 1N3029B diodes from kit and install one between terminals 50 and 56 and the other between terminals 50 and 58 on TB1, as shown in figure 8. Observe proper anode and cathode connections shown in figure 8.

54. Remove "-011" portion of identification mark "ASSY 2900513-011" on TB1 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

55. Obtain electronic component bracket, P/N 2901556, two terminal studs, P/N 1896962-003, and two pan head screws, P/N MS35233-12, from kit. Secure terminal studs to component bracket with pan head screws as shown in figure 9. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws prior to installing.

VII. B. PROCEDURE (CONTINUED)

56. Obtain capacitor, P/N CL25BL700UP3, from kit and install between E32 and E33 on electronic component bracket, P/N 2901556, as shown in figure 9. Insure positive lead of capacitor is connected to E32.

57. Remove four button head screws, P/N 1006783-18, flat washers, AN960 C4, and lock washers, P/N MS35338-78, which secure one side of comparators AR1 and AR2 to inner edge of electronic components bracket, P/N 2900795. (Removal of these four screws and associated washers will permit installation of new component bracket as shown in figure 9.) Retain all washers and dispose of four screws as directed in section IX of this RIB.

58. Secure electronic component bracket, P/N 2901556, to electronic component bracket, P/N 2900795, as shown in figure 9, using four button head screws, P/N 1006783-95, (supplied in kit) and washers retained in step 53.

59. Remove capacitor C4 from terminals 37 and 38 of TB3. Dispose of the capacitor as directed in section IX of this RIB. Retain the sleeving for later use.

60. Remove wire AA105 from terminals 47 and 31 of TB3.

VII. B. PROCEDURE (CONTINUED)

61. Move wire B32 of the B harness from terminal 47 to terminal 31 of TB3.

62. Move wire A32 of the A harness from terminal 47 to terminal 31 of TB3.

63. Move wire B36 of the B harness from terminal 38 to terminal 47 of TB3.

64. Remove the "C4" marking on electronic component assembly and replace it with "CR9". Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

65. Install diode CR9 which was removed in step 51, between terminals 38 and 47 of TB3 with cathode end attached to terminal 47. Install sleeving removed in step 59.

66. Interchange wires AA18 and A34 on fuseholder XF2. (See table 2.)

67. Interchange wires AA22 and A35 on fuseholder XF3. (See table 2.)

68. Remove "-011" portion of identification "ASSY 2900522-011" and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

VII. B. PROCEDURE (CONTINUED)

NOTE: If P/N 2901523 is marked on the inseparable assembly, the marking shall be removed and replaced with "P/N 2901583".

69. Remove jumper wire AA118 from between TB3-7 and TB3-8.

70. Change lead on diode CR27 from TB3-8 to TB3-7.

71. Change wire B7 from TB3-8 to TB3-7.

72. Change wire A53 from TB3-15 to TB3-9.

73. Remove the "CR27" marking from the inseparable assembly and replace it with "CR10". Marking shall be 0.09 inch high per ND 1002019 and black in color.

74. Add diode CR10 (1N459) between TB3-15 and TB3-8 with the cathode at TB3-15. This is a new CR10 and is not to be confused with the one that was removed in step 29.

75. Change wire A145 from TB3-9 to TB3-8.

VII. B. PROCEDURE (CONTINUED)

76. Completely remove leads listed in table 1. Do not remove any other leads which may be connected to the listed termination points in table 1.

Table 1. PTC Lead Deletions

Lead Ident.	From Ckt. Pt.	To Ckt. Pt.	Remarks
AA84	CR1-C	E1	
AA85	K1-4	E1	
AA119	TB3-14	TB3-15	
AA120	TB3-15	TB3-16	
A85	E17	TB3-9	
A122	TB2-37	K2-7	Previously removed from K2-7.
B3	TB3-9	K5-3	
B31	TB3-14	K2-3	Previously removed from K2-3.
B46	K2-2	K8-8	Previously removed from K2-2.
AA105	TB3-47	TB3-31	

VII. B. PROCEDURE (CONTINUED)

77. Revise lead connections as listed in table 2. Required accessory items are supplied in the kit.

Table 2. Revised PTC Lead Terminations

Lead Ident.	Removed From	Reconnect To	Strip Insul.	Tin	Accessoty Item P/N
AA73	E18	*E3	0.30	Yes	
B5	TB3-15	TB3-14	0.30	Yes	
B47	**K2-2	K8-8	0.30	Yes	1015864-140
A4	TB3-9	K5-3	0.30	Yes	1015864-140
A33	CR1-A	***E1	0.30	Yes	
A53	**K2-4	****TB3-15	0.30	Yes	
B36	R16-1	TB3-38	0.30		
A135	R16-2	TB2-18	0.30		
B29	K4-1	TB3-38	0.30		
A136	K4-19	TB2-19	0.30		
B50	K4-5	K6-2	0.30		
B51	K4-5	K14-8	0.30		
AA140	K4-6	K5-4	0.30		
A34	XF2-1	SIA-10	0.30		
AA18	XF2-2	T1-3	0.30		
A35	XF3-1	SIA-16	0.30		
AA22	XF3-2	T1-1	0.30		
B4	CR7-A	TB3-16			
B30	CR7-C	TB3-11			

*One more lead (AA163) will be added to this point later.
**Lead was previously removed from this point.
***Two more leads (AA154 and AA156) will be added to this point later.
****One more lead (A144) will be added to this point later.

VII. B. PROCEDURE (CONTINUED)

78. Obtain new wire list AA leads and required accessory items from kit lead set and install as indicated in table 3. (Notes referenced in the remarks column of table 3 can be found at the end of the table.)

Table 3. Wire List AA Lead Additions

Lead Ident.	From Ckt.Pt.	To Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA154	E1		0.20	Yes		See note 1
		K18-2	0.20	Yes	1015864-135	
AA155	K18-5		0.20	Yes	1015864-135	
		K1-4	0.20	Yes	1015864-135	
AA156	E1		0.20	Yes		See note 2
		K18-3	0.20	Yes	1015864-135	See note 3
AA157	K18-6		0.20	Yes	1015864-135	
		E3	0.20	Yes		See note 4
AA158	CR1-A		0.20	Yes	1015864-137	See note 5
		E17	0.20	Yes		See note 6
AA159	TB2-11		0.20	Yes		
		TB2-37	0.20	Yes		
AA160	J1-J		0.20	No		See note 7
		S7SW2-NO	0.30	Yes		Combine with AA43
AA161	TB3-14		0.30	Yes		Combine with B6
		TB3-16	0.30	Yes		Combine with A86
AA162	J1-H		0.20	No		See note 7
		S1A-24	0.30	Yes		Combine with AA25
AA163	E18		0.30	Yes		See note 8
		E3	0.30	Yes		See note 9

VII. B. PROCEDURE (CONTINUED)

Table 3. Wire List AA Lead Additions (Continued)

Note 1 - One more lead (AA156) will be added to this point.
Note 2 - Solder on E1 with leads A33, A79, and AA154.
Note 3 - One more lead (A147) will be added to this point.
Note 4 - One more lead (AA163) will be added to this point.
Note 5 - One more lead (A150) will be added to this point.
Note 6 - Solder on E17 with leads AA66, AA68, and AA69.
Note 7 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 8 - Solder on E18 with leads A70 and AA72.
Note 9 - Solder on E3 with leads AA73 and AA157.

79. Obtain new wiring harness A leads and required accessory items from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column of table 4 can be found at the end of the table.)

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions

Lead Ident.	From Ckt.Pt.	To Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A144	K18-8		0.30	Yes	1015864-135	
		TB3-15	0.30	Yes		See note 1
A145	TB2-25		0.30	Yes		
		TB3-9	0.30	Yes		
A146	TB2-20		0.30	Yes		See note 2
		XF1-3	0.30	Yes		See note 3
A147	K18-3		0.30	Yes		Combine with AA156
		TB2-10	0.30	Yes		
A148	K18-7		0.30	Yes	1015864-135	
		TB2-3	0.30	Yes		
A149	K5-2		0.30	Yes		Combine with B5
		CR1-C	0.30	Yes	1015864-163	
A150	CR1-A		0.30	Yes		Combine with AA158
		K5-3	0.30	Yes		Combine with A4
A151	J2-C		0.20	No		See notes 4 and 5
		TB1-58	0.30	Yes		
A152	TB2-30		0.30	Yes		See note 6
		E32	0.30	Yes		
A153	TB2-53		0.30	Yes		See note 6
		E33	0.30	Yes		

Note 1 - Combine with leads A53 and B5 at this point.
Note 2 - Route lead along harness branch near TB3.
Note 3 - See figure 4 for terminal information.
Note 4 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 5 - Route lead along harness branch near TB2 and TB3.
Note 6 - Route lead along harness branch near TB1.

VII. B. PROCEDURE (CONTINUED)

80. Wrap and spot tie black lacing tape over terminal 3 on fuseholder XF1 (see figure 4) to secure the terminal to the body of the fuseholder. The wrapping should pass over terminal 1 and also cover a small portion of the lead attached to terminal 3.

81. Spot tie new and rerouted leads into applicable harness as necessary, using black lacing tape.

82. Remove identification band marked "2900654" from wiring harness A and replace with kit supplied identification band marked "2901546". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in section IX of this RIB.

83. Remove identification band marked "2900655" from wiring harness B and replace with kit supplied identification band marked "2901549". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in Section IX of this RIB.

84. Transfer serial number from nameplate on PTC case to new nameplate supplied in kit. Use 1/16 inch high character metal stamp set to imprint data.

85. Remove nameplate from PTC case and dispose of as directed in section IX of this RIB. Retain four screws.

VII. B. PROCEDURE (CONTINUED)

86. Secure new nameplate to PTC case with four screws retained in preceeding step. Apply MIL-H-22473, grade H, sealing and retaining compound to threads of four screws prior to installation.

87. Carefully place wiring harness A, attached parts and assemblies into PTC case.

88. Secure bell assembly to PTC case in original position with hardware retained in step 19. Reference figure 1.

89. Secure capacitor C3 to PTC case in original position with hardware retained in steps 6 and 18. Reference figure 1.

90. Secure transformer T1 to PTC case in original position with hardware retained in step 5. Reference figure 1.

91. Secure electronics component assembly, P/N 2900521 -021, to PTC case in original position with hardware retained in step 4. Reference figure 1.

92. Secure electronic component bracket, P/N 2900795, to PTC case in original position with hardware retained in steps 14 and 15. Insure cable clamp is located above and between AR4 and AR3. Reference figure 1.

VII. B. PROCEDURE (CONTINUED)

93. Secure TB1 to PTC case in original position with hardware retained in step 13. Do not secure upper left corner (next to R13) to PTC case. Reference figure 1.

94. Install hardware retained in step 12 to upper left corner of TB1.

95. Secure two lower corners of TB2 to PTC case with hardware retained in step 10. Reference figure 1.

96. Install hardware retained in step 11 to two upper corners of TB2.

VII. B. PROCEDURE (CONTINUED)

97. Perform continuity and resistance checks per table 5.

Table 5. Continuity-Resistance Checks

From	To	Indication	Remarks
J1-J	J1-L	<1 OHM	All readings shall be less than 1 ohm
J2-C	TB1-58	↓	
J1-H	S1A-24	↓	
J1-B	J1-L	↓	

98. Using a razor blade and india ink, make the following changes to the decal on the inside of the PTC cover:

a. Change the schematic drawing number in the upper left-hand corner of the decal from 2900133 to 2901543.

b. Adjacent to the "28 VDC INPUT J1", change TEMP FAIL-ILTC to TEMP FAIL-LTC. Change POWER FAIL-ILTC to POWER FAIL-LTC. After M GROUND, add H BATT HI and J BATT LO.

c. Cover all new lettering with clear lacquer.

VII. PROCEDURE (CONTINUED)

C. RETEST PROCEDURES.

1. Recalibration of bridge excitation voltages.

NOTE: Relay assembly has to be swung up to make potentiometers accessable. Maintain isolation between assembly and case.

a. Make the test setup as indicated in figure 10.

b. Set control decade to 1560.0 ohms and the indicating decade to 2504.5 ohms.

NOTE: Apply only 28 ± 1 VDC power.

2. Control Bridge.

a. Set TEMP. ADJUST potentiometer to center position (11 turns from clockwise). See figure 1.

b. Connect differential voltmeter number 1 to TB2-56 (hi) and TB2-12 (lo).

c. Connect differential voltmeter number 2 to TB2-42 (hi) and TB2-12 (lo).

d. Adjust R33 and R35 on the relay assembly to obtain simultaneous voltages of 1.950 ± 0.020 VDC on differential voltmeter number 1 and 17.4 ± 0.174 VDC on meter number 2.

VII. C. PROCEDURE (CONTINUED)

3. Indicating Bridge.

   a. Connect differential voltmeter number 1 to TB2-52 (hi) and TB2-45 (lo).

   b. Connect differential voltmeter number 2 to TB2-39 (hi) and TB2-54 (lo).

   c. Adjust R18 and R19 to obtain simultaneous voltages of 1.610 ± 0.016 VDC on voltmeter number 1 and 17.6 ± 0.176 VDC on voltmeter number 2.

   d. Turn selector switch on the panel assembly to **OFF**. OFF

4. Recalibration of battery cutoff voltage.

   a. Remove electrical tape from lead A11 and connect to the high side of the voltohmmeter with the low side connected to TP2. Remove the electrical tape from lead A82 and connect it to the negative terminal on BT8, after removing the battery cover by removing two flat head screws.
   b. Turn R16 full clockwise. Turn the selector switch to ON.

   c. Apply 36.8 ± 0.1 VDC to TB2-19 high and TP2 low.

VII. C. PROCEDURE (CONTINUED)

   d. Slowly turn R16 counterclockwise until VTVM voltage drops to 28V source voltage. Decrease cutoff supply voltage from 36.8 to approximately 30 volts and momentarily remove the supply voltage.

   e. Slowly increase the cutoff supply voltage and varify that the switchover point is 36.8 ± 0.1 VDC. Adjust R16 and repeat these procedures if necessary.

   f. Remove the cutoff supply voltage; set the selector switch to OFF. Connect lead A11 to the positive terminal of BT1. Apply 115 VAC at J2-M and J2-J. Turn selector switch to ON. Monitor current through A11 with clip-on ammeter. Verify that the charging current drops to zero at a battery terminal voltage at J1-H high and J1-J low of 36.7 ± 0.3 VDC and that individual module (8) voltages do not exceed 4.75 VDC.

   g. Set selector switch to OFF. Obtain cushioning pad, P/N 2901588-001 from kit and place on battery. Reinstall the battery retainer cover on battery retainer with original two flat head screws.

VII. C. PROCEDURE (CONTINUED)

   h. Secure relay assembly to PTC case in original position with hardware retained in step 16. Reference figure 1.

   i. Secure relay assembly to nut sleeve located between relay assembly and electronic component assembly, P/N 2900521-021, with screw retained in step 17.

   j. Place panel assembly in original mounting position in PTC case and secure with six screws retained in step 2.

5. Recalibration of hot alarm set point.

   a. Set selector switch to ON. Set the HI ALARM LIMIT ADJUST potentiometer full clockwisw and monitor pins J3-A and J3-B.

   b. Set indicating decade box to 2225 ohms.

   c. Slowly turn the HI ALARM LIMIT ADJUST potentiomiter counterclockwise until continuity exists at J3-A and J3-B.

   d. Set the indicator decade box to 2500 and press ALARM INHIBITED (SYSTEM RESET) pushbutton to silence the bell and stop the flashing light.

VII. C. PROCEDURE (CONTINUED)

   e. Set the indicator decade box to 2240 ohms, and slowly decrease resistance in 1-ohm steps. Between 2230 and 2220 ohms the bell shall ring, the IMU HOT lamp shall flash, and continuity shall exist at J3-A and J3-B.

   f. Press and hold the ALARM INHIBITED (SYSTEM RESET) pushbutton for this paragraph. Slowly increase the resistance in 1-ohm steps. Before 2270 ohms, the IMU HOT lamp shall extinguish and continuity shall exist at J3-B and J3-C.

   g. Set indicator decade box at 2254.1 ohms. Set the selector to OFF for 5 seconds. Upon reapplication of power, the IMU HOT lamp shall not be flashing.

   h. Adjust HI TEMP ALARM ADJUST to meet conditions of steps e and g above if necessary.

   i. Set indicator decade box to 2201.3 ohms. The alarm bell shall ring, IMU HOT lamp shall flash, and the meter shall read 138.0 ± 0.5°F with or without the 138° CAL pushbutton depressed. Release the 138° CAL pushbutton and set the decade box to 2500 ohms. Return to normal operation by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

VII. C. PROCEDURE (CONTINUED)

5. Temperature Alarm Memory

a. With the 125° CAL pushbutton held in the depressed position, the bell shall ring and the IMU COLD **lamp** shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release the 125° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU COLD light shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

→ lamp [illegible]

b. With the 138° CAL pushbutton held in the depressed position, the bell shall ring and the IMU HOT lamp shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release 138° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU HOT ligh shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

6. Power Output.

a. Apply 25.2 VDC and remove 115VAC. Inhibit the alarm or open the switch S2 for loss of 115VAC. Set the control decade box to 1530 ohms. Multiply the readings of the output ammeter and the output voltage. The results shall be 60 watts minimum.

VII. C. PROCEDURE (CONTINUED)

7. Indicating Bridge Failure.

a. Apply 115 VAC to J2-M and J2-J. Set control decade box so that PTC meter reads 1.5 ± 0.5 amperes. Jumper J2-C to TP4. IMU HOT and IMU COLD lamps shall flash, the alarm bell shall ring, and the PTC meter shall read 1.5 ± 0.5 amps. Remove jumper and reset system by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

8. 28V Line Fuse Indication.

a. Remove the 28V fuse with holder. Bell shall ring and POWER FAIL lamp shall light. Reinsert holder without fuse. Lamp in holder shall light. Open switch S1. Bell shall stop **ringing** and POWER FAIL lamp shall go out, holder lamp shall continue to indicate. Reinsert fuse in fuseholder.

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record.

3. Record performance of the modification on the existing Unit History Record sheet (referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain the old Unit History Record sheet in the Acceptance Data Package.

B. Significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021
Panel Assembly	2900835-011	2900835-021
Electronic Component Assembly	2900521-011	2900521-021
Electronic Components Heatsink (Inseparable Assembly)	2900505	2901544

VIII. B. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Relay Assembly	2900777-011	2900777-021
Electronic Components Assembly	2900513-011	2900513-021
Electronic Components Assembly	2900778-011	2900778-021
Terminal Board (Inseparable Assembly)	2900519	2901545
Terminal Board (Inseparable Assembly)	2900523	2901583
Wiring Harness A	2900654	2901546
Wiring Harness B	2900655	2901549
Lead Set AA	2900656	2901550
Electronic Components Assembly	**2900522-011**	**2900522-021**

IX. DISPOSITION OF PARTS REMOVED

A. Send relay (K2), P/N 1015802-004, to AC Electronics, Logistics Department, bondroom. Logistics shall utilize this item as a spare.

B. Transfer the following items to full custody of the government via DD543 form (Inventory Schedule).

IX. B. DISPOSITION OF PARTS REMOVED (CONTINUED)

Qty	Part Number	Description
2	1N3030B	Semiconductor (1896966-070) (formerly CR13 and CR14)
1	1016053-003	Resistor (formerly R10)
1	1897260-005	Resistor (formerly R16)
1	RC32GF101J	Resistor (1896953-039) (formerly R11)
1	RC42GF101J	Resistor (1896951-025) (formerly R14)
1	Not assigned	Resistor, 420 ohm (formerly attached to XF1)
1	1016053-001	Resistor, (formerly R61)
1	1015832-312	Relay, (formerly K4)
2	RC32GF510J	Resistor (1896953-032) (formerly R53 and R57)
1	RC42GF510J	Resistor (1896951-018) (formerly R56)
1	RC32GF101J	Resistor (1896953-029) (formerly R25)

C. Scrap all other items via AC Electronics form MIL-127 or equivalent.

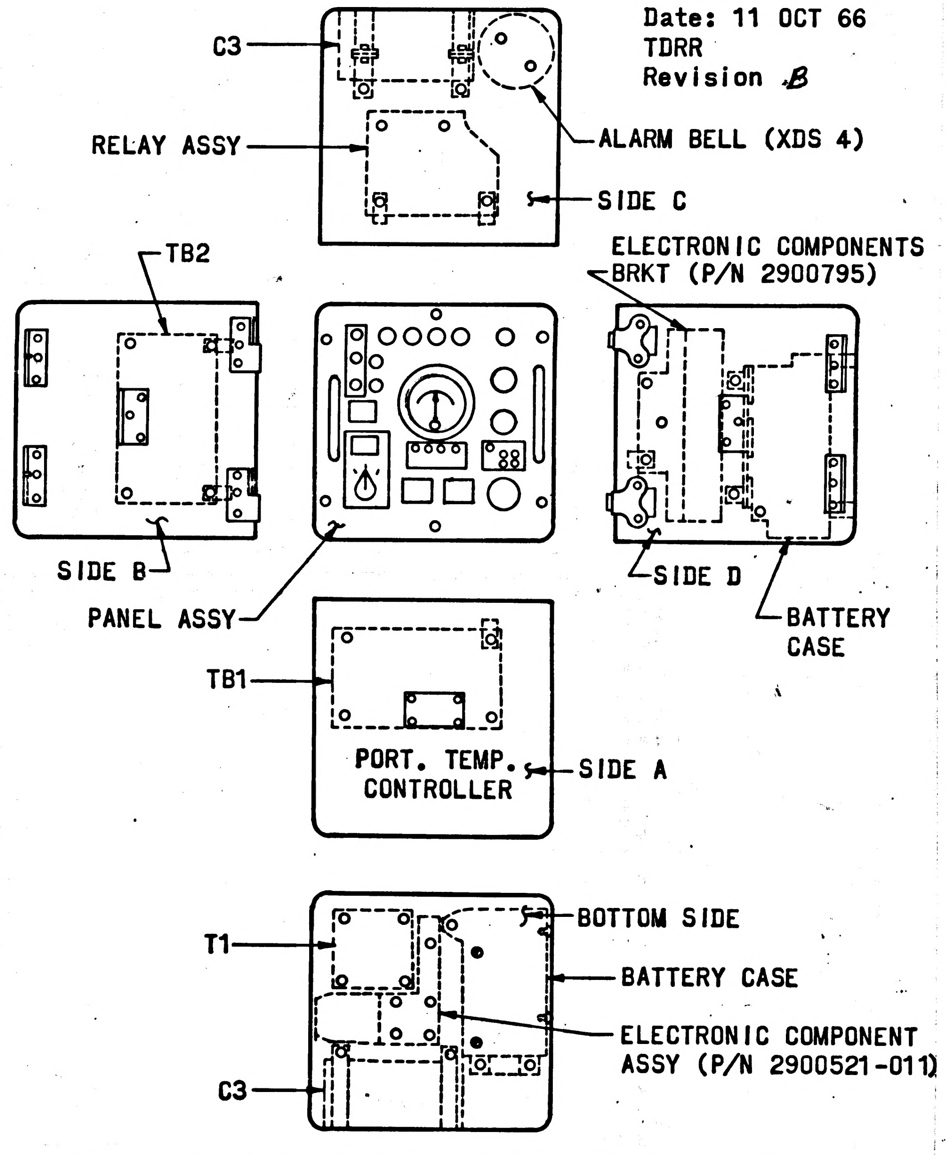

C3
RELAY ASSY
ALARM BELL (XDS 4)
SIDE C
TB2
ELECTRONIC COMPONENTS BRKT (P/N 2900795)
SIDE B
PANEL ASSY
SIDE D
BATTERY CASE
TB1
PORT. TEMP. CONTROLLER
SIDE A
T1
BOTTOM SIDE
BATTERY CASE
ELECTRONIC COMPONENT ASSY (P/N 2900521-011)
C3

Figure 1. LOWER SECTION OF PTC (SIMPLIFIED VIEWS)

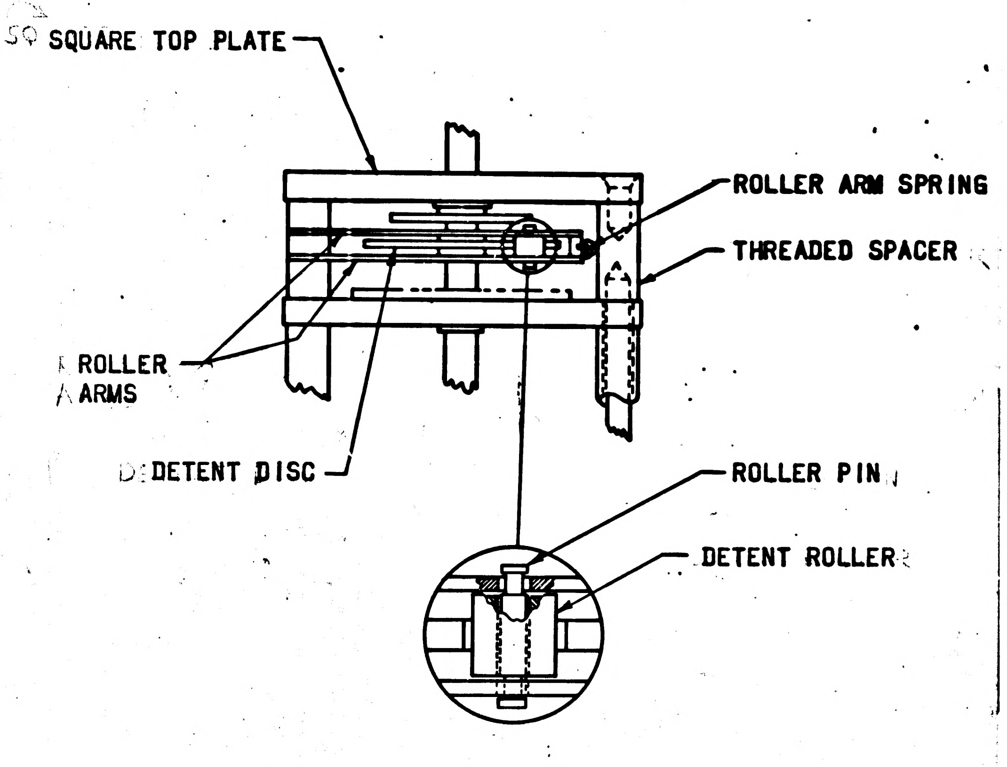
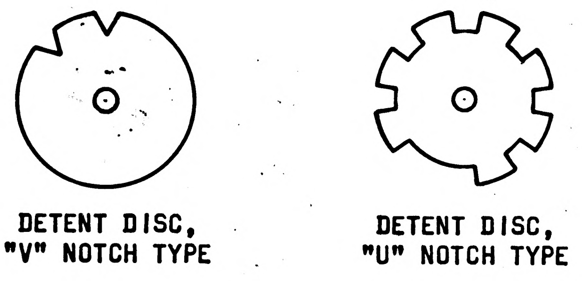

SQUARE TOP PLATE
ROLLER ARM SPRING
THREADED SPACER
ROLLER ARMS
DETENT DISC
ROLLER PIN
DETENT ROLLER

Figure 2. ROTARY SWITCH WITH "U" NOTCH TYPE DETENT DISC BEFORE MODIFICATION (SIMPLIFIER PARTIAL VIEW)


DETENT DISC, "V" NOTCH TYPE

DETENT DISC, "U" NOTCH TYPE

Figure 3. DETENT DISC TYPES

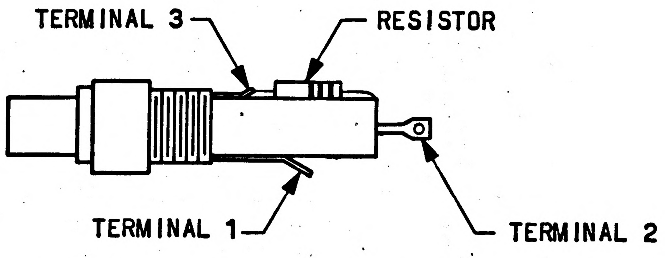

TERMINAL 3
RESISTOR
TERMINAL 1
TERMINAL 2

Figure 4. FUSEHOLDER TERMINALS

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DIMENSION TOLERANCES
2 Place Decimal ±.02
3 Place Decimal ±.005

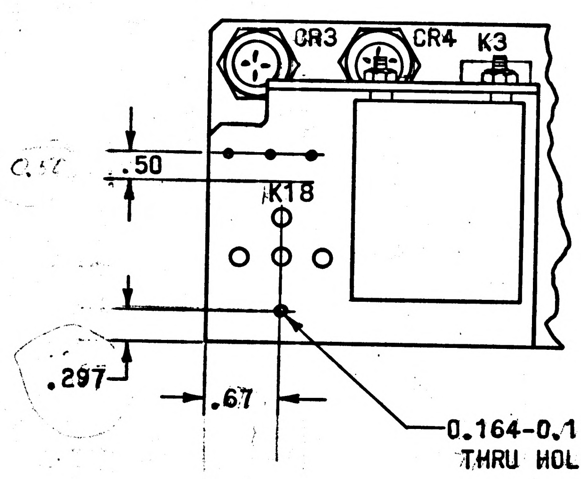
CR3
CR4
K3
.50
K18
.297
.67
0.164-0.172 DIA THRU HOLE

Figure 5. NEW HOLE IN ELECTRONIC COMPONENT ASSEMBLY, P/N 2900521-011

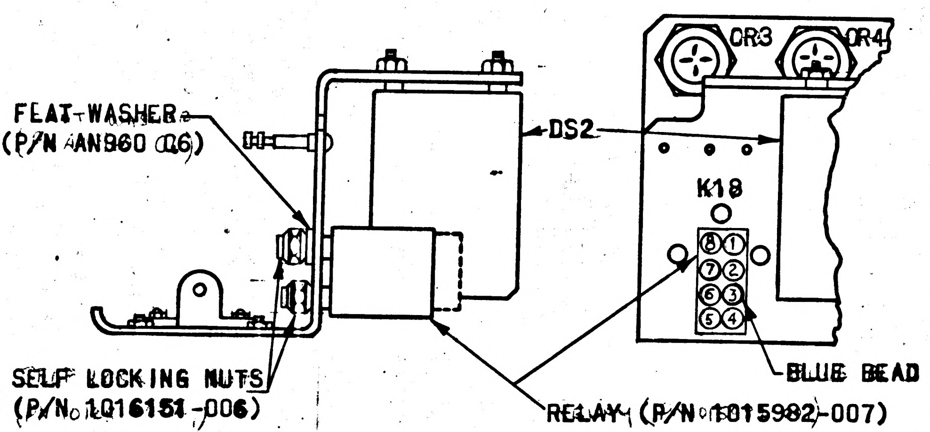
FLAT WASHER (P/N AN960 C6)
DS2
CR3
CR4
K18
SELF LOCKING NUTS (P/N 1016151-006)
RELAY (P/N 1015982-007)
BLUE BEAD

Figure 6. NEW RELAY K18 IN MOUNTED POSITION

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REV C

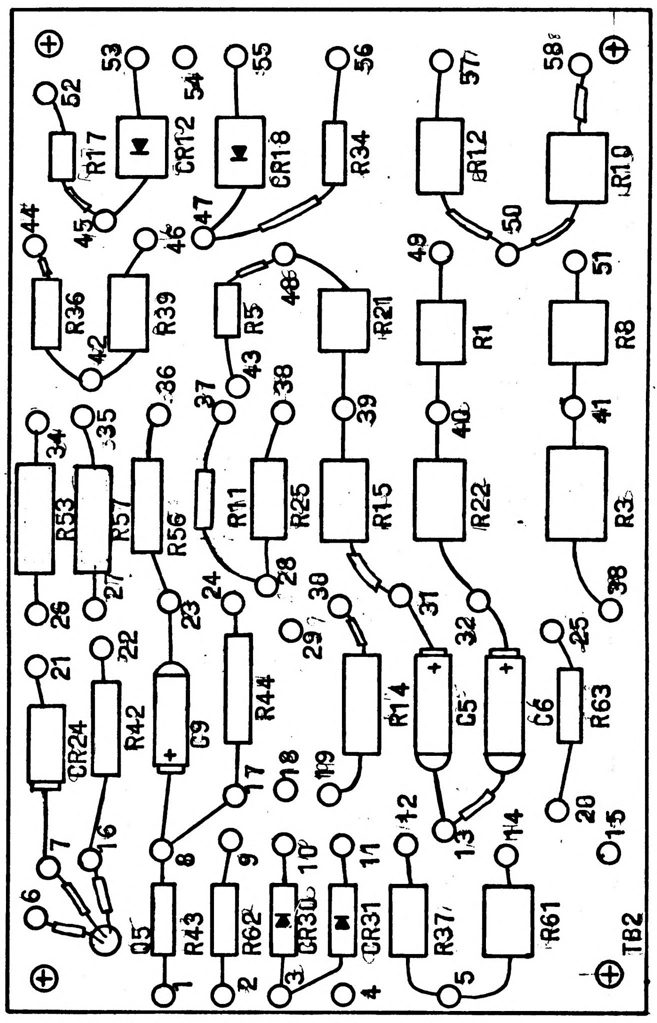
TB2
R17
CR12
CR18
R34
R12
R10
R36
R39
R5
R21
R1
R8
R53
R57
R56
R11
R25
R15
R22
R3
CR24
R42
C9
R44
R14
C5
C6
R63
Q5
R43
R62
CR30
CR31
R37
R61

Figure 7. ELECTRICAL COMPONENTS ASSEMBLY (TB2) AFTER MODIFICATION

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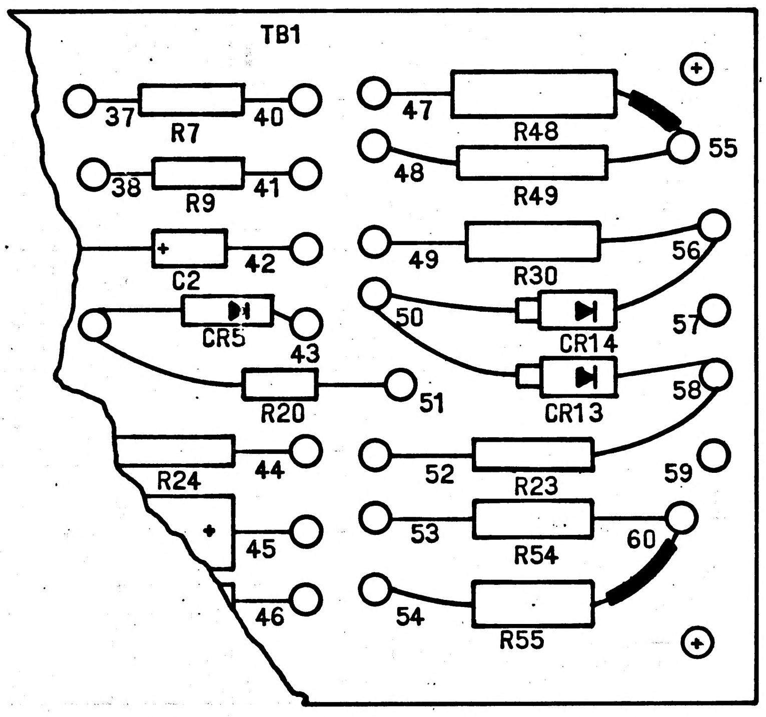
TB1
R7
R9
C2
CR5
R20
R24
R48
R49
R30
CR14
CR13
R23
R54
R55

Figure 8. ELECTRICAL COMPONENTS ASSEMBLY (TB1) AFTER MODIFICATION

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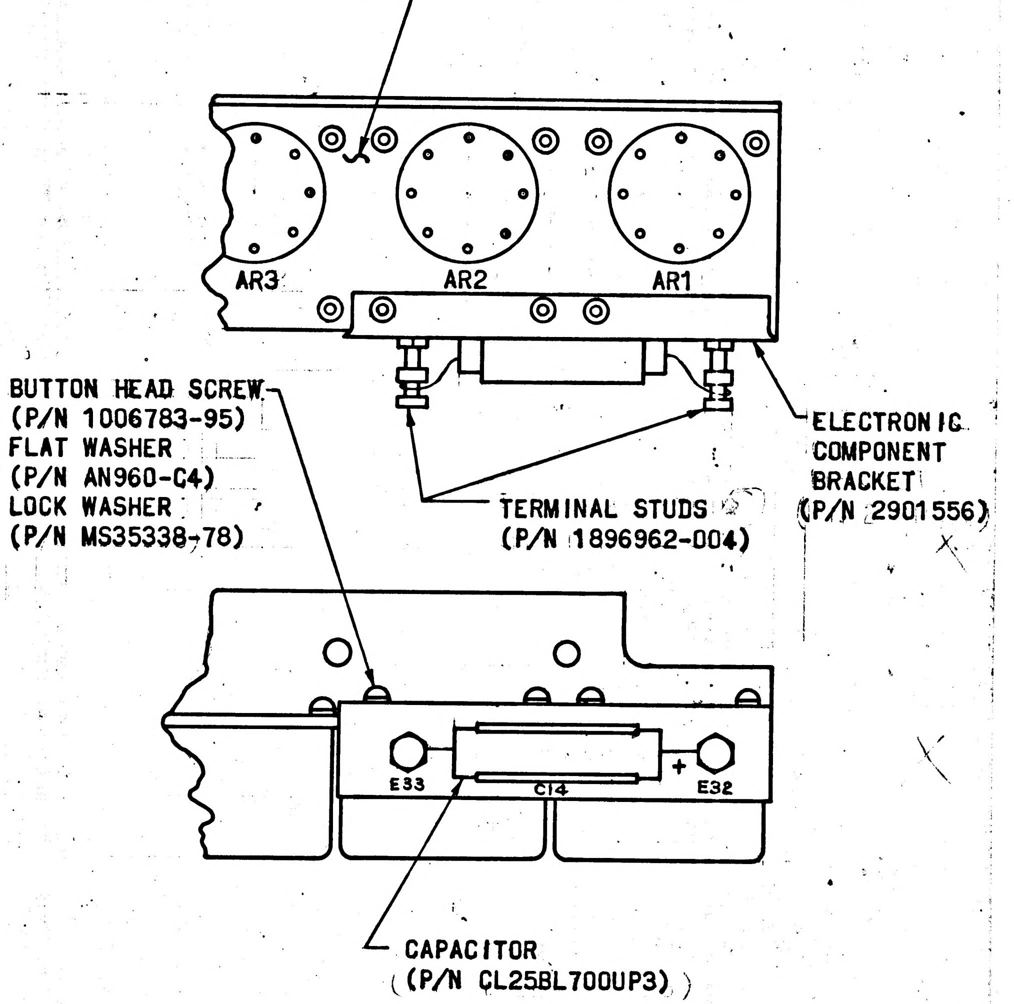
ELECTRONIC COMPONENT BRACKET (P/N 2900795)
AR3
AR2
AR1
BUTTON HEAD SCREW (P/N 1006783-95)
FLAT WASHER (P/N AN960-C4)
LOCK WASHER (P/N MS35338-78)
TERMINAL STUDS (P/N 1896962-004)
ELECTRONIC COMPONENT BRACKET (P/N 2901556)
E33
C14
E32
CAPACITOR (P/N CL25BL700UP3)

Figure 9. NEW COMPONENT BRACKET

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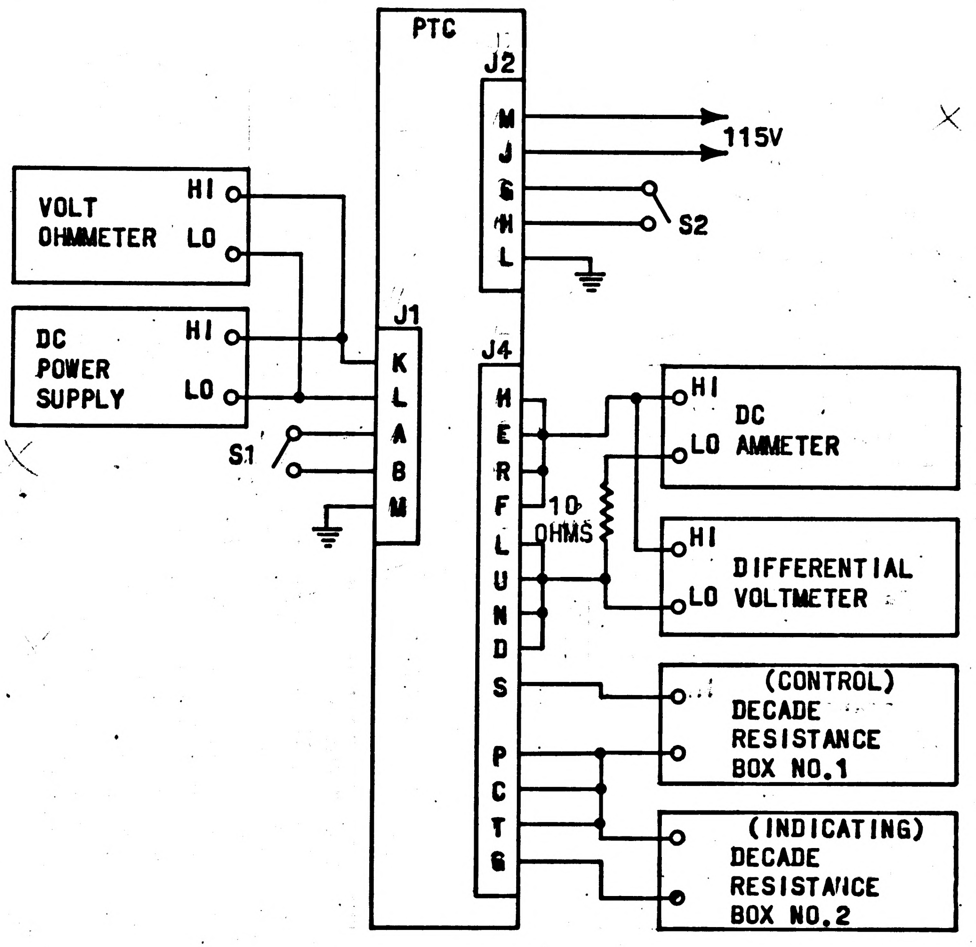
PTC
J2
M
J
S
H
L
115V
S2
VOLT OHMMETER
HI
LO
DC POWER SUPPLY
HI
LO
J1
K
L
A
B
M
S1
J4
H
E
R
F
L
U
N
D
S
P
C
T
G
10 OHMS
HI
LO
DC AMMETER
HI
LO
DIFFERENTIAL VOLTMETER
(CONTROL) DECADE RESISTANCE BOX NO.1
(INDICATING) DECADE RESISTANCE BOX NO.2

Figure 10. TEST SETUP

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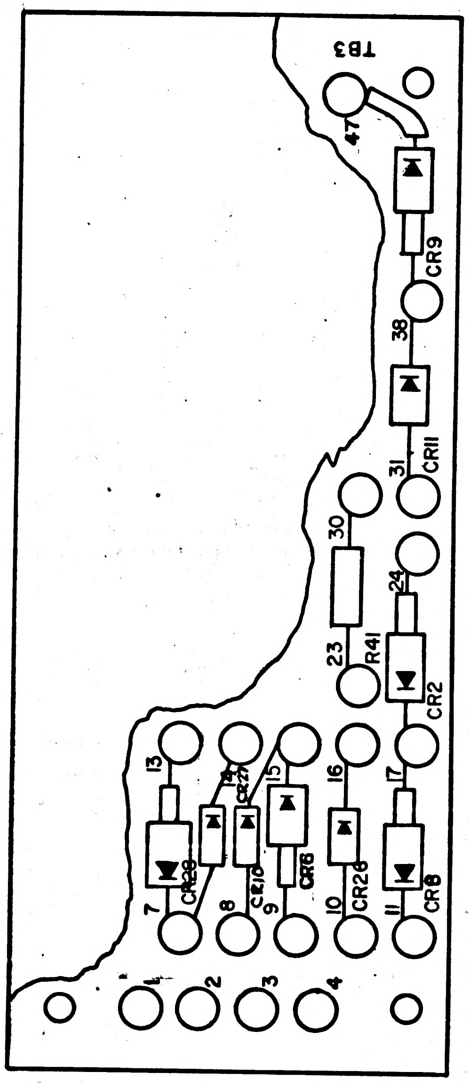
TB3
47
CR9
38
CR11
31
30
24
23
R41
CR2
13
14
CR27
15
16
17
7
CR28
8
CR10
9
CR6
10
CR26
11
CR8
1
2
3
4

Figure 11. ELECTRICAL COMPONENTS ASSEMBLY (TB3)
AFTER MODIFICATION

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Revision D

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR PORTABLE TEMPERATURE CONTROLLER, P/N 2900060-011

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CO[redacted]	NASA	
A	MSC 215759	1,4,6,14,15,16			21 OCT 66
Ⓜ B	32123	ALL INITIAL RELEASE		—	10/20/66
Ⓓ C	32732	1,2A,4A,7,12,12A,15,17,17A,32,34,41,46,50			24 JAN 67 ems [illegible]
D	35172	1,4A,32,43			13 MAR 67 ems [illegible]

Prepared by Earl Cox Date 10/13/66
P.C. Engineering Approval Date 10/13/66
Design Review Board Approval Date 11-18-66
MIT/IL Approval Date
NASA Approval Date 11/22/66
MIT Reliability Date

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Part No. 0102115
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TDRR
Revision B

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Portable Temperature Controller (PTC), P/N 2900060-011. This modification will accomplish the following:

1. Insure a power fail alarm occurs when the 28 volt input fuse is blown and power is supplied from 115V source.
2. Stabilize bridge excitation voltage when line voltage is low.
3. Enable operation of Block I IMU without changing the temperature adjustment for Block II.
4. Add filter and change to charging circuit to improve critical battery cutoff operation.
5. Change hot alarm trip point to exclude normal operating range.
6. Provide external means of initiating bridge excitation failure test.
7. Provide external means of monitoring battery voltage.
8. Improve the temp failure latching circuit for loss of external power.
9. Reroute 115V fuse wiring for safer operation.

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I. PURPOSE

10. To make the batteries more accessible and provide for more mechanical support.
11. To reduce power to two lamps and relays to rated values.

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II. AUTHORITY

This retrofit is authorized by Marriage Kit 3.
NASA 9-497 SA-42

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

Not applicable.

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102250, consisting of the following is required to modify Portable Temperature Controller, P/N 2900060-011.

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VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	0102115	Retrofit Instruction Bulletin
1	2901542	Lead set
1	1015982-007	Relay, armature
3	1N459	Diode (1896966-291)
2	1N3029B	Diode (1896966-069)
1	RC20GF301J	Resistor (1896952-036)
1	RC20GF431J	Resistor (1896952-040)
1	1016053-024	Resistor
1	1016053-029	Resistor
1	1004260-535	Nameplate
2	1016151-006	Nut, self locking
6	1015864-135	Sleeving, electrical insulation
1	1015864-137	Sleeving, electrical insulation
2	1015864-140	Sleeving, electrical insulation
1	1015864-163	Sleeving, electrical insulation
1	AN960 C6	Flat washer (1897006-026)
1	CL25BL700UP3	Capacitor (1897081-324)
2	1896962-003	Terminal stud
2	MS35233-12	Pan head screw
4	1006783-95	Button head screw
1	RW55V201	Resistor (1896928-068)
1	1015832-318	Relay
1	1897260-008	Resistor, variable
1	1N2976B	Diode (1896966-075)
1	2901555	Pin, straight, headed
1	2901556	Bracket, electronic component
1	2901586	Decal, Functional Area

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VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	RC32GF271J	Resistor (1896953-049)
1	RC42GF750J	Resistor (1896951-022)
2	RC42GF121J	Resistor (1896951-027)
2	2901587	Bracket, batt. retainer cover
1	2901588-001	Pad, cushioning
2	2901588-002	Pad, cushioning

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VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in the retrofit kit are as follows:

Qty	Part Number	Description
AR	N/A	Clean lacquer
AR	N/A	Lacquer thinner
AR	N/A	Chemical film (MIL-C-5541A, type 1, grade B, class 2)
AR	N/A	Sealing and retaining compound (MIL-S-22473), grades C and H
AR	N/A	Black marking ink
AR	N/A	Black lacing tape (MIL-T-713B, Type P, class 2)
AR	N/A	Solder (QQ-S-571, SN60 WRAP)
1	Any hi-speed	Number 19 size twist drill
1	*Schwaab Stamp and Seal Co.Type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
1	*Schwaab Stamp and Seal Co.Type AAG-0X	Rubber stamp, 1/12 inch, thirteen band, alpha-numerical
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/16 inch alpha-numerical
1	Buchanan MS3191-1	Crimping tool
1	Buchanan MS3191-20	Positioner
1	Bendix 11-7880-20	Extraction tool
1	Bendix 11-8107-20	Insertion tool
AR	1010748	Epoxy resin
AR	10107[illegible]	Curing agent
AR	10107[illegible]	Calcium carbonate filler

*or equivalent

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VI. B. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
2	Single pole, single throw	switch
1	HP-428B	DC ammeter
2	Fluke 803B	Differential voltmeter
1	HP-412A Alternate:HP-410C	Voltohmmeter
2	General Radio 1432X Alternate:Rubicon 2015	Decade resistance box
1	Harrison Labs 808A	Power supply
1	Ohmite, 15 ohms, variable, 100 watts minimum	Resistor
AR	MIL-V-6894A unreduced	Varnish

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard AC-STD-1, dated 15 January, 1965.

3. Ink markings:

   a. Markings to be removed should be removed with lacquer thinner.

   b. New markings shall be covered with a coat of clear lacquer, after ink has dried.

4. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties shall be added after all conductor rework has been completed.

5. Use heatsink device when unsoldering or soldering near semiconductors.

6. Where marking is specified, hand marking is acceptable.

7. When disassembling the PTC, reinstall loose hardware on major part to insure proper placement and usage of attached hardware upon reassembly. Discard the two nuts. Remove two brackets, P/N 2900510, fastened with two screws, P/N 1010630-13 and two nuts, P/N 1016151-004. Discard brackets, screws and nuts.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove top cover from PTC and set aside.

2. Remove six flat head screws, P/N 1010630-38, which secure panel assembly, P/N 2900835-011, to PTC case, P/N 2900525-011. Retain screws for later reassembly.

3. Carefully lift panel assembly out of PTC case and place along side of PTC case.

4. Remove five button head screws, P/N 1006783-22, which secure electronic component assembly, P/N 2900521-011, to bottom of PTC case. See figure 1. Retain screws for later reassembly.

5. Remove four button head screws, P/N 1006783-26, flat washers, P/N AN960-C8, and lock washers, P/N MS35338-80, which secure transformer T1 to bottom of PTC case. See figure 1. Retain all hardware for later reassembly.

6. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure capacitor C3 to side of PTC case. See figure 1. Retain screws and nuts for later reassembly.

VII. B. PROCEDURE (CONTINUED)

7. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and two button head screws, P/N 1006783-22 with self locking nuts, P/N 1012525-004.

8. Disconnect lead A11 from positive terminal on BT1 and lead A82 from negative terminal on BT8. Temporarily insulate leads A11 and A82 with electrical tape.

9. Reinstall battery retainer cover on battery retainer with original two flat head screws and retain the two button head screws for later installation.

10. Remove two button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure lower edge of TB2 to PTC case. See figure 1. Retain all hardware for later reassembly.

11. Remove two button head screws, P/N 1006783-104, four self locking nuts, P/N 1012525-004, and two spacers, P/N 1015860-026, which secure upper edge of TB2 and two cable clamps to PTC case. See figure 1. Retain all hardware for later reassembly.

12. Remove one button head screw, P/N 1006783-104, two self locking nuts, P/N 1012525-004, and one spacer, P/N 2025860-026, which secure cable clamp and TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

VII. B. PROCEDURE (CONTINUED)

13. Remove three button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

14. Remove one button head screw,, P/N 1006783-23, and two self locking nuts, P/N 1012525-004, which secure one cable clamp and electronic component bracket, P/N 2900795, (containing AR1 through AR4) to PTC case. See figure 1. Retain all hardware for later reassembly.

15. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure electronic component bracket, P/N 2900795, to PTC case. See figure 1. Retain all hardware for later reassembly.

16. Remove four button head screws, P/N 1006783-22, which secure relay assembly to PTC case. See figure 1. Retain screws for later reassembly.

17. Remove one button head screw, P/N 1006783-26, and lock washer, P/N MS35338-80, which secure relay assembly to nut sleeve, P/N 2900512-001, and electronic component assembly, P/N 2900521-011.

VII. B. PROCEDURE (CONTINUED)

18. Remove two button head screws, P/N 1006783-23, which secure two sections of each retainer strap on capacitor C3. Remove top section of each retainer strap to permit removal of C3. Retain screws and retainer straps for later reassembly.

19. Remove two button head screws, P/N 1006783-047, spacers, P/N 1015860-017, and self locking nuts, P/N 1016151-010, which secure bell assembly to PTC case. Retain all hardware for later reassembly.

20. Carefully remove wiring harness A, loose parts and assemblies from PTC case and place of workbench.

    a. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and retain the screws for later installation.

    b. Connect a 15 ohm variable resistor with an ammeter in series between BT1-(+) and BT8-(-) and proceed with the following steps.

        1) Discharge the battery at a 2.0 ± 0.1 ampere rate.

        2) Monitor individual module voltages; they shall not drop below 3.0 volts, during the first 30 minutes.

VII. B. PROCEDURE (CONTINUED)

        3) Discontinue discharge when total voltage drops below 18 volts or when voltage for individual module drops below 1.8 volts, whichever occurs first.

        4) Recharge at the rate of 100 ma to a cutoff voltage of 4.65 ± 0.05 volts/module, removing each module from the circuit as it attains its cutoff value.

        5) If the 1/2-hour minimum was not obtained in step 2) above, repeat steps 1 through 4.

    c. Install two brackets, P/N 2901587 from kit using two button head screws retained in step B.7.

    d. Remove three screws, P/N 1006783-26 and three washers, P/N MS35338-80 from battery retainer bracket, P/N 2900508. Obtain two cushioning pads from kit, P/N 2901588-002 and place one at each end of the battery (use only one pad if there is insufficient room for both) and reinstall retainer bracket. Secure bracket using only two screws and washers, leaving the hole vacant directly under the amplifier bracket, P/N 2900795. Discard one screw and one washer.

    e. Reinstall battery retainer cover with original flat head screws.

VII. B. PROCEDURE (CONTINUED)

21. Visually check rotary switch S1 to determine if detent disc has "U" or "V" type notches in its periphery. See figures 2 and 3. If detent disc has "V" type notches, obtain straight headed pin, P/N 2901555, from kit and dispose of as directed in section IX of this RIB, and then proceed to step 22. If detent disc has "U" type notches, perform the following:

    a. Remove rotary switch S1 from panel assembly. Retain all parts.

VII. B. PROCEDURE (CONTINUED)

    b. Remove threaded spacer shown in figure 2 which is located adjacent to mid-point of roller arms as follows:

        1) Remove flat head screw which secures threaded spacer to square top plate. Retain screw.

        2) Loosen other screw from bottom of switch assembly and pull out only far enough to enable removal of threaded spacer. Remove and retain threaded spacer.

    c. Disconnect spring from end of roller arms.

    d. Swing roller arms out and away from switch assembly.

    e. Press roller pin out of detent roller and replace with straight headed pin, P/N 2901555, supplied in kit. New pin shall be installed such that head of pin will be nearest to square top plate. Dispose of removed roller pin as directed in section IX of this RIB.

    f. Reconnect spring to roller arms.

    g. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws removed previously from threaded spacer.

VII. B. PROCEDURE (CONTINUED)

h. Insert threaded spacer in original position on switch assembly and thread screw from bottom of switch assembly into threaded spacer.

i. Reinstall flat head screw through square top plate into threaded spacer.

j. Reinstall switch assembly on panel assembly.

22. Remove resistor soldered between terminals 2 and 3 on fuseholder XF1. See figure 4. Dispose of resistor as directed in section IX of this RIB.

23. Replace resistor R16 with resistor 1897260-008, and replace all wires on the same respective terminals (see table 1). Dispose of R16 as directed in section IX of this RIB.

a. Obtain the decal, P/N 2901586 from the kit; remove the paper from the gummed back of the decal; and place it over the "135°" label on the 135° temperature calibration switch.

b. Apply a bead of varnish (MIL-V-6894A unreduced) over the decal.

c. Remove the number 2900501 from the panel and replace it with 2901585.

VII. B. PROCEDURE (CONTINUED)

24. Remove "-011" portion of identification mark "ASSY 2900835-011" on panel assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

25. Remove all leads from relay K4, P/N 1015802-004.

26. Remove relay K4 from relay assembly and dispose of as directed in section IX of this RIB.

27. Replace relay K4 with relay, 1015832-318, and replace all wires on respective terminals. (See table 2).

28. Replace diode CR7 with 1N2976B (1896966-075), being careful to connect the cathode and anode in the same manner that they were for CR7. (See table 2). Dispose of CR7 as directed in section IX of this RIB.

29. Remove "-011" portion of identification mark "ASSY 2900777-011" on relay assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

30. Locate, mark and drill one 0.164 to 0.172 inch diameter through hole in electronic component assembly, P/N 2900521-011, as shown in figure 5. Use number 19 size twist drill to drill hole.

31. Apply MIL-C-5541 chemical film to bare metal on inner surface of newly drilled hole.

VII. B. PROCEDURE (CONTINUED)

32. Mark "K18" on electronic component assembly in location shown in figure 5. Use 1/8 inch high character rubber stamp and black marking ink for new marking.

33. Remove identification mark "2900505" on electronic component assembly and replace with identification mark "2901544". New marking shall be per MIL-STD-130 (ES267).

34. Remove "-011" portion of identification mark "ASSY 2900521-011" and replace with new dash number "-021". New marking shall be per MIL-STD-130. (ES267)

NOTE: When performing next step, insure that relay is positioned such that the shoulder on the relay stud which will protrude through the larger of two holes, sufficiently grips the bracket material. Improper relay positioning will cause the shoulder to be drawn into the hole when the self-locking nuts are tightened.

35. Obtain relay, P/N 1015982-007, two self locking nuts, P/N 1016161-006, and one flat washer, P/N AN960 C6, from kit and secure to electronic component assembly as shown in figure 6.

36. Stamp "CR30" between terminals 3 and 10 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

VII. B. PROCEDURE (CONTINUED)

37. Stamp "CR31" between terminals 3 and 11 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

38. Stamp "R63" between terminals 20 and 25 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

39. Obtain two 1N459 diodes from kit and install one between terminals 3 and 10 and the other between terminals 2 and 11 on TB2, as shown in figure 7. Observe proper anode and cathode connections as shown in figure 7.

40. Obtain resistor, P/N RC20GF431J, from kit and install between terminals 20 and 25 on TB2 as shown in figure 7.

41. Remove resistors as follows:

a. Remove resistor R53, P/N RC32GF510J, located between terminals 26 and 34 on TB2.

b. Remove resistor R57, P/N RC32GF510J, located between terminals 27 and 35 on TB2.

c. Remove resistor R56, P/N RC42GF510J, located between terminals 23 and 26 on TB2.

VII. B. PROCEDURE (CONTINUED)

d. Remove resistor R11, P/N RC32GF101J, located between terminals 28 and 37 on TB2.

e. Remove resistor R25, P/N RC32GF101J, located between terminals 28 and 38 on TB2.

f. Dispose of resistors as directed in section IX of this RIB.

42. Obtain and install the following resistors:

a. Resistor RC42GF121J install between terminals 26 and 34 on TB2.

b. Resistor RC42GF121J install between terminals 27 and 35 on TB2.

c. Resistor RC42GF750J install between terminals 23 and 36 on TB2.

d. Resistor RC20GF301J install between terminals 28 and 37 on TB2.

e. Resistor RC32GF271J install between terminals 28 and 38 on TB2.

43. Using care not to damage sleeving on resistor R10 remove resistor R10, P/N 1016053-003, from between terminals 50 and 58 on TB2. Retain two insulation sleeves from R10 and dispose of R10 as directed in section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

44. Obtain resistor, P/N 1016053-029, from kit and install two sleeves, retained in step 43, on resistor leads. Solder resistor, between terminals 50 and 58 on TB2 as shown in figure 7.

45. Remove resistor R14, P/N RC42GF101J, from between terminals 19 and 30 on TB2. Retain insulation sleeve from R14 and dispose of R14 as directed in section IX of this RIB. Replace R61 with resistor P/N 1016053-024, between terminals 5 and 14 on TB-2. Dispose of old R61 as directed in section IX of this RIB.

46. Obtain resistor, RW55V201 (1896928-068), from kit and install between terminals 19 and 30 on TB2. Insulation sleeve retained in step 45 shall be placed on resistor lead which will be soldered to terminal 30. Reference figure 7.

47. Change wire A135 from terminal 18 to terminal 19 on TB2.

48. Remove diodes CR9 and CR10 which are identical, from terminals 18, 19, and 29 on TB2. Retain CR9 for later use and dispose of CR10 (P/N 1896966-187), as directed in section IX of this RIB. Delete letters CR9 and CR10 from TB2.

49. Remove "-011" portion of identification mark "ASSY 2900778-011" on TB2 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

VII. B. PROCEDURE (CONTINUED)

50. If terminal board (inseparable assembly) (TB2), is marked, P/N 2900519" re-identify as "P/N 2901545". Identification shall be in accordance with MIL-STD-130 (ES267).

51. Bond resistors R10 and R14 to terminal board TB2 per MD 1002203, using epoxy resin, P/N 1010748, curing agent, P/N 1010750, and calcium carbonate filter, P/N 1010749.

52. Remove 1N3030B diodes CR13 and CR14 from TB1-50, 56, and 58, and dispose of as directed in section IX of this RIB. Reference figure 8.

53. Obtain two 1N3029B diodes from kit and install one between terminals 50 and 56 and the other between terminals 50 and 58 on TB1, as shown in figure 8. Observe proper anode and cathode connections shown in figure 8.

54. Remove "-011" portion of identification mark "ASSY 2900513-011" on TB1 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

55. Obtain electronic component bracket, P/N 2901556, two terminal studs, P/N 1896962-003, and two pan head screws, P/N MS35233-12, from kit. Secure terminal studs to component bracket with pan head screws as shown in figure 9. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws prior to installing.

VII. B. PROCEDURE (CONTINUED)

56. Obtain capacitor, P/N CL25BL700UP3, from kit and install between E32 and E33 on electronic component bracket, P/N 2901556, as shown in figure 9. Insure positive lead of capacitor is connected to E32.

57. Remove four button head screws, P/N 1006783-18, flat washers, AN960 C4, and lock washers, P/N MS35338-78, which secure one side of comparators AR1 and AR2 to inner edge of electronic components bracket, P/N 2900795. (Removal of these four screws and associated washers will permit installation of new component bracket as shown in figure 9.) Retain all washers and dispose of four screws as directed in section IX of this RIB.

58. Secure electronic component bracket, P/N 2901556, to electronic component bracket, P/N 2900795, as shown in figure 9, using four button head screws, P/N 1006783-95, (supplied in kit) and washers retained in step 53.

59. Remove capacitor C4 from terminals 37 and 38 of TB3. Dispose of the capacitor as directed in section IX of this RIB. Retain the sleeving for later use.

60. Remove wire AA105 from terminals 47 and 31 of TB3.

VII. B. PROCEDURE (CONTINUED)

78. Obtain new wire list AA leads and required accessory items from kit lead set and install as indicated in table 3. (Notes referenced in the remarks column of table 3 can be found at the end of the table.)

Table 3. Wire List AA Lead Additions

Lead Ident.	From Ckt.Pt.	To Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA154	E1		0.20	Yes		See note 1
		K18-2	0.20	Yes	1015864-135	
AA155	K18-5		0.20	Yes	1015864-135	
		K1-4	0.20	Yes	1015864-135	
AA156	E1		0.20	Yes		See note 2
		K18-3	0.20	Yes	1015864-135	See note 3
AA157	K18-6		0.20	Yes	1015864-135	
		E3	0.20	Yes		See note 4
AA158	CR1-A		0.20	Yes	1015864-137	See note 5
		E17	0.20	Yes		See note 6
AA159	TB2-11		0.20	Yes		
		TB2-37	0.20	Yes		
AA160	J1-J		0.20	No		See note 7
		S7SW2-NO	0.30	Yes		Combine with AA43
AA161	TB3-14		0.30	Yes		Combine with B6
		TB3-16	0.30	Yes		Combine with A86
AA162	J1-H		0.20	No		See note 7
		S1A-24	0.30	Yes		Combine with AA25
AA163	E18		0.30	Yes		See note 8
		E3	0.30	Yes		See note 9

VII. B. PROCEDURE (CONTINUED)

Table 3. Wire List AA Lead Additions (Continued)

Note 1 - One more lead (AA156) will be added to this point.
Note 2 - Solder on E1 with leads A33, A79, and AA154.
Note 3 - One more lead (A147) will be added to this point.
Note 4 - One more lead (AA163) will be added to this point.
Note 5 - One more lead (A150) will be added to this point.
Note 6 - Solder on E17 with leads AA66, AA68, and AA69.
Note 7 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 8 - Solder on E18 with leads A70 and AA72.
Note 9 - Solder on E3 with leads AA73 and AA157.

79. Obtain new wiring harness A leads and required accessory items from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column of table 4 can be found at the end of the table.)

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions

Lead Ident.	From Ckt.Pt.	To Ckt.Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A144	K18-8		0.30	Yes	1015864-135	
		TB3-15	0.30	Yes		See note 1
A145	TB2-25		0.30	Yes		
		TB3-9	0.30	Yes		
A146	TB2-20		0.30	Yes		See note 2
		XF1-3	0.30	Yes		See note 3
A147	K18-3		0.30	Yes		Combine with AA156
		TB2-10	0.30	Yes		
A148	K18-7		0.30	Yes	1015864-135	
		TB2-3	0.30	Yes		
A149	K5-2		0.30	Yes		Combine with B5
		CR1-C	0.30	Yes	1015864-163	
A150	CR1-A		0.30	Yes		Combine with AA158
		K5-3	0.30	Yes		Combine with A4
A151	J2-C		0.20	No		See notes 4 and 5
		TB1-58	0.30	Yes		
A152	TB2-30		0.30	Yes		See note 6
		E32	0.30	Yes		
A153	TB2-53		0.30	Yes		See note 6
		E33	0.30	Yes		

Note 1 - Combine with leads A53 and B5 at this point.
Note 2 - Route lead along harness branch near TB3.
Note 3 - See figure 4 for terminal information.
Note 4 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 5 - Route lead along harness branch near TB2 and TB3.
Note 6 - Route lead along harness branch near TB1.

VII. B. PROCEDURE (CONTINUED)

80. Wrap and spot tie black lacing tape over terminal 3 on fuseholder XF1 (see figure 4) to secure the terminal to the body of the fuseholder. The wrapping should pass over terminal 1 and also cover a small portion of the lead attached to terminal 3.

81. Spot tie new and rerouted leads into applicable harness as necessary, using black lacing tape.

82. Remove identification band marked "2900654" from wiring harness A and replace with kit supplied identification band marked "2901546". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in section IX of this RIB.

83. Remove identification band marked "2900655" from wiring harness B and replace with kit supplied identification band marked "2901549". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in Section IX of this RIB.

84. Transfer serial number from nameplate on PTC case to new nameplate supplied in kit. Use 1/16 inch high character metal stamp set to imprint data.

85. Remove nameplate from PTC case and dispose of as directed in section IX of this RIB. Retain four screws.

VII. B. PROCEDURE (CONTINUED)

86. Secure new nameplate to PTC case with four screws retained in preceding step. Apply MIL-H-22473, grade H, sealing and retaining compound to threads of four screws prior to installation.

87. Carefully place wiring harness A, attached parts and assemblies into PTC case.

88. Secure bell assembly to PTC case in original position with hardware retained in step 19. Reference figure 1.

89. Secure capacitor C3 to PTC case in original position with hardware retained in steps 6 and 18. Reference figure 1.

90. Secure transformer T1 to PTC case in original position with hardware retained in step 5. Reference figure 1.

91. Secure electronics component assembly, P/N 2900521-021, to PTC case in original position with hardware retained in step 4. Reference figure 1.

92. Secure electronic component bracket, P/N 2900795, to PTC case in original position with hardware retained in steps 14 and 15. Insure cable clamp is located above and between AR4 and AR3. Reference figure 1.

VII. B. PROCEDURE (CONTINUED)

93. Secure TB1 to PTC case in original position with hardware retained in step 13. Do not secure upper left corner (next to R13) to PTC case. Reference figure 1.

94. Install hardware retained in step 12 to upper left corner of TB1.

95. Secure two lower corners of TB2 to PTC case with hardware retained in step 10. Reference figure 1.

96. Install hardware retained in step 11 to two upper corners of TB2.

VII. B. PROCEDURE (CONTINUED)

97. Perform continuity and resistance checks per table 5.

Table 5. Continuity-Resistance Checks

From	To	Indication	Remarks
J1-J	J1-L	<1 OHM	All readings shall be less than 1 ohm
J2-C	TB1-58	↓	
J1-H	S1A-24	↓	
J1-B	J1-L	↓	

98. Using a razor blade and an india ink, make the following changes to the decal on the inside of the PTC cover:

a. Change the schematic drawing number in the upper left-hand corner of the decal from 2900133 to 2901543.

b. Adjacent to the "28 VDC INPUT J1", change TEMP FAIL-ILTC to TEMP FAIL-LTC. Change POWER FAIL-ILTC to POWER FAIL-LTC. After M GROUND, add H BATT HI and J BATT LO.

c. Cover all new lettering with clear lacquer.

VII. PROCEDURE (CONTINUED)

C. RETEST PROCEDURES.

1. Recalibration of bridge excitation voltages.

NOTE: Relay assembly has to be swung up to make potentiometers accessable. Maintain isolation between assembly and case.

a. Make the test setup as indicated in figure 10.

b. Set control decade to 1560.0 ohms and the indicating decade to 2504.5 ohms.

NOTE: Apply only 28 ± 1 VDC power.

2. Control Bridge.

a. Set TEMP. ADJUST potentiometer to center position (11 turns from clockwise). See figure 1.

b. Connect differential voltmeter number 1 to TB2-56 (hi) and TB2-47 (lo).

c. Connect differential voltmeter number 2 to TB2-42 (hi) and TB2-12 (lo).

d. Adjust R33 and R35 on the relay assembly to obtain simultaneous voltages of 1.950 ± 0.020 VDC on differential voltmeter number 1 and 17.4 ± 0.174 VDC on meter number 2.

VII. C. PROCEDURE (CONTINUED)

3. Indicating Bridge.

   a. Connect differential voltmeter number 1 to TB2-52 (hi) and TB2-45 (lo).

   b. Connect differential voltmeter number 2 to TB2-39 (hi) and TB2-54 (lo).

   c. Adjust R18 and R19 to obtain simultaneous voltages of 1.610 ± 0.016 VDC on voltmeter number 1 and 17.6 ± 0.176 VDC on voltmeter number 2.

   d. Turn selector switch on the panel assembly to OFF.

OFF

4. Recalibration of battery cutoff voltage.

   a. Remove electrical tape from lead A11 and connect to the high side of the voltohmmeter with the low side connected to TP2. Remove the electrical tape from lead A82 and connect it to the negative terminal on BT8, after removing the battery cover by removing two flat head screws.
   b. Turn R16 full clockwise. Turn the selector switch to ON.

   c. Apply 36.8 ± 0.1 VDC to TB2-19 high and TP2 low.

VII. C. PROCEDURE (CONTINUED)

   d. Slowly turn R16 counterclockwise until VTVM voltage drops to 28V source voltage. Decrease cutoff supply voltage from 36.8 to approximately 30 volts and momentarily remove the supply voltage.

   e. Slowly increase the cutoff supply voltage and varify that the switchover point is 36.8 ± 0.1 VDC. Adjust R16 and repeat these procedures if necessary.

   f. Remove the cutoff supply voltage; set the selector switch to OFF. Connect lead A11 to the positive terminal of BT1. Apply 115 VAC at J2-M and J2-J. Turn selector switch to ON. Monitor current through A11 with clip-on ammeter. Verify that the charging current drops to zero at a battery terminal voltage at J1-H high and J1-J low of 36.7 ± 0.3 VDC and that individual module (8) voltages do not exceed 4.75 VDC.

   g. Set selector switch to OFF. Obtain cushioning pad, P/N 2901588-001 from kit and place on battery. Reinstall the battery retainer cover on battery retainer with original two flat head screws.

VII. C. PROCEDURE (CONTINUED)

   h. Secure relay assembly to PTC case in original position with hardware retained in step 16. Reference figure 1.

   i. Secure relay assembly to nut sleeve located between relay assembly and electronic component assembly, P/N 2900521-021, with screw retained in step 17.

   j. Place panel assembly in original mounting position in PTC case and secure with six screws retained in step 2.

5. Recalibration of hot alarm set point.

   a. Set selector switch to ON. Set the HI ALARM LIMIT ADJUST potentiometer full clockwisw and monitor pins J3-A and J3-B.

   b. Set indicating decade box to 2225 ohms.

   c. Slowly turn the HI ALARM LIMIT ADJUST potentiomiter counterclockwise until continuity exists at J3-A and J3-B.

   d. Set the indicator decade box to 2500 and press ALARM INHIBITED (SYSTEM RESET) pushbutton to silence the bell and stop the flashing light.

VII. C. PROCEDURE (CONTINUED)

   e. Set the indicator decade box to 2240 ohms, and slowly decrease resistance in 1-ohm steps. Between 2230 and 2220 ohms the bell shall ring, the IMU HOT lamp shall flash, and continuity shall exist at J3-A and J3-B.

   f. Press and hold the ALARM INHIBITED (SYSTEM RESET) pushbutton for this paragraph. Slowly increase the resistance in 1-ohm steps. Before 2270 ohms, the IMU HOT lamp shall extinguish and continuity shall exist at J3-B and J3-C.

   g. Set indicator decade box at 2254.1 ohms. Set the selector to OFF for 5 seconds. Upon reapplication of power, the IMU HOT lamp shall not be flashing.

   h. Adjust HI TEMP ALARM ADJUST to meet conditions of steps e and g above if necessary.

   i. Set indicator decade box to 2201.3 ohms. The alarm bell shall ring, IMU HOT lamp shall flash, and the meter shall read 138.0 ± 0.5°F with or without the 138° CAL pushbutton depressed. Release the 138° CAL pushbutton and set the decade box to 2500 ohms. Return to normal operation by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

VII. C. PROCEDURE (CONTINUED)

5. Temperature Alarm Memory

a. With the 125° CAL pushbutton held in the depressed position, the bell shall ring and the IMU COLD lamp shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release the 125° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU COLD light shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

→ lamp
didn't [illegible]

b. With the 138° CAL pushbutton held in the depressed position, the bell shall ring and the IMU HOT lamp shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release 138° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU HOT ligh shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

6. Power Output.

a. Apply 25.2 VDC and remove 115VAC. Inhibit the alarm or open the switch S2 for loss of 115VAC. Set the control decade box to 1530 ohms. Multiply the readings of the output ammeter and the output voltage. The results shall be 60 watts minimum.

VII. C. PROCEDURE (CONTINUED)

7. Indicating Bridge Failure.

a. Apply 115 VAC to J2-M and J2-J. Set control decade box so that PTC meter reads 1.5 ± 0.5 amperes. Jumper J2-C to TP4. IMU HOT and IMU COLD lamps shall flash, the alarm bell shall ring, and the PTC meter shall read 1.5 ± 0.5 amps. Remove jumper and reset system by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

8. 28V Line Fuse Indication.

a. Remove the 28V fuse with holder. Bell shall ring and POWER FAIL lamp shall light. Reinsert holder without fuse. Lamp in holder shall light. Open switch S1. Bell shall stop ringing and POWER FAIL lamp shall go out, holder lamp shall continue to indicate. Reinsert fuse in fuseholder.

→ 5 [illegible]

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record.

3. Record performance of the modification on the existing Unit History Record sheet (referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain the old Unit History Record sheet in the Acceptance Data Package.

B. Significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021
Panel Assembly	2900835-011	2900835-021
Electronic Component Assembly	2900521-011	2900521-021
Electronic Components Heatsink (Inseparable Assembly)	2900505	2901544

VIII. B. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Relay Assembly	2900777-011	2900777-021
Electronic Components Assembly	2900513-011	2900513-021
Electronic Components Assembly	2900778-011	2900778-021
Terminal Board (Inseparable Assembly)	2900519	2901545
Terminal Board (Inseparable Assembly)	2900523	2901583
Wiring Harness A	2900654	2901546
Wiring Harness B	2900655	2901549
Lead Set AA	2900656	2901550
Electronic Components Assembly	2900522-011	2900522-021

IX. DISPOSITION OF PARTS REMOVED

A. Send relay (K2), P/N 1015802-004, to AC Electronics, Logistics Department, bondroom. Logistics shall utilize this item as a spare.

B. Transfer the following items to full custody of the government via DD543 form (Inventory Schedule).

IX. B. DISPOSITION OF PARTS REMOVED (CONTINUED)

Qty	Part Number	Description
2	1N3030B	Semiconductor (1896966-070) (formerly CR13 and CR14)
1	1016053-003	Resistor (formerly R10)
1	1897260-005	Resistor (formerly R16)
1	RC32GF101J	Resistor (1896953-039) (formerly R11)
1	RC42GF101J	Resistor (1896951-025) (formerly R14)
1	Not assigned	Resistor, 420 ohm (formerly attached to XF1)
1	1016053-001	Resistor, (formerly R61)
1	1015832-312	Relay, (formerly K4)
2	RC32GF510J	Resistor (1896953-032) (formerly R53 and R57)
1	RC42GF510J	Resistor (1896951-018) (formerly R56)
1	RC32GF101J	Resistor (1896953-029) (formerly R25)

C. Scrap all other items via AC Electronics form MIL-127 or equivalent.

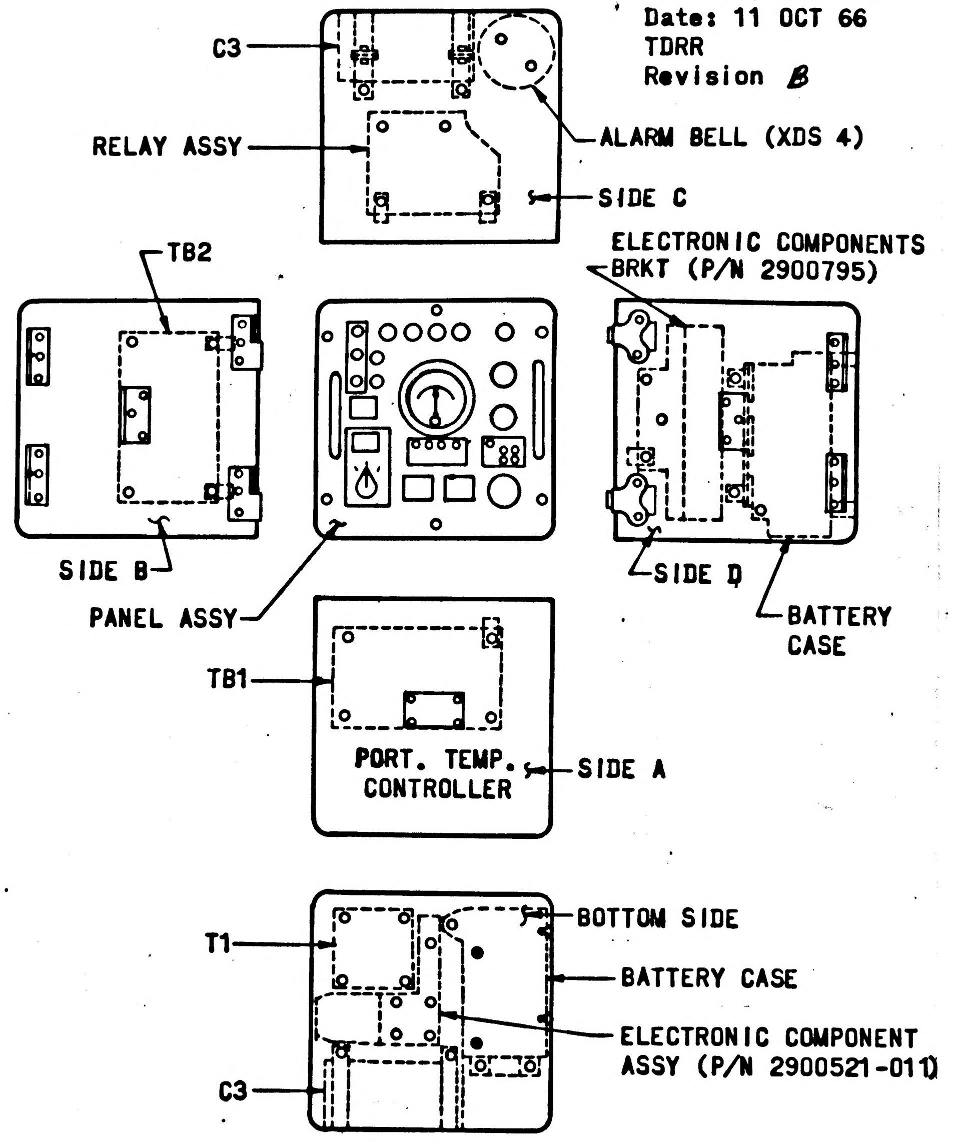
C3
RELAY ASSY
ALARM BELL (XDS 4)
SIDE C
TB2
ELECTRONIC COMPONENTS BRKT (P/N 2900795)
SIDE B
PANEL ASSY
SIDE D
BATTERY CASE
TB1
PORT. TEMP. CONTROLLER
SIDE A
T1
BOTTOM SIDE
BATTERY CASE
ELECTRONIC COMPONENT ASSY (P/N 2900521-011)
C3

Figure 1. LOWER SECTION OF PTC (SIMPLIFIED VIEWS)

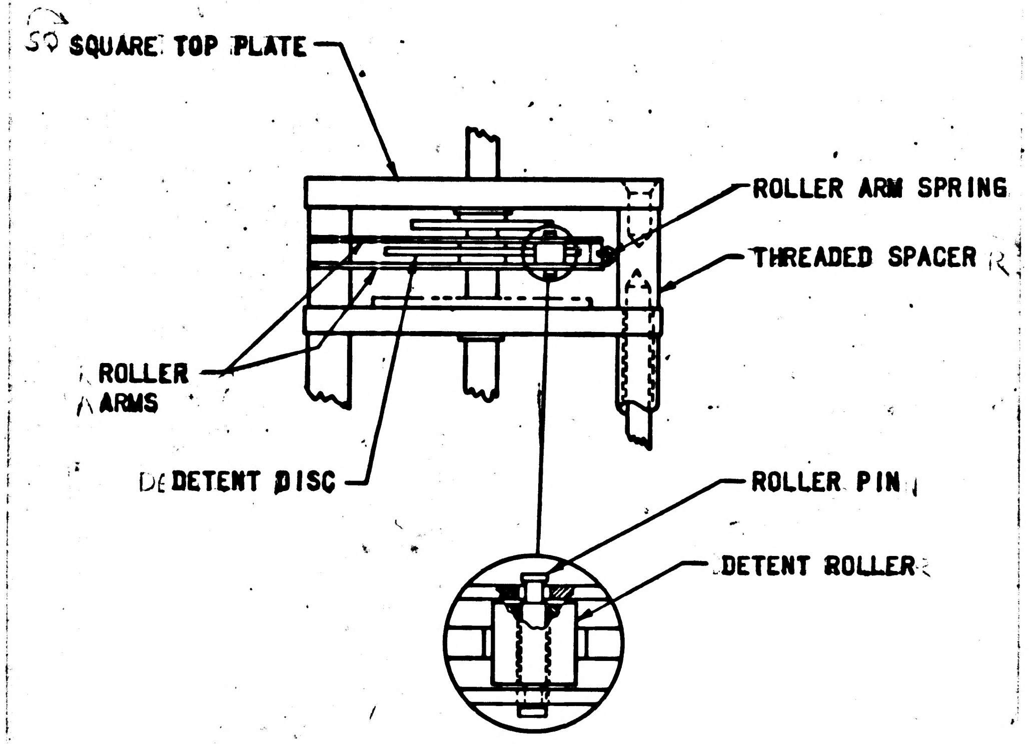
SQUARE TOP PLATE
ROLLER ARM SPRING
THREADED SPACER
ROLLER ARMS
DETENT DISC
ROLLER PIN
DETENT ROLLER

Figure 2. ROTARY SWITCH WITH "U" NOTCH TYPE DETENT DISC BEFORE MODIFICATION (SIMPLIFIED PARTIAL VIEW)

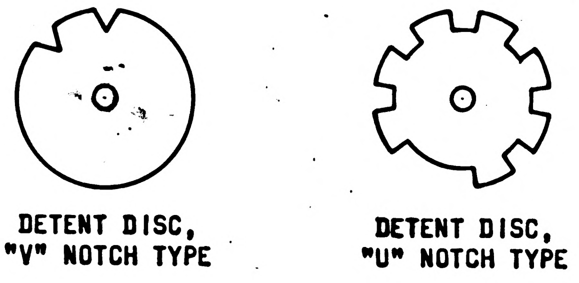
DETENT DISC, "V" NOTCH TYPE
DETENT DISC, "U" NOTCH TYPE

Figure 3. DETENT DISC TYPES

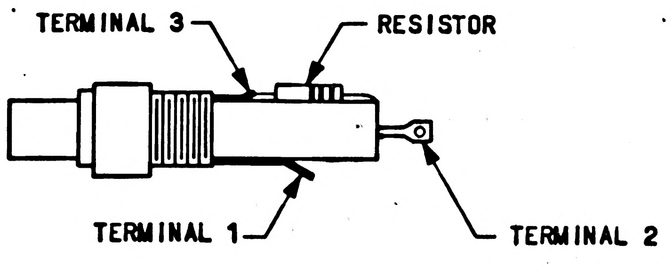
TERMINAL 3
RESISTOR
TERMINAL 1
TERMINAL 2

Figure 4. FUSEHOLDER TERMINALS

Sheet 45 of 50
Part No. 0102115
Date: 11 OCT 66
TDRR
Revision B

DIMENSION TOLERANCES
2 Place Decimal ±.02
3 Place Decimal ±.005

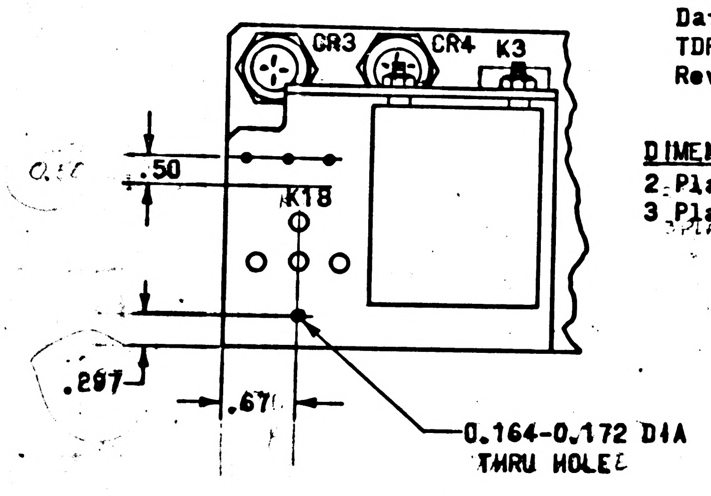
CR3
CR4
K3
K18
.50
.297
.67
0.164-0.172 DIA THRU HOLE

Figure 5. NEW HOLE IN ELECTRONIC COMPONENT ASSEMBLY, P/N 2900521-011

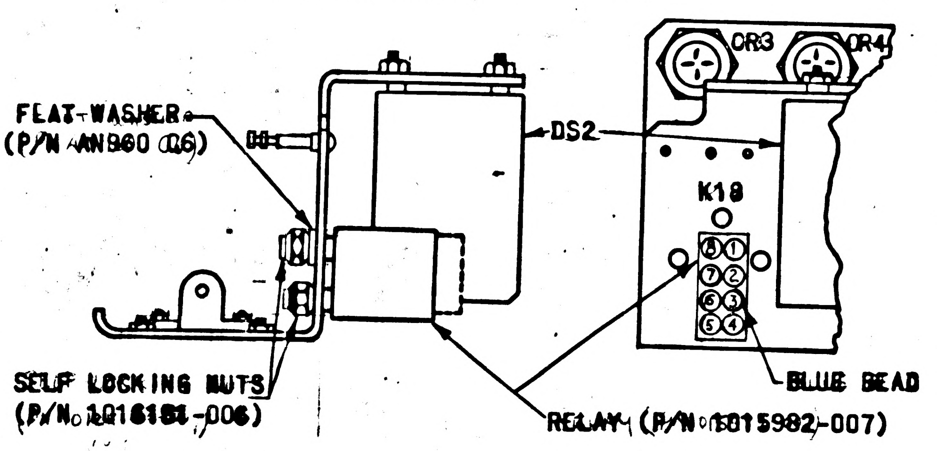
FLAT WASHER (P/N AN960 C6)
DS2
CR3
CR4
K18
SELF LOCKING NUTS (P/N 1016181-006)
RELAY (P/N 1015982-007)
BLUE BEAD

Figure 6. NEW RELAY K18 IN MOUNTED POSITION

Sheet 46 of 50
Part No. 0102115
Dated 11 OCT 66
TDRR
REV B

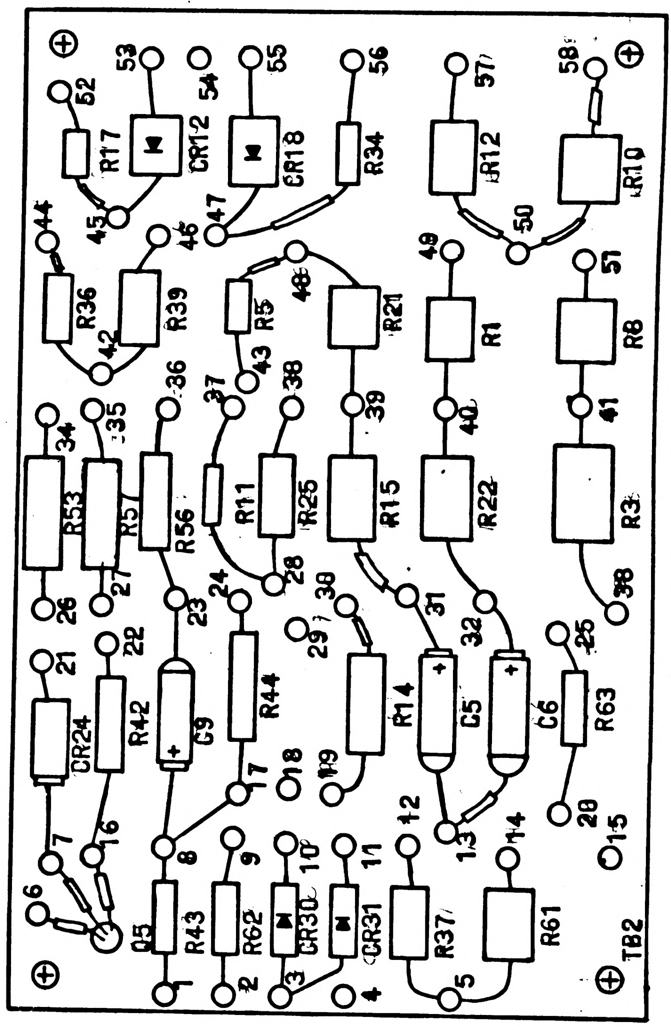
TB2
R17
CR12
CR18
R34
R12
R10
R36
R39
R5
R21
R1
R8
R53
R57
R56
R11
R25
R15
R22
R3
CR24
R42
C9
R44
R14
C5
C6
R63
R43
R62
CR30
CR31
R37
R61

Figure 7. ELECTRICAL COMPONENTS ASSEMBLY (TB2) AFTER MODIFICATION

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TDRR
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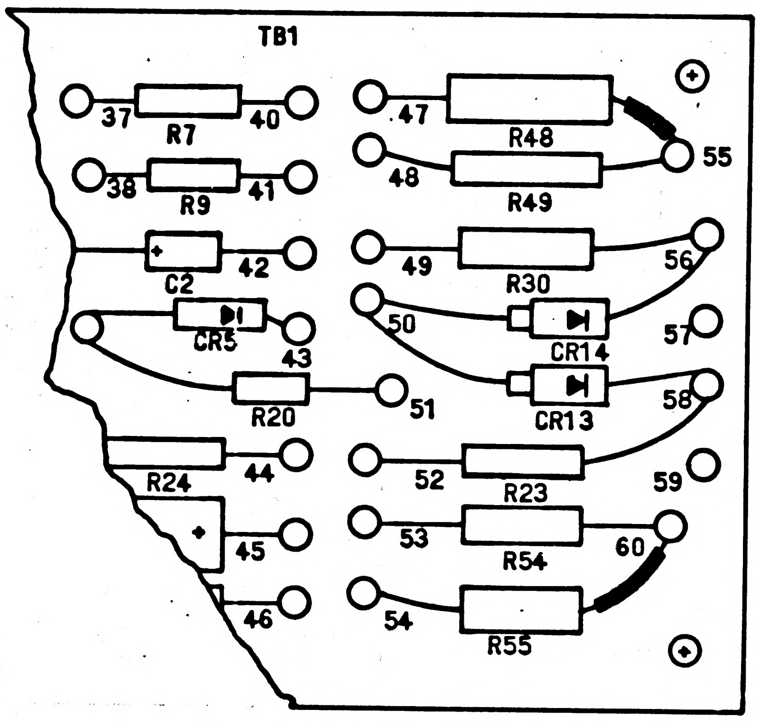
TB1
R7
R9
C2
CR5
R20
R24
R48
R49
R30
CR14
CR13
R23
R54
R55

Figure 8. ELECTRICAL COMPONENTS ASSEMBLY (TB1) AFTER MODIFICATION

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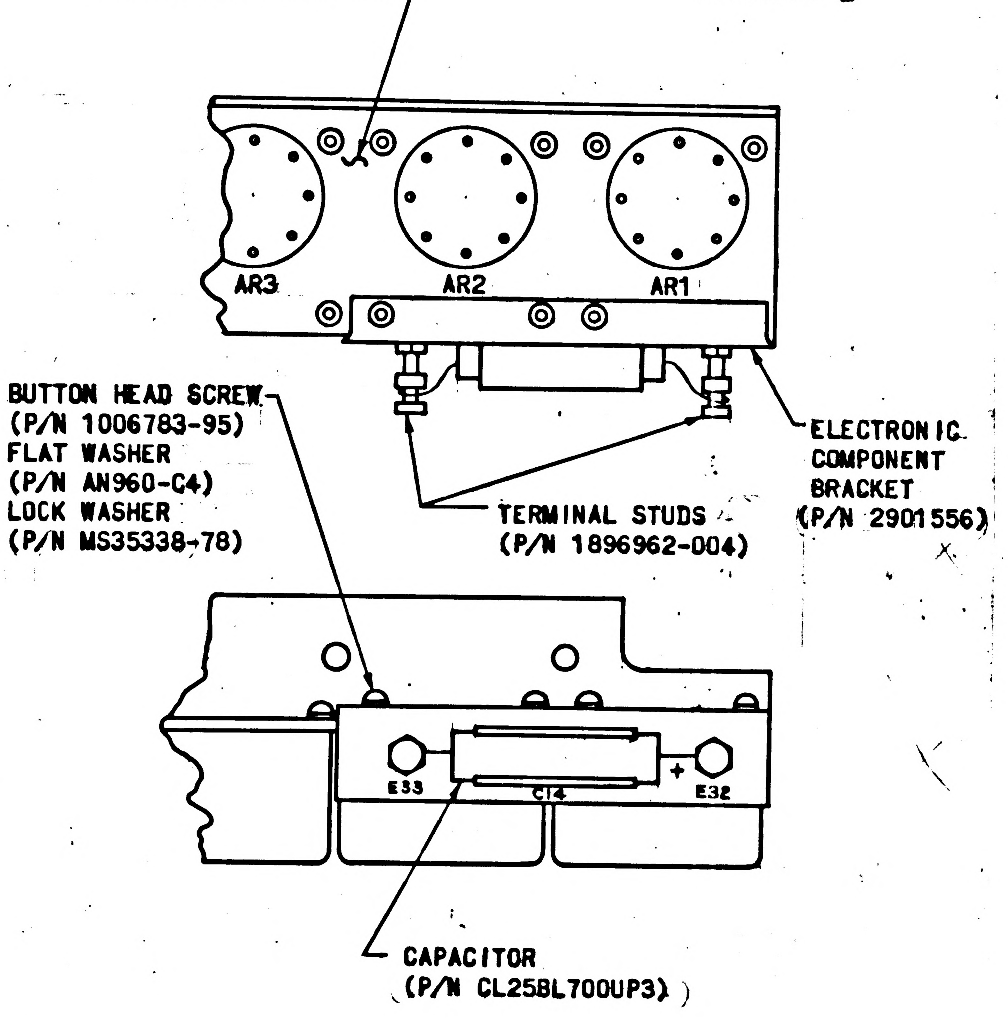
ELECTRONIC COMPONENT BRACKET (P/N 2900795)
AR3
AR2
AR1
BUTTON HEAD SCREW (P/N 1006783-95)
FLAT WASHER (P/N AN960-C4)
LOCK WASHER (P/N MS35338-78)
TERMINAL STUDS (P/N 1896962-004)
ELECTRONIC COMPONENT BRACKET (P/N 2901556)
E33
C14
E32
CAPACITOR (P/N CL25BL700UP3)

Figure 9. NEW COMPONENT BRACKET

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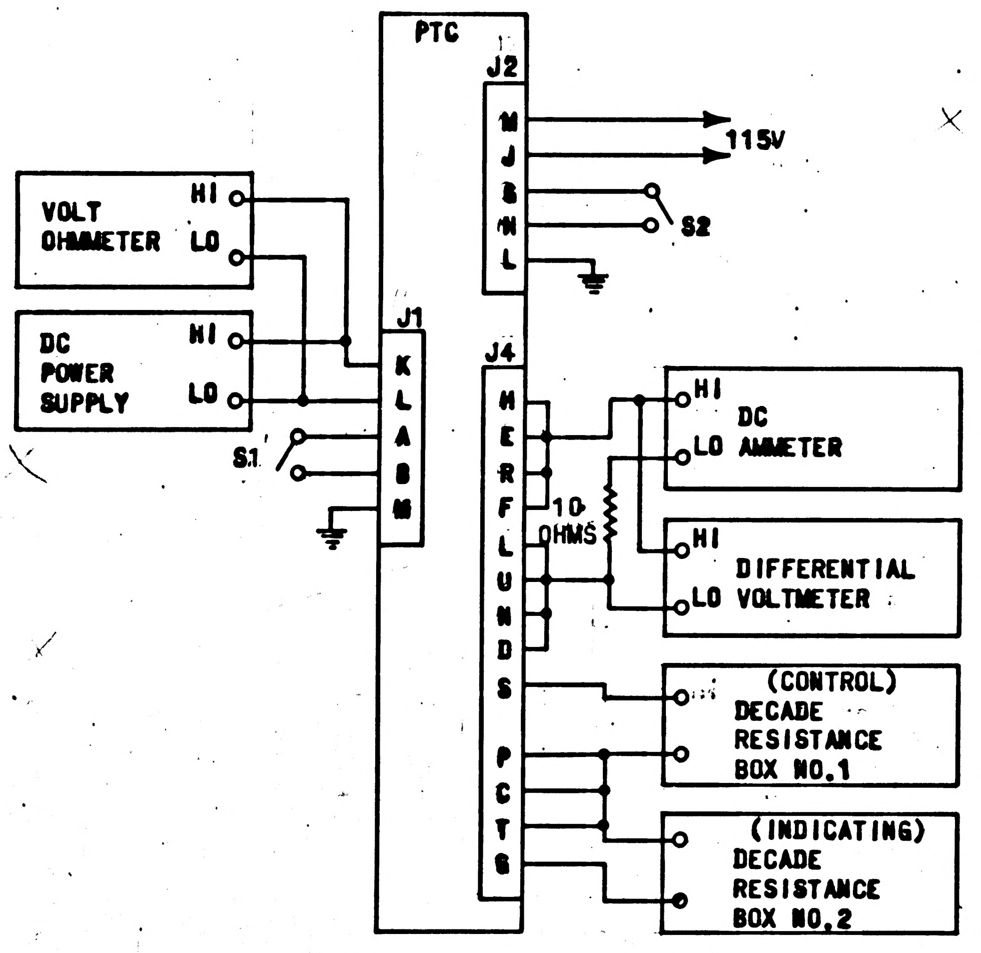
PTC
J2
M
J
B
N
L
115V
S2
VOLT OHMMETER
HI
LO
DC POWER SUPPLY
HI
LO
J1
K
L
A
B
M
S1
J4
H
E
R
F
L
U
N
D
S
P
C
T
G
10 OHMS
HI
DC
LO AMMETER
HI
DIFFERENTIAL
LO VOLTMETER
(CONTROL)
DECADE
RESISTANCE
BOX NO.1
(INDICATING)
DECADE
RESISTANCE
BOX NO.2

Figure 10. TEST SETUP

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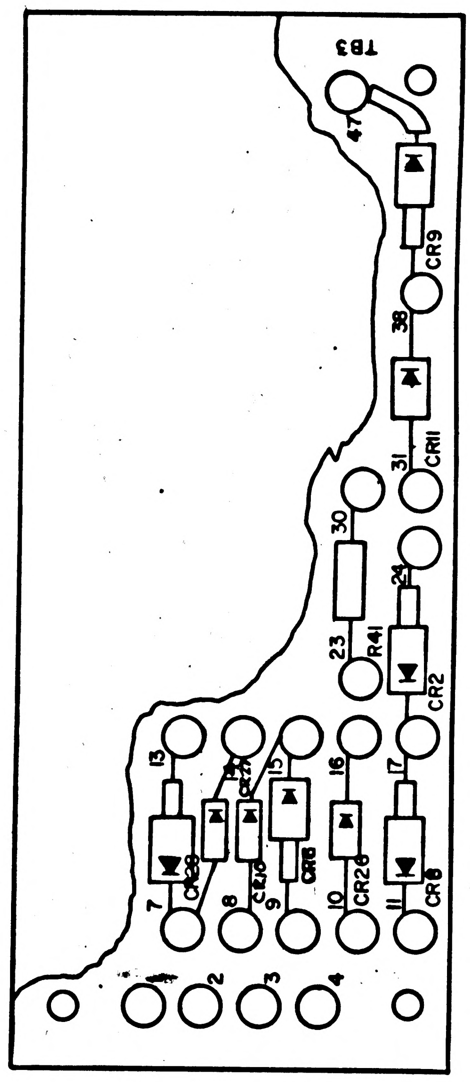
TB3
47
CR9
38
CR11
31
30
24
R41
23
CR2
17
16
15
CR26
CR8
13
7
8
9
10
11
CR6
CR10
CR27
CR28
2
3
4

Figure 11. ELECTRICAL COMPONENTS ASSEMBLY (TB3)
AFTER MODIFICATION

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Revision E

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR PORTABLE TEMPERATURE CONTROLLER, P/N 2900060-011

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CCB [redacted]	NASA	
A	MSC 215759	1,4,6,14,15,16			21 OCT 66
B	32123	ALL INITIAL RELEASE	EA	—	11/28/66
C	32732	1,2A,4A,7,12,12A,15,17,17A,33,34,41,46,50			24 JAN 67 ems
D	33172	1,4A,32,43			13 MAR 67 ems
E	33732	1,4,12,17,18,21,22,23,24,27,46			9 MAY 67 ems EF

Prepared by Earl Cox Date 10/13/66
P.C. Engineering Approval Date 10/13/66
Design Review Board Approval Date 11-18-66
MIT/IL Approval Date
NASA Approval Date 11/22/66
MIT Reliability Date

Sheet 2 of 50
Part No. 0102115
Date: 11 OCT 66
TDRR
Revision B

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of Portable Temperature Controller (PTC), P/N 2900060-011. This modification will accomplish the following:

1. Insure a power fail alarm occurs when the 28 volt input fuse is blown and power is supplied from 115V source.
2. Stabilize bridge excitation voltage when line voltage is low.
3. Enable operation of Block I IMU without changing the temperature adjustment for Block II.
4. Add filter and change to charging circuit to improve critical battery cutoff operation.
5. Change hot alarm trip point to exclude normal operating range.
6. Provide external means of initiating bridge excitation failure test.
7. Provide external means of monitoring battery voltage.
8. Improve the temp failure latching circuit for loss of external power.
9. Reroute 115V fuse wiring for safer operation.

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Revision C

I. PURPOSE

10. To make the batteries more accessible and provide for more mechanical support.
11. To reduce power to two lamps and relays to rated values.

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Revision B

II. AUTHORITY

This retrofit is authorized by Marriage Kit 3.
NASA 9-497 SA-42

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

Not applicable.

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102250, consisting of the following is required to modify Portable Temperature Controller, P/N 2900060-011.

VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	0102115	Retrofit Instruction Bulletin
1	2901542	Lead set
1	1015982-007	Relay, armature
3	1N459	Diode (1896966-291)
2	1N3029B	Diode (1896966-069)
1	RC20GF301J	Resistor (1896952-036)
1	RC20GF431J	Resistor (1896952-040)
1	1016053-024	Resistor
1	1016053-029	Resistor
1	1004260-535	Nameplate
2	1016151-006	Nut, self locking
6	1015864-135	Sleeving, electrical insulation
1	1015864-137	Sleeving, electrical insulation
2	1015864-140	Sleeving, electrical insulation
1	1015864-163	Sleeving, electrical insulation
1	AN960 C6	Flat washer (1897006-026)
1	CL25BL700UP3	Capacitor (1897081-324)
2	1896962-003	Terminal stud
2	MS35233-12	Pan head screw
4	1006783-95	Button head screw
1	RW69V201	Resistor (1896929-068)
1	1015832-318	Relay
1	1897260-008	Resistor, variable
1	1N2976B	Diode (1896966-075)
1	2901555	Pin, straight, headed
1	2901556	Bracket, electronic component
1	2901586	Decal, Functional Area

VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
1	RC32GF271J	Resistor (1896953-049)
1	RC42GF750J	Resistor (1896951-022)
2	RC42GF121J	Resistor (1896951-027)
2	2901587	Bracket, batt. retainer cover
1	2901588-001	Pad, cushioning
2	2901588-002	Pad, cushioning

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in the retrofit kit are as follows:

Qty	Part Number	Description
AR	N/A	Clean lacquer
AR	N/A	Lacquer thinner
AR	N/A	Chemical film (MIL-C-5541A, type 1, grade B, class 2)
AR	N/A	Sealing and retaining compound (MIL-S-22473), grades C and H
AR	N/A	Black marking ink
AR	N/A	Black lacing tape (MIL-T-713B, Type P, class 2)
AR	N/A	Solder (QQ-S-571, SN60 WRAP)
1	Any hi-speed	Number 19 size twist drill
1	*Schwaab Stamp and Seal Co.Type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha-numerical
1	*Schwaab Stamp and Seal Co.Type AAG-0X	Rubber stamp, 1/12 inch, thirteen band, alpha-numerical
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/16 inch alpha-numerical
1	Buchanan MS3191-1	Crimping tool
1	Buchanan MS3191-20	Positioner
1	Bendix 11-7880-20	Extraction tool
1	Bendix 11-8107-20	Insertion tool
AR	1010748	Epoxy resin
AR	1010750	Curing agent
AR	1010749	Calcium carbonate filler

*or equivalent

VI. B. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
2	Single pole, single throw	switch
1	HP-428B	DC ammeter
2	Fluke 803B	Differential voltmeter
1	HP-412A Alternate:HP-410C	Voltohmmeter
2	General Radio 1432X Alternate:Rubicon 2015	Decade resistance box
1	Harrison Labs 808A	Power supply
1	Ohmite, 15 ohms, variable, 100 watts minimum	Resistor
AR	MIL-V-6894A unreduced	Varnish

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in Workmanship Standard AC-STD-1, dated 15 January, 1965.

3. Ink markings:

   a. Markings to be removed should be removed with lacquer thinner.

   b. New markings shall be covered with a coat of clear lacquer, after ink has dried.

4. During this modification, lacing may be cut as required to accomplish necessary work. Spot ties shall be added after all conductor rework has been completed.

5. Use heatsink device when unsoldering or soldering near semiconductors.

6. Where marking is specified, hand marking is acceptable.

7. When disassembling the PTC, reinstall loose hardware on major part to insure proper placement and usage of attached hardware upon reassembly. Discard the two nuts. Remove two brackets, P/N 2900510, fastened with two screws, P/N 1010630-13 and two nuts, P/N 1016151-004. Discard brackets, screws and nuts.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Remove top cover from PTC and set aside.

2. Remove six flat head screws, P/N 1010630-38, which secure panel assembly, P/N 2900835-011, to PTC case, P/N 2900525-011. Retain screws for later reassembly.

3. Carefully lift panel assembly out of PTC case and place along side of PTC case.

4. Remove five button head screws, P/N 1006783-22, which secure electronic component assembly, P/N 2900521-011, to bottom of PTC case. See figure 1. Retain screws for later reassembly.

5. Remove four button head screws, P/N 1006783-26, flat washers, P/N AN960-C8, and lock washers, P/N MS35338-80, which secure transformer T1 to bottom of PTC case. See figure 1. Retain all hardware for later reassembly.

6. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure capacitor C3 to side of PTC case. See figure 1. Retain screws and nuts for later reassembly.

VII. B. PROCEDURE (CONTINUED)

7. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and two button head screws, P/N 1006783-22 with self locking nuts, P/N 1012525-004.

8. Disconnect lead A11 from positive terminal on BT1 and lead A82 from negative terminal on BT8. Temporarily insulate leads A11 and A82 with electrical tape.

9. Reinstall battery retainer cover on battery retainer with original two flat head screws and retain the two button head screws for later installation.

10. Remove two button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure lower edge of TB2 to PTC case. See figure 1. Retain all hardware for later reassembly.

11. Remove two button head screws, P/N 1006783-104, four self locking nuts, P/N 1012525-004, and two spacers, P/N 1015860-026, which secure upper edge of TB2 and two cable clamps to PTC case. See figure 1. Retain all hardware for later reassembly.

12. Remove one button head screw, P/N 1006783-104, two self locking nuts, P/N 1012525-004, and one spacer, P/N 2025860-026, which secure cable clamp and TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

VII. B. PROCEDURE (CONTINUED)

13. Remove three button head screws, P/N 1006783-23, self locking nuts, P/N 1012525-004, and spacers, P/N 1015860-026, which secure TB1 to PTC case. See figure 1. Retain all hardware for later reassembly.

14. Remove one button head screw, P/N 1006783-23, and two self locking nuts, P/N 1012525-004, which secure one cable clamp and electronic component bracket, P/N 2900795, (containing AR1 through AR4) to PTC case. See figure 1. Retain all hardware for later reassembly.

15. Remove two button head screws, P/N 1006783-22, and self locking nuts, P/N 1012525-004, which secure electronic component bracket, P/N 2900795, to PTC case. See figure 1. Retain all hardware for later reassembly.

16. Remove four button head screws, P/N 1006783-22, which secure relay assembly to PTC case. See figure 1. Retain screws for later reassembly.

17. Remove one button head screw, P/N 1006783-26, and lock washer, P/N MS35338-80, which secure relay assembly to nut sleeve, P/N 2900512-001, and electronic component assembly, P/N 2900521-011.

VII. B. PROCEDURE (CONTINUED)

18. Remove two button head screws, P/N 1006783-23, which secure two sections of each retainer strap on capacitor C3. Remove top section of each retainer strap to permit removal of C3. Retain screws and retainer straps for later reassembly.

19. Remove two button head screws, P/N 1006783-047, spacers, P/N 1015860-017, and self locking nuts, P/N 1016151-010, which secure bell assembly to PTC case. Retain all hardware for later reassembly.

20. Carefully remove wiring harness A, loose parts and assemblies from PTC case and place of workbench.

    a. Remove battery retainer cover, P/N 2900511, by removing two flat head screws, P/N 1010630-13, and retain the screws for later installation.

    b. Connect a 15 ohm variable resistor with an ammeter in series between BT1-(+) and BT8-(-) and proceed with the following steps.

        1) Discharge the battery at a 2.0 ± 0.1 ampere rate.

        2) Monitor individual module voltages; they shall not drop below 3.0 volts, during the first 30 minutes.

VII. B. PROCEDURE (CONTINUED)

        3) Decrease discharge current to 100 ma by increasing resistance when total voltage drops below 18 volts or when voltage for individual module drops below 1.8 volts, whichever occurs first. When any module drops to zero volts either short out module or remove it and continue until all modules are discharged.

        4) Recharge at the rate of 100 ma to a cutoff voltage of 4.65 ± 0.05 volts/module, removing each module from the circuit as it attains its cutoff value.

        5) If the 1/2 hour minimum was not obtained in step 2) above, repeat steps 1 through 4.

    c. Install two brackets, P/N 2901587 from kit using two button head screws retained in step B.7.

    d. Remove three screws, P/N 1006783-26 and three washers, P/N MS35338-80 from battery retainer bracket, P/N 2900508. Obtain two cushioning pads from kit, P/N 2901588-002 and place one at each end of the battery (use only one pad if there is insufficient room for both) and reinstall retainer bracket. Secure bracket using only two screws and washers, leaving the hole vacant directly under the amplifier bracket, P/N 2900795. Discard one screw and one washer.

    e. Reinstall battery retainer cover with original flat head screws.

VII. B. PROCEDURE (CONTINUED)

21. Visually check rotary switch S1 to determine if detent disc has "U" or "V" type notches in its periphery. See figures 2 and 3. If detent disc has "V" type notches, obtain straight headed pin, P/N 2901555, from kit and dispose of as directed in section IX of this RIB, and then proceed to step 22. If detent disc has "U" type notches, perform the following:

    a. Remove rotary switch S1 from panel assembly. Retain all parts.

VII. B. PROCEDURE (CONTINUED)

    b. Remove threaded spacer shown in figure 2 which is located adjacent to mid-point of roller arms as follows:

        1) Remove flat head screw which secures threaded spacer to square top plate. Retain screw.

        2) Loosen other screw from bottom of switch assembly and pull out only far enough to enable removal of threaded spacer. Remove and retain threaded spacer.

    c. Disconnect spring from end of roller arms.

    d. Swing roller arms out and away from switch assembly.

    e. Press roller pin out of detent roller and replace with straight headed pin, P/N 2901555, supplied in kit. New pin shall be installed such that head of pin will be nearest to square top plate. Dispose of removed roller pin as directed in section IX of this RIB.

    f. Reconnect spring to roller arms.

    g. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws removed previously from threaded spacer.

VII. B. PROCEDURE (CONTINUED)

h. Insert threaded spacer in original position on switch assembly and thread screw from bottom of switch assembly into threaded spacer.

i. Reinstall flat head screw through square top plate into threaded spacer.

j. Reinstall switch assembly on panel assembly.

22. Remove resistor soldered between terminals 2 and 3 on fuseholder XF1. See figure 4. Dispose of resistor as directed in section IX of this RIB.

23. Replace resistor R16 with resistor 1897260-008, and replace all wires on the same respective terminals (see table 1). Dispose of R16 as directed in section IX of this RIB.

a. Obtain the decal, P/N 2901586 from the kit; remove the paper from the gummed back of the decal; and place it over the "135°" label on the 135° temperature calibration switch.

b. Apply a bead of varnish (MIL-V-6894A unreduced) over the decal.

c. Remove the number 2900501 from the panel and replace it with 2901585.

VII. B. PROCEDURE (CONTINUED)

24. Remove "-011" portion of identification mark "ASSY 2900835-011" on panel assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

25. Remove all leads from relay K4, P/N 1015802-004.

26. Remove relay K4 from relay assembly and dispose of as directed in section IX of this RIB.

27. Replace relay K4 with relay, 1015832-318, and replace all wires on respective terminals. (See table 2).

28. Replace diode CR7 with 1N2976B (1896966-075), being careful to connect the cathode and anode in the same manner that they were for CR7. (See table 2). Dispose of CR7 as directed in section IX of this RIB.

29. Remove "-011" portion of identification mark "ASSY 2900777-011" on relay assembly and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

30. Locate, mark and drill one 0.164 to 0.172 inch diameter through hole in electronic component assembly, P/N 2900521-011, as shown in figure 5. Use number 19 size twist drill to drill hole.

31. Apply MIL-C-5541 chemical film to bare metal on inner surface of newly drilled hole.

VII. B. PROCEDURE (CONTINUED)

32. Mark "K18" on electronic component assembly in location shown in figure 5. Use 1/8 inch high character rubber stamp and black marking ink for new marking.

33. Remove identification mark "2900505" on electronic component assembly and replace with identification mark "2901544". New marking shall be per MIL-STD-130 (ES267).

34. Remove "-011" portion of identification mark "ASSY 2900521-011" and replace with new dash number "-021". New marking shall be per MIL-STD-130; (ES267)

NOTE: When performing next step, insure that relay is positioned such that the shoulder on the relay stud which will protrude through the larger of two holes, sufficiently grips the bracket material. Improper relay positioning will cause the shoulder to be drawn into the hole when the self-locking nuts are tightened.

35. Obtain relay, P/N 1015982-007, two self locking nuts, P/N 1016161-006, and one flat washer, P/N AN960 C6, from kit and secure to electronic component assembly as shown in figure 6.

36. Stamp "CR30" between terminals 3 and 10 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

VII. B. PROCEDURE (CONTINUED)

37. Stamp "CR31" between terminals 3 and 11 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

38. Stamp "R63" between terminals 20 and 25 on TB2 as shown in figure 7. Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

39. Obtain two 1N459 diodes from kit and install one between terminals 3 and 10 and the other between terminals 3 and 11 on TB2, as shown in figure 7. Observe proper anode and cathode connections as shown in figure 7.

40. Obtain resistor, P/N RC20GF431J, from kit and install between terminals 20 and 25 on TB2 as shown in figure 7.

41. Remove resistors as follows:

a. Remove resistor R53, P/N RC32GF510J, located between terminals 26 and 34 on TB2.

b. Remove resistor R57, P/N RC32GF510J, located between terminals 27 and 35 on TB2.

c. Remove resistor R56, P/N RC42GF510J, located between terminals 23 and 36 on TB2.

VII. B. PROCEDURE (CONTINUED)

d. Remove resistor R11, P/N RC32GF101J, located between terminals 28 and 37 on TB2.

e. Remove resistor R25, P/N RC32GF101J, located between terminals 28 and 38 on TB2.

f. Dispose of resistors as directed in section IX of this RIB.

42. Obtain and install the following resistors:

a. Resistor RC42GF121J install between terminals 26 and 34 on TB2.

b. Resistor RC42GF121J install between terminals 27 and 35 on TB2.

c. Resistor RC42GF750J install between terminals 23 and 36 on TB2.

d. Resistor RC20GF301J install between terminals 28 and 37 on TB2.

e. Resistor RC32GF271J install between terminals 28 and 38 on TB2.

43. Using care not to damage sleeving on resistor R10 remove resistor R10, P/N 1016053-003, from between terminals 50 and 58 on TB2. Retain two insulation sleeves from R10 and dispose of R10 as directed in section IX of this RIB.

VII. B. PROCEDURE (CONTINUED)

44. Obtain resistor, P/N 1016053-029, from kit and install two sleeves, retained in step 43, on resistor leads. Solder resistor, between terminals 50 and 58 on TB2 as shown in figure 7.

45. Remove resistor R14, P/N RC42GF101J, from between terminals 19 and 30 on TB2. Retain insulation sleeve from R14 and dispose of R14 as directed in section IX of this RIB. Replace R61 with resistor P/N 1016053 -024, between terminals 5 and 14 on TB-2. Dispose of old R61 as directed in section IX of this RIB.

46. Obtain resistor, RW69V201 (1896929-068) from kit and install between terminals 19 and 30 on TB2. Mount resistor so that the body does not touch the terminal board. Reference figure 7.

47. Change wire A135 from terminal 18 to terminal 19 on TB2.

48. Remove diodes CR9 and CR10 which are identical, from terminals 18, 19, and 29 on TB2. Retain CR9 for later use and dispose of CR10 (P/N 1896966-187), as directed in section IX of this RIB. Delete letters CR9 and CR10 from TB2.

49. Remove "-011" portion of identification mark "ASSY 2900778-011" on TB2 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

VII. B. PROCEDURE (CONTINUED)

50. If terminal board (inseparable assembly) (TB2), is marked, P/N 2900519" re-identify as "P/N 2901545". Identification shall be in accordance with MIL-STD-130 (ES267).

51. Bond resistors R10 and R14 to terminal board TB2 per ND 1002203, using epoxy resin, P/N 1010748, curing agent, P/N 1010750, and calcium carbonate filter, P/N 1010749.

52. Remove 1N3030B diodes CR13 and CR14 from TB1-50, 56, and 58, and dispose of as directed in section IX of this RIB. Reference figure 8.

53. Obtain two 1N3029B diodes from kit and install one between terminals 50 and 56 and the other between terminals 50 and 58 on TB1, as shown in figure 8. Observe proper anode and cathode connections shown in figure 8.

54. Remove "-011" portion of identification mark "ASSY 2900513-011" on TB1 and replace with new dash number "-021". New marking shall be in accordance with MIL-STD-130 (ES267).

55. Obtain electronic component bracket, P/N 2901556, two terminal studs, P/N 1896962-003, and two pan head screws, P/N MS35233-12, from kit. Secure terminal studs to component bracket with pan head screws as shown in figure 9. Apply MIL-S-22473, grade C, sealing and retaining compound to threads of two screws prior to installing.

VII. B. PROCEDURE (CONTINUED)

56. Obtain capacitor, P/N CL25BL700UP3, from kit and install between E32 and E33 on electronic component bracket, P/N 2901556, as shown in figure 9. Insure positive lead of capacitor is connected to E32.

57. Remove four button head screws, P/N 1006783-18, flat washers, AN960 C4, and lock washers, P/N MS35338-78, which secure one side of comparators AR1 and AR2 to inner edge of electronic components bracket, P/N 2900795. (Removal of these four screws and associated washers will permit installation of new component bracket as shown in figure 9.) Retain all washers and dispose of four screws as directed in section IX of this RIB.

58. Secure electronic component bracket, P/N 2901556, to electronic component bracket, P/N 2900795, as shown in figure 9, using four button head screws, P/N 1006783-95, (supplied in kit) and washers retained in step 53.

59. Remove capacitor C4 from terminals 37 and 38 of TB3. Dispose of the capacitor as directed in section IX of this RIB. Retain the sleeving for later use.

60. Remove wire AA105 from terminals 47 and 31 of TB3.

VII. B. PROCEDURE (CONTINUED)

61. Move wire B32 of the B harness from terminal 47 to terminal 31 of TB3.

62. Move wire A82 of the A harness from terminal 47 to terminal 31 of TB3.

63. Move wire B36 of the B harness from terminal 38 to terminal 47 of TB3.

64. Remove the "C4" marking on electronic component assembly and replace it with "CR9". Marking shall be 1/12 inch high, black in color and in accordance with ND 1002019.

65. Install diode CR9 which was removed in step 51, between terminals 38 and 47 of TB3 with cathode end attached to terminal 47. Install sleeving removed in step 59.

66. Interchange wires AA18 and A34 on fuseholder XF2. (See table 2.)

67. Interchange wires AA22 and A35 on fuseholder XF3. (See table 2.)

68. Remove "-011" portion of identification "ASSY 2900522-011" and replace with new dash number "-021". New marking shall be per MIL-STD-130 (ES267).

VII. B. PROCEDURE (CONTINUED)

NOTE: If P/N 2901523 is marked on the inseparable assembly, the marking shall be removed and replaced with "P/N 2901583".

69. Remove jumper wire AA118 from between TB3-7 and TB3-9.

70. Change lead on diode CR27 from TB3-8 to TB3-7.

71. Change wire B7 from TB3-8 to TB3-7.

72. DELETED ~~Change wire A53 from TB3-15 to TB3-9.~~

73. Remove the "CR27" marking from the inseparable assembly and replace it with "CR10". Marking shall be 0.09 inch high per ND 1002019 and black in color.

74. Add diode CR10 (1N459) between TB3-15 and TB3-8 with the cathode at TB3-15. This is a new CR10 and is not to be confused with the one that was removed in step 29.

75. DELETED ~~Change wire A145 from TB3-9 to TB3-8.~~

VII. B. PROCEDURE (CONTINUED)

76. Completely remove leads listed in table 1. Do not remove any other leads which may be connected to the listed termination points in table 1.

Table 1. PTC Lead Deletions

Lead Ident.	From Ckt. Pt.	To Ckt. Pt.	Remarks
AA84	CR1-C	E1	
AA85	K1-4	E1	
AA119	TB3-14	TB3-15	
AA120	TB3-15	TB3-16	
A85	E17	TB3-9	
A122	TB2-37	K2-7	Previously removed from K2-7.
B3	TB3-9	K5-3	
B31	TB3-24	K2-3	Previously removed from K2-3.
B46	K2-2	K8-8	Previously removed from K2-2.
~~AA105~~	~~TB3-47~~	~~TB3-31~~	

VII. B. PROCEDURE (CONTINUED)

77. Revise lead connections as listed in table 2. Required accessory items are supplied in the kit.

Table 2. Revised/Reconnect PTC Lead Terminations

Lead Ident.	Removed From	Reconnect To	Strip Insul.	Tin	Accessoty Item P/N
AA73	E18	*E3	0.30	Yes	
B5	TB3-15	TB3-14	0.30	Yes	
B47	**K2-2	K8-8	0.30	Yes	1015864-140
A4	TB3-9	K5-3	0.30	Yes	1015864-140
A33	CR1-A	***E1	0.30	Yes	
A53	**K2-4	***TB3-9	0.30	Yes	
B36	TB3-38	TB3-47	0.30		
A135	TB2-18	TB2-19	0.30		
B29	K4-1	K4-1	0.30		
A136	K4-4	K4-4	0.30		
B50	K4-5	K4-5	0.30		
B51	K4-5	K4-5	0.30		
AA140	K4-6	K4-6	0.30		
A34	XF2-2	XF2-1	0.30		
AA18	XF2-1	XF2-2	0.30		
A35	XF3-2	XF3-1	0.30		
AA22	XF3-1	XF3-2	0.30		
B4	CR7-A	CR7-A	0.30		
B30	CR7-C	CR7-C	0.30	Yes	

*One more lead (AA163) will be added to this point later.

**Lead was previously removed from this point.

***Two more leads (AA154 and AA156) will be added to this point later.

~~****One more lead (A144) will be added to this point later.~~

VII. B. PROCEDURE (CONTINUED)

78. Obtain new wire list AA leads and required accessory items from kit lead set and install as indicated in table 3. (Notes referenced in the remarks column of table 3 can be found at the end of the table.)

Table 3. Wire List AA Lead Additions

Lead Ident.	From Ckt. Pt.	To Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
AA154	E1		0.20	Yes		See note 1
		K18-2	0.20	Yes	1015864-135	
AA155	K18-5		0.20	Yes	1015864-135	
		K1-4	0.20	Yes	1015864-135	
AA156	E1		0.20	Yes		See note 2
		K18-3	0.20	Yes	1015864-135	See note 3
AA157	K18-6		0.20	Yes	1015864-135	
		E3	0.20	Yes		See note 4
AA158	CR1-A		0.20	Yes	1015864-137	See note 5
		E17	0.20	Yes		See note 6
AA159	TB2-11		0.20	Yes		
		TB2-37	0.20	Yes		
AA160	J1-J		0.20	No		See note 7
		S7SW2-NO	0.30	Yes		Combine with AA43
AA161	TB3-14		0.30	Yes		Combine with B6
		TB3-16	0.30	Yes		Combine with A86
AA162	J1-H		0.20	No		See note 7
		S1A-24	0.30	Yes		Combine with AA25
AA163	E18		0.30	Yes		See note 8
		E3	0.30	Yes		See note 9

VII. B. PROCEDURE (CONTINUED)

Table 3. Wire List AA Lead Additions (Continued)

Note 1 - One more lead (AA156) will be added to this point.
Note 2 - Solder on E1 with leads A33, A79, and AA154.
Note 3 - One more lead (A147) will be added to this point.
Note 4 - One more lead (AA163) will be added to this point.
Note 5 - One more lead (A150) will be added to this point.
Note 6 - Solder on E17 with leads AA66, AA68, and AA69.
Note 7 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 8 - Solder on E18 with leads A70 and A72.
Note 9 - Solder on E3 with leads AA73 and AA157.

79. Obtain new wiring harness A leads and required accessory items from kit lead set and install as indicated in table 4. (Notes referenced in the remarks column of table 4 can be found at the end of the table.)

VII. B. PROCEDURE (CONTINUED)

Table 4. Wiring Harness A Lead Additions

Lead Ident.	From Ckt. Pt.	To Ckt. Pt.	Strip Insul	Tin	Accessory Item P/N	Remarks
A144	K18-8		0.30	Yes	1015864-135	
		TB3-15	0.30	Yes		See note 1
A145	TB2-25		0.30	Yes		
		TB3-8	0.30	Yes		
A146	TB2-20		0.30	Yes		See note 2
		XF1-3	0.30	Yes		See note 3
A147	K18-3		0.30	Yes		Combine with AA156
		TB2-10	0.30	Yes		
A148	K18-7		0.30	Yes	1015864-135	
		TB2-3	0.30	Yes		
A149	K5-2		0.30	Yes		Combine with B5
		CR1-C	0.30	Yes	1015864-163	
A150	CR1-A		0.30	Yes		Combine with AA158
		K5-3	0.30	Yes		Combine with A4
A151	J2-C		0.20	No		See notes 4 and 5
		TB1-58	0.30	Yes		
A152	TB2-30		0.30	Yes		See note 6
		E32	0.30	Yes		
A153	TB2-53		0.30	Yes		See note 6
		E33	0.30	Yes		

Note 1 - Combine with leads A53 and B5 at this point.
Note 2 - Route lead along harness branch near TB3.
Note 3 - See figure 4 for terminal information.
Note 4 - Utilize existing contact in connector. Use Buchanan MS3191-1 crimping tool with Buchanan MS3191-20 positioner, Bendix 11-7880-20 extraction tool, and Bendix 11-8107-20 insertion tool.
Note 5 - Route lead along harness branch near TB2 and TB3.
Note 6 - Route lead along harness branch near TB1.

VII. B. PROCEDURE (CONTINUED)

80. Wrap and spot tie black lacing tape over terminal 3 on fuseholder XF1 (see figure 4) to secure the terminal to the body of the fuseholder. The wrapping should pass over terminal 1 and also cover a small portion of the lead attached to terminal 3.

81. Spot tie new and rerouted leads into applicable harness as necessary, using black lacing tape.

82. Remove identification band marked "2900654" from wiring harness A and replace with kit supplied identification band marked "2901546". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in section IX of this RIB.

83. Remove identification band marked "2900655" from wiring harness B and replace with kit supplied identification band marked "2901549". Secure new identification band in place with black lacing tape. Dispose of old identification band as indicated in Section IX of this RIB.

84. Transfer serial number from nameplate on PTC case to new nameplate supplied in kit. Use 1/16 inch high character metal stamp set to imprint data.

85. Remove nameplate from PTC case and dispose of as directed in section IX of this RIB. Retain four screws.

VII. B. PROCEDURE (CONTINUED)

86. Secure new nameplate to PTC case with four screws retained in preceeding step. Apply MIL-H-22473, grade H, sealing and retaining compound to threads of four screws prior to installation.

87. Carefully place wiring harness A, attached parts and assemblies into PTC case.

88. Secure bell assembly to PTC case in original position with hardware retained in step 19. Reference figure 1.

89. Secure capacitor C3 to PTC case in original position with hardware retained in steps 6 and 18. Reference figure 1.

90. Secure transformer T1 to PTC case in original position with hardware retained in step 5. Reference figure 1.

91. Secure electronics component assembly, P/N 2900521 -021, to PTC case in original position with hardware retained in step 4. Reference figure 1.

92. Secure electronic component bracket, P/N 2900795, to PTC case in original position with hardware retained in steps 14 and 15. Insure cable clamp is located above and between AR4 and AR3. Reference figure 1.

VII. B. PROCEDURE (CONTINUED)

93. Secure TB1 to PTC case in original position with hardware retained in step 13. Do not secure upper left corner (next to R13) to PTC case. Reference figure 1.

94. Install hardware retained in step 12 to upper left corner of TB1.

95. Secure two lower corners of TB2 to PTC case with hardware retained in step 10. Reference figure 1.

96. Install hardware retained in step 11 to two upper corners of TB2.

VII. B. PROCEDURE (CONTINUED)

97. Perform continuity and resistance checks per table 5.

Table 5. Continuity-Resistance Checks

From	To	Indication	Remarks
J1-J	J1-L	<1 OHM	All readings shall be less than 1 ohm
J2-C	TB1-58	↓	
J1-H	S1A-24	↓	
J1-B	J1-L	↓	

98. Using a razor blade and india ink, make the following changes to the decal on the inside of the PTC cover:

a. Change the schematic drawing number in the upper left-hand corner of the decal from 2900133 to 2901543.

b. Adjacent to the "28 VDC INPUT J1", change TEMP FAIL-ILTC to TEMP FAIL-LTC. Change POWER FAIL-ILTC to POWER FAIL-LTC. After M GROUND, add H BATT HI and J BATT LO.

c. Cover all new lettering with clear lacquer.

VII. PROCEDURE (CONTINUED)

C. RETEST PROCEDURES.

1. Recalibration of bridge excitation voltages.

NOTE: Relay assembly has to be swung up to make potentiometers accessable. Maintain isolation between assembly and case.

a. Make the test setup as indicated in figure 10.

b. Set control decade to 1560.0 ohms and the indicating decade to 2504.5 ohms.

NOTE: Apply only 28 ± 1 VDC power.

2. Control Bridge.

a. Set TEMP. ADJUST potentiometer to center position (11 turns from clockwise). See figure 1.

b. Connect differential voltmeter number 1 to TB2-56 (hi) and TB2-47 (lo).

c. Connect differential voltmeter number 2 to TB2-42 (hi) and TB2-12 (lo).

d. Adjust R33 and R35 on the relay assembly to obtain simultaneous voltages of 1.950 ± 0.020 VDC on differential voltmeter number 1 and 17.4 ± 0.174 VDC on meter number 2.

VII. C. PROCEDURE (CONTINUED)

3. Indicating Bridge.

   a. Connect differential voltmeter number 1 to TB2-52 (hi) and TB2-45 (lo).

   b. Connect differential voltmeter number 2 to TB2-39 (hi) and TB2-54 (lo).

   c. Adjust R18 and R19 to obtain simultaneous voltages of 1.610 ± 0.016 VDC on voltmeter number 1 and 17.6 ± 0.176 VDC on voltmeter number 2.

   d. Turn selector switch on the panel assembly to OFF.

4. Recalibration of battery cutoff voltage.

   a. Remove electrical tape from lead A11 and connect to the high side of the voltohmmeter with the low side connected to TP2. Remove the electrical tape from lead A82 and connect it to the negative terminal on BT8, after removing the battery cover by removing two flat head screws.
   b. Turn R16 full clockwise. Turn the selector switch to ON.

   c. Apply 36.8 ± 0.1 VDC to TB2-19 high and TP2 low.

VII. C. PROCEDURE (CONTINUED)

   d. Slowly turn R16 counterclockwise until VTVM voltage drops to 28V source voltage. Decrease cutoff supply voltage from 36.8 to approximately 30 volts and momentarily remove the supply voltage.

   e. Slowly increase the cutoff supply voltage and varify that the switchover point is 36.8 ± 0.1 VDC. Adjust R16 and repeat these procedures if necessary.

   f. Remove the cutoff supply voltage; set the selector switch to OFF. Connect lead A11 to the positive terminal of BT1. Apply 115 VAC at J2-M and J2-J. Turn selector switch to ON. Monitor current through A11 with clip-on ammeter. Verify that the charging current drops to zero at a battery terminal voltage at J1-H high and J1-J low of 36.7 ± 0.3 VDC and that individual module (8) voltages do not exceed 4.75 VDC.

   g. Set selector switch to OFF. Obtain cushioning pad, P/N 2901588-001 from kit and place on battery. Reinstall the battery retainer cover on battery retainer with original two flat head screws.

VII. C. PROCEDURE (CONTINUED)

   h. Secure relay assembly to PTC case in original position with hardware retained in step 16. Reference figure 1.

   i. Secure relay assembly to nut sleeve located between relay assembly and electronic component assembly, P/N 2900521-021, with screw retained in step 17.

   j. Place panel assembly in original mounting position in PTC case and secure with six screws retained in step 2.

5. Recalibration of hot alarm set point.

   a. Set selector switch to ON. Set the HI ALARM LIMIT ADJUST potentiometer full clockwisw and monitor pins J3-A and J3-B.

   b. Set indicating decade box to 2225 ohms.

   c. Slowly turn the HI ALARM LIMIT ADJUST potentiomiter counterclockwise until continuity exists at J3-A and J3-B.

   d. Set the indicator decade box to 2500 and press ALARM INHIBITED (SYSTEM RESET) pushbutton to silence the bell and stop the flashing light.

VII. C. PROCEDURE (CONTINUED)

   e. Set the indicator decade box to 2240 ohms, and slowly decrease resistance in 1-ohm steps. Between 2230 and 2220 ohms the bell shall ring, the IMU HOT lamp shall flash, and continuity shall exist at J3-A and J3-B.

   f. Press and hold the ALARM INHIBITED (SYSTEM RESET) pushbutton for this paragraph. Slowly increase the resistance in 1-ohm steps. Before 2270 ohms, the IMU HOT lamp shall extinguish and continuity shall exist at J3-B and J3-C.

   g. Set indicator decade box at 2254.1 ohms. Set the selector to OFF for 5 seconds. Upon reapplication of power, the IMU HOT lamp shall not be flashing.

   h. Adjust HI TEMP ALARM ADJUST to meet conditions of steps e and g above if necessary.

   i. Set indicator decade box to 2201.3 ohms. The alarm bell shall ring, IMU HOT lamp shall flash, and the meter shall read 138.0 ± 0.5°F with or without the 138° CAL pushbutton depressed. Release the 138° CAL pushbutton and set the decade box to 2500 ohms. Return to normal operation by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

VII. C. PROCEDURE (CONTINUED)

5. Temperature Alarm Memory

a. With the 125° CAL pushbutton held in the depressed position, the bell shall ring and the IMU COLD lamp shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release the 125° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU COLD light shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

b. With the 138° CAL pushbutton held in the depressed position, the bell shall ring and the IMU HOT lamp shall flash. Press ALARM INHIBITED (SYSTEM RESET) pushbutton. Release 138° CAL pushbutton and remove input power for 5 seconds. When power is restored the IMU HOT ligh shall be flashing. Reset the system by pressing the ALARM INHIBITED (SYSTEM RESET) pushbutton.

6. Power Output.

a. Apply 25.2 VDC and remove 115VAC. Inhibit the alarm or open the switch S2 for loss of 115VAC. Set the control decade box to 1530 ohms. Multiply the readings of the output ammeter and the output voltage. The results shall be 60 watts minimum.

VII. C. PROCEDURE (CONTINUED)

7. Indicating Bridge Failure.

a. Apply 115 VAC to J2-M and J2-J. Set control decade box so that PTC meter reads 1.5 ± 0.5 amperes. Jumper J2-C to TP4. IMU HOT and IMU COLD lamps shall flash, the alarm bell shall ring, and the PTC meter shall read 1.5 ± 0.5 amps. Remove jumper and reset system by pressing ALARM INHIBITED (SYSTEM RESET) pushbutton.

8. 28V Line Fuse Indication.

a. Remove the 28V fuse with holder. Bell shall ring and POWER FAIL lamp shall light. Reinsert holder without fuse. Lamp in holder shall light. Open switch S1. Bell shall stop ringing and POWER FAIL lamp shall go out, holder lamp shall continue to indicate. Reinsert fuse in fuseholder.

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record.

3. Record performance of the modification on the existing Unit History Record sheet (referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain the old Unit History Record sheet in the Acceptance Data Package.

B. Significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Portable Temperature Controller	2900060-011	2900060-021
Panel Assembly	2900835-011	2900835-021
Electronic Component Assembly	2900521-011	2900521-021
Electronic Components Heatsink (Inseparable Assembly)	2900505	2901544

VIII. B. MODIFICATION DESIGNATION (CONTINUED)

Name	Pre-modification P/N	Post-modification P/N
Relay Assembly	2900777-011	2900777-021
Electronic Components Assembly	2900513-011	2900513-021
Electronic Components Assembly	2900778-011	2900778-021
Terminal Board (Inseparable Assembly)	2900519	2901545
Terminal Board (Inseparable Assembly)	2900523	2901583
Wiring Harness A	2900654	2901546
Wiring Harness B	2900655	2901549
Lead Set AA	2900656	2901550
Electronic Components Assembly	2900522-011	2900522-021

IX. DISPOSITION OF PARTS REMOVED

A. Send relay (K2), P/N 1015802-004, to AC Electronics, Logistics Department, bondroom. Logistics shall utilize this item as a spare.

B. Transfer the following items to full custody of the government via DD543 form (Inventory Schedule).

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IX. B. DISPOSITION OF PARTS REMOVED (CONTINUED)

Qty	Part Number	Description
2	1N3030B	Semiconductor (1896966-070) (formerly CR13 and CR14)
1	1016053-003	Resistor (formerly R10)
1	1897260-005	Resistor (formerly R16)
1	RC32GF101J	Resistor (1896953-039) (formerly R11)
1	RC42GF101J	Resistor (1896951-025) (formerly R14)
1	Not assigned	Resistor, 420 ohm (formerly attached to XF1)
1	1016053-001	Resistor, (formerly R61)
1	1015832-312	Relay, (formerly K4)
2	RC32GF510J	Resistor (1896953-032) (formerly R53 and R57)
1	RC42GF510J	Resistor (1896951-018) (formerly R56)
1	RC32GF101J	Resistor (1896953-029) (formerly R25)

C. Scrap all other items via AC Electronics form MIL-127 or equivalent.

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TDRR
Revision B

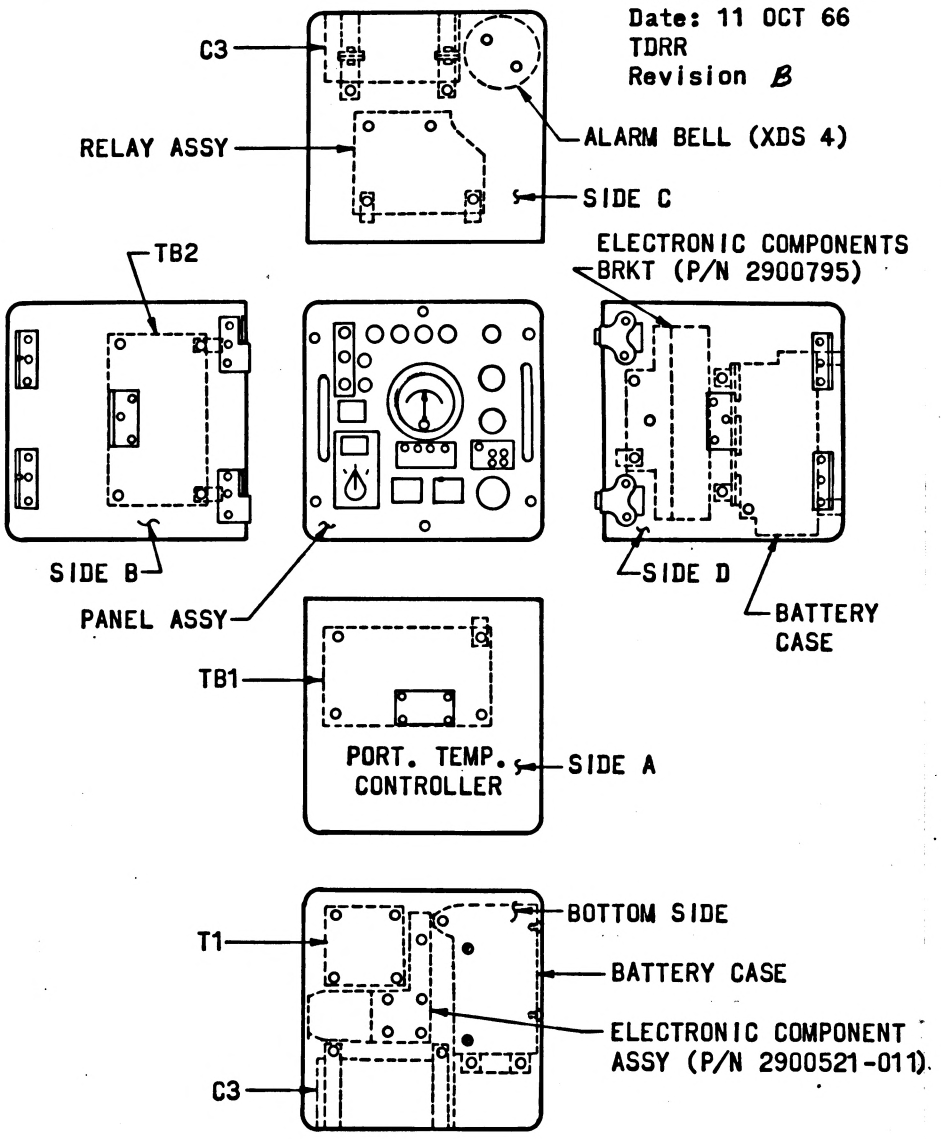
C3
RELAY ASSY
ALARM BELL (XDS 4)
SIDE C
ELECTRONIC COMPONENTS BRKT (P/N 2900795)
TB2
SIDE B
PANEL ASSY
SIDE D
BATTERY CASE
TB1
PORT. TEMP. CONTROLLER
SIDE A
T1
BOTTOM SIDE
BATTERY CASE
ELECTRONIC COMPONENT ASSY (P/N 2900521-011)
C3

Figure 1. LOWER SECTION OF PTC (SIMPLIFIED VIEWS)

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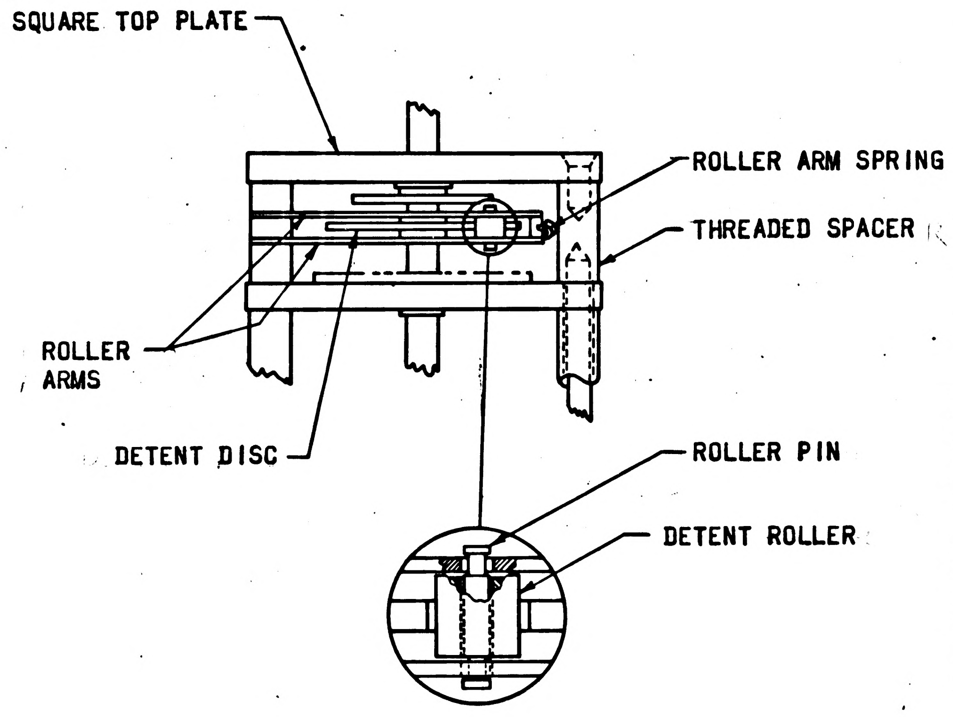
SQUARE TOP PLATE
ROLLER ARM SPRING
THREADED SPACER
ROLLER ARMS
DETENT DISC
ROLLER PIN
DETENT ROLLER

Figure 2. ROTARY SWITCH WITH "U" NOTCH TYPE DETENT DISC BEFORE MODIFICATION (SIMPLIFIED PARTIAL VIEW)

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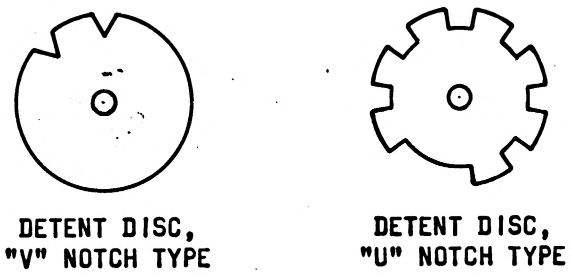
DETENT DISC, "V" NOTCH TYPE
DETENT DISC, "U" NOTCH TYPE

Figure 3. DETENT DISC TYPES

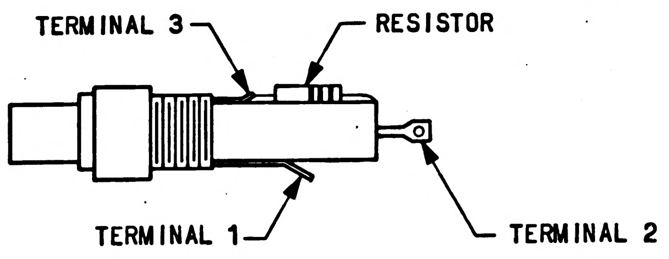
TERMINAL 3
RESISTOR
TERMINAL 1
TERMINAL 2

Figure 4. FUSEHOLDER TERMINALS

DIMENSION TOLERANCES
2 Place Decimal ±.02
3 Place Decimal ±.005

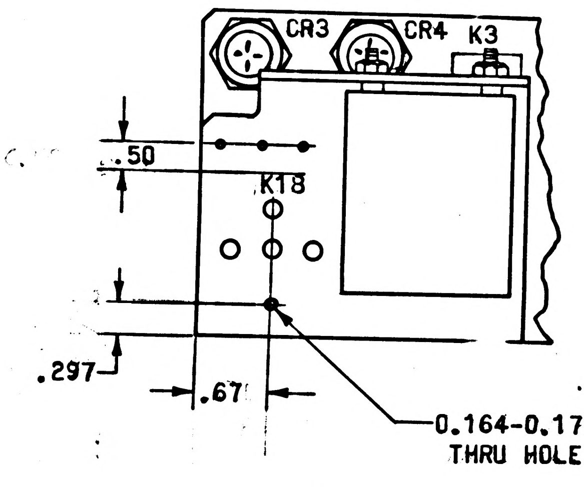
CR3
CR4
K3
K18
.50
.297
.67
0.164-0.172 DIA
THRU HOLE

Figure 5. NEW HOLE IN ELECTRONIC COMPONENT ASSEMBLY, P/N 2900521-011

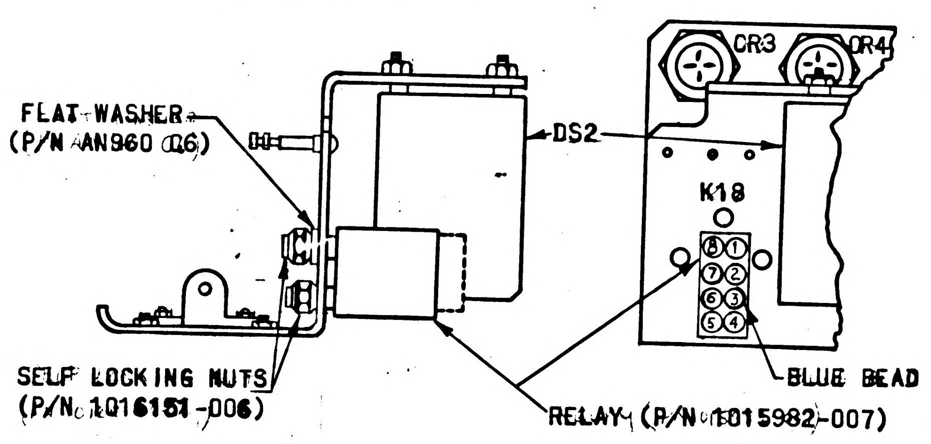
FLAT WASHER
(P/N AN960 C6)
DS2
CR3
CR4
K18
BLUE BEAD
SELF LOCKING NUTS
(P/N 1016151-006)
RELAY (P/N 1015982-007)

Figure 6. NEW RELAY K18 IN MOUNTED POSITION

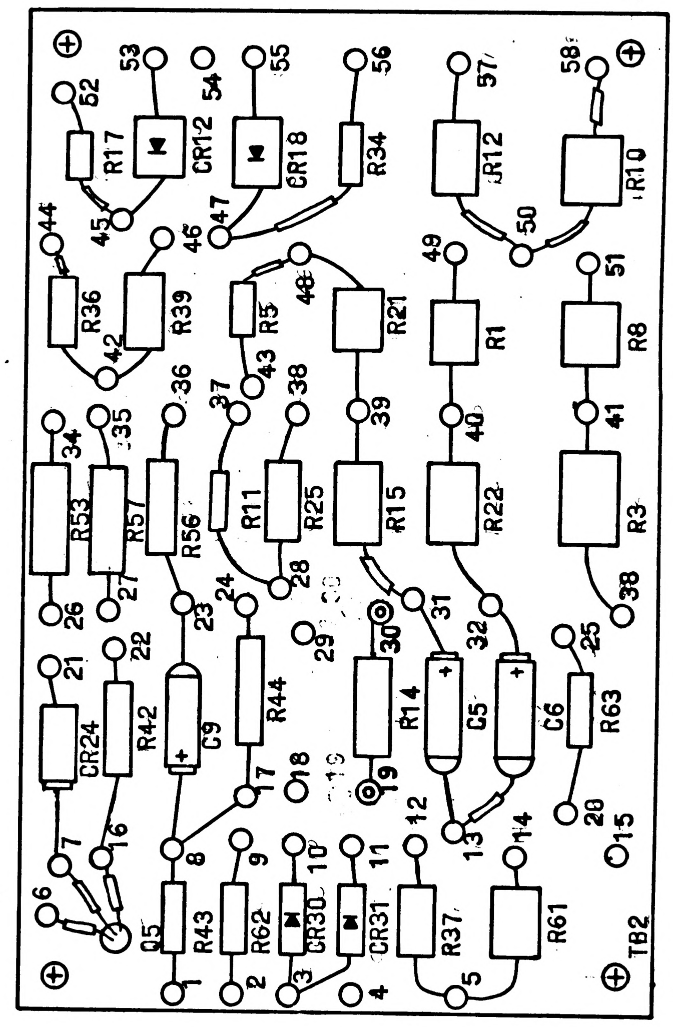
TB2
R17
CR12
CR18
R34
R12
R10
R36
R39
R5
R21
R1
R8
R53
R57
R56
R11
R25
R15
R22
R3
CR24
R42
C9
R44
R14
C5
C6
R63
R43
R62
CR30
CR31
R37
R61

Figure 7. ELECTRICAL COMPONENTS ASSEMBLY (TB2) AFTER MODIFICATION

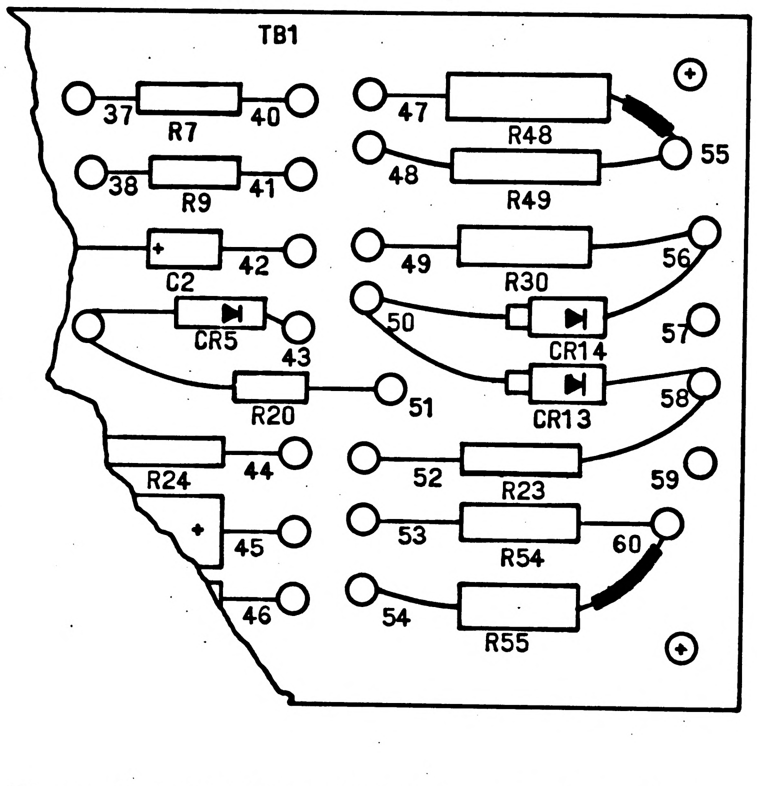
TB1
R7
R9
C2
CR5
R20
R24
R48
R49
R30
CR14
CR13
R23
R54
R55

Figure 8. ELECTRICAL COMPONENTS ASSEMBLY (TB1) AFTER MODIFICATION

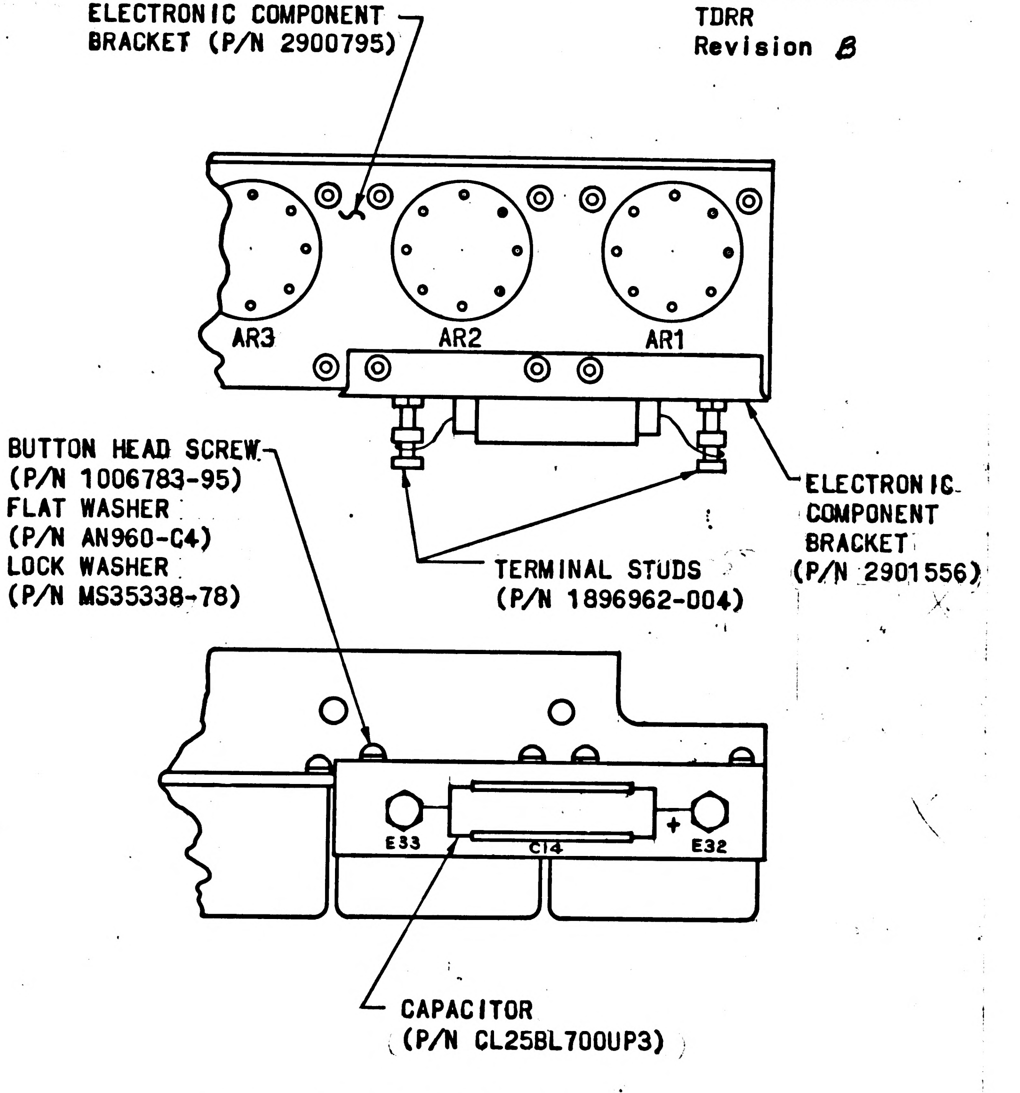
ELECTRONIC COMPONENT
BRACKET (P/N 2900795)
AR3
AR2
AR1
BUTTON HEAD SCREW
(P/N 1006783-95)
FLAT WASHER
(P/N AN960-C4)
LOCK WASHER
(P/N MS35338-78)
TERMINAL STUDS
(P/N 1896962-004)
ELECTRONIC
COMPONENT
BRACKET
(P/N 2901556)
E33
C14
E32
CAPACITOR
(P/N CL25BL700UP3)

Figure 9. NEW COMPONENT BRACKET

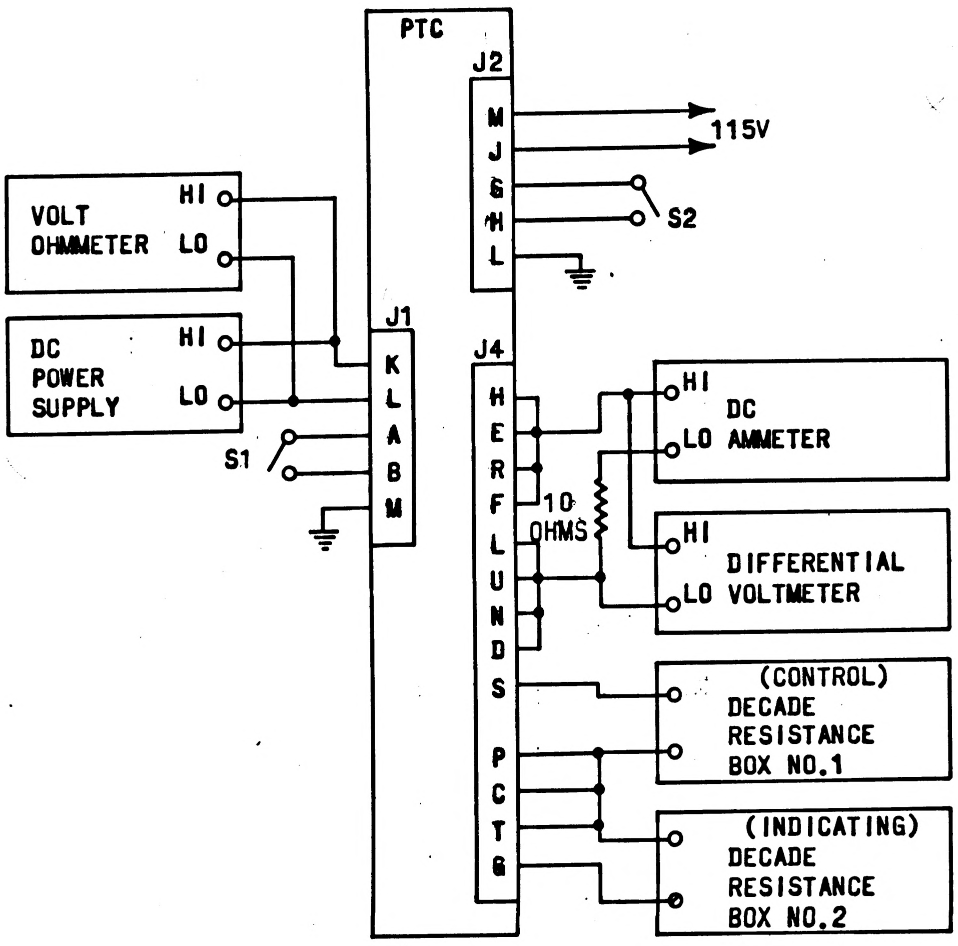
PTC
J2
M
J
G
H
L
115V
S2
VOLT OHMMETER
HI
LO
DC POWER SUPPLY
HI
LO
J1
K
L
A
B
M
S1
J4
H
E
R
F
L
U
N
D
S
P
C
T
G
10 OHMS
HI
DC
LO AMMETER
HI
DIFFERENTIAL
LO VOLTMETER
(CONTROL)
DECADE
RESISTANCE
BOX NO.1
(INDICATING)
DECADE
RESISTANCE
BOX NO.2

Figure 10. TEST SETUP

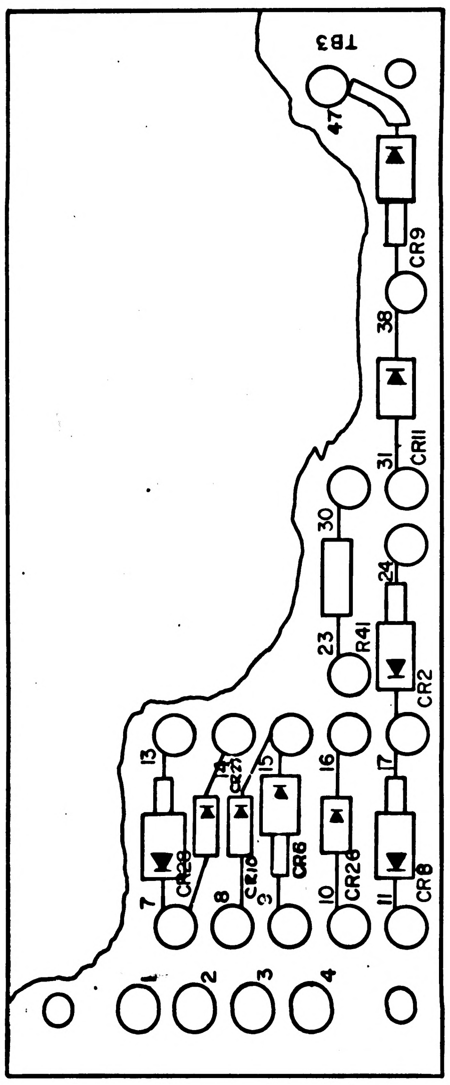
TB3
47
CR9
38
CR11
31
30
24
23
R41
CR2
17
16
15
14
13
CR27
CR28
CR10
CR6
CR26
CR8
7
8
3
10
11
1
2
3
4

Figure 11. ELECTRICAL COMPONENTS ASSEMBLY (TB3)
AFTER MODIFICATION

Sheet 1 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR 32123
Revision A

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR OPTICS INERTIAL ANALYZER, P/N 2900023-031

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CCB	NASA	
A	32123	ALL INITIAL RELEASE		—	11/28/66

Prepared by ________ Date 18 July 1966
P.C. Engineering Approval ________ Date 8/29/66
Design Review Board Approval ________ Date 10-14-66
MIT/IL Approval ________ Date ________
NASA Approval ________ Date 11/22/66
MIT Reliability ________ Date ________

Sheet 2 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR
Revision A

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to define the modification and retest procedures which must be performed to retrofit the Optics Inertial Analyzer (OIA), P/N 2900023-031.

II. AUTHORITY

NAS 9-497 SA42
This retrofit is authorized by Marriage Kit 3.

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Optics Inertial Analyzer	2900023-031	2900023-041

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

RIB 0102116 and RIB 0102123

Sheet 3 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR
Revision A

VI. MATERIAL REQUIRED

A. One retrofit kit, P/N 8102251, consisting of the following items is required to accomplish this modification.

Qty	Part Number	Description
1	8102254	Retrofit Kit for Test Selector Assembly, P/N 2900028-021
1	0102119	Retrofit Instruction Bulletin
1	1004260-536	Nameplate
1	8102257	Retrofit Kit for Monitor Panel Assembly, P/N 2900031-031

B. Materials and special tools required but not supplied in the retrofit kit are referenced in RIB 0102116.

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to performing modification-retest of Optics Inertial Analyzer (OIA).
2. All workmanship shall meet the requirements defined in Workmanship Standard AC-STD-1, dated 15 January 1965.

Sheet 4 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR
Revision A

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS.

1. Remove Test Selector Assembly, P/N 2900028-021, and Monitor Panel Assembly, P/N 2900031-031, from OIA, using standard removal procedures.
2. Modify removed Test Selector Assembly as directed in RIB 0102116, using retrofit kit P/N 8102254.
3. Modify removed Monitor Panel Assembly as directed in RIB 0102123, using retrofit kit P/N 8102257.
4. Reinstall modified Test Selector Assembly and Monitor Panel Assembly, using standard reinstallation procedures.
5. Transfer serial number from old nameplate to new nameplate, P/N 1004260-536, supplied in kit. Use metal stamp set with 1/8 inch numerals and letters for imprinting data.
6. Carefully remove four screws securing old nameplate to OIA cabinet. Retain screws.
7. Install new nameplate, P/N 1004260-536, in same location as nameplate removed in step 6. Secure with screws retained in step 6.
8. Retest OIA in accordance with retest procedures referenced in detailed RIB.

VIII. MODIFICATION DESIGNATION

A. The following part number changes resulted from this modification

Pre-modification P/N	Item Name	Post-modification P/N
2900023-031	Optics Inertial Analyzer	2900023-041
2900028-021	Test Selector Assembly	2900028-031
2900031-031	Monitor Panel Assembly	2900031-041

B. Update the Acceptance Data Package as follows:

1. Insert Kit Acceptance Data List into Unit Acceptance Data List.

2. Make necessary entry into Equipment Inventory Record.

3. Record modification in existing Unit History Record, denoting this RIB.

4. Start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed OIA nameplate via AC Electronics from MIL-127 or equivalent.

Sheet 1 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR 32123
Revision B

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR OPTICS INERTIAL ANALYZER, P/N 2900023-031

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CCB [redacted]	NASA	
A	32123	ALL INITIAL RELEASE		—	11/18/66
B	32961	ALL			14 FEB 67 ems

Prepared by D Lund Date 18 July 1966
P.C. Engineering Approval Date 8/29/66
Design Review Board Approval Date 10-14-66
MIT/IL Approval Date
NASA Approval Date 11/22/66
MIT Reliability Date

Sheet 2 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR
Revision B

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to define the modification and retest procedures which must be performed to retrofit the Optics Inertial Analyzer (OIA), P/N 2900023-031.

II. AUTHORITY

NAS 9-497 SA42

This retrofit is authorized by Marriage Kit 3.

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Optics Inertial Analyzer	2900023-031	2900023-041

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

RIB 0102116 and RIB 0102123 and RIB 0102131

Sheet 3 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR
Revision B

VI. MATERIAL REQUIRED

A. One retrofit kit, P/N 8102251, consisting of the following items is required to accomplish this modification.

Qty	Part Number	Description
1	8102254	Retrofit Kit for Test Selector Assembly, P/N 2900028-021
1	0102119	Retrofit Instruction Bulletin
1	1004260-536	Nameplate
1	8102257	Retrofit Kit for Monitor Panel Assembly, P/N 2900031-031
1	8102268	Retrofit Kit for Gyro Caging Electronics Assembly, P/N 2900029-021

B. Materials and special tools required but not supplied in the retrofit kit are referenced in RIB 0102116.

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to performing modification-retest of Optics Inertial Analyzer (OIA).

2. All workmanship shall meet the requirements defined in Workmanship Standard AC-STD-1, dated 15 January 1965.

Sheet 4 of 5
Part No. 0102119
Date: 14 JUL 66
TDRR
Revision B

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS.

1. Remove Test Selector Assembly, P/N 2900028-021, Monitor Panel Assembly, P/N 2900031-021, and Gyro Caging Electronics Assembly, P/N 2900029-021. from OIA, using standard removal procedures.

2. Modify removed Test Selector Assembly as directed in RIB 0102116, using retrofit kit P/N 8102254.

3. Modify removed Monitor Panel Assembly as directed in RIB 0102123, using retrofit kit P/N 8102257.

3A. Modify removed gyro caging electronics assembly as directed in RIB 0102131, using Retrofit Kit P/N 8102268.

4. Reinstall modified Test Selector Assembly, Monitor Panel Assembly, and Gyro Caging Electronics Assembly, using standard reinstallation procedures.

5. Transfer serial number from old nameplate to new nameplate, P/N 1004260-536, supplied in kit. Use metal stamp set with 1/8 inch numerals and letters for imprinting data.

6. Carefully remove four screws securing old nameplate to OIA cabinet. Retain screws.

7. Install new nameplate, P/N 1004260-536, in same location as nameplate removed in step 6. Secure with screws retained in step 6.

8. Retest OIA in accordance with retest procedures referenced in detailed RIB.

VIII. MODIFICATION DESIGNATION

A. The following part number changes resulted from this modification

Pre-modification P/N	Item Name	Post-modification P/N
2900023-031	Optics Inertial Analyzer	2900023-041
2900028-021	Test Selector Assembly	2900028-031
2900031-031	Monitor Panel Assembly	2900031-041
2900029-021	Gyro Caging Electronics Assy	2900029-031

B. Update the Acceptance Data Package as follows:

1. Insert Kit Acceptance Data List into Unit Acceptance Data List.

2. Make necessary entry into Equipment Inventory Record.

3. Record modification in existing Unit History Record, denoting this RIB.

4. Start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed OIA nameplate via AC Electronics from MIL-127 or equivalent.

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR INTERCONNECT CABLE SET, (SPECIAL BLK II) P/N 2900712-031

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CCB	NASA	
A	32123	ALL INITIAL RELEASE		—	11/29/66
B	33273	ALL			27 MAR 67 ems

Prepared by Konrad K Konietzke Date 28 July 1966

P.C. Engineering Approval Date 8/29/66

Design Review Board Approval Date 10-14-66

MIT/IL Approval Date

NASA Approval Date 11/22/66

MIT Reliability Date

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Interconnect Cable Set, P/N 2900712-031. A switch of YAW and ROLL CDU attitude error signals in Blk II G/N harness requires a similar change in the GSE cable. Additional changes are also being made to the cable set to ruggedize the cable connectors.

II. AUTHORITY

The retrofit is authorized by Marriage Kit 3.

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Interconnect Cable Set (Special Blk II)	2900712-031	2900712-041
Cable Assembly W154	2901469	2901566
Cable Assembly W148	2901212	2901212
Cable Assembly W149	2901485	2901485
Cable Assembly W152	2900659	2900659
Cable Assembly W156	2900663	2900663
Cable Assembly W158	2900664	2900664

IV. PRIORITY CHANGES

Not applicable

V. RELATED CHANGES

Not applicable

VI. MATERIAL REQUIRED

A. Retrofit Kit, P/N 8102258 consisting of the following items is required to accomplish this modification;

Qty	Part Number	Description
1	0102122	Retrofit Instruction Bulletin
1	8102259	Retrofit kit for cable assembly W154, P/N 2901469
32	MS171433	Pin
32	1897324-002	Washer, Flat
2	2901591-007	Clamp, Movable
4	2901591-004	Clamp, Movable
2	2901591-003	Clamp, Movable
2	2901591-002	Clamp, Movable
2	2901591-001	Clamp, Movable
2	2901590-007	Gasket
4	2901590-004	Gasket
2	2901590-003	Gasket
2	2901590-002	Gasket
2	2901590-001	Gasket

VI. MATERIAL REQUIRED (CONTINUED)

B. Retrofit Kit, P/N 8102259, consisting of the following items is required to modify cable assembly W154, P/N 2901469:

Qty	Part Number	Description
1	0102122	Retrofit Instruction Bulletin
1	1016128-011	Identification band

C. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	MIL-T-713B	Lacing tape, type P, class 2, black
AR	N/A	Marking India ink
1	Schwaab Stamp & Seal Co., type AAG-0	Rubber stamp, 1/8 inch, 13 band alpha numerical
AR	N/A	Clear lacquer (MIL-L-73A)
1	Black & Decker, P/N 30	Drill, hand portable, electric
1	Cleveland Twist Drill Co, 52	No. 52 drill
AR	1006692-2	Tape, pressure sensitive
AR	1006458-004	Tape, lacing and tying
AR	MIL-I-631 Type F, Form T, Grade A, Black	Tape, filler (.020 thick and 5/8 inch wide)

VI. C. MATERIAL REQUIRED (CONTINUED)

Qty	Part Number	Description
AR	MIL-A-5092B, Type II	Adhesive, Rubber Base
1	ND1002151	Bonding Spec
AR	Snap-On Tools Corporation AW-1018K	Hex Key Set (Allen Wrenches)

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and completely understand RIB prior to attempting this modification.

2. All workmanship shall meet the requirements defined in AC Workmanship Standard AC-STD-1, dated 15 January 1965.

3. Ink Markings.

   a. New markings shall be covered with a coat of clear flat lacquer after ink has dried.

   b. New markings shall meet requirements of ND1002019.

VII. A. PROCEDURE (CONTINUED)

4. When marking is specified, hand marking is acceptable.

5. Lacing cut shall be replaced using black lacing tape, type P, Class 2, in accordance with MIL-T-713B.

6. Following are approved methods of which the required wire slack may be obtained when installing new clamp and gasket assemblies:

   NOTE: Two people are required to perform the following methods.

   NOTE: Use filler tape or adhesive tape to ensure that shoulder screws do not damage wire insulation during assembly.

VII. A. PROCEDURE (CONTINUED)

a. Without removing or disturbing existing tape or spot-ties, push wire bundle toward connector base (pull leads to gain as much available slack as possible). If required, trim zipper tubing to ensure that it will not restrict the shaping of the lead bundle entering the fixed clamp. Install new movable clamp and tighten until shoulder screws are seated (see Figure 3). Check to ensure that pins at connector are secured properly and wrap-posts are not bent, and that there is no strain or pressure between movable clamp and connector. Flex cable at rear of connector shell half and visually check to ensure no movement is transmitted through the movable clamp and observed between the clamp and connector base. If movement is transmitted through movable clamp, remove clamp, add filler tape, or adhesive tape, replace movable clamp and perform above check. Continue this procedure until desired results indicated above are obtained.

b. If required slack cannot be obtained without removing spot-ties and tape, proceed as follows:

   1) Remove existing spot-ties, filler tape and adhesive tape as required.

VII. A. PROCEDURE (CONTINUED)

   2) Push wire bundle(s) toward connector base until desired slack is obtained. It may be necessary to mark and remove upper two or three rows of pins, fold back, work slack first at lower tiers of wiring and then the upper, and then reinstall removed pins.

   3) After desired slack is obtained, install movable clamp (see Figure 3). Check to ensure that pins at connector are secured properly and wrap-posts are not bent, and that there is no strain or pressure between movable clamp and connector. Flex cable at rear of connector shell half and perform same check as in step "a".

   4) Add spot-ties and adhesive tape as required.

B. DETAILED PROCEDURES. Perform modification as follows:

1. Obtain and modify cable assembly W148, P/N 2901212, in accordance with paragraph D.

2. Obtain and modify cable assembly W149, P/N 2901485, in accordance with paragraph E.

3. Obtain and modify cable assembly W152, P/N 2900659, in accordance with paragraph F.

VII. B. PROCEDURE (CONTINUED)

4. Obtain and modify cable assembly W154, P/N 2901469, in accordance with paragraph G.

5. Obtain and modify cable assembly W156, P/N 2900663, in accordance with paragraph H.

6. Obtain and modify cable assembly W158, P/N 2900664, in accordance with paragraph I.

C. Externally Relieved Body Screw, P/N 2900676-002. Perform modification as follows:

1. Remove retaining ring, P/N MS16633-4015, from each screw.

2. Remove screws from connector block. Retain two (2) washers, P/N 1897324-002, from each screw assembly.

3. Locate and drill a 0.062 - 0.065 inch hole in each removed screw using a number 52 drill. Locate and drill hole per Figure 1.

4. Obtain flat washers, P/N 1897324-002, and pins, P/N MS171433, from retrofit kit, Obtain washers retained in step 2.

5. Install washer on screw and install screw through connector block. See Figure 2.

VII. C. PROCEDURE (CONTINUED)

6. Install two (2) washers per Figure 2.

7. Install pin through drilled hole. See Figure 2. Center pin.

D. Retrofit Cable Assembly W148, P/N 2901212, as follows:

1. Remove externally relieved body screws, P/N 2900676-002, and modify per VII.C, steps 1 through 3.

2. Place connector(s) on flat working surface with back shell half containing no rivets facing up.

3. Remove screws holding shell halves together. Remove screws holding shell half containing no rivets to connector base. Retain screws.

4. Remove shell half.

5. Remove internal movable clamp(s). Where more than one internal clamp exists, one may be left in place while working on the other. Retain shoulder screws.

6. Obtain movable clamps and gaskets from kit and bond gaskets to clamps per table 2 and figure 3. Use MIL-A-5092, Type II, adhesive per ND 1002151 for bonding instructions.

VII. D. PROCEDURE (CONTINUED)

NOTE: Careful visual inspection is required to perform step 7 correctly.

7. Place each new movable clamp in position in accordance with Figure 3. Press movable clamp into position and note effect on wiring to connector base. If any lateral pressure is evident, additional wire slack must be provided to ensure all slide-on sockets seat fully on wire-wrap posts in the connector base without bending. If additional slack is required, perform VII.A., step 6, before proceeding. Secure movable clamp using shoulder screw retained in step 5.

8. Secure wire bundle(s) in grommet(s) at rear of retained connector half-shell. Test fit removed half shell for proper fit. Use tape as required to obtain proper fit.

9. Perform continuity check of modified connectors per cable P/N drawings. (See table 2).

10. Reassemble removed half-shell using screws retained in step 3.

11. Install modified externally relieved body screws per VII.C, steps 4 through 7.

VII. D. PROCEDURE (CONTINUED)

12. Update applicable records per section VIII.

13. Dispose of removed parts per section IX.

E. Retrofit Cable Assembly W149, P/N 2901485, as follows:

1. Remove externally relieved body screws, P/N 2900676-002, and modify per VII.C, steps 1 through 3.

2. Place connector(s) on flat working surface with back shell half containing no rivets facing up.

3. Remove screws holding shell halves together. Remove screws holding shell half containing no rivets to connector base. Retain screws.

4. Remove shell half.

5. Remove internal movable clamp(s). Where more than one internal clamp exists, one may be left in place while working on the other. Retain shoulder screws.

6. Obtain movable clamps and gaskets from kit and bond gaskets to clamps per table 2 and figure 3. Use MIL-A-5092, type II, adhesive per ND 1002151 for bonding instructions.

VII. E. PROCEDURE (CONTINUED)

NOTE: Careful visual inspection is required to perform step 7 correctly.

7. Place each new movable clamp in position in accordance with figure 3. Press movable clamp into position and note effect on wiring to connector base. If any lateral pressure is evident, additional wire slack must be provided to ensure all slide-on sockets seat fully on wire-wrap posts in the connector base without bending. If additional slack is required, perform VII.A, step 6, before proceeding. Secure movable clamp using shoulder screw retained in step 5.

8. Secure wire bundle(s) in grommet(s) at rear of retained connector half-shell. Test fit removed half shell for proper fit. Use tape as required to obtain proper fit.

9. Perform continuity check of modified connectors per cable P/N drawings. (See table 2).

10. Reassemble removed half-shell using screws retained in step 3.

11. Install modified externally relieved body screws per VII.C, steps 4 through 7.

VII. E. PROCEDURE (CONTINUED)

12. Update applicable records per section VIII.

13. Dispose of removed parts per section IX.

F. Retrofit Cable Assembly W152, P/N 2900659, as follows:

1. Remove externally relieved body screws, P/N 2900676 -002 and modify per VII.C, steps 1 through 3.

2. Place connector(s) on flat working surface with back shell half containing no rivets facing up.

3. Remove screws holding shell halves together. Remove screws holding shell half containing no rivets to connector base. Retain screws.

4. Remove shell half.

5. Remove internal movable clamps(s). Where more than one internal clamp exists, one may be left in place while working on the other. Retain shoulder screws.

6. Obtain movable clamps and gaskets from kit and bond gaskets to clamps per table 2 and figure 3. Use MIL-A-5092, type II, adhesive per ND 1002151 for bonding instructions.

VII. F. PROCEDURE (CONTINUED)

NOTE: Careful visual inspection is required to perform step 7 correctly.

7. Place each new movable clamp in position in accordance with figure 3. Press movable clamp into position and note effect on wiring to connector base. If any lateral pressure is evident, additional wire slack must be provided to ensure all slide-on sockets seat fully on wire-wrap posts in the connector base without bending. If additional slack is required, perform VII.A, step 6, before proceeding. Secure movable clamp using shoulder screw retained in step 5.

8. Secure wire bundle(s) in grommet(s) at rear of retained connector half-shell. Test fit removed half shell for proper fit. Use tape as required to obtain proper fit.

9. Perform continuity check of modified connectors per cable P/N drawings. (See table 2).

10. Reassemble removed half-shell using screws retained in step 3.

11. Install modified externally relieved body screws per VII.C, steps 4 through 7.

VII. F. PROCEDURE (CONTINUED)

12. Update applicable records per section VIII.

13. Dispose of removed parts per section IX.

G. Retrofit Cable Assembly W154, P/N 2901469, as follows:

CAUTION: The following steps must be performed with care to insure that leads do not pull off connector base.

1. Viewing face of plug P4, remove four (4) recessed socket head screws adjacent to connector contact pins 601 through 650, using a 3/32 allen wrench. Retain screws.

2. Remove three (3) button head screws, P/N 1006783-19, from plug backshell using 1/16 allen wrench. Retain screws.

3. Remove loosened half of connector backshell.

4. Anchor cable to prevent any relative movement between cable and P4 connector.

5. Disassemble strain relief clamp inside P4 connector backshell as required to perform modification.

VII. G. PROCEDURE (CONTINUED)

6. Remove, reverse, and reinsert pins 432 and 133.
7. Remove, reverse, and reinsert pins 532 and 233.
8. Remove, reverse, and reinsert pins 632 and 333.
9. Spot tie as applicable using black lacing tape.
10. Assemble strain relief clamp inside P4 connector backshell.
11. Install half of connector backshell using three (3) button head screws, P/N 1006783-19, removed in step 2. Use 1/16 allen wrench.
12. Install four (4) socket head screws adjacent to connector contact pins 601 through 650 using screws retained in step 1. Use 3/32 allen wrench.
13. Perform continuity resistance check per table 1.
14. Obtain kit identification band, P/N 1016128-011, and mark with new cable P/N 2901566.
15. Obtain serial number from old identification band and mark on new identification band.
16. Remove old identification band and replace with new identification band using black lacing tape.

VII. G. PROCEDURE (CONTINUED)

17. Dispose of old identification band in accordance with section IX.
18. Remove externally relieved body screws, P/N 2900676 -002, and modify per VII.C, steps 1 through 3.
19. Place connector(s) on flat working surface with back shell half containing no rivets facing up.
20. Remove screws holding shell halves together. Remove screws holding shell half containing no rivets to connector base. Retain screws.
21. Remove shell half.
22. Remove internal movable clamp(s). Where more than one internal clamp exists, one may be left in place while working on the other. Retain shoulder screws.
23. Obtain movable clamps and gaskets from kit and bond gaskets to clamps per table 2 and figure 3. Use MIL-A-5092, type II, adhesive per ND 1002151 for bonding instructions.

NOTE: Careful visual inspection is required to perform step 24 correctly.

VII. G. PROCEDURE (CONTINUED)

24. Place each new movable clamp in position in accordance with figure 3. Press movable clamp into position and note effect on wiring to connector base. If any lateral pressure is evident, additional wire slack must be provided to ensure all slide-on sockets seat fully on wire-wrap posts in the connector base without bending. If additional slack is required, perform VII.A, step 6, before proceeding. Secure movable clamp using shoulder screw retained in step 22.
25. Secure wire bundle(s) in grommet(s) at rear of retained connector half-shell. Test fit removed half shell for proper fit. Use tape as required to obtain proper fit.
26. Perform continuity check of modified connectors per cable P/N drawings. (See table 2).
27. Reassemble removed half-shell using screws retained in step 20.
28. Install modified externally relieved body screws per VII.C, steps 4 through 7.
29. Update applicable records per section VIII.
30. Dispose of removed parts per section IX.

VII. PROCEDURE (CONTINUED)

H. Retrofit Cable Assembly W156, P/N 2900663, as follows:

1. Remove externally relieved body screws, P/N 2900676 -002, and modify per VII.C, steps 1 through 3.
2. Place connector(s) on flat working surface with back shell half containing no rivets facing up.
3. Remove screws holding shell halves together. Remove screws holding shell half containing no rivets to connector base. Retain screws.
4. Remove shell half.
5. Remove internal movable clamp(s). Where more than one internal clamp exists, one may be left in place while working on the other. Retain shoulder screws.
6. Obtain movable clamps and gaskets from kit and bond gaskets to clamps per table 2 and figure 3. Use MIL-A-5092, type II, adhesive per ND 1002151 for bonding instructions.

NOTE: Careful visual inspection is required to perform step 7 correctly.

VII. H. PROCEDURE (CONTINUED)

7. Place each new movable clamp in position in accordance with figure 3. Press movable clamp into position and note effect on wiring to connector base. If any lateral pressure is evident, additional wire slack must be provided to ensure all slide-on sockets seat fully on wire-wrap posts in the connector base without bending. If additional slack is required, perform VII.A, step 6, before proceeding. Secure movable clamp using shoulder screw retained in step 5.

8. Secure wire bundle(s) in grommet(s) at rear of retained connector half-shell. Test fit removed half shell for proper fit. Use tape as required to obtain proper fit.

9. Perform continuity check of modified connectors per cable P/N drawings. (See table 2).

10. Reassemble removed half-shell using screws retained in step 3.

11. Install modified externally relieved body screws per VII.C, steps 4 through 7.

12. Update applicable records per section VIII.

13. Dispose of removed parts per section IX.

VII. PROCEDURE (CONTINUED)

I. Retrofit Cable Assembly W158, P/N 2900664, as follows:

1. Place connector on flat working surface with back shell half containing no rivets facing up.

2. Remove screws holding shell halves together and screws holding shell half containing no rivets to connector base. Retain screws.

3. Remove shell half.

4. Remove internal movable clamp(s). Where more than one internal clamp exists, one may be left in place while working on the other. Retain shoulder screws.

5. Obtain two (2) movable clamps, P/N 2901591-001, and gaskets, P/N 2901590-001, from retrofit kit.

6. Bond gaskets to movable clamps per figure 3, using MIL-A-5092, type II, adhesive, per ND 1002151.

NOTE: Careful visual inspection is required to perform step 7 correctly.

VII. I. PROCEDURE (CONTINUED)

7. Place each new movable clamp in position per figure 3. Press movable clamp into position and note effect on wiring to connector base. If any lateral pressure is evident, additional wire slack must be provided to ensure all slide-on sockets seat fully on wire-wrap posts in the connector base without bending. If additional slack is required perform VII.A, step 6 before proceeding. Secure movable clamp using shoulder screws retained in step 4.

8. Secure wire bundle(s) in grommet(s) at rear of retained connector half-shell. Test fit removed half shell for proper fit. Use tape as required, to obtain proper fit.

9. Perform continuity check of modified connector per cable drawing P/N 2900664 (W158-P1).

10. Reassemble removed half shell using screws retained in step 2.

11. Update applicable records per section VIII.

12. Dispose of removed parts per section IX.

VII. PROCEDURE (CONTINUED)

Table 1. Continuity Resistance Check

Lead Ident.	From	To	Indication
A111R	P3-B5	P4-133	Indication shall be one ohm or less
A111L	P3-A5	P4-233	
A111B	P3-C5	P4-333	
A112R	P3-A6	P4-432	
A112L	P3-B6	P4-532	
A112B	P3-C6	P4-632	

Cable Set/Cable	Cable Part Number	Movable Clamp P/N 2901591-	Gasket P/N 2901590-	Qty (each)
W148-P2	2901212	-002	-002	1
W149-P2	2901485	-004	-004	1
W152-P4	2900659	-007	-007	1
W152-P5	2900659	-002	-002	1
W152-P6	2900659	-007	-007	1
W154-P3	2901469	-003	-003	2
W154-P4	2901469	-004	-004	2
W156-P3	2900663	-004	-004	1
W158-P1	2900664	-001	-001	2

Table 2. Cable Assembly Information

Sheet 25 of 27
Part No. 0102122
Date: 28 JULY 66
TDRR
Revision B

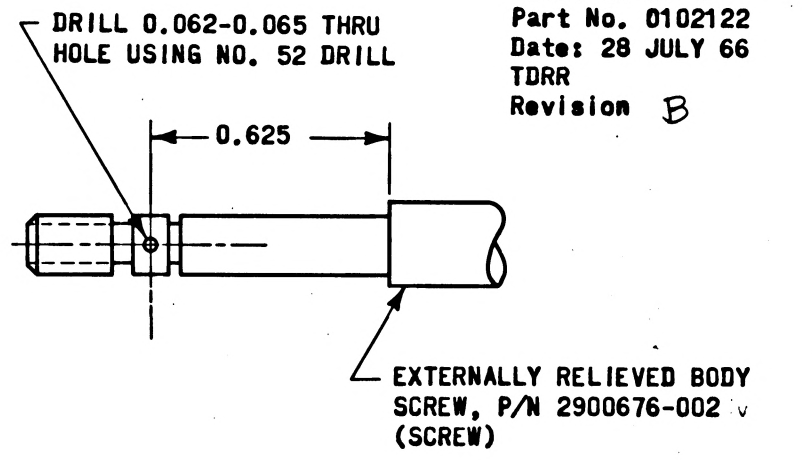
DRILL 0.062-0.065 THRU
HOLE USING NO. 52 DRILL
0.625
EXTERNALLY RELIEVED BODY
SCREW, P/N 2900676-002
(SCREW)

FIGURE 1. EXTERNALLY RELIEVED BODY SCREW, P/N 2900676-002

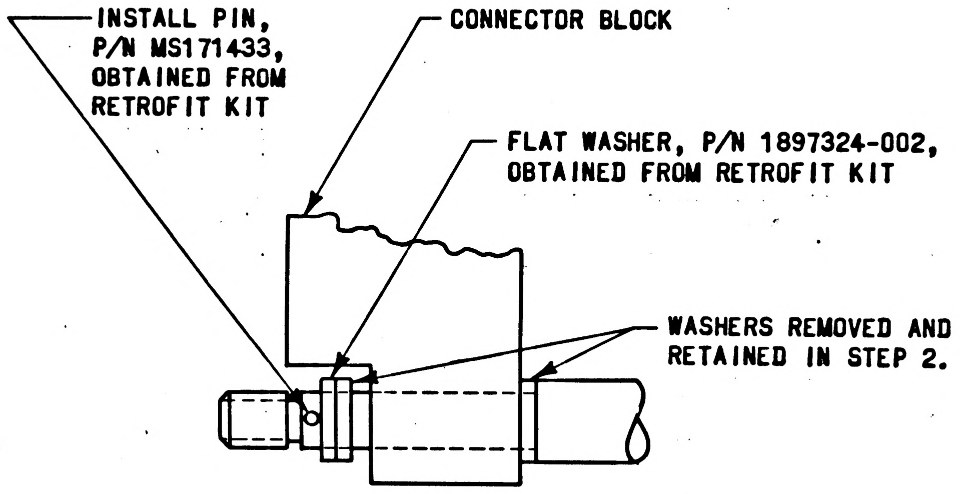
INSTALL PIN,
P/N MS171433,
OBTAINED FROM
RETROFIT KIT
CONNECTOR BLOCK
FLAT WASHER, P/N 1897324-002,
OBTAINED FROM RETROFIT KIT
WASHERS REMOVED AND
RETAINED IN STEP 2.

FIGURE 2. SCREW AND CONNECTOR ASSEMBLY

Sheet 26 of 27
Part No. 0102122
Date: 28 JULY 66
TDRR
Revision B

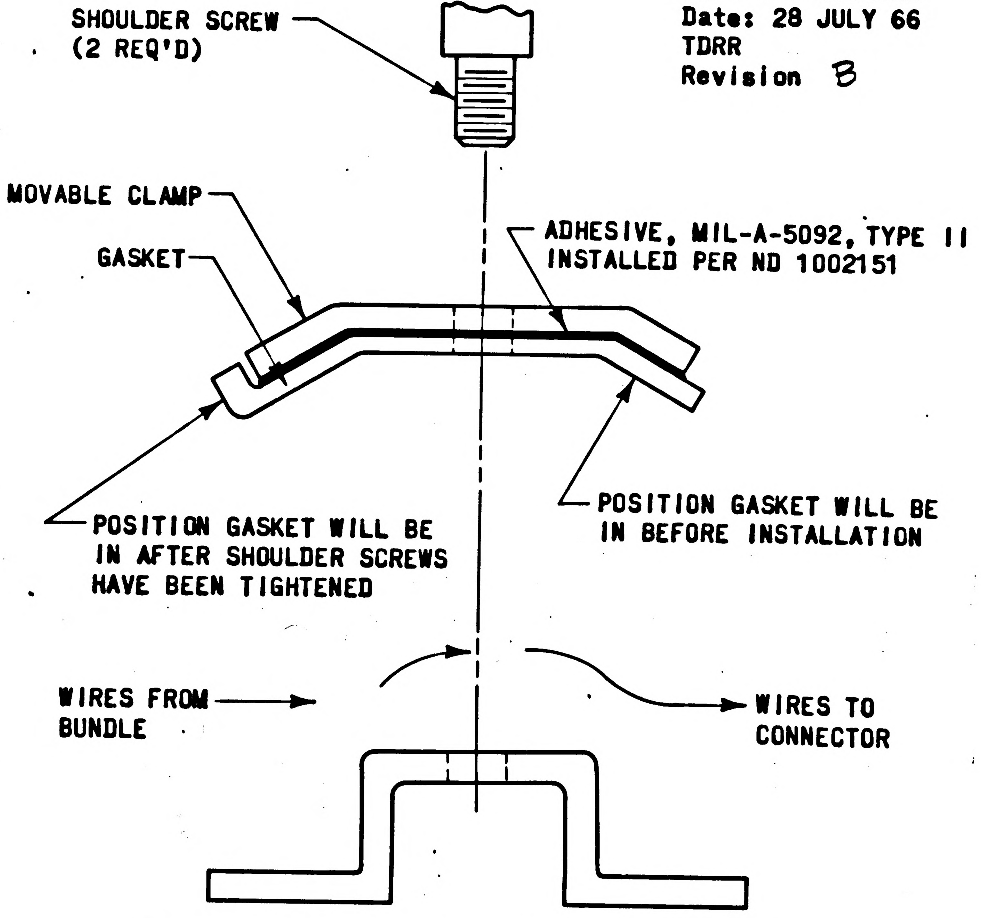
SHOULDER SCREW
(2 REQ'D)
MOVABLE CLAMP
GASKET
ADHESIVE, MIL-A-5092, TYPE II
INSTALLED PER ND 1002151
POSITION GASKET WILL BE
IN AFTER SHOULDER SCREWS
HAVE BEEN TIGHTENED
POSITION GASKET WILL BE
IN BEFORE INSTALLATION
WIRES FROM
BUNDLE
WIRES TO
CONNECTOR

FIGURE 3. MOVABLE CLAMP AND GASKET ASSEMBLY
(END VIEW)

Sheet 27 of 27
Part No. 0102122
Date: 28 JULY 66
TDRR
Revision B

VIII. MODIFICATION DESIGNATION

A. The significant part number changes resulting from this modification are as listed in section III.

B. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List into the Unit Acceptance Data List.

2. Make necessary entries into the Equipment Inventory Record.

3. Record accomplishment of this modification on the existing Unit History Record Sheet and start a new Unit History Record sheet for the new part number unit. Retain the old Unit History Record sheet in the Acceptance Data Package.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR GYRO CAGING ELECTRONICS ASSEMBLY, P/N 2900029-021

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			ACB	NASA	
A	MYC217284	1,3,9			4 JAN 66
B	INITIAL REL 32960			—	10 FEB 67

Prepared by__________ Date 16 Dec 66

P.C. Engineering Approval__________ Date 12/16/66

Design Review Board Approval__________ Date 24 Jan 67

MIT/IL Approval__________ Date__________

NASA Approval__________ Date 1/24/67

MIT Reliability__________ Date__________

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Gyro Caging Electronics, P/N 2900029-021. This modification is being performed to reduce the sensitivity of the Buffer and Interrogator to noise, and prevent improper triggering of the Interrogators at high error signal input levels.

II. AUTHORITY

This retrofit is authorized by Marriage Kit 3.

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Gyro Caging Electronics	2900029-021	2900029-031
Interrogator Electronic Component Assembly	2900076-021	2900076-031
Buffer Electronic Assembly	2901405-011	2901405-021

IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

RIB 0102119, RIB 0102120 and 8102158 (Marriage Kit 3).

VI. MATERIAL REQUIRED

A. One retrofit kit, P/N 8102268, consisting of the following items is required to modify the Gyro Caging Electronics Assembly:

Qty	Part Number	Description
1	0102131	Retrofit Instruction Bulletin
1	1004260-548	Nameplate
3	8102269	Retrofit kit for Interrogator Electronic Component Assy, P/N 2900076-021
1	8102270	Retrofit kit for Buffer Electronic Assembly, P/N 2901405-011

B. Retrofit kit, P/N 8102269, consisting of the following items is required to modify the Interrogator Electronic Component Assembly, P/N 2900076-021:

Qty	Part Number	Description
1	0102131	Retrofit Instruction Bulletin
2	1N459 (1896966-291)	Diode, semiconductor, MIL-S-19500
1	RC07GF103J (1896985-073)	Resistor, MIL-R-11/8

VI. MATERIAL REQUIRED (CONTINUED)

C. Retrofit kit, P/N 8102270, consisting of the following items is required to modify the Buffer Electronic Assembly, P/N 2901405-011

Qty	Part Number	Description
1	0102131	Retrofit Instruction Bulletin
1	MS17157-6	Feed-thru terminal stud
1	RC07GF303J (1896985-084)	Resistor, MIL-R-11/8

D. Material and special tools required but not supplied in kits are as follows:

Qty	Part Number	Description
AR	N/A	Lacquer thinner (MS35626)
AR	AC General Stores, P/N 29606	Clear lacquer
AR	AC Stationery Stores, P/N 24262	Black India Ink
AR	N/A	Solder, QQ-S-571d, SN60, Form Q, type RA, Core P2
1	*Schwaab Stamp & Seal Co., type AAG-0	Rubber stamp, 1/8 inch, 13 band, alpha numerical

VI. D. MATERIAL REQUIRED (CONTINUED)

Qty	Part Number	Description
1	*Greenfield Steel Stamp Works	Metal stamp set (1/16 inch alpha numerical)
1	Cleveland Twist Drill Co., 59 set	3/32 drill
1	**PSA-30(6430)	Anvil Swaging tool (Cambridge Thermionic)
1	**PSP-54(6654)	Rolling Punch Swaging tool (Cambridge Thermionic)

*or equivalent
**obtain from Host Contractor

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

VII. A. PROCEDURE (CONTINUED)

3. Ink Markings.

   a. Marking to be removed should be removed using lacquer thinner.

   b. New markings shall be covered with a coat of clear lacquer after ink has dried.

   c. New markings shall meet requirements of ND 1002019.

4. When marking is specified, hand marking is acceptable.

B. DETAILED INSTRUCTIONS. Perform modification as follows:

1. Modify Interrogator Electronic Component Assembly, P/N 2900076-021, in accordance with paragraph C.

2. Modify Buffer Electronic Assembly, P/N 2901405-011, in accordance with paragraph D.

3. Obtain nameplate, P/N 1004260-548 from retrofit kit, P/N 8102268.

VII. B. PROCEDURE (CONTINUED)

4. Transfer serial number from original nameplate located on Gyro Caging Electronics, P/N 2900029-021, to nameplate obtained in above step.

5. Remove original nameplate and replace with new nameplate. Dispose of original nameplate per section IX.

6. Dispose of removed parts per section IX.

7. Update applicable records per section VIII.

C. INTERROGATOR ELECTRONIC COMPONENT ASSEMBLY, P/N 2900076-021. Obtain retrofit kit, P/N 8102269, and perform modification as follows:

1. Mark reference designations CR14 and CR15 on side of terminal board opposite the electrical connector adapter. Locate marking per figure 1.

2. Obtain two (2) 1N459 diodes from kit and install (solder) per figure 1.

3. Locate and remove resistor R6 (located between pins 64 and 67).

VII. C. PROCEDURE (CONTINUED)

4. Obtain 10KΩ resistor, P/N RC07GF103J, from kit and install (solder) between pins 64 and 67.

5. Locate identification mark, P/N 2900076-021, on terminal board of assembly. Remove "-021" and replace with "-031".

6. Recalibrate assembly per JDC 19091 or PS 2016105.

D. BUFFER ELECTRONIC ASSEMBLY, P/N 2901405-011. Obtain retrofit kit, P/N 8102270, and perform modification as follows:

1. Unsolder terminal number 10 end of CR3.

2. Obtain a 3/32" drill and carefully drill out and remove terminal stud 10.

3. Mark terminal number "10" and reference designation "R11" next to hole (where stud was removed) on side of terminal board opposite the electrical connector adapter. Locate marking per figure 1.

4. Obtain feed thru terminal stud, P/N MS17157-6, install in terminal 10 hole and swage using PSA-30(6430) anvil swaging tool and PSP-54(6654) rolling punch swaging tool.

VII. D. PROCEDURE (CONTINUED)

5. Obtain resistor, P/N RC07GF303J, from kit and install (solder) between terminals 10 and 20. Install on side where new markings were applied. See figure 1 for reference.

5a. Resolder CR3 lead to terminal number 10.

6. Locate identification mark, P/N 2901405-011, on terminal board assembly. Remove "-011" and replace with "-021".

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package by (1) inserting the Kit Acceptance Data List into the Unit Acceptance Data List, (2) making the necessary entry into the Equipment Inventory Record, and (3) Recording modification in the Unit History Record (referencing Retrofit Instruction Bulletin).

B. If a part number change is made as a result of the modification record performance on the existing Unit History Record sheet and start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

VIII. MODIFICATION DESIGNATION (CONTINUED)

C. If a part number change is not made as a result of the modification, record performance on the existing Unit History Record sheet.

D. Significant part number changes resulting from this modification are as listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap all parts removed via AC Electronics form 127 or equivalent.

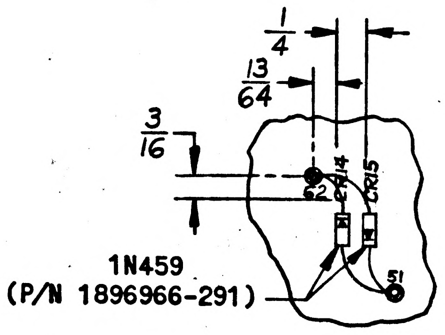

Figure 1. INTERROGATOR ELECTRONIC COMPONENT ASSEMBLY, P/N 2900076-021

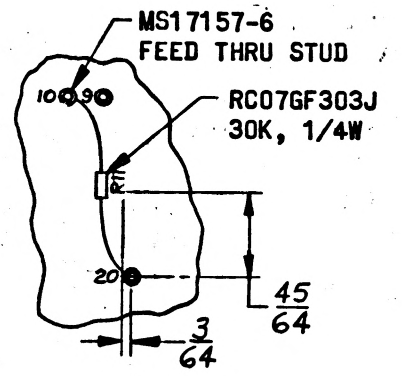

Figure 1. BUFFER ELECTRONIC ASSEMBLY, P/N 2901405-011

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR INTERCONNECT CABLE SET (SPECIAL BLOCK II), P/N 2900712-031 OR P/N 2900712-041

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CCB ~~MIT~~	NASA	
A	33572	ALL INITIAL RELEASE		—	13 Apr 67

Prepared by ________ Date 8 March 1967
P.C. Engineering Approval ________ Date 8 March 1967
Design Review Board Approval ________ W S Lawrence 70 Apr 67 Date 4-6-67
MIT/IL Approval ________ Date ________
NASA Approval ________ Date 4/10/67
MIT Reliability ________ Date ________

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Interconnect Cable Set, P/N 2900712-031 or -041. This modification is being performed to shorten the Externally Relieved Body Screws to ensure proper moisture sealing of the PSA's.

II. AUTHORITY

This retrofit is authorized by ECP-ACSK-0529, CCA-497-404.

III. UNITS AFFECTED

NOTE: All part numbers listed below are the same for both configurations except for items asterisked, which are the part numbers for the 2900712-041 configuration.

Name	Pre-modification P/N	Post-modification P/N
Cable Set, Interconnect (Special Block II)	2900712-031 *2900712-041	2900712-051 *2900712-061
Cable Assembly, Special Purpose, Electrical-W148	2901212	2901595
Cable Assembly, Special Purpose, Electrical-W149	2901485	2901596
Cable Assembly, Special Purpose Branched, Electrical-W152	2900659	2901597

III. UNITS AFFECTED (CONTINUED)

Name	Pre-modification P/N	Post modification P/N
Cable Assembly, Special Purpose, Electrical, Branched-W154	2901469 *2901566	2901598 *2901605
Cable Assembly, Special Purpose, Electrical, Branched-W156	2900663	2901599
Connector, Plug, Electrical, W148-P2 (PSA-J8/45J8)-(P2)	2900877-011	2900877-021
Connector, Plug, Electrical, W149-P2 (J10-PSA)-(P2)	2900880-011	2900880-021
Connector, Plug, Electrical, W152-P4 (J5-PSA)-(P4)	2900850-011	2900850-021
Connector, Plug, Electrical, W152-P5 (J9-PSA)-(P5)	2900876-011	2900876-021
Connector, Plug, Electrical, W152-P6 (J7-PSA)-(P6)	2900879-011	2900879-021
Connector Plug, Electrical, W154-P2 (J4-PSA)-(P3)	2900854-011	2900854-021
Connector, Plug, Electrical, W156-P3 (J6-PSA)-(P3)	2900840-011	2900840-021

IV. PRIORITY CHANGES

N/A

V. RELATED CHANGES

RIB's 0102682, 0102683, 0102135, 0102136 and 0102137.

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102279, consisting of the following items is required to perform this modification.

Qty	Part Number	Description
1	8102138	Retrofit Instruction Bulletin
5	1016128-011	I.D. Band

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
A/R	MIL-T-713B	Lacing tape, type P, Class 2, black
1	ND 1002019	Marking specification
1	*N/A	Punch, pin, 1/16 inch
A/R	1006271-10	Marking ink, black
A/R	1006271-1	Marking ink, white
A/R	Commercial grade	Clear flat lacquer
A/R	Commercial grade	Lacquer thinner
1	*Schwaab Stamp & Seal Co., AAG-0	13 band, alpha-numeric rubber stamp with 1/8 inch characters
1	N/A	Center punch

*or equivalent

VII. PROCEDURE

A. GENERAL REQUIREMENTS

1. Read and understand complete RIB prior to attempting this modification.

2. Minimum workmanship shall meet requirements defined in Workmanship Standard AC-STD-1, dated 15 January 1965.

3. Ink Markings:

   a. Markings to be removed should be removed using lacquer thinner.

   b. New markings shall be covered with a coat of clear flat lacquer after ink has dried.

   c. New markings shall be performed in accordance with ND 1002019.

4. Where marking is specified, hand marking is acceptable.

B. DETAILED INSTRUCTIONS. Obtain Cable assemblies listed in section III and modify connector plugs listed in section III as follows:

NOTE: If RIB 0102122 has not been installed perform paragraph D. If RIB 0102122 has been installed perform paragraph C.

VII. PROCEDURE (CONTINUED)

C. Externally Relieved Body Screw, P/N 2901508. Perform modification as follows:

NOTE: Do not damage pin during removal and installation.

1. Using a 1/16 inch pin punch (or equivalent), drive out pin, P/N MS171433, from screw by gently tapping with small hammer. Retain pin.

2. Remove screw and three (3) washers, P/N 1897324-002, from connector block. Retain hardware.

3. Remove 0.062 inch of material from tip of screw and chamfer end 45° X 0.03. See figure 1 for reference.

4. Center punch screw head in two (2) places approximately 1/32 inch deep and fill holes with white marking ink, P/N 1006271-1. See figure 1.

5. Obtain one (1) washer retained in step 2 and install on modified screw. Install washer and screw through connector block.

6. Obtain two (2) remaining washers from step 2 and install on screw.

7. Obtain pin retained in step 1 and install. Center pin. See figure 1.

8. Proceed to paragraph E.

VII. PROCEDURE (CONTINUED)

D. Externally Relieved Body Screw, P/N 2900676-002. Perform modification as follows:

1. Remove "E" ring from screw and retain.

2. Remove screw and two (2) washers from connector block. Retain hardware.

3. Remove 0.062 inch of material from tip of screw and chamfer end 45° X 0.03. See figure 2.

4. Center punch screw head in two (2) places approximately 1/32 inch deep and fill holes with white ink, P/N 1006271-1. See figure 2.

5. Install one (1) washer retained in step 2 on modified screw.

6. Install above assembly through connector block and install second washer and "E" ring retained in step 2 on screw.

7. Proceed to paragraph E.

VII. PROCEDURE (CONTINUED)

E. Identification Information.

1. Obtain five (5) new I.D. bands, P/N 1016128-011, from kit.

2. Mark modified Cable Assembly post-modification part numbers on new bands per section III.
   Mark per ND 1002019 with characters 0.12 inch high and centralized. Use 1006271-10 black marking ink.

3. Locate present cable assembly I.D. bands on cables and transfer applicable serial numbers to new I.D. bands. (Use same ink as above.)

4. Remove present I.D. bands and replace with new I.D. band using black lacing tape.

5. Locate modified connector plugs per section III.
   Remove "-011" and replace with "-021" per section III.

6. Update applicable records per section VIII.

7. Scrap all removed parts per AC Electronics form MIL-127 or equivalent.

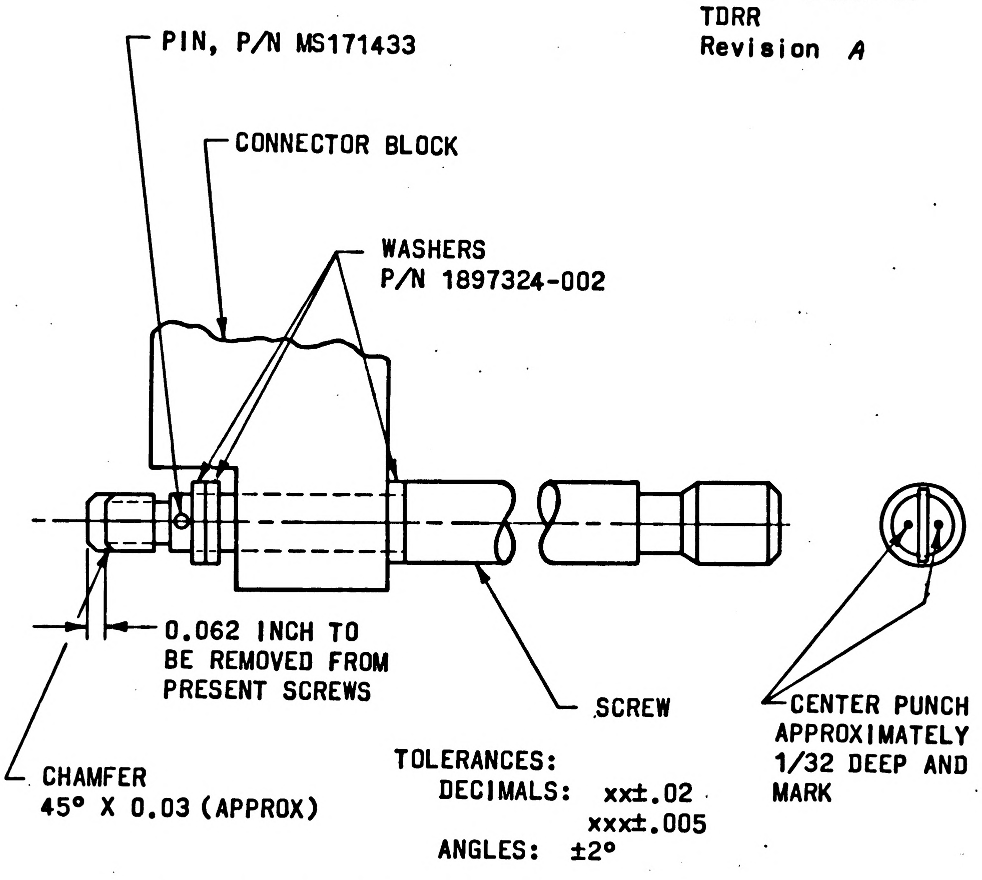
PIN, P/N MS171433
CONNECTOR BLOCK
WASHERS
P/N 1897324-002
0.062 INCH TO
BE REMOVED FROM
PRESENT SCREWS
SCREW
CENTER PUNCH
APPROXIMATELY
1/32 DEEP AND
MARK
CHAMFER
45° X 0.03 (APPROX)
TOLERANCES:
DECIMALS: xx±.02
xxx±.005
ANGLES: ±2°

Figure 1. Externally Relieved Body Screw
P/N 2901508

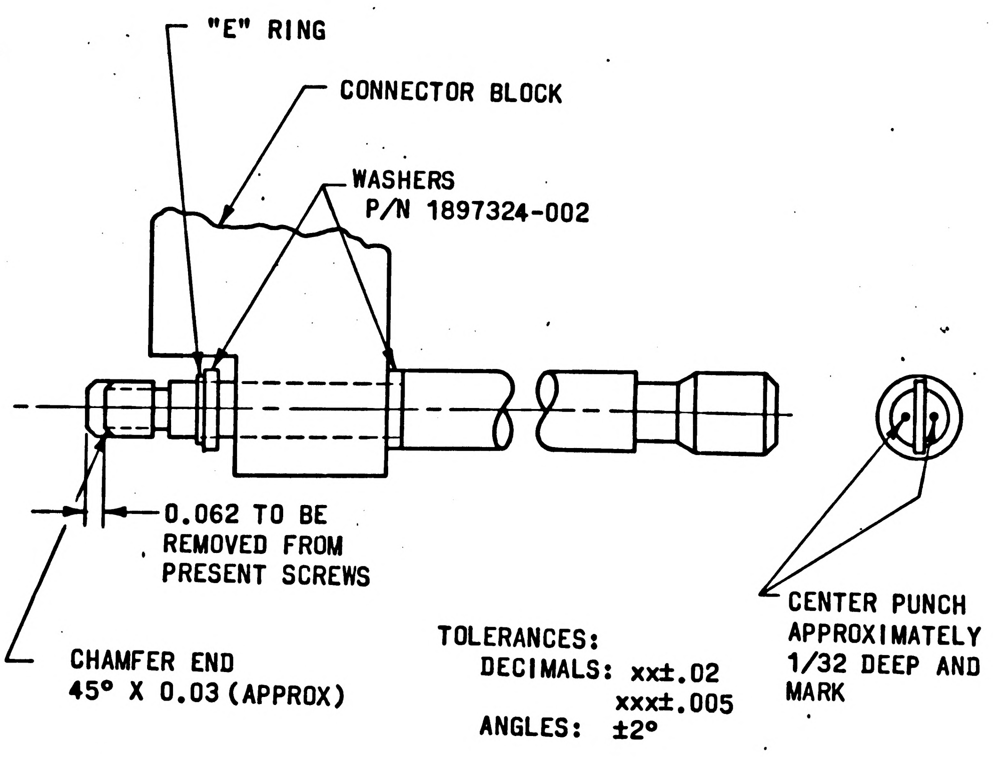
"E" RING
CONNECTOR BLOCK
WASHERS
P/N 1897324-002
0.062 TO BE
REMOVED FROM
PRESENT SCREWS
CENTER PUNCH
APPROXIMATELY
1/32 DEEP AND
MARK
CHAMFER END
45° X 0.03 (APPROX)
TOLERANCES:
DECIMALS: xx±.02
xxx±.005
ANGLES: ±2°

Figure 2. Externally Relieved Body Screw
P/N 2900676-002

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package by (1) inserting the Kit Acceptance Data List into the Unit Acceptance Data List, (2) making the necessary entry into the Equipment Inventory Record, and (3) recording modification in the Unit History Record (referencing Retrofit Instruction Bulletin).

B. If a part number change is made as a result of the modification record performance on the existing Unit History Record sheet and start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

C. If a part number change is not made as a result of the modification, record performance on the existing Unit History Record sheet.

D. Complete Apollo Configuration Control (ACC) form No. 1 (Revised) in accordance with ND 1002345.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 12 of 16
'Part No. 0102138
'Date: 8 MAR 67
'TDRR ________
'Revision A

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit			
					P/N	S/N		
1a	Cable Set,	2900712-031		529	8102279		2900712-051	
	Inter-Connect							
	(Spec Blk II)							
1b	Cable Set,	2900712-041		529	8102279		2900712-061	
	Inter-Connect							
	(Spec Blk II)							
2	Cable Assy,	2901212		529	8102279		2902595	
	Spec. Purpose							
	Elect-W148							

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
2	R	1	I.D. Band					
2	A	1	I.D. Band	1016128-011				
3	R	1	I.D. Band					
3	A	1	I.D. Band	1016128-011				
4	R	1	I.D. Band					
4	A	1	I.D. Band	1016128-011				
5a	R	1	I.D. Band					
5a	A	1	I.D. Band	1016128-011				
5b	R	1	I.D. Band					
5b	A	1	I.D. Band	1016128-011				
6	R	1	I.D. Band					
6	A	1	I.D. Band	1016128-011				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 13 of 16
ⁱPart No. 0102138
ⁱDate: 8 MAR 67
ⁱTDRR ________
ⁱRevision A

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N #________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
					Kit			
				ECP No.	P/N	S/N		
3	Cable Assy,	2901485		529	8102279		2901596	
	Spec. Purpose,							
	Elect-W149							
4	Cable Assy,	2900659		529	8102279		2901597	
	Spec.Purpose							
	Branched,							
	Elec, W152							
5	Cable Assy	2901469		529	8102279		2901598	
	Spec.Purpose,	Elect						
	Branched-W154							

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ⁱApplicable for Retrofit only

ACC Form 1 (Revised)
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ⁱDate: 8 MAR 67
ⁱTDRR ________
ⁱRevision A

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N #________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
					Kit			
				ECP No.	P/N	S/N		
5b	Cable Assy,	2901566		529	8102279		2901605	
	Spec.Purpose,							
	Elect.Branched							
	W154							
6	Cable Assy,	2900663		529	8102279		2901599	
	Spec.Purpose							
	Elect.Branched							
	-W156							
7	Connector,Plug	2900877-011		529	8102279		2900877-021	
	Elect,W148-P2							

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

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DATE		
SIGNED		

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RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N #________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
					Kit			
				ECP No.	P/N	S/N		
8	Connector,Plug	2900880-011		529	8102279		2900880-021	
	Elect,W149-P2							
9	Connector,Plug	2900850-011		529	8102279		2900850-021	
	Elect,W152-P4							
10	Connector,Plug	2900876-011		529	8102279		2900876-021	
	Elect,W152-P5							
11	Connector,Plug	2900879-011		529	8102279		2900879-021	
	Elect.W152-P6							
12	Connector,Plug	2900854-011		529	8102279		2900854-021	
	Elect,W154-P3							

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ⁱApplicable for Retrofit only

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RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N #________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
					Kit			
				ECP No.	P/N	S/N		
13	Connector,Plug	2900840-011		529	8102279		2900840-021	
	Elect,W156-P3							

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ⁱApplicable for Retrofit only

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Part No. 0102148
Date: 25 OCT 67
TDRR 35633
Revision A

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR INTERCONNECT CABLE SET (SPECIAL, LEM) P/N 6900043-041 (ECP-ACSK-0647)

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			[redacted]	NASA	
A	35633	ALL INITIAL RELEASE	EnA	—	15 Feb 68

Prepared by______ Date 14 Nov 1967
P.C. Engineering Approval______ Date 27 Nov 1967
Design Review Board Approval______ Date 6 Feb 68
MIT/IL Approval______ Date______
NASA Approval______ Date 2/9/68
MIT Reliability______ Date______

Sheet 2 of 16
Part No. 0102148
Date: 25 OCT 67
TDRR
Revision A

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Special Purpose Electrical Branched Cable Assembly-W133, P/N 6900143, which is part of the Interconnect Cable Set (Special, LEM), P/N 6900043-041. Additional wires are being added to the heater low lines, LOW LEVEL SHIELDS, and 28 volt distribution to decrease the total IR drop during airborne heater switching.

II. AUTHORITY

This retrofit is authorized by ECP-ACSK-0647.
CCA 497-0530

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Interconnect Cable Set (Special, LEM)	6900043-041	6900043-051
Cable Assembly, Special Purpose, Electrical, Branched-W133	6900143	6900161

IV. PRIORITY CHANGES

N/A

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V. RELATED CHANGES

N/A

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102293, consisting of the following items is required to modify the Interconnect Cable Set (Special, LEM) P/N 6900043-041:

Qty	Part Number	Description
1	0102148	Retrofit Instruction Bulletin
3	1016006-004	Splice Reducer
1	6900162	Lead Set, Electrical

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	MIL-T-713B	Lacing tape, type P, class 2, black
1	ND1002019	Marking specification
AR	1006271-10	Marking ink, black
AR	Commercial grade	Clear flat lacquer
AR	Commercial Grade	Lacquer thinner
1	*Schwaab Stamp & Seal Co., AAG-O	13 band, alpha-numeric rubber stamp with 1/8 inch characters

*or equivalent

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VI. B. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
AR	QQ-S-571d, Composition SN60, form W, type RA, Core P2	Solder
1	Burndy MR4CQ	Crimping tool
1	G7673A, Master Appliance Co.	Heat gun

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and completely understand RIB prior to attempting this modification.

2. All workmanship shall meet the minimum requirements defined in AC Workmanship Standard, AC-STD-1, dated 15 January 1965.

3. Ink Markings:

   a. Markings to be removed should be removed using lacquer thinner.

   b. New markings shall be covered with a coat of clear flat lacquer after ink has dried.

VII. A. PROCEDURE (CONTINUED)

c. New markings shall meet requirements of ND 1002019.

4. When marking is specified, hand marking is acceptable.

5. Lacing cut to reroute or replace leads shall be replaced using black lacing tape.

6. Delete leads from cable assembly when instructed, by one of the two following methods:

   a. Method one (preferred)

      1) Disconnect lead from its termination point.

      2) Clip attached termination hardware and/or exposed tinned tip(s) from all lead ends and discard.

      3) Pull lead out of harness/cable at most convenient point and discard.

   b. Method two.

      1) Disconnect lead from its termination point.

      2) Clip attached termination hardware and/or exposed tinned tip(s) from all lead ends and discard.

      3) Apply a drop of blue glyptal to severed ends of leads.

VII. PROCEDURE (CONTINUED)

B. DETAILED PROCEDURE. Perform modification to Special Purpose Electrical Branched Cable Assembly-W133, P/N 6900143, as follows.

1. Locate connector P10 on cable W133 and disassemble as necessary to gain access to connector pins. Remove P10 identification band and retain.

2. Obtain one (1) white wire, P/N 6900162-001, (A483) from electrical lead set, P/N 6900162 and install in connector P10 in accordance with Table I.

3. Obtain one (1) wht/red, wht/blu wire, (twisted pair), P/N 6900162-002, from electrical lead set and install in connector P10 in accordance with Table I. (This lead hereafter will be identified as A482.)

4. Obtain One (1) wht/red, wht/blu wire (twisted pair), P/N 6900162-002, from electrical lead set and install in connector P10 in accordance with Table I. (This lead hereafter will be identified as A484.)

5. Route added leads along wire harness to approximately 10 to 12 inches from connector P2. Wires can either be routed along harness and spot tied to harness, or harness lacing can be cut, wires added, and harness retied. Do not cut ends of added wires at this time.

VII. B. PROCEDURE (CONTINUED)

6. Measure back approximately 10 to 12 inches from connector P2. Cut lacing in that immediate area and locate splice reducers E10, E11, and E13.

7. Locate E10 and measure approximately 1-1/8 inch back from it in accordance with figure 1.

8. Cut leads.

9. Strip ends of cut leads .53 inch.

10. Obtain one (1) splice reducer, P/N 1016006-004, from kit and one (1) sleeving insulation, P/N 1010490-642, from electrical lead set. Mark sleeving with "E10", if required, at this time.

11. Slip sleeving over leads prepared in step 9. See figure 1 for reference.

12. Insert leads prepared in step 9 into new splice reducer. See figure 1 for reference.

13. Locate lead A482, measure and cut to proper length, and prepare in accordance with table II.

14. Prepare lead A482R(wht/red) in accordance with table II. Insert prepared lead through sleeving into new splice reducer. See figure 1 for reference.

VII. B. PROCEDURE (CONTINUED)

15. Crimp splice reducer using Burndy MR4CQ crimping tool.

16. Centralize new sleeving over both new splice reducer and original E10 sleeving. New sleeving should cover both points. Heat shrink sleeving in place.

17. Locate E11, measure approximately 1-1/8 inch back from it (see figure 1 for reference) and cut leads.

18. Strip ends of cut leads .53 inch.

19. Obtain one (1) splice reducer, P/N 1016006-004, from kit and one (1) sleeving insulation, P/N 1010490-638, from electrical lead set. Mark sleeving with "E11", if required, at this time.

20. Slip sleeving over leads prepared in step 18. See figure 1 for reference.

21. Insert leads prepared in step 18 into splice reducer. See figure 1 for reference.

22. Prepare lead A482L(wht/blu) in accordance with table II and insert lead through sleeving into splice reducer. See figure 1 for reference.

23. Locate leads A483 and A484, measure and cut leads to proper length. Prepare lead A484 in accordance with table II.

VII. B. PROCEDURE (CONTINUED)

24. Prepare leads A483(wht) and A484L(wht/blu) in accordance with table II. Insert leads through new sleeving into splice reducer. See figure 1 for reference.

25. Crimp splice reducer using Burndy MR4CQ crimping tool.

26. Centralize new "E11" sleeving over both new splice reducer and original E11 sleeving. New sleeving should cover both points. Heat shrink sleeving in place.

27. Locate E13, measure approximately 1-1/8 inch back from kit (see figure 1 for reference) and cut leads.

28. Locate and remove lead A387 from harness by one of two methods recommended in section VI.A, step 6.

29. Strip ends of cut leads .53 inch.

30. Obtain one (1) splice reducer, P/N 1016006-004, from kit and one (1) sleeving insulation, P/N 1010490-642, from electrical lead set. Mark sleeving with "E13", if required, at this time.

31. Slip sleeving over leads prepared in step 29. See figure 1 for reference.

32. Insert leads prepared in step 29 into splice reducer. See figure 1 for reference.

VII. B. PROCEDURE (CONTINUED)

33. Prepare lead A484R(wht/red) in accordance with table II. Insert lead through new sleeving into splice reducer. See figure 1 for reference.

34. Crimp splice reducer using Burndy MR4CQ crimping tool.

35. Centralize new "E13" sleeving over both new splice reducer and original E13 sleeving. New sleeving should cover both points. Heat shrink sleeving into place.

35a. Check continuity per table I.

36. Obtain identification band, P/N 1016128-011, from electrical lead set.

37. Locate and remove cable identification band. Transfer serial number from identification band to new identification band obtained above.

38. Attach new identification band to same position from which old band was removed. Use black lacing tape to attach band.

39. Spot tie modified harness as applicable using black lacing tape.

40. Reassemble connector P10 in reverse order of disassembly. Reattach ID band retained in step 1.

41. Dispose of removed parts in accordance with section IX.

42. Update applicable records in accordance with section VIII.

Table I. Wiring Additions

Lead Ident.	Strip Jacket (inches)	Strip Shield	Strip Lead (inches)	Add Premarked Accessory P/N	Tin	Solder to Connector P10-Pin	Remarks
A483	—	—	.28		Yes	y	
A482	4.30	*4.00	—	**Sleeving insulation, P/N 1010490-226	—	—	
A482L	—	—	.28	—	Yes	D	See note 1
A482R	—	—	.28	—	Yes	C	See note 1
A484	5.30	*5.00	—	**Insulation sleeving, P/N 1010490-226	—	—	
A484L	—	—	.28	—	Yes	J	See note 1
A484R	—	—	.28	—	Yes	H***	See note 1

* After jacket has been stripped from shield, fold shield back over jacket.

** Slide premarked sleeving insulation onto prepared shield and heat shrink into place.

*** Unsolder lead A387 from pin H before soldering A484R to pin H. Do not resolder lead A387.

Note 1 - L indicates white with blue tracer
R indicates white with red tracer

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Table II.

Lead Ident.	Strip Jacket (Inches)	Strip Shield (Inches)	Strip Leads (Inches)	Add Premarked Accessory P/N	Remarks
A482	4.30	*4.00		**Sleeving insulation, P/N 1010490-226	
A482L			.53		See note 1
A482R			.53		See note 1
A483			.53		
A484	5.30	*5.00		**Sleeving insulation, P/N 1010490-226	
A484L			.53		See note 1
A484R			.53		See note 1

* After jacket has been stripped from shield, fold shield back over jacket.

** Slide premarked sleeving insulation onto prepared shield and heat shrink into place.

NOTE 1 - L indicates white with blue tracer
R indicates white with red tracer

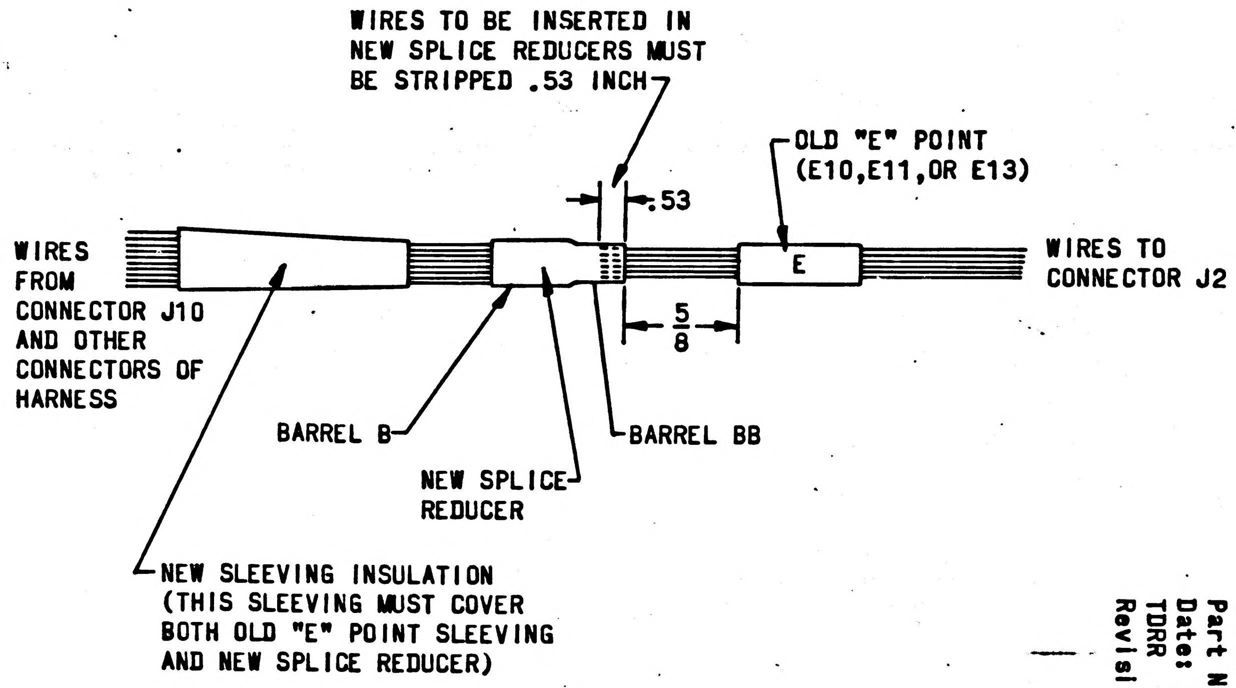
WIRES TO BE INSERTED IN NEW SPLICE REDUCERS MUST BE STRIPPED .53 INCH
OLD "E" POINT (E10,E11,OR E13)
.53
E
WIRES FROM CONNECTOR J10 AND OTHER CONNECTORS OF HARNESS
WIRES TO CONNECTOR J2
5/8
BARREL B
BARREL BB
NEW SPLICE REDUCER
NEW SLEEVING INSULATION (THIS SLEEVING MUST COVER BOTH OLD "E" POINT SLEEVING AND NEW SPLICE REDUCER)

FIGURE 1. MODIFICATION INFORMATION

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VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package by (1) inserting the Kit Acceptance Data List into the Unit Acceptance Data List, (2) making the necessary entry into the Equipment Inventory Record, and (3) recording modification in the Unit History Record (referencing Retrofit Instruction Bulletin).

B. If a part number change is made as a result of the modification record performance on the existing Unit History Record sheet and start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

C. If a part number change is not made as a result of the modification, record performance on the existing Unit History Record sheet.

D. Complete Apollo Configuration Control (ACC) form No. 1 (Revised) in accordance with ND 1002345.

E. Significant part number changes resulting from this modification are as listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

TABLE I

Continuity Check

Indicators shall be one (1) ohm or less

From	To
J33-A	J33-C
	J33-E
	P2-A4
J33-B	J33-D
	J33-G
	J33-N
	J33-y
	J33-J
	P2-A5
J33-H	J33-F
	P11-8
	P2-A8

Shall be no Continuity (indication)

From	To
J33-A	J33-B
	J33-H
J33-B	J33-H

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RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N# ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

Indent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Interconnect	6900043-041		647	8102293		6900043-051	
	Cable Set,							
	(Special LEM)							
2	Cable Assembly	6900143		647	8102293		6900161	
	Special Purpose							
	Electrical,							
	Branched-W133							

PART II: A/B PARTS ADDED OR REMOVED

Indent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
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'Applicable for Retrofit only

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Part No. 0102153
Date: 28 Aug 68
TDRR 36741
Revision A

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR AUXILIARY BATTERY PACK, P/N 1901492-031 (ECP-ACSK-0570)

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			ac	NASA	
A	36741	ALL INITIAL RELEASE	CwA	—	28 Aug 68

Prepared by ________ Date 8 July 1968
P.C. Engineering Approval ________ Date 18 July 1968
Design Review Board Approval ________ Date 22 Aug 68
MIT/IL Approval J. M. Watson Date 8-23-68
NASA Approval ________ Date 8/23/68
MIT Reliability ________ Date ________

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Revision A

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Auxiliary Battery Pack, P/N 1901492-031. This modification is being performed to provide back-up power to the Portable Temperature Controller (PTC II).

II. AUTHORIZATION

This retrofit is authorized by ACP-ACSK-0570 (CCA-497-0566).

III. UNITS AFFECTED

Name	Pre-Modification P/N	Post-Modification P/N
Auxiliary Battery Pack	1901492-031	1901492-041

IV. PRIORITY CHANGES

N/A

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V. RELATED CHANGES

N/A

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102299, consisting of the following items is required to perform this modification:

Qty	Part Number	Description
1	0102153	Retrofit Instruction Bulletin
3	F02A250V2A (1897099-011)	Fuse-cartridge, style F02, MIL-F-15160/02
1	MS26572-1	Fuseholder
1	1004260-580	Nameplate
1	2901623	Lead set
1	2901625	Cable assy - Spl Purpose, Electrical, Branched, W185
1	2901624	Decal
12	1006783-19	Screw, Button head
12	1016151-004	Nut, self-locking
4	AN535-0-3 (1897109-103)	Screw, drive
4	AN363C1032 (1896990-011)	Nut, self-locking
4	1006783-44	Screw, button head
7	MS3193-16A (1896877-016)	Contact
7	1015864-135	Insulation - sleeving

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VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
4	1016105-010	Strap assy - harness
1	1016073-183	Connector - dummy
2	1016073-143	Connector, dummy
5	1015902-49	Terminal - lug
1	1010490-258	Insulation - sleeving, heat shrink
1	1016006-001	Splice - reducer
2	1015873-001	Fuseholder

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
1	*Black & Decker P/N 30	1/4 inch drill, hand portable, electric
1	*Black & Decker P/N 361	1/2 inch drill, hand portable, electric
1	*Cleveland Twist Drill Co. 52 set	No. 6 and 31 drill
1	*Schwaab Stamp & Seal Co., type AAG-0	13 band, alpha-numeric rubber stamp with 1/8 inch characters
1	*Greenfield Steel Stamp Works	Metal stamp set, 1/8 inch alpha-numerical

VI. B. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
A/R	1006271-10	Marking ink, black
A/R	QQ-S-571d, composition SN60, form W, type RA, core P2	Solder
A/R	MIL-T-713B, type P, waxed, class 2	Black lacing & tying tape
1	ND1002019	Marking specification
A/R	Commercial grade	Clear flat lacquer
A/R	Commercial grade	Lacquer thinner
1	G7673A Master appliance Co.	Heat gun
A/R	MIL-V-6894/A	Oil varnish
1	Bendix 11-8107-16	Insertion tool
1	Bendix 11-7880-16	Extraction tool
1	Bendix MS3191-A	Crimping tool
1	Bendix MS3191-16A	Positioner tool
1	Burndy MR8-33T-1	Crimp tool
1	Burndy Y10-MRF-4	Crimp tool

* or equivalent.

VII. PROCEDURE

A. GENERAL REQUIREMENTS

1. Read and completely understand RIB prior to attempting this modification.
2. All workmanship shall meet the minimum requirement defined in AC Workmanship Standard, AC-STD-1, dated 15 January 1965.
3. Ink Markings:
   a. Markings to be removed should be removed using lacquer thinner.
   b. New markings shall be covered with a coat of clear flat lacquer after ink has dried.
   c. New markings shall meet requirement of ND1002019.
4. When marking is specified, hand marking is acceptable.
5. During modification, lacing may be cut as required to accomplish necessary work. Spot ties shall be added as necessary after all conductor rework has been completed.
6. Decal Installation Procedure:

VII. PROCEDURE (CONTINUED)

a. Dip decal in luke-warm water for approximately 15 seconds (in cold water for approximately 20 seconds). Decal should slide easily on backing. If it does not, soak for a few more seconds.

b. Slide decal to edge of backing, but do not completely remove from backing.

c. Position and install decal in proper location using backing as an installation aid.

d. Completely remove backing from decal and carefully flatten decal using an edge of a piece of cardboard or similar straight edged object.

e. Carefully wash face of decal with clear water to remove gum. Allow decal to air dry for four hours.

f. Apply a bead of varnish (MIL-V-6894A unreduced) to decal, overlapping all edges 1/4 inch minimum.

B. DETAILED PROCEDURE.

Perform modification to Auxiliary Battery Pack, P/N 1901492-031, (ABP), as follows:

1. Locate sixteen (16) holes in ABP Cover as indicated in figure 1.

VII. B. PROCEDURE (CONTINUED)

2. Drill holes located in above step using a number 6 drill. Deburr any sharp edges on drilled holes. Remove all chips resulting from drilling holes.
3. Mark new dummy connector identifications as indicated in figure 1. Characters shall be marked in accordance with ND 1002019, 0.12 inch high, using black marking ink, P/N 1006271-10.
4. Obtain dummy connector, P/N 1016073-183, (P1), four (4) button head screws, P/N 1006783-19, and four (4) self-locking nuts, P/N 1016151-004, from kit. Install connector on ABP cover as indicated in figure 1. Install screws so self-locking nuts are on connector side of ABP cover.
5. Obtain two (2) dummy connectors, P/N 1016073-143, (P2 and P3), eight (8) button head screws, P/N 1006783-19, eight (8) self-locking nuts, P/N 1016151-004, from kit. Install connectors on ABP cover as indicated in figure 1. Install screws so self-locking nuts are on connector side of ABP cover.
6. Obtain four (4) harness strap assemblies, P/N 1016105-010, four (4) button head screws, P/N 1006783-44, and four (4) self-locking nuts, P/N AN363C1032 (1896990-011), from kit.

VII. B. PROCEDURE (CONTINUED)

7. Install harness strap assemblies on ABP cover as indicated in figure 1. Install screws so self-locking nuts are on harness strap assembly side of ABP cover.

8. Locate ABP cover P/N "1901535". Remove and remark with P/N "2901637-011", in accordance with section VII.A.3. See figure 1 for part number location.

9. Locate three (3) new fuse holes on ABP front panel, P/N 1902136, as indicated in figure 2.

10. Drill holes located in step 9, .630 inch. Deburr any sharp edges on drilled holes. Remove all metal chips resulting from drilling holes.

11. Obtain decal, P/N 2901624, from kit and install on ABP front panel in accordance with figure 2 and section VII.A.6.

12. Obtain fuseholder, P/N MS26572-1, from kit and install on ABP front panel in position designated as "2A". See figure 2 for reference.

13. Obtain two (2) fuseholders, P/N 1015873-001, from kit and install on ABP front panel in positions designated as "PTC II and 2 AMP".

VII. B. PROCEDURE (CONTINUED)

14. Locate Part Number "1902136" on ABP panel. Remove and remark with "2901638" in accordance with section VII.A.3. See figure 3 for part number location.

15. Mark fuse designations on back of front panel as indicated in figure 3. Mark in accordance with ND 1002019, using black marking ink, P/N 1006271-10.

16. Locate lead A36 at J1-A. Remove lead from J1 using Bendix 11-7880-16 extraction tool.

17. Cut approximately three inches from end of lead A36 and discard.

18. Strip end of lead A36 .25 inch.

19. Obtain splice reducer, P/N 1016006-001, and heat shrink sleeving insulation, P/N 1010490-258, from kit. Mark sleeving with "E2", if required, at this time.

20. Install sleeving on lead A36, insert lead A36 into "BB" end of reducer (smaller end) and crimp "BB" end of reducer using Burndy Y10-MRF4 crimp tool.

21. Obtain leads A74 and A75 from lead set, P/N 2901623, and strip one end of each lead .25 inch.

22. Insert stripped end of leads A74 and A75 into "B" end of splice reducer (larger end) and crimp using Burndy Y10-MRF4 crimp tool.

VII. B. PROCEDURE (CONTINUED)

23. Slide sleeving insulation over splice reducer and heat shrink.

24. Route opposite ends of leads A74 and A75 to J1 connector and cut to proper length.

25. Strip ends of leads A74 and A75 .25 inch.

26. Obtain two (2) contacts, P/N MS3193-16A, from kit, install on stripped ends of leads A74 and A75, and crimp using Bendix MS3191-A crimp tool and Bendix MS3191-16A positioner.

27. Insert lead A74 in J1-H and lead A75 in J1-A using Bendix 11-8107-16 insertion tool.

28. Obtain leads A65 through A73 and lead A76 from lead set, P/N 2901623, and install in accordance with Table I.

29. Obtain three (3) fuses, P/N F02A250V2A from kit and install in three (3) new fuseholders.

30. Add spot ties and lacing as necessary after leads have been installed.

31. Perform continuity and voltage check in accordance with Table II.

32. Perform functional check in accordance with Table III.

VII. B. PROCEDURE (CONTINUED)

33. Locate identification band marked "1902208" on wiring harness.

34. Obtain identification band, P/N 1016128-011, from lead set and mark with P/N "2901643", if not marked.

35. Remove existing identification band and replace with identification band obtained in step 34.

36. Obtain new nameplate, P/N 1004260-580, from kit. Transfer serial number and contract number from existing nameplate located on side of ABP case to new nameplate. Use metal stamp set with 1/8 inch high characters for imprinting data. If required, add new Auxiliary Battery Pack Part number "1910492-041" to nameplate.

37. Remove existing nameplate from side of ABP case. Remove screws carefully so drive screw holes are not damaged.

38. Obtain four (4) drive screws, P/N AN535-0-3, from kit and use to install new nameplate, prepared in step 31, in position where old nameplate was installed.

39. Update applicable records as directed in section VII.

40. Dispose of removed parts in accordance with section IX.

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TABLE I. ABP LEAD ADDITIONS

NOTE: CUT LEADS TO PROPER LENGTHS WHEN INSTALLING

LEAD IDENT	FROM CKT. PT.	TO CKT. PT.	STRIP LEAD	TIN	SOLDER	KIT ACCESSORY ITEM P/N	REMARKS
A 65	XF4-1		.30	YES	YES	1015864-135	
		J1-K	.25	NO	NO	MS3193A-16A	SEE NOTE 1
A 66	XF4-2		.30	YES	YES	1015864-135	
		S1-9	.25	NO	NO	1015902-49	SEE NOTE 2
A67	XF1-1		.30	YES	*YES		*SEE NOTE 3
		S1-8	.25	NO	NO	1015902-49	SEE NOTE 2
A68	XF5-1		.30	YES	YES	1015864-135	
		J1-J	.25	NO	NO	MS3193A-16A	SEE NOTE 1
A69	XF5-2		.30	YES	YES	1015864-135	
		S1-12	.25	NO	NO	1015902-49	SEE NOTE 2
A70	XF2-1		.30	YES	*YES		*SEE NOTE 3
		S1-11	.25	NO	NO	1015902-49	SEE NOTE 2
A71	E1		.25	NO	NO	1015902-49	SEE NOTE 2
		J1-L	.25	NO	NO	MS3193-16A	SEE NOTE 1
A72	TB1-1		.30	YES	YES		
		K2-D2	.30	YES	YES	1015864-135	
A73	J1-F		.25	NO	NO	MS3193A-16A	SEE NOTE 1
		K2-D3	.30	YES	YES	1015864-135	
A76	TB1-8		.30	YES	YES		
		J1-G	.25	NO	NO	MS3193A-16A	SEE NOTE 1

TABLE I. ABP LEAD ADDITIONS (CONTINUED)

NOTE 1. CRIMP CONTACT PINS, MS3193A-16A TO WIRE USING A BENDIX MS3191-A CRIMP TOOL AND BENDIX MS3191-16A POSITIONER. INSERT PINS INTO CONNECTOR USING A BENDIX 11-8107-16 INSERTION TOOL.

NOTE 2. CRIMP LUG TERMINALS TO LEADS USING BURNDY MR8-33T-1 CRIMP TOOL.

NOTE 3. SLIDE SLEEVING BACK ON EXISTING WIRE AT TERMINATING POINT. SLIP LEAD BEING ADDED THROUGH EXISTING SLEEVING AND SOLDER TO TERMINATING POINT. SLIDE SLEEVING BACK TO ORIGINAL POSITION.

VII. B. PROCEDURE (CONTINUED)

TABLE II. ABP CONTINUITY AND VOLTAGE CHECK

NOTE: Final entry in Table II is a voltage measurement which verifies wiring additions performed.

FROM	TO	INDICATION	CONDITION
J1-A	J1-H	< 1 Ω	
J1-B	J1-G	< 1 Ω	
P1-A	J1-K	< 1 Ω	S1 ON
P1-B	J1-J	< 1 Ω	S1 ON
P1-C	J1-L	< 1 Ω	
P1-C	P1-B	> 100 KΩ	S1 ON
P1-C	P1-A	> 100 KΩ	S1 ON
P1-C	J1-B	> 100 KΩ	
J1-F	J1-G	25-35 VDC	S1 ON

VII. B. PROCEDURE (CONTINUED)

TABLE III. ABP FUNCTIONAL CHECK

1. Set battery switch to OFF.
2. Connect P1 of W185 to J1 of ABP.
3. Connect P1 of ABP to 115.0 ± 11.5 V, 60 ± 3 hz source
4. Check for no voltage (0 ± 1 VDC OR AC) at W185 P2-M (hi) and P2-J (lo), or P3-K (Pos) and P3-L (Neg).
5. Set battery switch to ON.
6. Check for 115 volts at W185 P2-M (hi) and P2-J (lo).
7. Check for no voltage (0 ± 1 VDC) at W185 P3-K (Pos) and P3-L (Neg).
8. Remove P1 from 115 volt source.
9. Check for no voltage (0 ± 1 VAC) at W185 P2-M (hi) and P2-J (lo).
10. Check for 28 +7, -3 VDC at W185 P3-K (Pos) and P3-L (Neg).
11. Reconnect P1 to 115 volt source. The same voltages shall exist as in steps 9 and 10.
12. Set battery switch to OFF position and then to ON position. The same voltages shall exist as in steps 6 and 7.

VII. B. PROCEDURE (CONTINUED)

TABLE III. ABP FUNCTIONAL CHECK (CONTINUED)

13. Set battery switch to OFF, disconnect P1 of ABP, and disconnect P1 of W185 from J1 of ABP and install W185 in ABP cover.

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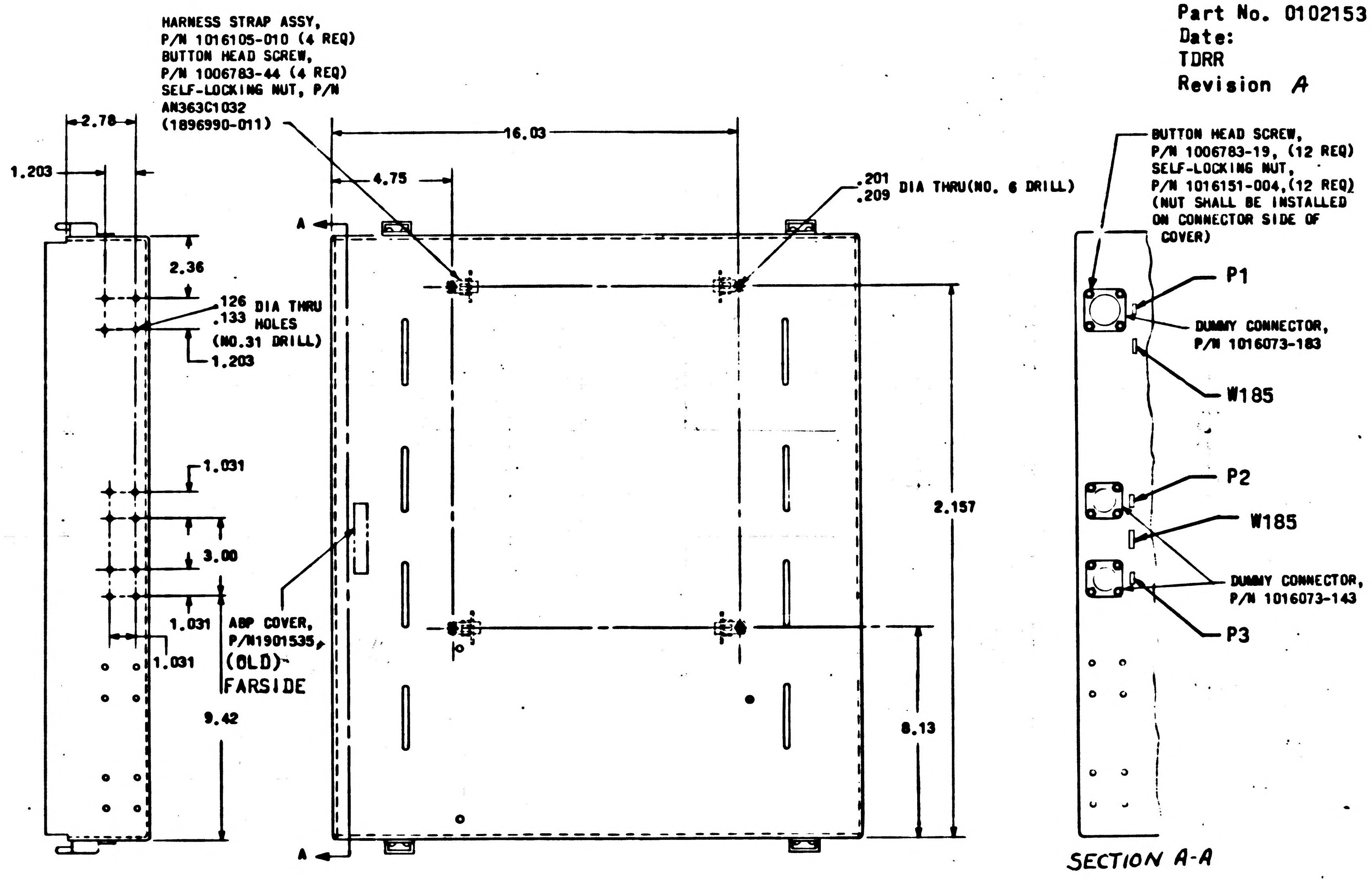
HARNESS STRAP ASSY,
P/N 1016105-010 (4 REQ)
BUTTON HEAD SCREW,
P/N 1006783-44 (4 REQ)
SELF-LOCKING NUT, P/N
AN363C1032
(1896990-011)
2.78
1.203
2.36
.126
.133 DIA THRU HOLES (NO.31 DRILL)
1.203
1.031
3.00
1.031
1.031
ABP COVER, P/N1901535,
(OLD)-
FARSIDE
9.42
A
A
16.03
4.75
.201
.209 DIA THRU(NO. 6 DRILL)
2.157
8.13
BUTTON HEAD SCREW,
P/N 1006783-19, (12 REQ)
SELF-LOCKING NUT,
P/N 1016151-004, (12 REQ)
(NUT SHALL BE INSTALLED
ON CONNECTOR SIDE OF
COVER)
P1
DUMMY CONNECTOR,
P/N 1016073-183
W185
P2
W185
DUMMY CONNECTOR,
P/N 1016073-143
P3
SECTION A-A

FIGURE 1. AUXILIARY BATTERY PACK COVER

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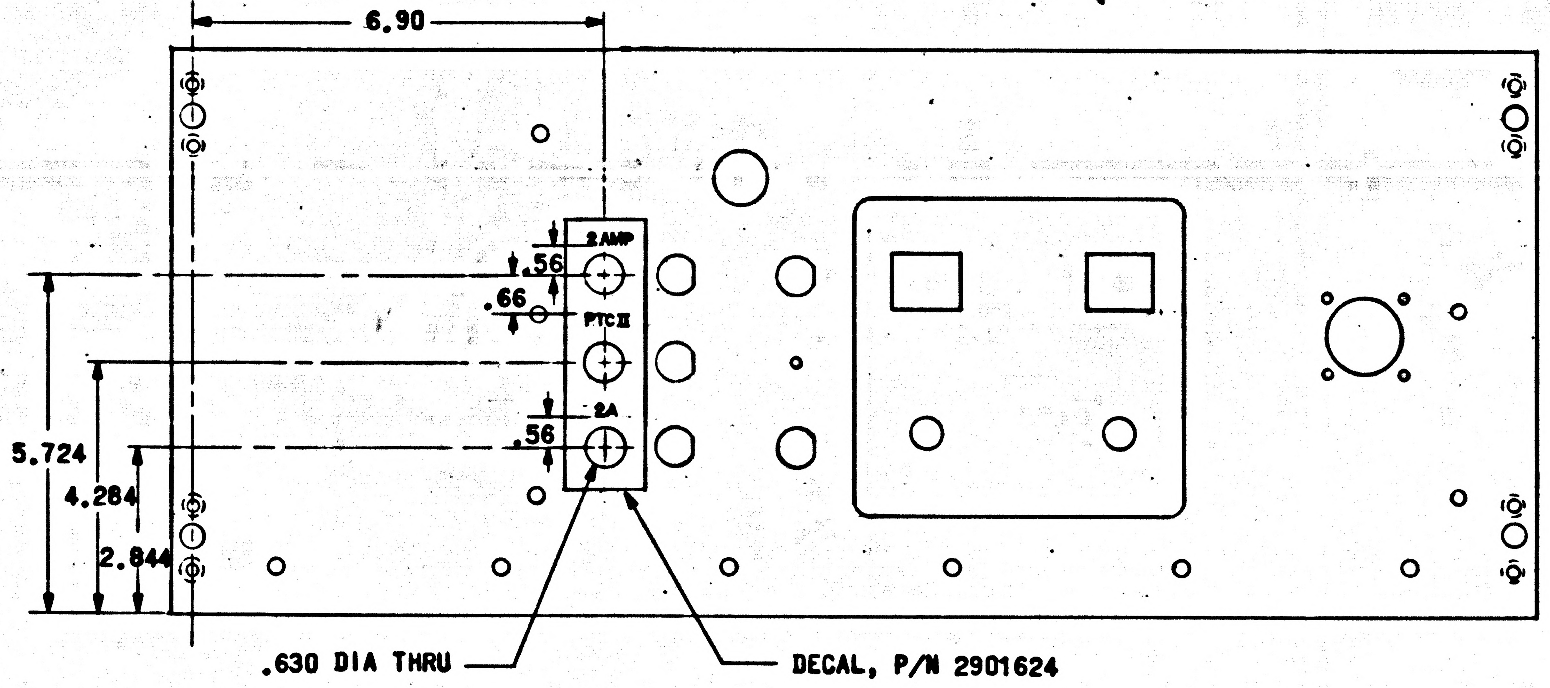
6.90
2 AMP
.56
.66
PTC II
2A
.56
5.724
4.284
2.844
.630 DIA THRU
DECAL, P/N 2901624

FIGURE 2. AUXILIARY BATTERY PACK PANEL

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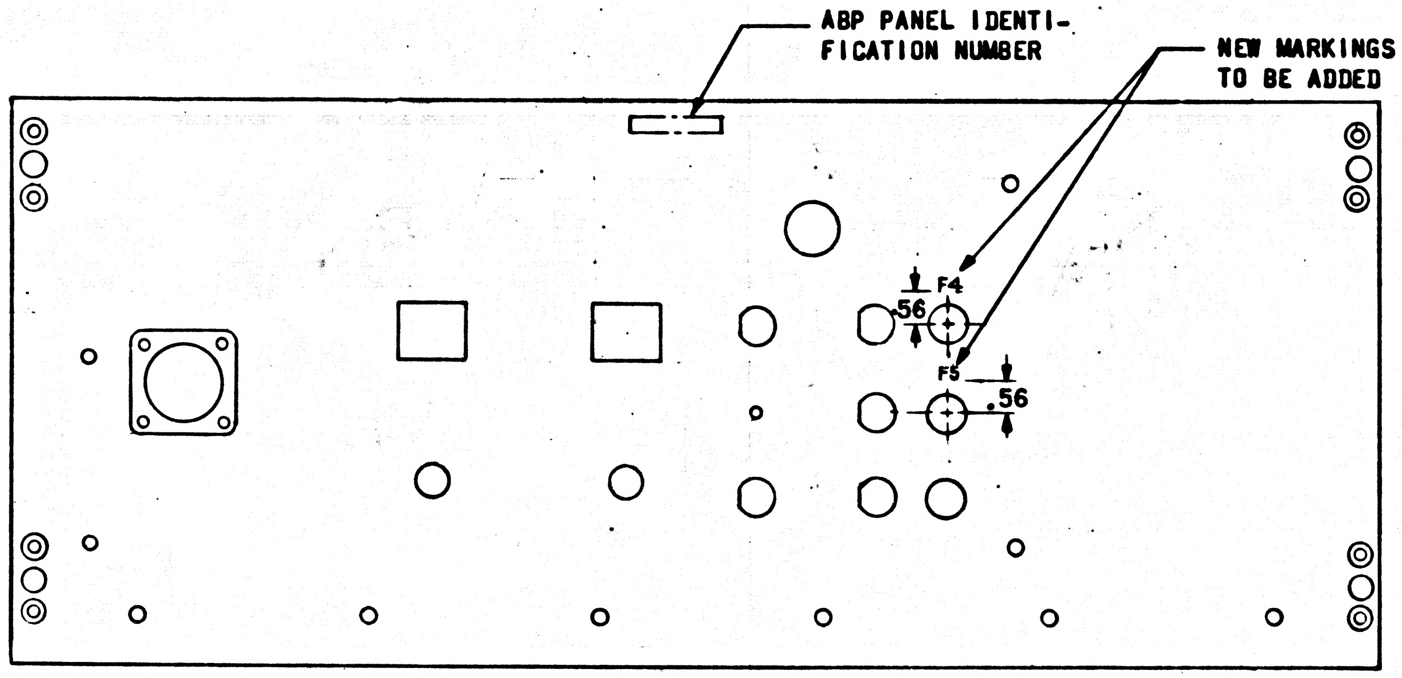
ABP PANEL IDENTI-
FICATION NUMBER
NEW MARKINGS
TO BE ADDED
F4
.56
F5
.56

FIGURE 3. ABP FRONT PANEL, REAR VIEW

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package by making the necessary entry into the Equipment Inventory Record in accordance with RE 1.10, (Apollo Guidance and Navigation Equipment Inventory Record Procedure), and recording modification in the Unit History Record (referencing Retrofit Instruction Bulletin) in accordance with RE 1.9 (Unit History Record Procedure).

B. If a part number change is made as a result of the modification, record performance on the existing Unit History Record sheet, and start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

C. If a part number change is not made as a result of the modification, record performance on the existing Unit History Record sheet.

D. Complete Apollo Configuration Control (ACC) form No. 1 (Revised) in accordance with ND 1002345.

VIII. MODIFICATION DESIGNATION (CONTINUED)

E. Significant part number changes resulting from this modification are as listed below:

Name	Pre-Modification P/N	Post-Modification P/N
Auxiliary Battery Pack	1901492-031	1901492-041
Auxiliary Battery Pack Cover	1901535	2901637-011
Auxiliary Battery Pack Panel	1902136	2901638
Wiring Harness A	1902208	2901643

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form 1 (Revised)
10/10/66

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¹Part No. 0102153
¹Date:
¹TDRR
¹Revision A

Document Control No. ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-06, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

Indent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit			
					P/N	S/N		
1	Aux. Battery Pack	1901492-031		570	8102299		1901492-041	
2	Aux. Battery Pack Cover	1901535		570	8102299		2901637-011	
3	Aux. Battery Pack Panel	1902136		570	8102299		2901638	
4	Wiring Harness A	1902208		570	8102299		2901643	

PART II: A/B PARTS ADDED OR REMOVED

Indent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

*Parts
A - Added
R - Removed

¹Applicable for Retrofit only

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR AUXILIARY BATTERY PACK P/N 1901492-041 AND BATTERY POWER PACK P/N 1900011-051 (PART OF ICTC, P/N 1900342-041)(ECP-ACSK-0748)
ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			~~MIT~~ AC	~~NASA~~	
A	37299	INITIAL Release			5 Feb 69

Prepared by CARL G. GUILE Date 12 DEC 1968

P.C. Engineering Approval Date 13 Dec 1968

Design Review Board Approval H. Miller Date 17/DEC/68

MIT/IL Approval Date 27 Jan 69

NASA Approval Date 1/29/69

MIT Reliability Date

I. PURPOSE

The purpose of this RIB is to provide instructions for the modification of the Auxiliary Battery Pack, P/N 1901492-041, (ABP), and modification of the Battery Power Pack, P/N 1900011-051, (BPP). This modification is being performed to both the ABP and the BPP to correct blowing of 2 amp fuses in 115 volt, 60 hz circuit due to current waveform distortion caused by transformer operated fullwave rectifier load in PTC II.

II. AUTHORITY

These retrofits are authorized by ECP-ACSK-0748. CCA 497-0606.

III. UNITS AFFECTED

Name	Pre-Modification P/N	Post-Modification P/N
Auxiliary Battery Pack Serial No's. 1 & 2	1901492-041	1901492-051
Battery Power Pack Serial No's. 1 thru 14	1900011-051	1900011-061
Inertial Components Temperature Controller (ICTC)	1900342-041	1900342-051

IV. PRIORITY CHANGES

N/A

V. RELATED CHANGES

N/A

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102303, consisting of the following items is required to modify the Auxiliary Battery Pack, P/N 1901492-041.

Qty	Part Number	Description
1	0102158	RIB
1	1004260-587	Nameplate
3	F02A250V5A	(1897099-014) fuse MIL-F-15160/02
1	2901663	Stencil, identification

B. One Retrofit Kit, P/N 8102302, consisting of the following items is required to modify the Battery Power Pack, P/N 1900011-051.

Qty	Part Number	Description
1	0102158	RIB
1	1004260-586	Nameplate
3	F02A250V5A	(1897099-014) fuse MIL-F-15160/02
1	2901663	Stencil, identification

VI. MATERIALS REQUIRED (CONTINUED)

C. Materials and special tools required but not supplied in kits are as follows;

Qty	Part Number	Description
1	ND 1002019	Marking specification
A/R	1006271-10	Marking Ink, Black
A/R	MIL-P-8585A, color yellow	Primer coating, Zinc Chromate, low-moisture - sensitivity
A/R	TT-E-529a, Class A (Air-drying, color 26440, grey)	Enamel, Alkyd, semi-gloss
1	MIL-F-14072	Painting specification
1	*Schwaab Stamp & Seal Co., AAG-0	13 band, alpha - numeric rubber stamp with 1/8 inch characters
1	*Greenfield Steel Stamp Works	Metal Stamp Set, 1/8 inch Alpha - numerical
A/R	*Y9108, 1 inch wide	Masking tape
A/R	FED-TT-I-735a	ISOPROPYL Alcohol
A/R	0-B-41	Distilled water
A/R	BB-F-671a, type F-113	Cleaning agent, freon TF

* or equivalent.

VII. PROCEDURE

A. GENERAL REQUIREMENTS

1. Read and completely understand RIB prior to attempting this modification.

2. All workmanship shall meet the minimum requirements defined in AC Workmanship Standard, AC-STD-1, dated 15 January 1965.

3. Ink Markings - Removing and remarking part numbers shall be accomplished as follows:

   a. Mask part number or area of part number to be changed using one (1) inch masking tape.

   b. Using a fine grade of sandpaper, carefully remove part number or area of part number to be changed. Take as much care as possible to prevent removing grey paint during part number removal.

   c. Clean area to be painted and remarked using isopropyl alcohol, distilled water, isopropyl alcohol, and freon, in that order. Allow cleaned area to air dry.

   NOTE: If no grey paint has been removed in step b, proceed to step e. If paint has been removed, perform all the following steps.

VII. A. 3. PROCEDURE (CONTINUED)

   d. Apply yellow primer, MIL-P-8585A to area which is to be repainted and allow to air dry in accordance with P513 of MIL-F-14072. (painting specification)

   e. Apply grey semi-gloss enamel, TT-E-529a, class A, color 26440, and allow to air dry. Apply paint in accordance with P513 of MIL-F-14072.

4. When marking is specified, hand marking is acceptable.

B. DETAIL PROCEDURE FOR ABP

Perform modification to the ABP, P/N 1901492-041, as follows:

1. Remove and discard in accordance with paragraph IX, the three 2 amp fuses, P/N F02A250V2A, from the front panel locations marked 2 AMP PTC II, and 2A SPARE.

2. Remove and restencil with stencil from kit the following front panel markings in accordance with paragraph VII. A. 3.:

FROM	TO
5 AMP	5 ASB
5 A	5 ASB
2 AMP	5 AMP
2 A	5 A

VII. B. PROCEDURE (CONTINUED)

CAUTION: If fuse holders are removed to facilitate modification be certain proper identification is maintained to assure correct reassembly.

3. Obtain three (3) 5 amp fuses, P/N F02A250V5A, from kit, P/N 8102303, and install in the locations marked PTC II or newly marked as 5 AMP and 5A.

4. Replace nameplate located on side of case assembly (reuse the four mounting drive screws) with new nameplate from retrofit kit.

5. Remove and renumber the front panel assembly, P/N 1902248-021; change to -031, in accordance with paragraph VII. A. 3.

6. Remove and renumber the front panel, P/N 2901638; change to P/N 2901661, in accordance with paragraph VII. A. 3.

C. DETAIL PROCEDURE FOR BPP

Perform modification to the BPP, P/N 1900011-051, as follows:

1. Remove one (1) 2 amp fuse, P/N F02A250V2A, and one (1) 5 amp fuse, P/N F02B32V5AS, from the front panel locations under SPARE FUSES 2 amp and 5 amp. Retain the 5 amp fuse. From locations marked 2 AMP and PTC remove two (2) 2 amp fuses. Discard the three (3) 2 AMP fuses in accordance with paragraph IX.

VII. C. PROCEDURE (CONTINUED)

2. Remove and restencil with stencil from kit the following front panel markings in accordance with paragraph VII. A. 3.

Under SPARE FUSES

FROM	TO
2 AMP	5 ASB

Under FUSES

FROM	TO
5 AMP	5 ASB
2 AMP	5 AMP

CAUTION: If fuse holders are removed to facilitate modification be certain proper identification is maintained to assure correct reassembly.

3. Remove and renumber front panel assembly, P/N 1902630-011, change to -021, in accordance with paragraph VII. A. 3.

4. Remove and renumber front panel, P/N 1902629, change to P/N 2901662, in accordance with paragraph VII. A. 3.

5. Replace nameplate located on side of case assembly (reuse the four mounting screws) with new nameplate from retrofit kit.

VII. B. PROCEDURE (CONTINUED)

6. Install 5 amp fuse, P/N F02B32V5AS, retained from step VII. C. 1, into fuse holder location on front panel marked 5 ASB under SPARE FUSES.

7. Obtain three (3) 5 amp fuses, P/N F02A250V5A, from kit, P/N 8102302, and install in front panel locations 5 AMP, PTC, and SPARE FUSE holder marked 5 AMP.

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package by (1) inserting the Kit Acceptance Data List into the Unit Acceptance Data List, (2) making the necessary entry into the Equipment Inventory Record, and (3) recording modification in the Unit History Record (referencing Retrofit Instruction Bulletin).

B. If a part number change is made as a result of the modification record performance on the existing Unit History Record sheet and start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

VIII. MODIFICATION DESIGNATION (CONTINUED)

C. If a part number change is not made as a result of the modification, record performance on the existing Unit History Record sheet.

D. Complete Apollo Configuration Control (ACC) form No. 1 (revised) in accordance with ND 1002345.

IX. DISPOSITION OF PARTS REMOVED

Scrap ✓ removed parts in accordance with AC Electronics form MIL-127 or equivalent. Good fuses can be returned to stock.

ACC Form 1 (Revised)
10/10/66

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' Part No. 0102158
' Date: ________
' TDRR 37299
' Revision A

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

Indent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit			
					P/N	S/N		
1	ABP	1901492-041		748	8102303		1901492-051	
2	Front Panel	1902248-021					1902248-031	
	Assy							
3	Front Panel	2901638					2901661	
	ICTC	1900342-041		748	8102302		1900342-051	
1	BPP	1900011-051		748	8102302		1900011-061	
2	Front Panel	1902630-011					1902630-021	
	Assy							
3	Front Panel	1902629					2901662	

PART II: A/B PARTS ADDED OR REMOVED

Indent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

Sheet 1 of 9
Part No. 0102160
Date: 22 SEPT 69
TDRR 37822
Revision A

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR BLOCK II PSA ADAPTER MODULE (PSAAM) P/N 2901143-021 (ECP-ACSK-794)

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			~~MIT~~	NASA	
A	37822	ALL INITIAL RELEASE			8/4/69

Prepared by Carl G. Guile Date 29 July 69

P.C. Engineering Approval E.N. Carpenter Date 31 JULY 69

Design Review Board Approval Date 26 July 69

MIT/IL Approval Date

NASA Approval Date 9/4/69

MIT Reliability Date

Sheet 2 of 9
Part No. 0102160
Date:
TDRR
Revision A

I. PURPOSE

The purpose of this RIB is to provide instructions for the modification of the PSAAM, P/N 2901143-021. This modification is being performed to prevent the PSAAM from resting against the PSA closeout panel of the spacecraft by the addition of two spacer blocks to case bottom cover of the PSAAM.

II. AUTHORITY

This retrofit is authorized by ECP-ACSK-794; CCA 638 EA 8604-5379.

III. UNITS AFFECTED

Name	Pre-Modification P/N	Post-Modification P/N
PSAAM S/N's 1 thru 8	2901143-021	2901143-031

IV. PRIORITY CHANGES

N/A

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V. RELATED CHANGES

N/A

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102305, consisting of the following items is required to modify the PSAAM, P/N 2901143-021.

Qty	Part Number	Description
1	0102160	RIB
2	2901679-011	Spacer assembly
4	MS35338-81	Washers, lock
4	MS51958-64	Screws, pan hd
1	1004260-590	Nameplate

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
1	ND1002019	Marking specification
AR	1006271-10	Marking ink, Black
1	No.2 size	Drill
AR	MIL-C-5541A Type 1, grade B, class 2	Alodine or equivalent

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VI. B. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
AR	FED-TT-I-735a	Isopropyl alcohol
AR	O-B-14	Distilled water
AR	BB-F-671a, type F-113	Freon TF, cleaning agent

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and completely understand RIB prior to attempting this modification. Assure availability of latest issue of RIB by referring to SIDL.
2. All workmanship shall meet the minimum requirements defined in AC Workmanship Standard, AC-STD-1, dated 15 January 1965.
3. Ink Marking - Removing and remarking part numbers shall be accomplished as follows:

   Clean area to be remarked using isopropyl alcohol, distilled water, isopropyl alcohol, and freon, in that order. Allow cleaned area to air dry.

4. When marking is specified, hand marking is acceptable.

VII. PROCEDURE (CONTINUED)

B. DETAIL PROCEDURE.
Perform modification to the PSAAM, P/N 2901143-021, as follows:

1. Disassemble the case bottom cover from the PSAAM by removal of 34 button head screws and lock washers. Retain this attaching hardware.
2. Locate, punch centers, and drill (use no. 2 size drill) four (4) thru holes in accordance with Figure 1.
3. Deburr and clean surfaces of new holes and apply alodine to exposed unfinished aluminum surfaces at the four new holes.
4. Obtain from kit the two (2) spacer blocks, and four (4) pan head screws and split lock washers.
5. Install spacer blocks onto the outside surface of the case bottom cover assembly with two (2) pan head screws and split lock washers each; insert screws thru the new drilled holes from inner side of cover assembly. Orient spacer blocks with major height dimension toward bottom of case bottom cover.

VII. B. PROCEDURE (CONTINUED)

6. Remove and renumber the part number of the case bottom cover subassembly, P/N 2901243; change to 2901680, in accordance with paragraph VII.A.3.
7. Obtain nameplate, P/N 1004260-590, from kit. Locate existing nameplate on PSAAM and transfer serial number and contract number from existing nameplate to new nameplate.
8. Replace nameplate located on side of case assembly (reuse the four mounting screws) with new nameplate from retrofit kit.
9. Reassemble the modified case bottom cover, to the PSAAM using the attaching hardware retained in step B.1.

VIII. MODIFICATION DESIGNATION

A. Update the Acceptance Data Package by (1) inserting the Kit Acceptance Data List into the Unit Acceptance Data List, (2) making the necessary entry into the Equipment Inventory Record, and (3) recording modification in the Unit History Record (referencing Retrofit Instruction Bulletin).

B. If a part number change is made as a result of the modification, record performance on the existing Unit History Record sheet and start a new Unit History Record sheet for the changed part number. Retain the old Unit History Record sheet in the Acceptance Data Package.

C. If a part number change is not made as a result of the modification, record performance on the existing Unit History Record sheet.

D. Complete Apollo Configuration Control (ACC) form No. 1 (Revised) in accordance with ND 1002345.

CAUTION: When drilling the 4 thru holes, back area with a wooden block to prevent tearing of shielding.

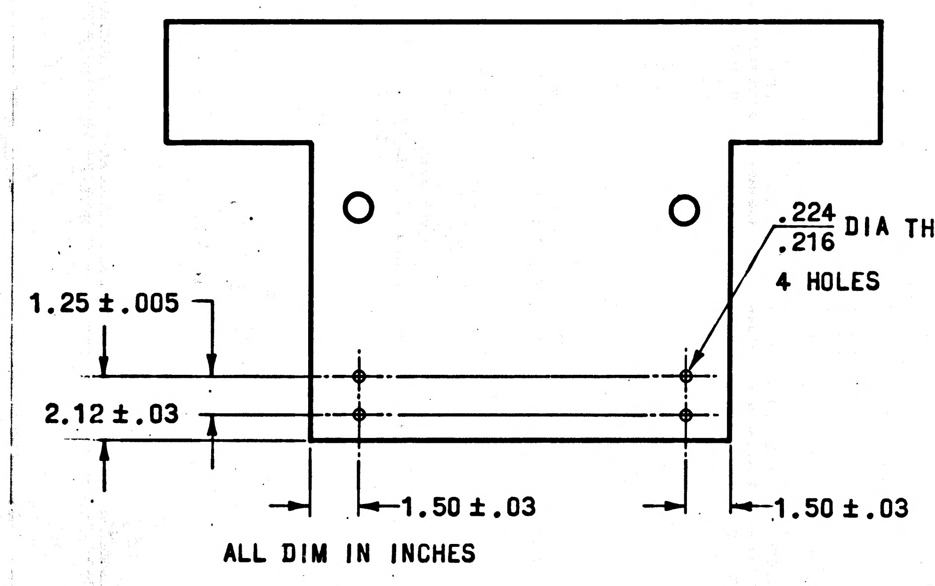

Figure 1. Spacer Block Mounting Hole Locations on PSAAM Case Bottom Cover (Rear or Outer Surface View)

ACC Form 1 (Revised)
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ꞌ Part No. 0102160
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RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # GSE

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	PSAAM	2901143-021		794	8102305		2901143-031	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ꞌApplicable for Retrofit only

Sheet 1 of 9
Part No. 0102600
Date: 22 FEB. 65
TDRR 19032
Revision —

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR SIGNAL CONDITIONER
POWER SUPPLY (ECP 0025)
ORIGINATOR: AC SPARK PLUG DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	

Prepared by James H. Woodruff Date March 5, 1965
P.C. Engineering
Approval H. Muller Date ______
Design Review Board
Approval W. Stameris Date 12 May 65
MIT/IL Approval W Kupfer 12 May 65 Date 12 May 65
NASA Approval ______ Date 5-12-65
MIT Reliability
Approval ______ 5/12/65 Date 5/12/65

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) shall contain necessary instructions for addition of a Signal Conditioner Power Supply to tray 10 of Block I, Series 00 G & N Systems 5, 6, 7, 8, and 20, and Block I, Series 5C G & N Systems 17 and 12, Power and Servo Assemblies. Addition of the power supply module shall provide necessary power requirements for proper Signal Conditioner Operation. The above changes were necessitated by the added requirement of a Signal Conditioner.

II. AUTHORITY

This retrofit is authorized by ECP 0025.

III. UNITS AFFECTED

Assy	Unit	P/N	New P/N	Kit P/N
PSA	Tray 10	1007160	1007256-011	8102601
PSA	Tray 10	1021230-011	1007256-021	8102600
PSA	Tray 10	1007460-011	1007256-021	8102600

IV. PRIORITY CHANGES

None.

V. RELATED CHANGES

None.

VI. MATERIAL REQUIRED

A. One (1) Retrofit Kit, P/N 8102601, for G & N Systems 5, 6, 7 and 8, consisting of the following.

Item	Qty	Nomenclature	P/N
1.	1	Retrofit Instruction Bulletin (RIB)	0102600
2.	1	Tray 10 Frame Assembly	1007258-011
3.	1	Signal Conditioner Power Supply	1007125
4.	18	Socket Head Cap Screw	NAS 1352-06-8
5.	18	Flat Washer	MS15795-805

B. One (1) Retrofit Kit, P/N8102600, for G & N Systems 20, 17 and 12, consisting of the following.

Item	Qty	Nomenclature	P/N
1.	1	Retrofit Instruction Bulletin (RIB)	0102600
2.	1	Tray 10 Frame Assembly	1007258-021
3.	1	Signal Conditioner Power Supply	1007525-011
4.	18	Socket Head Cap Screw	NAS 1352-06-8
5.	18	Flat Washer	MS15795-805

C. Special tools or equipment required but not supplied in kit.

Item	Qty	Nomenclature	P/N
1.	1	Hex Head Cap Screw Driver, (Snap On TMA-3-1/2, 1/4 Inch Square Drive, 7/64 Inch Size)	N/A
2.	1	Hex Head Cap Screw Driver, (Snap On TMA-5, 1/4 Inch Square Drive, 5/32 Inch Size)	N/A

VI. MATERIAL REQUIRED (CONTINUED)

Item	Qty	Nomenclature	P/N
3.	1	Socket Wrench Adapter (Snap-On TA-3 Adapter 3/8 Inch Square Drive, Female X 1/4 Inch Square Drive Male)	N/A
4.	1	Torque Wrench (P.A. Sturtevant F50-1, 0 to 50 Inch-Pounds, 3/8 Inch Square Drive)	N/A
5.	AR	Thermal Grease	1006879

VII. PROCEDURE

A. General

1. Read and thoroughly understand the RIB before attempting retrofit.

2. Assure that latest revision RIB is used to effect the modification. (Verify by checking with SIDL.)

B. Procedural

1. Remove tray 10 (P/N 1007160 for G & N Systems 5, 6, 7, and 8; P/N 1021230-011 for G & N System 20; and P/N 1007460-011 for G & N Systems 17 and 12) by:

   a. Unscrew one (1) socket head screw P/N 1008098, from jack screw retainer, P/N 1001317, located on front of tray face.

VII. PROCEDURE (CONTINUED)

b. Remove tray 10 from PSA.

2. Remove the following modules from their respective frame assemblies in this order:

Item	Qty/ Assy	Module and P/N	Frame Assy P/N	System S/N
1.	1	(800 cps Compensation)		
		P/N 1007095	1007150	5,6, 7 & 8
		P/N 1007591-011	1021220-011 1007450-011	20,17 & 12
2.	3	(G&N Subsystem Supply Filter)		
		P/N 1007090	1007150	5,6, 7 & 8
		P/N 1007590-011	1021220-011 1007450-011	20,17 & 12
3.	1	(Amplifier 5 percent 800 cps)		
		P/N 1007048	1007150	5,6, 7 & 8
		P/N 1007438-011	1021220-011 1007450-011	20,17 & 12

3. Remove 800 cps compensation module (Item 1) by unscrewing two (2) captivated hex jack screws, P/N 1008172. Turn one screw at a time (alternating) one after another in increments of one and one-half turns. Continue process until module is detached from frame. Retain module.

VII. PROCEDURE (CONTINUED)

4. Remove three (3) G & N subsystem supply filter modules (Item 2) by unscrewing three (3) captivated hex jack screws, P/N 1008172. Turn one screw at a time (alternating) one after another in increments of one and one-half turns. Continue process until modules are detached from frame. Retain modules.

5. Remove 5 percent, 800 cps amplifier module (Item 3) by unscrewing four (4) captivated hex jack screws, P/N 1008172. Turn one screw at a time (alternating) one after another in increments of one and one-half turns. Continue process until module is detached from frame. Retain module.

6. Scrap old tray 10 frameassemblies.

7. Items 1, 2 and 3 above shall be mounted on new frame assemblies in reverse order followed, lastly, by signal conditioner power supply module as designated below in the following sequence:

Item	Qty/ Assy	Module and P/N	New Frame P/N	System S/N
1.	1	(Amplifier, 5 percent 800 cps)		
		P/N 1007048	1007258-011	5,6, 7 & 8
		P/N 1007438-011	1007258-021	20,17 & 12

VII. PROCEDURE (CONTINUED)

Item	Qty/ Assy	Module and P/N	New Frame P/N	System S/N
2.	3	(G&N Subsystem Supply Filter)		
		P/N 1007090	1007258-011	5,6, 7 & 8
		P/N 1007590-011	1007258-021	20,17 & 12
3.	1	(800 cps Compensation)		
		P/N 1007095	1007258-011	5,6, 7 & 8
		P/N 1007591-011	1007258-021	20,17 & 12
4.	1	(Signal Conditioner Power Supply)		
		P/N 1007125	1007258-011	5,6, 7 & 8
		P/N 1007525-011	1007258-021	20,17 & 12

8. Mount retained modules as listed in the above sequence on their respective new frame assemblies as described below:

   a. Apply thermal grease, P/N 1006879, to heat-sink portion of mounting face of all modules.

   b. Plug modules in place and fasten to frame assembly with socket head cap screw, P/N NAS 1352-06-8, and flat washer, P/N MS15795-805.

VII. PROCEDURE (CONTINUED)

   c. Tighten screws, one at a time, until module is secure.

   d. Torque screws to, 25 to 30 inch-pounds.

9. Replace tray 10 in PSA.

10. Fasten socket head screw, P/N 1009098, located in jack screw retained, P/N 1001317, on face of tray 10 until fully secure. Torque screw to 25-30 inch-pounds.

VIII. MODIFICATION DESIGNATION

A. The following list comprises all resulting part number changes:

Series	Nomenclature	From	To
00	Tray 10, Frame Assy	1007150	1007258-011
00	Tray 10, Frame Assy	1021220-011	1007258-021
50	Tray 10, Frame Assy	1007450-011	1007258-021
00	Signal Conditioner Power Supply	None	1007125
50	Signal Conditioner Power Supply	None	1007525-011

B. The following part number changes resulted due to this RIB and therefore should be noted:

Series	Nomenclature	From	To
00	Power Diodes & Signal Conditioning Electronics Assembly	1007160	1007256-011

VIII. MODIFICATION DESIGNATION (CONTINUED)

Series	Nomenclature	From	To
00	Power Diodes & Signal Conditioning Electronics Assembly	1021230-011	1007256-021
50	Power Diodes & Signal Conditioning Electronics Assembly	1007460-011	1007256-021
00	Power & Servo Assy	1007100	1007257-011
00	Power & Servo Assy	1007170	1007257-021
00	Power & Servo Assy	1021207-011	1007257-031
50	Power & Servo Assy	1007400-011	1007257-041

IX. DISPOSITION OF PARTS REMOVED

Scrap any tray 10 (old) frames assemblies removed.

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Part No. 0102643
Date: 10/14/66
TDRR 31551
Revision A

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR NAV. BASE, OPTICAL UNIT AND BELLOWS INSTALLATION KIT, P/N 2899950-011 (BLK II) AND NAVIGATION BASE ASSEMBLY LEM, P/N 6899950-011 AND P/N 6899980-011 (ECP-ACSK-0359)

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			CCA	NASA	
A	31551	ALL INITIAL RELEASE		–	10/14/66

Prepared by Konrad K Konaitzke Date 12 September 1966

P.C. Engineering Approval BEL 9/12/66 H. Miller Date 14 Sept 1966

Design Review Board Approval W Stamens Date 7 Oct 66

MIT/IL Approval________ Date________

NASA Approval________ Date________

MIT Reliability________ Date________

Sheet 2 of 17
Part No. 0102643
Date: 9 SEPT 66
TDRR
Revision A

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instruction for the modification of the Nav Base Optical Unit and Bellows Installation Kit and Navigation Base Assembly LEM (kit). This modification is required to prevent galling of alignment surfaces on the IMU mounting pads during assembly and disassembly of the IMU to the Navigation Base. (Both LEM and BLK II)

II. AUTHORITY

This Retrofit is authorized by ECP-ACSK-0359. (CCA-497-0313)

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Nav. Base, Optical Unit and Bellows Installation Kit (G&N Systems 201,202,203,204,205, and 206)	2899950-011	2899950-031
Navigation Base Assembly LEM (G&N Systems 601 and 602)	6899950-011	6899950-021
Navigation Base Assembly LEM (G&N Systems 603,604,605, and 606)	6899980-011	6899980-021

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IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

Not applicable.

VI. MATERIAL REQUIRED

A. Retrofit kit, P/N 8102668, contains the following items:

Qty	Part Number	Description
1	0102643	Retrofit Instruction Bulletin (RIB)
2	2021204	Bushing
4	NAS674V19	Bolt, Hex Cap

B. Retrofit kit, P/N 8102685, contains the following items:

Qty	Part Number	Description
1	0102643	Retrofit Instruction Bulletin (RIB)
2	2021204	Bushing, sleeving, IMU mount
4	NAS674V19	Bolt, Hex Cap
1	1004260-101	Identification plate

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VI. MATERIAL REQUIRED (CONTINUED)

C. Retrofit kit, P/N 8102684, contains the following items:

Qty	Part Number	Description
1	0102643	Retrofit Instruction Bulletin (RIB)
2	2021204	Bushing, sleeving, IMU mount
4	NAS674V19	Bolt, Hex Cap
1	1004260-508	Identification plate

D. Materials and special tools required but not supplied in the retrofit kit are as follows:

Qty	Part Number	Description
AR	N/A	Methyl-ethyl-ketone (MEK) TT-M-261
AR	1011541	Adhesive, epoxy (3M, type EC2216)
1	ND1002219	Instructions to apply 1011541 adhesive. Apply in accordance with Method II.

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand RIB prior to performing modifications.
2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

B. DETAILED PROCEDURES. Perform the following modifications as applicable.

1. Modify Nav. Base Optical Unit and Bellows Installation Kit, P/N 2899950-011, (G & N Systems 201 through 206) in accordance with paragraph C.
2. Modify Navigation Base Assembly LEM, P/N 6899950-011, (G & N Systems 601 and 602) in accordance with paragraph D.
3. Modify Navigation Base Assembly LEM, P/N 6899980-011, (G & N Systems 603 through 606) in accordance with paragraph E.

VII. PROCEDURE (CONTINUED)

C. MODIFICATION OF NAV. BASE, OPTICAL UNIT AND BELLOWS INSTALLATION KIT, P/N 2899950-011, (G & N Systems 201 through 206). Perform modification as follows:

NOTE: Do not incorporate modification if IMU is mounted in spacecraft, assign retrofit kit to system and install kit during installation of a replacement IMU or when an IMU has been removed and is being reinstalled.

1. Obtain retrofit kit, P/N 8102668.
2. Obtain Nav. Base, Optical Unit and Bellows Installation Kit, P/N 2899950-011, and remove the following items:

Qty	Part Number	Description
2	NAS674V18	Bolt, hex cap
2	2899992	Bolt, IMU mount

3. Obtain items from retrofit kit, P/N 8102668, and add to installation kit, P/N 2899950-011.
4. Dispose of all removed parts in accordance with section IX.
5. Update applicable records and forms in accordance with section VIII.

VII. PROCEDURE (CONTINUED)

D. MODIFICATION OF NAVIGATION BASE ASSEMBLY LEM, P/N 6899950-011, (G & N Systems 601 and 602). Perform modification as follows:

NOTE: Do not incorporate modification if IMU is mounted in spacecraft. If IMU is mounted in spacecraft, assign retrofit kit to system and install kit during installation of a replacement IMU or when a IMU has been removed and is being reinstalled.

1. Obtain retrofit kit, P/N 8102685.
2. Obtain Navigation Base Assembly LEM, P/N 6899950-011, and remove the following items:

Qty	Part Number	Description
2	NAS674V18	Bolt, hex cap
2	2899992	Bolt, IMU mount

3. Obtain the following items from retrofit kit, P/N 8102685, and add to Navigation Base Assembly LEM, P/N 6899950-011, (kit):

Qty	Part Number	Description
4	NAS674V19	Bolt, hex cap
2	2021204	Bushing, sleeving-IMU mount

VII. D. PROCEDURE (CONTINUED)

4. Obtain identification plate, P/N 1004260-101, from retrofit kit and transfer serial number and contract number from existing nameplate on Navigation Base Assembly LEM, P/N 6899951-011 (final machined) to new nameplate. Use typewriter (with ribbon removed) to imprint information on new identification plate. (Height of typewriter characters should be 0.057 to 0.067 inches.)

   WARNING: Methyl-ethyl-ketone (MEK) is toxic and inflammable. When using this solvent provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

5. Clean old identification plate with MEK.
6. Mount new identification plate over old plate using 1011541 epoxy adhesive applied in accordance with ND 1002219, method II.
7. Dispose of all removed parts in accordance with section IX.
8. Update applicable records and forms in accordance with section VIII.

VII. PROCEDURE (CONTINUED)

E. MODIFICATION OF NAVIGATION BASE ASSEMBLY LEM, P/N 6899980-011 (G & N Systems 603 through 606). Perform modification as follows:

NOTE: Do not incorporate modification if IMU is mounted in spacecraft. If IMU is mounted in spacecraft, assign retrofit kit to system and install kit during installation of a replacement IMU or when an IMU has been removed and is being reinstalled.

1. Obtain retrofit kit, P/N 8102684.

2. Obtain Navigation Base Assembly LEM, P/N 6899980-011, and remove the following items:

Qty	Part Number	Description
2	NAS674V18	Bolt, hex cap
2	2899992	Bolt, IMU mount

3. Obtain the following items from retrofit kit, P/N 8102684, and add to Navigation Base Assembly LEM, P/N 6899980-011 (kit):

Qty	Part Number	Description
4	NAS674V19	Bolt, hex cap
2	2021204	Bushing, sleeving-IMU mount

VII. E. PROCEDURE (CONTINUED)

4. Obtain identification plate, P/N 1004260-508, from retrofit kit and transfer serial number and contract number from existing identification plate on Navigation Base Assembly LEM, P/N 6899978-011 (final machined) to new plate. Use typewriter (with ribbon removed) to imprint information on new identification plate. (Height of typewriter characters should be 0.057 to 0.067 inches.)

WARNING: Methyl-ethyl-ketone (MEK) is toxic and inflammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

5. Clean surface of old identification plate with MEK.

6. Mount new identification plate over old plate using 1011541 epoxy adhesive applied in accordance with ND 1002219, method II.

7. Dispose of all removed parts in accordance with section IX.

8. Update applicable records and forms in accordance with section VIII.

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. **MODIFICATION DESIGNATION** (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.
2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.
3. Repair - If a repair; check the repair block.
4. Complete the chart as follows:
    - a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.
    - b. Qty. - Insert the quantity of the added and/or removed part.
    - c. Part Name - Insert the name of the added and/or removed part.
    - d. P/N - Insert the part number of the added and/or removed part.
    - e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.
    - f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. **MODIFICATION DESIGNATION** (CONTINUED)

- g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.
2. Make necessary entry in the Equipment Inventory Record sheet.
3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. **MODIFICATION DESIGNATION** (CONTINUED)

E. Significant part number changes resulting from this modification are listed in section III.

IX. **DISPOSITION OF PARTS REMOVED**

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

Typical [illegible] with regular typewriter

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ________ G&N # ________

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

Sheet 17 17 of 17
Part No. 0102643
Date: 9 SEPT 66
~~TDRR~~ 31551
Revision A

ACC Form No. 1a
2/23/66

Date: ____________

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ____________ P/N: ____________ S/N: ________

ECP NO.: ____________ Retrofit Kit No.: ____________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ____________

Sheet 1 of 23
Part No. 0102644
Date: 7 JULY 1966
TDRR 31707
Revision A

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR G & N INTERCONNECT HARNESS GROUP, C/M BLK II, P/N 2014567-021 (ECP-ACSK-0388)

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	31707	~~INITIAL RELEASE~~ ALL			10/27/66

Prepared by ______ Date 8 July 1966

P.C. Engineering Approval W Farley ______ Date 12 JULY 66

Design Review Board Approval ______ Date 21 Oct 66

MIT/IL Approval ______ Date 10-7-66

NASA Approval ______ Date 10/20/66

MIT Reliability ______ Date 12/7/66

Sheet 2 of 23
Part No. 0102644
Date: 7 JULY 1966
TDRR
Revision A

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the replacement of hardware and refinishing of connectors to eliminate possible corrosion problems.

II. AUTHORITY

This retrofit is authorized by ECP-ACSK-388 CCA-
CCA-497-0281

III. UNITS AFFECTED

Name	Pre-Modification P/N	Post-Modification P/N
G & N Interconnect Harness Group (G & N System 203)	2014567-021	2014567-031

IV. PRIORITY CHANGES

Not applicable

V. RELATED CHANGES

Not applicable

Sheet 3 of 23
Part No. 0102644
Date: 7 JULY 1966
TDRR
Revision A

VI. MATERIAL REQUIRED

A. One retrofit kit, P/N 8102669, consisting of the following is required to accomplish this modification:

Qty	Part Number	Description
1	0102644	Retrofit Instruction Bulletin
28	2010782-001	Screw, jack
8	2010782-002	Screw, jack
28	2010767-001	Washer, step
6	2010767-002	Washer, step
8	2010767-003	Washer, step
4	2010767-004	Washer, step
46	2010768	Gasket
4	1008827-002	Screw, cap, socket head - captive
6	1008827-003	Screw, cap, socket head - captive
36	1004207	Drive cylinder ejection screw
36	2004148-010	Washer, flat
36	MS171433	Pin, spring
1 pt	1010992	Primer coating, epoxy polyamide chemical and solvent resistant
1 pt	1008809-1	Paint, epoxy, dark gray
1 pt	1012543-003	Coating kit, light diffusing

Sheet 4 of 23
Part No. 0102644
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TDRR
Revision A

VI. MATERIAL REQUIRED (CONTINUED)

B. Material and special tools required but not supplied in this kit are as follows:

Qty	Part Number	Description
AR	N/A	Lacquer thinner (MS35626)
AR	N/A	Clear lacquer (MIL-L-73A)
AR	N/A	Marking India ink
1	*Schwaab Stamp and Seal Co., type AAG-0	Rubber stamp, 1/8 inch, thirteen band, alpha numerical
AR	FED-TT-1-735	Isopropyl alcohol
AR	Dupont, type TF	Freon
AR	TT-N-95	Naptha, aliphatic
AR	*America Paper Co., Y9108	Masking tape
AR	MIL-M-3171, type 6	Dow Corning 19
1	N/A	Piloted counterbore, 0.312 dia
AR	TT-M-261	Methyl-Ethyl-Ketone
AR	TT-X-916	Zylene
AR	TT-T-548	Toluene

* or equivalent

VII. PROCEDURE

A. GENERAL REQUIREMENTS

1. Read and understand complete RIB prior to attempting this modification.

2. Obtain following documents for use in performing this modification:
   ND 1002279
   ND 1002291
   ND 1002040
   ND 1002019

3. All workmanship shall meet the minimum requirements defined in Workmanship Standard AC-STD-1, dated 15 January 1965.

4. Ink Markings.

   a. Markings to be removed should be removed using lacquer thinner.

   b. New markings shall meet requirements of ND 1002019. Do not apply a coat of clear flat lacquer after ink has dried to pin identifications.

5. When marking is specified, hand marking is acceptable.

VII. A. PROCEDURE (CONTINUED)

6. Remove harnesses "A" through "H" (see Table 1) from containers and perform visual inspection prior to performing detailed modifications.

7. Insure protective covers or plates are on all connector plugs not being modified prior to performing detailed modifications.

B. DETAILED PROCEDURES. Perform modifications to connectors contained in Table 2 in accordance with paragraphs C and D.

NOTE: Paragraph C is a typical example to be used for refinishing all nine (9) connectors contained in Table 2.

CDU

C. DETAILED REFINISHING PROCEDURE.
Refinish CDU electrical connector plug, P/N 2014741-011, P9, as follows.

1. After wiring harness "A" has had a visual inspection, place on bench with CDU connector plug (P9) accessable.

2. Remove 4 jack screws, P/N 1004579-1, and 8 flat washers, P/N's 1004546-1 and 1004546-3, from connector by removing external retaining rings, P/N MS16633-4015. See figure 1 for reference.

VII. C. PROCEDURE (CONTINUED)

3. Remove 2 captive cap. socket head screws, P/N 1008827-1, and 2 flat washers, P/N 1004546-3, from connector. See figure 1 for reference.

4. Clean connector base, P/N 2010658, and shell, P/N 2014754, using Isopropyl alcohol, P/N FED-TT-1-735, and Freon, Dupont, type TF. Wait one hour before proceeding to next step.

5. Mask pin area on bottom of CDU connector and all exposed areas of the harness above the connector in accordance with ND 1002291. See figures 1 and 2 for reference.

6. Record all pin numbers and other identification markings which will be covered by painting. Make special note of pin markings with respect to polarizing holes and physical size of connector base to ensure correct marking after connector has been painted.

7. Obtain epoxy polyamide primer, P/N 1010992, from kit and prepare in accordance with ND 1002279.

NOTE: Primer coat shall be dried for a minimum of one hour at room temperature prior to applying first coat of paint.

8. Spray complete connector with primer prepared in step 7 in accordance with ND 1002279.

VII. C. PROCEDURE (CONTINUED)

9. Obtain dark gray epoxy paint, P/N 1008809-1, from kit and prepare an ample amount to paint CDU connector in accordance witn ND 1002279.

10. Apply a spray coat of paint prepared in step 9 to complete connector in accordance with ND 1002279.

11. Allow connector a minimum of 30 minutes to air dry, then install in oven and bake for 35 minutes at a temperature of 140 ± 5 degrees F.

12. Obtain light-diffusing coating kit P/N 1012543-003 from kit and prepare an ample amount to paint connector in accordance with ND 1002291.

13. Apply a spray coat of paint prepared in step 12 to complete CDU connector in accordance with ND 1002291. CDU

14. Allow connector a minimum of 15 minutes to air dry, then install in oven and bake for 24 hours at a temperature of 140 ± 5 degrees F.

15. Remark all pin numbers and other identification markings which were covered in step 8. Make sure connector is correctly marked. (See note 1.)

16. Remove masking tape.

VII. C. PROCEDURE (CONTINUED)

17. Using a piloted counterbore, remove paint from immediate area around four (4) jack screw holes on top side of connector base. See figure 1, top view.

18. Thoroughly clean all surfaces where masking tape and paint have been removed in accordance with ND 1002291.

19. Apply Dow 19 (MIL-M-3171, type 6) to jack screw holes where paint has been removed in accordance with ND 1002040.

20. Repeat steps 1 through 19 for remaining connectors (see table 2). Part numbers for hardware being removed are identical, except connector plugs 56P18, 56P19, 56P17, 56P26, 56P28, 56P29, and 56P27, which contain jack screws, P/N 1004579-3 rather than jack screws, P/N 1004579-1.

21. Proceed to paragraph D after all connectors in table 2 have been painted.

NOTE 1: When remarking information on shell of connectors, replace harness part numbers with new part numbers, located in table 1. (Harness "A" part number information is located on connector 56P10.)

VII. PROCEDURES (CONTINUED)

D. DETAILED JACK SCREW AND CAPTIVE SCREW INSTALLATION. Install jack screws and captive screws as follows:

1. Jack Screw Installation Procedure for Connector Plugs 56P9 & 56P10.

a. Obtain the following items from retrofit kit.

Qty	Part Number	Description
8	2010782-002	Jack screws
8	2010767-003	Step washers
4	2010757-004	Step washers
12	2010768	Gaskets
8	1004207	Drive cylinders
8	2004148-010	Washer
8	MS171433	Pins
4	1008827-002	Captive cap. socket head screws

NOTE: Use figure 3 in conjunction with following steps for installation.

b. Obtain a jack screw, P/N 2010782-002, and install a washer, P/N 2004148-010.

c. Install jack screw up through bottom of connector base. (Jack screws are installed in all 4 corners of the connectors.)

VII. D. PROCEDURE (CONTINUED)

d. Obtain gasket, P/N 2010768 and step washer, P/N 2010767-003 and install gasket on step washer.

e. Install gasket & step washer on jack screw. Ensure gasket is toward connector.

f. Obtain drive cylinder, P/N 1004207, and install on jack screw.

g. Obtain pin, P/N MS171433. Align hole in jack screw with hole in drive cylinder and install pin.

h. Repeat steps c through g for remaining corners of both connectors.

2. Captive Screw Installation Procedures for Connector Plugs 56P9 & 56P10.

a. Obtain a step washer P/N 2010767-004, and gasket, P/N 2010768. Install gasket on step washer.

b. Obtain captive cap. socket head screw, P/N 1008827-002, and install step washer and gasket. Ensure gasket is facing away from captive screw head.

VII. D. PROCEDURE (CONTINUED)

c. Screw captive screw through threaded hole in connector base. (Only center holes are threaded.)

d. Repeat steps a through c for installation of remaining captive screws in connector base center holes.

3. Jack Screw Installation Procedure for Connector Plugs 56P18, 56P19, 56P17, 56P26, 56P28, 56P29, and 56P27.

a. Obtain the following items for connector plugs listed above.

Qty	Part Number	Description
28	2010782-001	Jack Screw
28	2010767-001	Step washer
34	2010768	Gaskets
28	1004207	Drive cylinder
28	2004148-010	Washer
28	MS171433	Pins
6	1008827-003	Captive cap. socket head screws
6	2010767-002	Step washer

NOTE: Use figure 3 in conjunction with the following steps for installation.

b. Obtain a jack screw, P/N 2010782-001, and install a washer, P/N 2004148-010.

VII. D. PROCEDURE (CONTINUED)

c. Install jack screw up through bottom of connector base. (Jack screws are installed in all 4 corners of the connectors.)

d. Obtain gasket, P/N 2010768, and step washer, P/N 2010767-001, and install gasket on step washer.

e. Install gasket and washer on jack screw. Ensure gasket is toward connector.

f. Obtain drive cylinder, P/N 1004207, and install on jack screw.

g. Obtain pin, P/N MS171433. Align hole in jack screw with hole in drive cylinder and install pin.

h. Repeat steps c through g for remaining corners of connectors.

4. Captive Screw Installation Procedures for Connector Plugs 56P19, 56P17, and 56P29.

a. Obtain a step washer, P/N 2010767-002, and gasket, P/N 2010768. Install gasket on step washer.

VII. D. PROCEDURE (CONTINUED)

b. Obtain captive cap. socket head screw, P/N 1008827-003, and install step washer and gasket. Ensure gasket is facing away from captive screw head.

c. Screw captive screw through threaded hole in connector base. (Only center holes are threaded.)

d. Repeat steps a through c for installation of remaining captive screws in connectors 56P19, 56P17, and 56P29. (Center threaded holes.)

5. Dispose of all removed parts in accordance with section IX.

6. Update applicable records and forms as indicated in section VIII.

Table 1. Harness Information

Harness Number	Connector Number	Connector Pre-Modification P/N	Connector Post-Modification P/N
A	56P9 & 56P10	2014641	2010774
B	56P18	2014642	2010775
C	56P19	2014643	2010776
D	56P17	2014796	2010777
E	56P26	2014645	2010778
F	56P28	2014646	2010779
G	56P29	2014647	2010780
H	56P27	2014648	2010781

VII. PROCEDURES (CONTINUED)

Table 2. Connector Information

Harness Number	Connector Number	Connector Pre-Modification P/N	Connector Post-Modification P/N
A	56P9	2014741-011	2014741-021
A	56P10	2014749-011	2014749-021
B	56P18	2014742-011	2014742-021
C	56P19	2014743-011	2014743-021
D	56P17	2014744-011	2014744-021
E	56P26	2014745-011	2014745-021
F	56P28	2014746-011	2014746-021
G	56P29	2014747-011	2014747-021
H	56P27	2014748-011	2014748-021

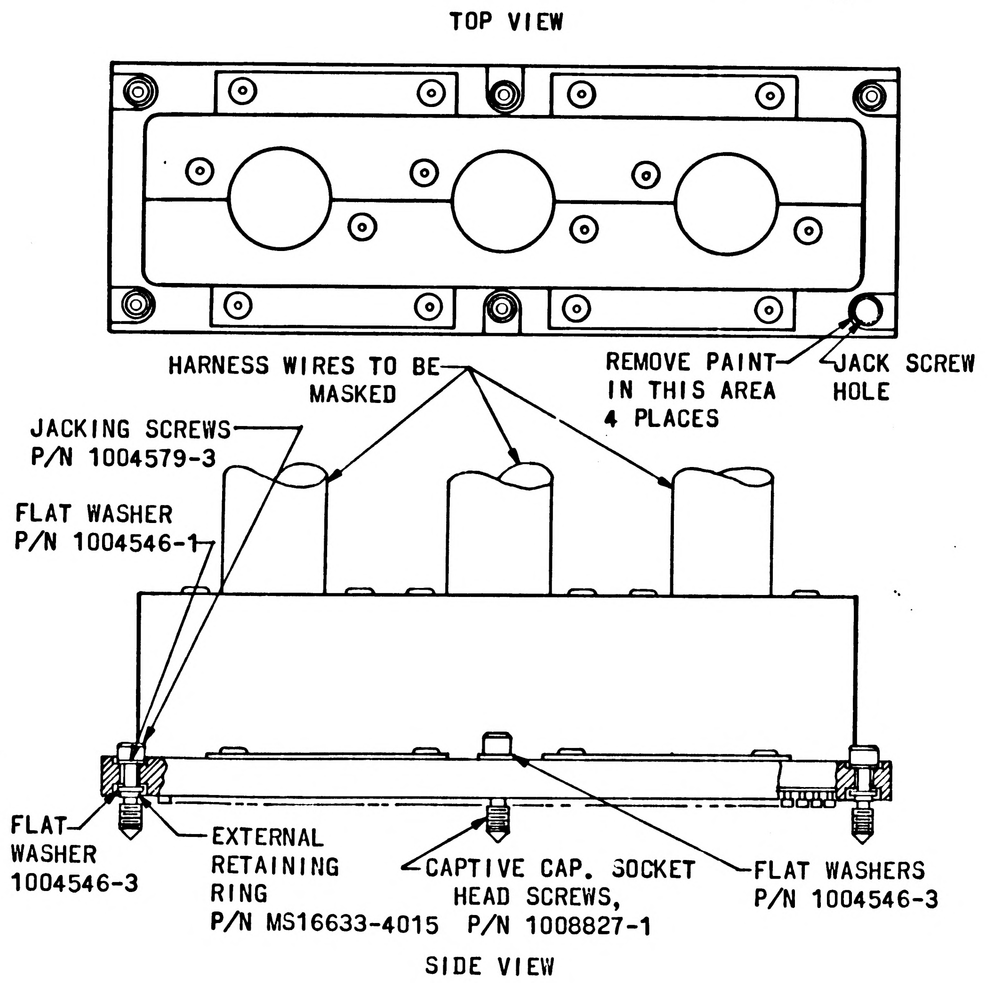

TOP VIEW
HARNESS WIRES TO BE MASKED
REMOVE PAINT IN THIS AREA 4 PLACES
JACK SCREW HOLE
JACKING SCREWS P/N 1004579-3
FLAT WASHER P/N 1004546-1
FLAT WASHER 1004546-3
EXTERNAL RETAINING RING P/N MS16633-4015
CAPTIVE CAP. SOCKET HEAD SCREWS, P/N 1008827-1
FLAT WASHERS P/N 1004546-3
SIDE VIEW

Figure 1.

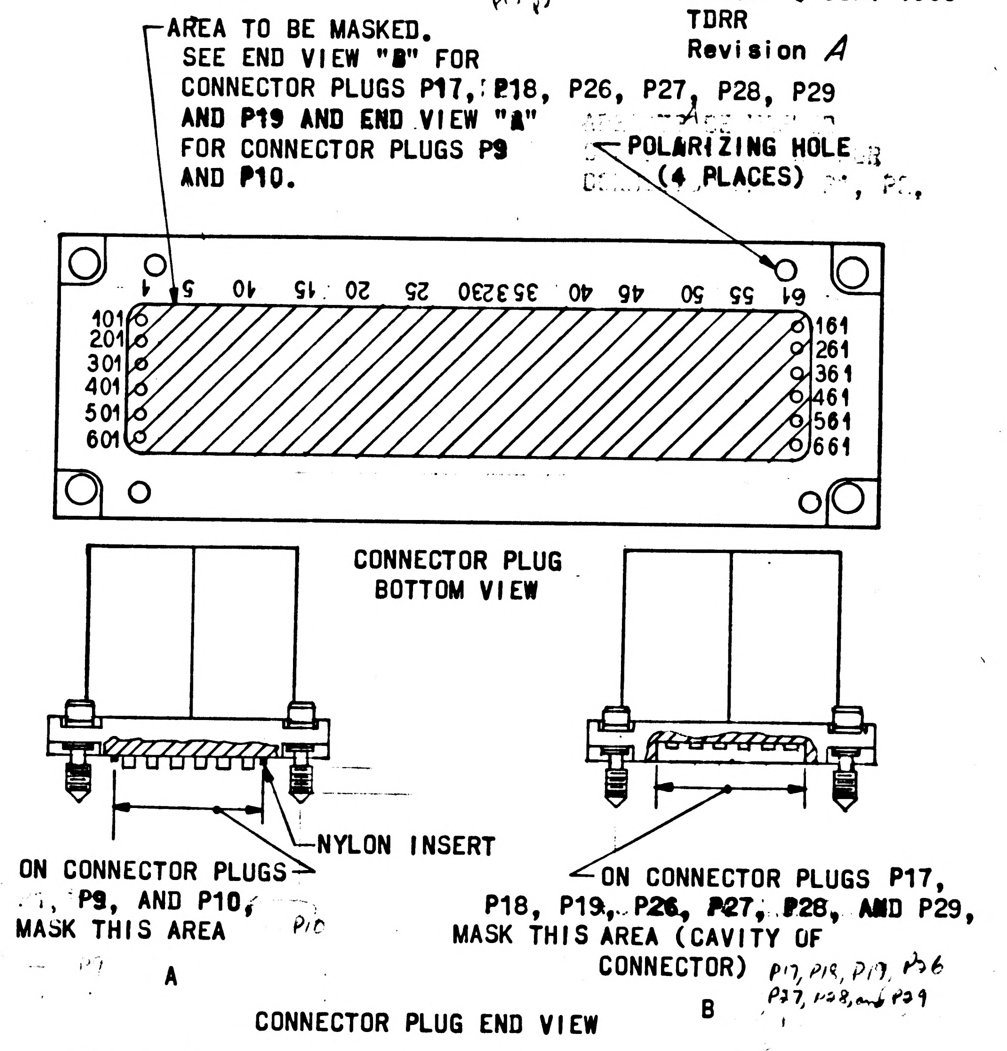

AREA TO BE MASKED.
SEE END VIEW "B" FOR CONNECTOR PLUGS P17, P18, P26, P27, P28, P29 AND P19 AND END VIEW "A" FOR CONNECTOR PLUGS P9 AND P10.
POLARIZING HOLE (4 PLACES)
1 5 10 15 20 25 30 35 40 46 50 55 61
101 201 301 401 501 601
161 261 361 461 561 661
CONNECTOR PLUG BOTTOM VIEW
NYLON INSERT
ON CONNECTOR PLUGS P9, AND P10, MASK THIS AREA
A
ON CONNECTOR PLUGS P17, P18, P19, P26, P27, P28, AND P29, MASK THIS AREA (CAVITY OF CONNECTOR)
P17, P18, P19, P26 P27, P28, and P29
B
CONNECTOR PLUG END VIEW

Figure 2. End and Bottom Views of Connector Plugs

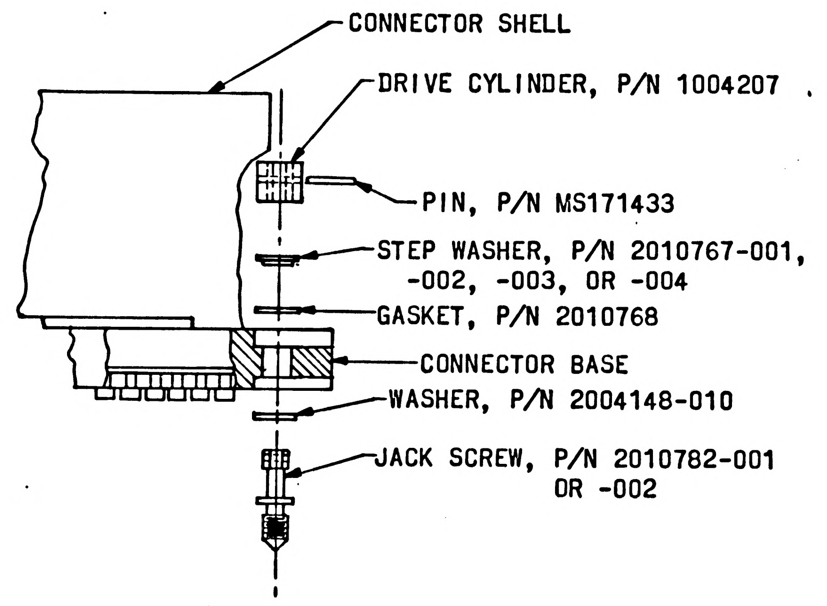

CONNECTOR SHELL
DRIVE CYLINDER, P/N 1004207
PIN, P/N MS171433
STEP WASHER, P/N 2010767-001, -002, -003, OR -004
GASKET, P/N 2010768
CONNECTOR BASE
WASHER, P/N 2004148-010
JACK SCREW, P/N 2010782-001 OR -002

Figure 3. Jack Screw Installation

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. MODIFICATION DESIGNATION (CONTINUED)

E. See Tables 1 and 2 for part number changes resulting from this modification.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

Attachment #1
Part No. 0102644
Date:
TDRR: 31707
Revision A

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ________ G&N # ______

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No.1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

Attachment #2
Part No. 0102644
Date:
TDRR: 31707
Revision: A

ACC Form No. 1a
2/23/66

Date: ____

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ____________ P/N: ____________ S/N: ______

ECP NO.: ____________ Retrofit Kit No.: ____________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ____________

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY, P/N 1899950-191 AND P/N 1899950-211
ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	CM216232	1,3,5,7,8,9,10,16,18			12 NOV 66
B	32202	INITIAL RELEASE		—	12/1/66

Prepared by ____ Date Oct 15 1966
P.C. Engineering Approval ____ / H. Miller Date 10-26-66
Design Review Board Approval John E. Miller, ____ Date 28 Nov 66
MIT/IL Approval ____ Date ____
NASA Approval ____ Date 11/28/66
MIT Reliability ____ Date ____

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Navigation Base and Optical Unit Assembly. This modification is being performed to add the astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This retrofit is authorized by CCA-497-0309, REV 1, in liew of approval of ECP-0427.

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Navigation Base	1899950-191	1899950-311
Navigation Base	1899950-211	1899950-321

IV. PRIORITY CHANGES

Not applicable

V. RELATED CHANGES

Not applicable

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102691, consisting of the following items is required to modify the Navigation Base and Optical Unit Assembly.

Qty	Part Number	Description
1	1021382	Seat, sextant cover
4	1008487-001	Screw, slotted hd. cap
1	1008487-002	Screw, slotted hd. cap
4	1008487-003	Screw, slotted hd. cap
13	1008486	Washer, flat
4	1008488	Screw, slotted, special
7	1008493	Insulator
1	1008495	Seat, telescope cover
4	1008494	Screw, flat head
1	1008490	Cover and Baffle Telescope (Insep Assy)
1	1008480	Cover and Baffle Sextant (Insep Assy)
1	1021377	Crown Half & Plug Assy Telescope (Matched Assy)
1	1021378	Crown Half & Plug Assy Sextant (Matched Assy)
4	1008484-000	Screw, captive
1	1014650-19	Nameplate
1	0102662	Retrofit Instruction Bulletin
2	1021379	Fastener, Screw Tube, Flat Hd.
1	1012196	Nameplate
1	1021383	Clamp
6	1008484-001	Screw, Captive
1	1021340	Potting Ring, Telescope

VI. MATERIALS REQUIRED

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	FED-TT-I-735	Isopropyl alcohol
AR	DuPont Type TF	Freon
AR	N/A	Adhesive (MIL-S-22473, grade C) Sealing and retaining compound
1	ND1002329-001	Process specification for bonding with 1008903 adhesive (EPON 954)
AR	1008903	Adhesive (EPON 954)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	1011541	Adhesive, Epoxy

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Obtain Retrofit Kit, P/N 8102691, and perform modifications to telescope head, in accordance with paragraph C, and sextant head, in accordance with paragraph D.

C. TELESCOPE HEAD.

1. Remove existing cover, P/N 2012547, from telescope head and dispose as per direction given in section IX.

   NOTE: When loosening four (4) captive screws, P/N 1008484-000, no more than 2 turns per screw, alternating until loose.

2. Obtain telescope cover seat, P/N 1008495, and cover and baffle, P/N 1008490, install four (4) captive screws, P/N 1008484-000, into telescope cover and baffle assembly. Assemble seat and cover to telescope head. Orient assembly so telescope scans 45° off the optics center line in direction of worm shaft bearing retaining cap, P/N 2011186, and seat the assembly on the telescope prism mount support, P/N 2011185-000 or 011 for a fit check. Check for proper seating of assembly, proper clearance of optics, and mounting screw hole alignment.

VII. C. PROCEDURE (CONTINUED)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

NOTE: Do not clean painted surfaces with MEK.

3. Remove telescope cover seat from cover assembly and clean telescope cover seat with MEK. Rinse with isopropyl alcohol and freon.

4. Install telescope potting ring, P/N 1021340, between telescope head seating surface and telescope cover seat, P/N 1008495. See figure 1.

5. Obtain adhesive, P/N 1008903 (hereafter referred to as EPON 954) and prepare in accordance with ND 1002329-001.

6. Apply a narrow band of adhesive EPON 954 to telescope cover seat. (See figure 3).

7. Clean adhesive from all surfaces not to be bonded. Install telescope cover seat making certain alignment repeats trial fit orientation.

VII. C. PROCEDURE (CONTINUED)

8. Install telescope cover and baffle, P/N 1008490. Align the four (4) holes of cover and baffle with holes in telescope seat cover and attach with four (4) captive screws, P/N 1008484-000. Torque screws 5 to 6 inch pounds.

   NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N, Form R, and allow to dry.

9. Apply adhesive, MIL-S-22473, grace C to threads of flat head screws, P/N 1008494. Insert screws through cover and baffle, P/N 1008490 and torque assembly to telescope head 4 ± 1 inch pounds. Ensure assembly is fully seated to telescope before torquing screws. Check for proper clearance of optics and telescope cover.

   NOTE: Rotate telescope by hand every 15 minutes for 1 hour.

10. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

VII. PROCEDURE (CONTINUED)

D. SEXTANT HEAD.

1. Remove existing cover, P/N 2012675, from sextant head. Do NOT remove the two (2) 6 inch long threaded studs, P/N 2011603. Discard slotted nuts, P/N 2011602, and cover, P/N 2012675, in accordance with section IX.

   CAUTION: Avoid any damage to flex print circuit board.

   NOTE: If any interference problems are encountered, reorient flex print to provide clearance.

2. Trial fit sextant cover seat, P/N 1021382, and clamp, P/N 1021383, to sextant head. Check for proper seating to sextant head.

3. Rotate sextant so that sextant flex print circuit board junction is in lowest position.

   CAUTION: Move mirror by using top of mirror and move it very slowly from stop to stop. Do NOT touch mirror surface.

   NOTE: Ensure assembly does not bind with flex print during or after installation.

VII. D. PROCEDURE (CONTINUED)

4. Install 6 captive screws, P/N 1008484-001, into cover and baffle assembly. Temporarily attach sextant cover and baffle assembly, P/N 1008480 to seat (see step 2) using (6) captive screws (1008484-001) and two screw tube fasteners, P/N 1021379, to long studs. Check clearance between sextant mirror and sextant cover and baffle assembly, P/N 1008480. Carefully move mirror from stop to stop and check clearance on each side. Rotate cover and baffle assy to provide approximately 1/8 inch clearance between mirror, mirror mount, and mirror bracket.

5. Remove sextant cover seat, sextant cover clamp and sextant baffle assembly. (Separate cover seat and clamp from cover and baffle assembly.)

   WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

   CAUTION: Do not apply MEK to painted surfaces.

6. Clean sextant cover seat with MEK. Rinse with isopropyl alcohol and freon.

VII. D. PROCEDURE (CONTINUED)

7. Apply a narrow band of adhesive EPON 954 to sextant cover seat, P/N 1021382, see figure 3. Remove any excess adhesive. Clean adhesive from all surfaces not to be bonded.

8. Carefully install sextant cover seat, P/N 1021382 and sextant cover clamp, P/N 1021383, over flex print circuit board and seat properly to sextant housing, orient screw holes to location obtained during trial fit (step 2).

9. Lower sextant cover and baffle assembly onto sextant cover seat. Align holes and secure assembly to seat with six (6) captive screws, P/N 1008484-001. Torque 5 to 6 inch pounds. Check clearance as described in paragraph (4).

10. Apply sealing and retaining compound, MIL-S-22473, to threads of two (2) screw tube fasteners, P/N 1021379, and torque to 4 ± 1 inch pounds. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

E. TELESCOPE AND SEXTANT LOWER CROWN HALVES.

1. Remove potting ring, P/N 1021340, from telescope. Remove potting ring by pulling attached strings until ring splits apart. After ring splits, pull away from telescope assembly and dispose of potting ring in accordance with section IX.

VII. E. PROCEDURE (CONTINUED)

2. When NAA supplied inner ablator assembly is installed (see figure 1), perform trial fit of sextant/telescope crown. To determine amount of material to be removed from inner ablator assembly to provide .187 gap clearance.

3. Obtain crown half and plug assembly, P/N 1021378. Remove fillet protector and plugs but identify plugs so they may be returned in same holes.

4. Assemble and match crown half lower telescope cover to cover and baffle assembly with two (2) screws, P/N 1008487-003, and two (2) washers, P/N 1008486.

   NOTE: Ensure sextant lower crown half, P/N 1021329 slot openings are installed parallel to slot openings in cover and baffle assembly, P/N 1008480.

5. Obtain crown half upper sextant cover, P/N 1021320. (Part of crown half and plug assembly, P/N 1021377.) Remove plugs, P/N 1021322-002, identify plugs in order to reassemble in same holes.

6. Install crown half lower sextant cover, P/N 1021329, to sextant cover and baffle assembly, P/N 1008480, using four (4) insulators, P/N 1008493, four (4) washers, P/N 1008486, and four (4) sextant cover special slotted screws, P/N 1008488.

VII. E. PROCEDURE (CONTINUED)

   NOTE: There shall be a minimum of 1/32 inch clearance between crown halves of the sextant lower crown half and telescope lower crown half. If 1/32 inch clearance is obtained, remove screws and apply sealing and retaining compound, MIL-S-22473, grade C, to threads of sextant's (4) special slotted screws, P/N 1008493, and telescope's (2) slotted head cap screws, P/N 1008487-003, torque to 9 ± 1 inch pounds, and skip to step VII. F.1. If clearance is not obtained, perform step 7.

7. Remove sextant lower crown half and telescope lower crown half. Remove material from telescope lower crown half until there is a minimum clearance of 1/32 inch between crown halves. Replace sextant and telescope lower crown halves and apply sealing and retaining compound, MIL-S-22473, grade C, to threads of screws and torque to 9 ± 1 inch pounds.

F. TELESCOPE

1. Position and orient fillet protector, P/N 1008496, to lower crown half. Install 3 insulators P/N 1008493 into appropriate holes in the lower crown half. Attach with total of three screws (one (1), P/N 1008487-002, two (2), P/N 1008487-003) and three (3) washers, P/N 1008486. Apply sealing and retaining compound, MIL-S-22473, grade C to threads. Torque screws to 9 ± 1 inch pounds.

VII. F. PROCEDURE (CONTINUED)

2. Three (3) plugs, P/N 1021322-002 (removed in step VII.E.3), are inserted into telescope cover protector fillet, P/N 1008496. Surfaces shall be flush.

3. Vacuum area to remove loose chips and dirt.

G. SEXTANT

1. Obtain sextant cover upper crown halves, P/N 1021320, and install using four (4) washers, P/N 1008486, and four (4) slotted head cap screws, P/N 1008487-001, apply sealing and retaining compound, MIL-S-22473, grade C. Torque screws to 9 ± 1 inch pounds.

2. Obtain four (4) plugs P/N 1021322-001, removed in step VII.E.5, and screw plugs into place so they are flush with outer surface.

3. Vacuum area to remove loose chips and dirt.

VII. PROCEDURE (CONTINUED)

H. NAMEPLATES.

1. Transfer serial number and contract number from existing nameplate on Navigation Base and Optical Unit Assembly to new nameplate, P/N 1014650-19, supplied in retrofit kit. Imprint applicable three digit post modification dash number to pre-stamped part number, (1899950) on new identification plate as determined from section III. Use typewriter (with ribbon removed) to imprint information on new nameplate. (Height of typewriter characters should be 0.057 to 0.067 inches.)

2. Remove existing nameplate from Navigation Base and Optical Unit Assembly.

3. Clean nameplate mounting surface with MEK.

4. Apply MEK to activate adhesive on back of new nameplate. Allow activated adhesive to air dry until surface becomes tacky before performing next step.

5. Apply new nameplate to same location as occupied by old nameplate.

VII. H. PROCEDURE (CONTINUED)

6. Transfer serial number and contract number from existing nameplate on Optical Unit Assembly to new nameplate, P/N 1012196, supplied in retrofit kit. Imprint applicable three digit post modification dash number to pre-stamped part number, (1021368) on new identification plate as determined from section III. Use typewriter (with ribbon removed) to imprint information on new nameplate. (Height of typewriter characters should be 0.057 to 0.067 inches.)

7. Remove existing nameplate from Optical Unit Assembly.

8. Clean nameplate mounting surface with MEK.

9. Abrade back nameplate, P/N 1012196, and clean with MEK. Apply epoxy adhesive, P/N 1011541, to back of nameplate.

10. Apply new nameplate to same location as occupied by old nameplate.

11. Update applicable records as directed in section VIII.

12. Dispose of removed parts in accordance with section IX.

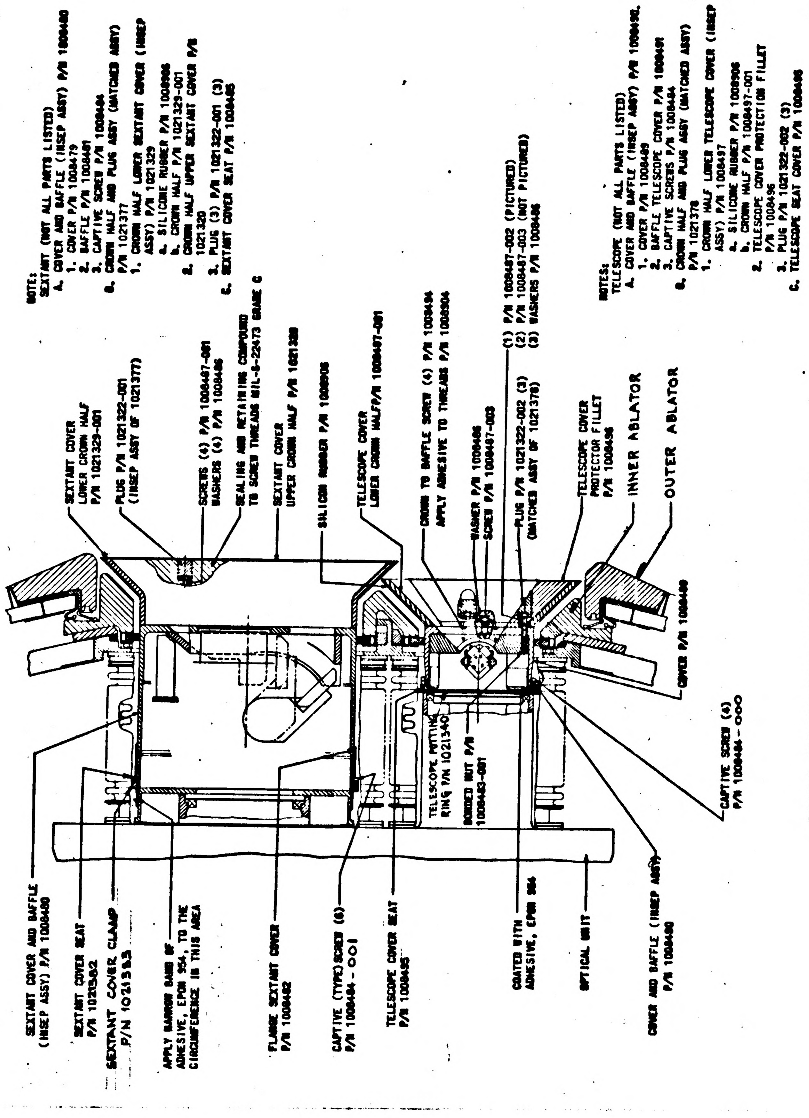

NOTE:
SEXTANT (NOT ALL PARTS LISTED)
A. COVER AND BAFFLE (INSEP ASSY) P/N 1008480
1. COVER P/N 1008479
2. BAFFLE P/N 1008481
3. CAPTIVE SCREW P/N 1008484
B. CROWN HALF AND PLUG ASSY (MATCHED ASSY) P/N 1021377
1. CROWN HALF LOWER SEXTANT COVER (INSEP ASSY) P/N 1021329
a. SILICONE RUBBER P/N 1008906
b. CROWN HALF P/N 1021329-001
2. CROWN HALF UPPER SEXTANT COVER P/N 1021320
3. PLUG (3) P/N 1021322-001 (3)
C. SEXTANT COVER SEAT P/N 1008485
NOTES:
TELESCOPE (NOT ALL PARTS LISTED)
A. COVER AND BAFFLE (INSEP ASSY) P/N 1008490
1. COVER P/N 1008489
2. BAFFLE TELESCOPE COVER P/N 1008491
3. CAPTIVE SCREWS P/N 1008484
B. CROWN HALF AND PLUG ASSY (MATCHED ASSY) P/N 1021378
1. CROWN HALF LOWER TELESCOPE COVER (INSEP ASSY) P/N 1008497
a. SILICONE RUBBER P/N 1008906
b. CROWN HALF P/N 1008497-001
2. TELESCOPE COVER PROTECTION FILLET P/N 1008496
3. PLUG P/N 1021322-002 (3)
C. TELESCOPE SEAT COVER P/N 1008495
SEXTANT COVER LOWER CROWN HALF P/N 1021329-001
PLUG P/N 1021322-001 (INSEP ASSY OF 1021377)
SCREWS (4) P/N 1008487-001
WASHERS (4) P/N 1008486
SEALING AND RETAINING COMPOUND TO SCREW THREADS MIL-S-22473 GRADE C
SEXTANT COVER UPPER CROWN HALF P/N 1021320
SILICON RUBBER P/N 1008906
TELESCOPE COVER LOWER CROWN HALF P/N 1008497-001
CROWN TO BAFFLE SCREW (4) P/N 1008494
APPLY ADHESIVE TO THREADS P/N 1008904
WASHER P/N 1008486
SCREW P/N 1008487-003
(1) P/N 1008487-002 (PICTURED)
(2) P/N 1008487-003 (NOT PICTURED)
(3) WASHERS P/N 1008486
PLUG P/N 1021322-002 (3) (MATCHED ASSY OF 1021378)
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
INNER ABLATOR
OUTER ABLATOR
COVER P/N 1008489
CAPTIVE SCREW (4) P/N 1008484-000
TELESCOPE POTTING RING P/N 1021340
BONDED NUT P/N 1008483-001
SEXTANT COVER AND BAFFLE (INSEP ASSY) P/N 1008480
SEXTANT COVER SEAT P/N 1021362
SEXTANT COVER CLAMP P/N 1021363
APPLY NARROW BAND OF ADHESIVE, EPON 954, TO THE CIRCUMFERENCE IN THIS AREA
FLANGE SEXTANT COVER P/N 1008482
CAPTIVE (TYPE) SCREW (6) P/N 1008484-001
TELESCOPE COVER SEAT P/N 1008495
COATED WITH ADHESIVE, EPON 954
OPTICAL UNIT
COVER AND BAFFLE (INSEP ASSY) P/N 1008490

FIGURE 1. TELESCOPE AND SEXTANT ASSEMBLIES (SIDE VIEW)

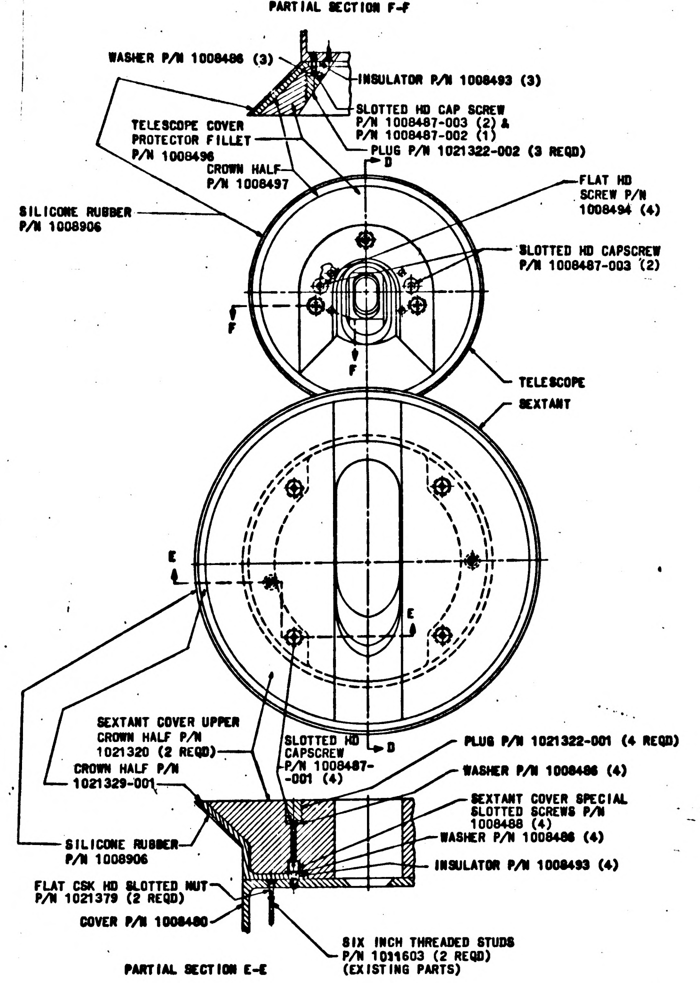

PARTIAL SECTION F-F
WASHER P/N 1008486 (3)
INSULATOR P/N 1008493 (3)
SLOTTED HD CAP SCREW P/N 1008487-003 (2) & P/N 1008487-002 (1)
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
PLUG P/N 1021322-002 (3 REQD)
D
CROWN HALF P/N 1008497
FLAT HD SCREW P/N 1008494 (4)
SILICONE RUBBER P/N 1008906
SLOTTED HD CAPSCREW P/N 1008487-003 (2)
F
F
TELESCOPE
SEXTANT
E
E
SEXTANT COVER UPPER CROWN HALF P/N 1021320 (2 REQD)
CROWN HALF P/N 1021329-001
SLOTTED HD CAPSCREW P/N 1008487--001 (4)
D
PLUG P/N 1021322-001 (4 REQD)
WASHER P/N 1008486 (4)
SEXTANT COVER SPECIAL SLOTTED SCREWS P/N 1008488 (4)
WASHER P/N 1008486 (4)
INSULATOR P/N 1008493 (4)
SILICONE RUBBER P/N 1008906
FLAT CSK HD SLOTTED NUT P/N 1021379 (2 REQD)
COVER P/N 1008480
SIX INCH THREADED STUDS P/N 1011603 (2 REQD) (EXISTING PARTS)
PARTIAL SECTION E-E

FIGURE 2. FRONT VIEW

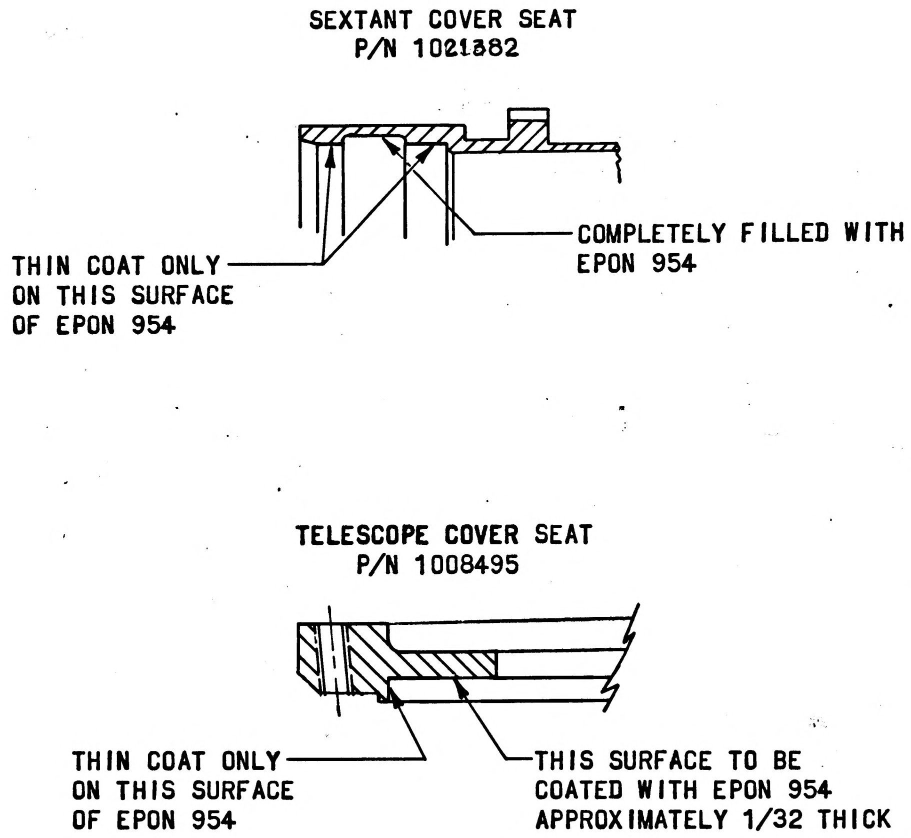

SEXTANT COVER SEAT
P/N 1021382
THIN COAT ONLY ON THIS SURFACE OF EPON 954
COMPLETELY FILLED WITH EPON 954
TELESCOPE COVER SEAT
P/N 1008495
THIN COAT ONLY ON THIS SURFACE OF EPON 954
THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 THICK

Figure 3. APPLICATION OF ADHESIVE

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. MODIFICATION DESIGNATION

E. Significant part number changes resulting from this modification are listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______________________ Date: __________ G&N # ______

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

Sheet 25 of 25
Part No. 0102662
Date: 18 OCT 66
TDRR
Revision B

ACC Form No. 1a
2/23/66

Date: ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ________ P/N: ________ S/N: ________

ECP NO.: ________ Retrofit Kit No.: ________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ________

Sheet 1 of 25
Part No. 0102662
Date: 18 OCT 66
TDRR 32202
Revision C

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY, P/N 1899950-191 AND P/N 1899950-211
ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	CM216232	1,3,5,7,8,9,10,16,18			12 NOV 66
B	32202	INITIAL RELEASE		—	12/1/66
C	32281	1,3,5,7,9,11,16,17			

Prepared by______________ Date Oct 18 1966
P.C. Engineering Approval ____ / H. Miller Date 10-26-66
Design Review Board Approval ____ John E. Miller, ____ Date 28 Nov 66
MIT/IL Approval______________ Date______
NASA Approval______________ Date 11/28/66
MIT Reliability______________ Date______

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Navigation Base and Optical Unit Assembly. This modification is being performed to add the astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This retrofit is authorized by CCA-497-0309, REV 1, in liew of approval of ECP-0427.

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Navigation Base	1899950-191	1899950-311
Navigation Base	1899950-211	1899950-321

IV. PRIORITY CHANGES

Not applicable

V. RELATED CHANGES

Not applicable

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102691, consisting of the following items is required to modify the Navigation Base and Optical Unit Assembly.

Qty	Part Number	Description
1	1021382	Seat, sextant cover
4	1008487-001	Screw, slotted hd. cap
1	1008487-002	Screw, slotted hd. cap
4	1008487-003	Screw, slotted hd. cap
13	1008486	Washer, flat
4	1008488	Screw, slotted, special
7	1008493	Insulator
1	1008495	Seat, telescope cover
4	1008494	Screw, flat head
1	1008490-011	Cover and Baffle Telescope (Insep Assy)
1	1008480-011	Cover and Baffle Sextant (Insep Assy)
1	1021377-011	Crown Half & Plug Assy Telescope (Matched Assy)
1	1021378-011	Crown Half & Plug Assy Sextant (Matched Assy)
4	1008484-000	Screw, captive
1	1014650-19	Nameplate
1	0102662	Retrofit Instruction Bulletin
2	1021379	Fastener, Screw Tube, Flat Hd.
1	1012196	Nameplate
1	1021383	Clamp
6	1008484-001	Screw, Captive
1	1021340	Potting Ring, Telescope

VI. MATERIALS REQUIRED

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	FED-TT-I-735	Isopropyl alcohol
AR	DuPont Type TF	Freon
AR	N/A	Adhesive (MIL-S-22473, grade C) Sealing and retaining compound
1	ND1002329-001	Process specification for bonding with 1008903 adhesive (EPON 954)
AR	1008903	Adhesive (EPON 954)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	1011541	Adhesive, Epoxy

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

VII. PROCEDURE (CONTINUED)

B. DETAILED INSTRUCTIONS. Obtain Retrofit Kit, P/N 8102691, and perform modifications to telescope head, in accordance with paragraph C, and sextant head, in accordance with paragraph D.

C. TELESCOPE HEAD.

1. Remove existing cover, P/N 2012547, from telescope head and dispose as per direction given in section IX.

   NOTE: When loosening four (4) captive screws, P/N 1008484-000, no more than 2 turns per screw, alternating until loose.

2. Obtain telescope cover seat, P/N 1008495, and cover and baffle, P/N 1008490-011, install four (4) captive screws, P/N 1008484-000, into telescope cover and baffle assembly. Assemble seat and cover to telescope head. Orient assembly so telescope scans 45° off the optics center line in direction of worm shaft bearing retaining cap, P/N 2011186, and seat the assembly on the telescope prism mount support, P/N 2011185-000 or 011 for a fit check. Check for proper seating of assembly, proper clearance of optics, and mounting screw hole alignment.

VII. C. PROCEDURE (CONTINUED)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

NOTE: Do not clean painted surfaces with MEK.

3. Remove telescope cover seat from cover assembly and clean telescope cover seat with MEK. Rinse with isopropyl alcohol and freon.

4. Install telescope potting ring, P/N 1021340, between telescope head seating surface and telescope cover seat, P/N 1008495. See figure 1.

5. Obtain adhesive, P/N 1008903 (hereafter referred to as EPON 954) and prepare in accordance with ND 1002329-001.

6. Apply a narrow band of adhesive EPON 954 to telescope cover seat. (See figure 3).

7. Clean adhesive from all surfaces not to be bonded. Install telescope cover seat making certain alignment repeats trial fit orientation.

VII. C. PROCEDURE (CONTINUED)

8. Install telescope cover and baffle, P/N 1008490-011. Align the four (4) holes of cover and baffle with holes in telescope seat cover and attach with four (4) captive screws, P/N 1008484-000. Torque screws 5 to 6 inch pounds.

   NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N, Form R, and allow to dry.

9. Apply adhesive, MIL-S-22473, grace C to threads of flat head screws, P/N 1008494. Insert screws through cover and baffle, P/N 1008490-011 and torque assembly to telescope head 4 ± 1 inch pounds. Ensure assembly is fully seated to telescope before torquing screws. Check for proper clearance of optics and telescope cover.

   NOTE: Rotate telescope by hand every 15 minutes for 1 hour.

10. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

VII. PROCEDURE (CONTINUED)

D. SEXTANT HEAD.

1. Remove existing cover, P/N 2012675, from sextant head. Do NOT remove the two (2) 6 inch long threaded studs, P/N 2011603. Discard slotted nuts, P/N 2011602, and cover, P/N 2012675, in accordance with section IX.

   CAUTION: Avoid any damage to flex print circuit board.

   NOTE: If any interference problems are encountered, reorient flex print to provide clearance.

2. Trial fit sextant cover seat, P/N 1021382, and clamp, P/N 1021383, to sextant head. Check for proper seating to sextant head.

3. Rotate sextant so that sextant flex print circuit board junction is in lowest position.

   CAUTION: Move mirror by using top of mirror and move it very slowly from stop to stop. Do NOT touch mirror surface.

   NOTE: Ensure assembly does not bind with flex print during or after installation.

VII. D. PROCEDURE (CONTINUED)

4. Install 6 captive screws, P/N 1008484-001, into cover and baffle assembly. Temporarily attach sextant cover and baffle assembly, P/N 1008480-011 TO seat (see step 2) using (6) captive screws (1008484-001) and two screw tube fasteners, P/N 1021379, to long studs. Check clearance between sextant mirror and sextant cover and baffle assembly, P/N 1008480-011. Carefully move mirror from stop to stop and check clearance on each side. Rotate cover and baffle assy to provide approximately 1/8 inch clearance between mirror, mirror mount, and mirror bracket.
5. Remove sextant cover seat, sextant cover clamp and sextant baffle assembly. (Separate cover seat and clamp from cover and baffle assembly.)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

CAUTION: Do not apply MEK to painted surfaces.

6. Clean sextant cover seat with MEK. Rinse with isopropyl alcohol and freon.

VII. D. PROCEDURE (CONTINUED)

7. Apply a narrow band of adhesive EPON 954 to sextant cover seat, P/N 1021382, see figure 3. Remove any excess adhesive. Clean adhesive from all surfaces not to be bonded.

8. Carefully install sextant cover seat, P/N 1021382 and sextant cover clamp, P/N 1021383, over flex print circuit board and seat properly to sextant housing, orient screw holes to location obtained during trial fit (step 2).

9. Lower sextant cover and baffle assembly onto sextant cover seat. Align holes and secure assembly to seat with six (6) captive screws, P/N 1008484-001. Torque 5 to 6 inch pounds. Check clearance as described in paragraph (4).

10. Apply sealing and retaining compound, MIL-S-22473, to threads of two (2) screw tube fasteners, P/N 1021379, and torque to 4 ± 1 inch pounds. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

E. TELESCOPE AND SEXTANT LOWER CROWN HALVES.

1. Remove potting ring, P/N 1021340, from telescope. Remove potting ring by pulling attached strings until ring splits apart. After ring splits, pull away from telescope assembly and dispose of potting ring in accordance with section IX.

VII. E. PROCEDURE (CONTINUED)

2. When NAA supplied inner ablator assembly is installed (see figure 1), perform trial fit of sextant telescope crown. To determine amount of material to be removed from inner ablator assembly to provide .187 gap clearance.

3. Obtain crown half and plug assembly, P/N 1021378-011. Remove fillet protector and plugs but identify plugs so they may be returned in same holes.

4. Assemble and match crown half lower telescope cover to cover and baffle assembly with two (2) screws, P/N 1008487-003, and two (2) washers, P/N 1008486.

NOTE: Ensure sextant lower crown half, P/N 1021329 slot openings are installed parallel to slot openings in cover and baffle assembly, P/N 1008480-011.

5. Obtain crown half upper sextant cover, P/N 1021320. (Part of crown half and plug assembly, P/N 1021377-011) Remove plugs, P/N 1021322-002, identify plugs in order to reassemble in same holes.

6. Install crown half lower sextant cover, P/N 1021329, to sextant cover and baffle assembly, P/N 1008480-011, using four (4) insulators, P/N 1008493, four (4) washers, P/N 1008486, and four (4) sextant cover special slotted screws, P/N 1008488.

VII. E. PROCEDURE (CONTINUED)

NOTE: There shall be a minimum of 1/32 inch clearance between crown halves of the sextant lower crown half and telescope lower crown half. If 1/32 inch clearance is obtained, remove screws and apply sealing and retaining compound, MIL-S-22473, grade C, to threads of sextant's (4) special slotted screws, P/N 1008493, and telescope's (2) slotted head cap screws, P/N 1008487-003, torque to 9 ± 1 inch pounds, and skip to step VII. F.1. If clearance is not obtained, perform step 7.

7. Remove sextant lower crown half and telescope lower crown half. Remove material from telescope lower crown half until there is a minimum clearance of 1/32 inch between crown halves. Replace sextant and telescope lower crown halves and apply sealing and retaining compound, MIL-S-22473, grade C, to threads of screws and torque to 9 ± 1 inch pounds.

F. TELESCOPE

1. Position and orient fillet protector, P/N 1008496, to lower crown half. Install 3 insulators P/N 1008493 into appropriate holes in the lower crown half. Attach with total of three screws (one (1), P/N 1008487-002, two (2), P/N 1008487-003) and three (3) washers, P/N 1008486. Apply sealing and retaining compound, MIL-S-22473, grade C to threads. Torque screws to 9 ± 1 inch pounds.

VII. F. PROCEDURE (CONTINUED)

2. Three (3) plugs, P/N 1021322-002 (removed in step VII.E.3), are inserted into telescope cover protector fillet, P/N 1008496. Surfaces shall be flush.

3. Vacuum area to remove loose chips and dirt.

G. SEXTANT

1. Obtain sextant cover upper crown halves, P/N 1021320, and install using four (4) washers, P/N 1008486, and four (4) slotted head cap screws, P/N 1008487-001, apply sealing and retaining compound, MIL-S-22473, grade C. Torque screws to 9 ± 1 inch pounds.

2. Obtain four (4) plugs P/N 1021322-001, removed in step VII.E.5, and screw plugs into place so they are flush with outer surface.

3. Vacuum area to remove loose chips and dirt.

VII. PROCEDURE (CONTINUED)

H. NAMEPLATES.

1. Transfer serial number and contract number from existing nameplate on Navigation Base and Optical Unit Assembly to new nameplate, P/N 1014650-19, supplied in retrofit kit. Imprint applicable three digit post modification dash number to pre-stamped part number, (1899950) on new identification plate as determined from section III. Use typewriter (with ribbon removed) to imprint information on new nameplate. (Height of typewriter characters should be 0.057 to 0.067 inches.)

2. Remove existing nameplate from Navigation Base and Optical Unit Assembly.

3. Clean nameplate mounting surface with MEK.

4. Apply MEK to activate adhesive on back of new nameplate. Allow activated adhesive to air dry until surface becomes tacky before performing next step.

5. Apply new nameplate to same location as occupied by old nameplate.

VII. H. PROCEDURE (CONTINUED)

6. Transfer serial number and contract number from existing nameplate on Optical Unit Assembly to new nameplate, P/N 1012196, supplied in retrofit kit. Imprint applicable three digit post modification dash number to pre-stamped part number, (1021368) on new identification plate as determined from section III. Use typewriter (with ribbon removed) to imprint information on new nameplate. (Height of typewriter characters should be 0.057 to 0.067 inches.)

7. Remove existing nameplate from Optical Unit Assembly.

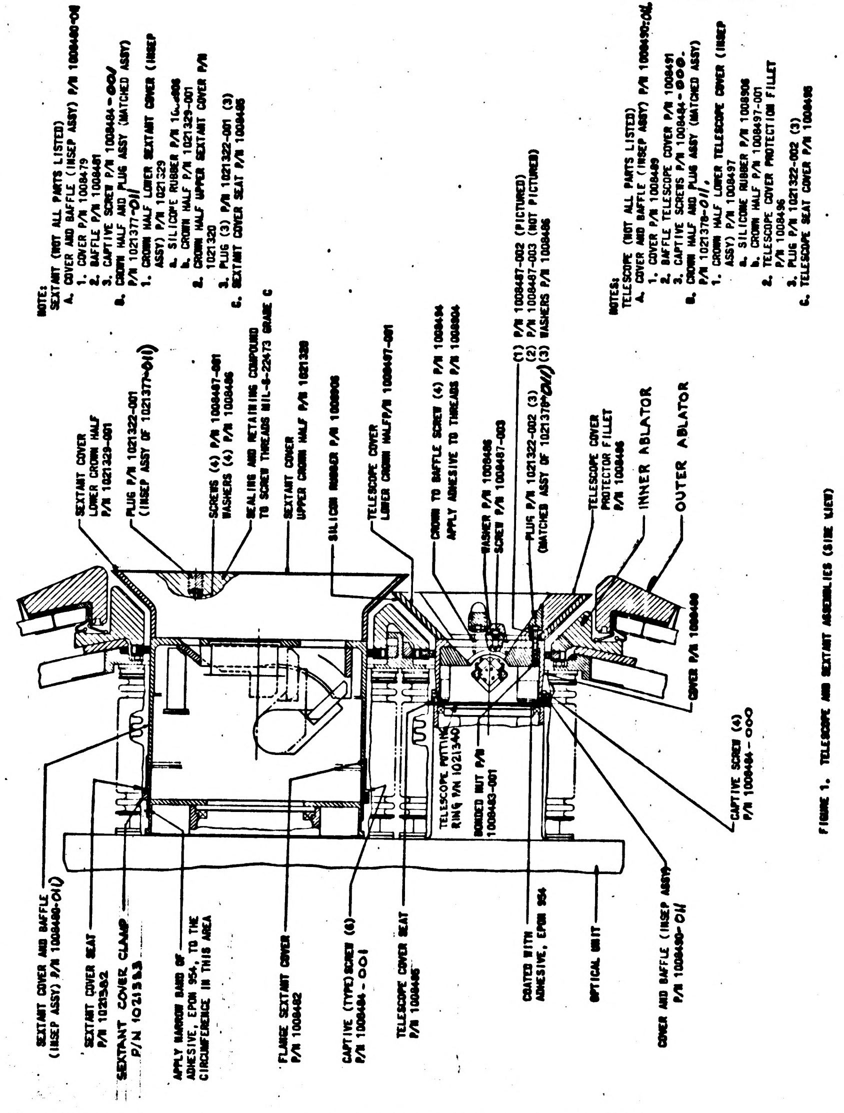
8. Clean nameplate mounting surface with MEK.

9. Abrade back nameplate, P/N 1012196, and clean with MEK. Apply epoxy adhesive, P/N 1011541, to back of nameplate.

10. Apply new nameplate to same location as occupied by old nameplate.

11. Update applicable records as directed in section VIII.

12. Dispose of removed parts in accordance with section IX.


SEXTANT COVER LOWER CROWN HALF P/N 1021329-001
PLUG P/N 1021322-001 (INSEP ASSY OF 1021377-011)
SCREWS (4) P/N 1008487-001
WASHERS (4) P/N 1008486
SEALING AND RETAINING COMPOUND TO SCREW THREADS MIL-S-22473 GRADE C
SEXTANT COVER UPPER CROWN HALF P/N 1021320
SILICON RUBBER P/N 1008906
TELESCOPE COVER LOWER CROWN HALF P/N 1008497-001
CROWN TO BAFFLE SCREW (4) P/N 1008494
APPLY ADHESIVE TO THREADS P/N 1008904
WASHER P/N 1008486
SCREW P/N 1008487-003
PLUG P/N 1021322-002 (3) (MATCHED ASSY OF 1021378-011)
(1) P/N 1008487-002 (PICTURED)
(2) P/N 1008487-003 (NOT PICTURED)
(3) WASHERS P/N 1008486
TELESCOPE COVER
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
INNER ABLATOR
OUTER ABLATOR
COVER P/N 1008489
CAPTIVE SCREW (4) P/N 1008484-000
TELESCOPE POTTING RING P/N 1021340
BONDED NUT P/N 1008483-001
SEXTANT COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
SEXTANT COVER SEAT P/N 1021362
SEXTANT COVER CLAMP P/N 1021363
APPLY NARROW BAND OF ADHESIVE, EPON 954, TO THE CIRCUMFERENCE IN THIS AREA
FLANGE SEXTANT COVER P/N 1008482
CAPTIVE (TYPE) SCREW (6) P/N 1008484-001
TELESCOPE COVER SEAT P/N 1008495
COATED WITH ADHESIVE, EPON 954
OPTICAL UNIT
COVER AND BAFFLE (INSEP ASSY) P/N 1008490-011

NOTE:
SEXTANT (NOT ALL PARTS LISTED)
- A. COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
  - 1. COVER P/N 1008479
  - 2. BAFFLE P/N 1008481
  - 3. CAPTIVE SCREW P/N 1008484-001
- B. CROWN HALF AND PLUG ASSY (MATCHED ASSY) P/N 1021377-011
  - 1. CROWN HALF LOWER SEXTANT COVER (INSEP ASSY) P/N 1021329
    - a. SILICONE RUBBER P/N 1008906
    - b. CROWN HALF P/N 1021329-001
  - 2. CROWN HALF UPPER SEXTANT COVER P/N 1021320
  - 3. PLUG (3) P/N 1021322-001 (3)
- C. SEXTANT COVER SEAT P/N 1008485

NOTES:
TELESCOPE (NOT ALL PARTS LISTED)
- A. COVER AND BAFFLE (INSEP ASSY) P/N 1008490-011
  - 1. COVER P/N 1008489
  - 2. BAFFLE TELESCOPE COVER P/N 1008491
  - 3. CAPTIVE SCREWS P/N 1008484-000
- B. CROWN HALF AND PLUG ASSY (MATCHED ASSY) P/N 1021378-011
  - 1. CROWN HALF LOWER TELESCOPE COVER (INSEP ASSY) P/N 1008497
    - a. SILICONE RUBBER P/N 1008906
    - b. CROWN HALF P/N 1008497-001
  - 2. TELESCOPE COVER PROTECTION FILLET P/N 1008496
  - 3. PLUG P/N 1021322-002 (3)
- C. TELESCOPE SEAT COVER P/N 1008495

FIGURE 1. TELESCOPE AND SEXTANT ASSEMBLIES (SIDE VIEW)

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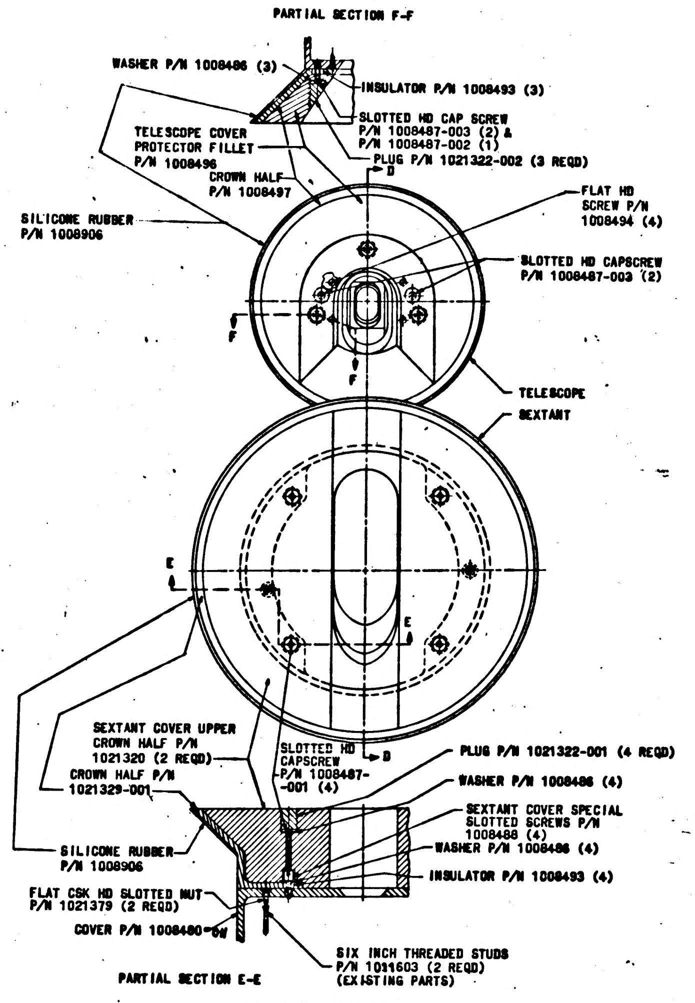
PARTIAL SECTION F-F
WASHER P/N 1008486 (3)
INSULATOR P/N 1008493 (3)
SLOTTED HD CAP SCREW P/N 1008487-003 (2) & P/N 1008487-002 (1)
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
PLUG P/N 1021322-002 (3 REQD)
D
CROWN HALF P/N 1008497
FLAT HD SCREW P/N 1008494 (4)
SILICONE RUBBER P/N 1008906
SLOTTED HD CAPSCREW P/N 1008487-003 (2)
F
F
TELESCOPE
SEXTANT
E
E
SEXTANT COVER UPPER CROWN HALF P/N 1021320 (2 REQD)
SLOTTED HD CAPSCREW P/N 1008487-001 (4)
D
PLUG P/N 1021322-001 (4 REQD)
CROWN HALF P/N 1021329-001
WASHER P/N 1008486 (4)
SEXTANT COVER SPECIAL SLOTTED SCREWS P/N 1008488 (4)
SILICONE RUBBER P/N 1008906
WASHER P/N 1008486 (4)
INSULATOR P/N 1008493 (4)
FLAT CSK HD SLOTTED NUT P/N 1021379 (2 REQD)
COVER P/N 1008480-0W
SIX INCH THREADED STUDS P/N 1011603 (2 REQD) (EXISTING PARTS)
PARTIAL SECTION E-E

FIGURE 2. FRONT VIEW

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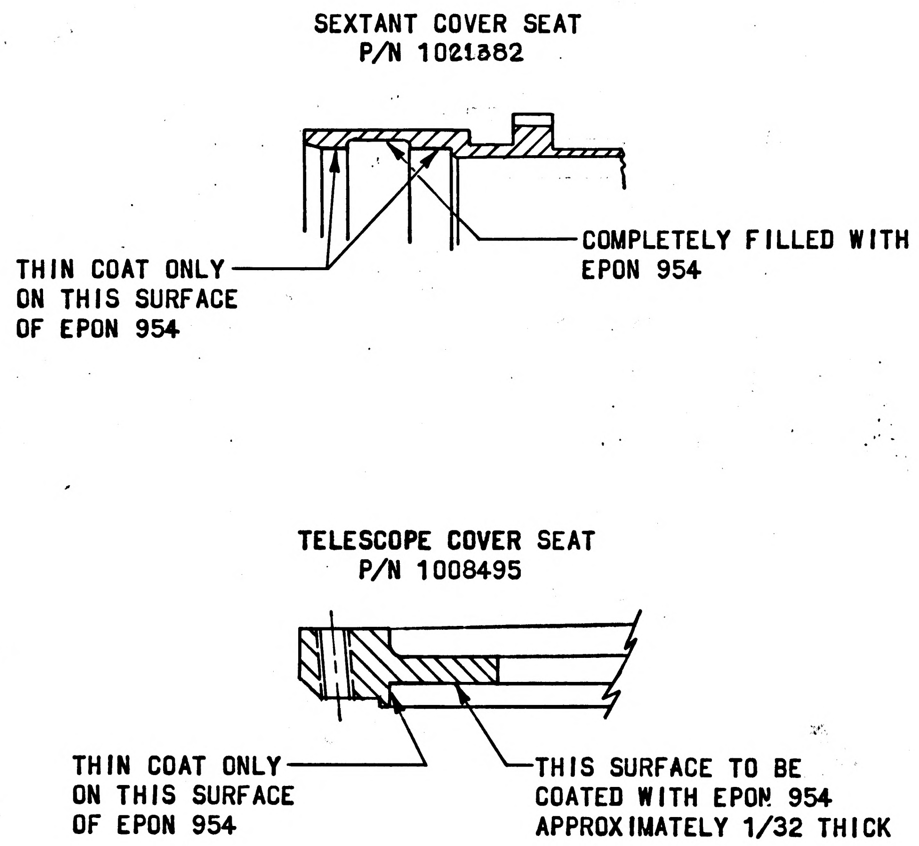
SEXTANT COVER SEAT
P/N 1021382
THIN COAT ONLY ON THIS SURFACE OF EPON 954
COMPLETELY FILLED WITH EPON 954
TELESCOPE COVER SEAT
P/N 1008495
THIN COAT ONLY ON THIS SURFACE OF EPON 954
THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 THICK

Figure 3. APPLICATION OF ADHESIVE

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VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

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VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. MODIFICATION DESIGNATION

E. Significant part number changes resulting from this modification are listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______________ Date: ________ G&N # ________

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

ACC Form No. 1a
2/23/66

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Date: ______

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ______ P/N: ______ S/N: ______

ECP NO.: ______ Retrofit Kit No.: ______

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ______

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NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY, P/N 1899950-191 AND P/N 1899950-211
ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	CM216232	1,3,5,7,8,9,10,14,18			12 Nov 66
B	32202	INITIAL RELEASE		—	12/6/66
C	32281	1,3,5,7,9,14,16,17			
D	33012	1,4,5,11,12,13,16,17			3-7-67

Prepared by ____________ Date Oct 18 1966

P.C. Engineering Approval ____ / H. Miller Date 10-26-66

Design Review Board Approval ____ Date 28 Nov 66

MIT/IL Approval ____ Date ____

NASA Approval ____ Date 11/28/66

MIT Reliability ____ Date ____

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I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Navigation Base and Optical Unit Assembly. This modification is being performed to add the astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This retrofit is authorized by CCA-497-0309, REV 1, in lieu of approval of ECP-0427.

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Navigation Base	1899950-191	1899950-311
Navigation Base	1899950-211	1899950-321

IV. PRIORITY CHANGES

Not applicable

V. RELATED CHANGES

Not applicable

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VI. MATERIALS REQUIRED

A. Retrofit Kit, P/N 8102691, consisting of the following items is required to modify the Navigation Base and Optical Unit Assembly.

Qty	Part Number	Description
1	1021382	Seat, sextant cover
4	1008487-001	Screw, slotted hd. cap
1	1008487-002	Screw, slotted hd. cap
4	1008487-003	Screw, slotted hd. cap
13	1008486	Washer, flat
4	1008488	Screw, slotted, special
7	1008493	Insulator
1	1008495	Seat, telescope cover
4	1008494	Screw, flat head
1	1008490-011	Cover and Baffle Telescope (Insep Assy)
1	1008480-011	Cover and Baffle Sextant (Insep Assy)
1	1021377-011	Crown Half & Plug Assy Telescope (Matched Assy).
1	1021378-011	Crown Half & Plug Assy Sextant (Matched Assy)
4	1008484-000	Screw, captive
1	1014650-19	Nameplate
1	0102662	Retrofit Instruction Bulletin
2	1021379	Fastener, Screw Tube, Flat Hd.
1	1012196	Nameplate
1	1021383	Clamp
6	1008484-001	Screw, Captive
1	1021340	Potting Ring, Telescope
1	[illegible]	

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VI. MATERIALS REQUIRED (CONTINUED)

1. Retrofit Kit, P/N 8102708, consisting of the following items, is provided if shimming of Sextant and Telescope Crowns is required:

Qty	Part Number	Description
1	0102662	Retrofit Instruction Bulletin
2	2021265-001	Spacer, Plate - SCT
1	2021265-002	Spacer, Plate - SCT
2	2021266-001	Spacer, Plate - SXT
1	2021266-002	Spacer, Plate - SXT
4	1008488-001	Screw, Slotted, Special, Sextant Cover
4	1008487-004	Screw, Cap, Slotted Hd.
1	1008487-005	Screw, Cap, Slotted Hd.

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	FED-TT-I-735	Isopropyl alcohol
AR	DuPont Type TF	Freon
AR	N/A	Adhesive (MIL-S-22473, grade C) Sealing and retaining compound
1	ND1002329-001	Process specification for bonding with 1008903 adhesive (EPON 954)
AR	1008903	Adhesive (EPON 954)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	1011541	Adhesive, Epoxy

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.
2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

B. DETAILED INSTRUCTIONS. Obtain Retrofit Kit, P/N 8102691, and perform modifications to telescope head, in accordance with paragraph C, and sextant head, in accordance with paragraph D.

C. TELESCOPE HEAD.

1. Remove existing cover, P/N 2012547, from telescope head and dispose as per direction given in section IX.

   NOTE: When loosening four (4) captive screws, P/N 1008484-000, no more than 2 turns per screw, alternating until loose.

2. Obtain telescope cover seat, P/N 1008495, and cover and baffle, P/N 1008490-011, install four (4) captive screws, P/N 1008484-000, into telescope cover and baffle assembly. Assemble seat and cover to telescope head. Orient assembly so telescope scans 45° off the optics center line in direction of worm shaft bearing retaining cap, P/N 2011186, and seat the assembly on the telescope prism mount support, P/N 2011185-000 or 011 for a fit check. Check for proper seating of assembly, proper clearance of optics, and mounting screw hole alignment.

VII. C. PROCEDURE (CONTINUED)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

NOTE: Do not clean painted surfaces with MEK.

3. Remove telescope cover seat from cover assembly and clean telescope cover seat with MEK. Rinse with isopropyl alcohol and freon.
4. Install telescope potting ring, P/N 1021340, between telescope head seating surface and telescope cover seat, P/N 1008495. See figure 1.
5. Obtain adhesive, P/N 1008903 (hereafter referred to as EPON 954) and prepare in accordance with ND 1002329-001.
6. Apply a narrow band of adhesive EPON 954 to telescope cover seat. (See figure 3).
7. Clean adhesive from all surfaces not to be bonded. Install telescope cover seat making certain alignment repeats trial fit orientation.

VII. C. PROCEDURE (CONTINUED)

8. Install telescope cover and baffle, P/N 1008490-011. Align the four (4) holes of cover and baffle with holes in telescope seat cover and attach with four (4) captive screws, P/N 1008484-000. Torque screws 5 to 6 inch pounds.

   NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N, Form R, and allow to dry.

9. Apply adhesive, MIL-S-22473, grace C to threads of flat head screws, P/N 1008494. Insert screws through cover and baffle, P/N 1008490-011 and torque assembly to telescope head 4 ± 1 inch pounds. Ensure assembly is fully seated to telescope before torquing screws. Check for proper clearance of optics and telescope cover.

   NOTE: Rotate telescope by hand every 15 minutes for 1 hour.

10. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

VII. PROCEDURE (CONTINUED)

D. SEXTANT HEAD.

1. Remove existing cover, P/N 2012675, from sextant head. Do NOT remove the two (2) 6 inch long threaded studs, P/N 2011603. Discard slotted nuts, P/N 2011602, and cover, P/N 2012675, in accordance with section IX.

   CAUTION: Avoid any damage to flex print circuit board.

   NOTE: If any interference problems are encountered, reorient flex print to provide clearance.

2. Trial fit sextant cover seat, P/N 1021382, and clamp, P/N 1021383, to sextant head. Check for proper seating to sextant head.
3. Rotate sextant so that sextant flex print circuit board junction is in lowest position.

   CAUTION: Move mirror by using top of mirror and move it very slowly from stop to stop. Do NOT touch mirror surface.

   NOTE: Ensure assembly does not bind with flex print during or after installation.

VII. D. PROCEDURE (CONTINUED)

4. Install 6 captive screws, P/N 1008484-001, into cover and baffle assembly. Temporarily attach sextant cover and baffle assembly, P/N 1008480-011 TO seat (see step 2) using (6) captive screws (1008484-001) and two screw tube fasteners, P/N 1021379, to long studs. Check clearance between sextant mirror and sextant cover and baffle assembly, P/N 1008480-011. Carefully move mirror from stop to stop and check clearance on each side. Rotate cover and baffle assy to provide approximately 1/64 inch clearance between mirror, mirror mount, and mirror bracket.

5. Remove sextant cover seat, sextant cover clamp and sextant baffle assembly. (Separate cover seat and clamp from cover and baffle assembly.)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

CAUTION: Do not apply MEK to painted surfaces.

6. Clean sextant cover seat with MEK. Rinse with isopropyl alcohol and freon.

VII. D. PROCEDURE (CONTINUED)

7. Apply a narrow band of adhesive EPON 954 to sextant cover seat, P/N 1021382, see figure 3. Remove any excess adhesive. Clean adhesive from all surfaces not to be bonded.

8. Carefully install sextant cover seat, P/N 1021382 and sextant cover clamp, P/N 1021383, over flex print circuit board and seat properly to sextant housing, orient screw holes to location obtained during trial fit (step 2).

9. Lower sextant cover and baffle assembly onto sextant cover seat. Align holes and secure assembly to seat with six (6) captive screws, P/N 1008484-001. Torque 5 to 6 inch pounds. Check clearance as described in paragraph (4).

10. Apply sealing and retaining compound, MIL-S-22473, to threads of two (2) screw tube fasteners, P/N 1021379, and torque to 4 ± 1 inch pounds. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

E. TELESCOPE AND SEXTANT LOWER CROWN HALVES.

1. Remove potting ring, P/N 1021340, from telescope. Remove potting ring by pulling attached strings until ring splits apart. After ring splits, pull away from telescope assembly and dispose of potting ring in accordance with section IX.

VII. E. PROCEDURE (CONTINUED)

2. Obtain crown half and plug assembly, telescope, P/N 1021377. Remove fillet protector P/N 1008496 and Plugs, P/N 1021322-002. Identify Plugs so they may be reassembled in same holes.

3. Assemble crown half, lower, P/N 1008497 to Cover & Baffle Assembly, P/N 1008490, using two screws, P/N 1008487-003, and two washers, P/N 1008486.

4. Measure gap between crown half, lower, P/N 1008497, and the NAA Inner Ablator Assembly. The gap shall be .188 to .250. If it is less than .188 a certain maximum amount of material, as determined by NAA personnel, may be removed from the Inner Ablator Assembly. If after the maximum amount of material has been removed from the Ablator Assembly and the .188 min. gap is not obtainable, any combination of spacers, 2021265-001 & 002 may be used between the Cover & Baffle Assy and the Crown half-lower to obtain the .188 to .250 gap. If spacers are required, Screws, P/N 1008487-003 will be replaced with P/N 1008487-004.

5. Obtain crown half and plug assembly, Sextant P/N 1021378. Remove two (2) Crown Halves, upper, P/N 1021320 and four (4) Plugs, P/N 1021322-001. Identify Crown Halves and Plugs in order to reassemble in same position.

VII. E. PROCEDURE (CONTINUED)

6. Assembly Crown Half, Lower, P/N 1021329, to Sextant Cover and Baffle Assembly, P/N 1008480, using four insulators, P/N 1008493, four washers, P/N 1008486 and four sextant cover special slotted screws, P/N 1003488.

7. Measure gap between the Crown half, lower and NAA Inner Ablator Assembly. The gap shall be .188 to .250. If it is less than .188, a certain maximum amount of material as determined by NAA personnel may be removed from Inner Ablator Assembly. If after the maximum amount of material has been removed from Inner Ablator, and the .188 min. gap is not obtainable, any combination of spacers, P/N 2021266 -001 and 002 may be used between Cover and Baffle Assembly to obtain the .188 to .250 clearance. If only one P/N 2021266-001 spacer is used, Screws, P/N 1008488 may be used. If more than one Spacer, P/N 2021266-001 is used, Screws, P/N 1008488-001 shall be used.

8. There shall be a minimum of 1/32" clearance between the Telescope Lower Crown Half and the Sextant Lower Crown Half when the Sextant and Scanning Telescope are each rotated thru 360°. If there is not sufficient clearance, remove sextant and telescope crown halves and remove material from telescope lower crown half to obtain the 1/32" minimum clearance. Replace sextant and telescope lower crown halves and spacers as determined from steps 4 and 7 above and apply sealing and retaining compound MIL-S-22473, Grade C, per ND 1002211 to the threads of the appropriate screws and torque to 9 ± 1 inch-pounds.

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VII. PROCEDURE (CONTINUED)

F. TELESCOPE

1. Install 3 insulators, P/N 1008493, into appropriate holes in lower crown half. Position and orient fillet protector, P/N 1008496, to lower crown half. Attach with three screws (one (1) P/N 1008487-002 and two (2) P/N 1008487-003) as shown in Figures 1 and 2. If any spacers were required in Step VII.E.4, screw, P/N 1008487-005, will be used in place of P/N 1008487-002, and P/N 1008487-004 will be used in place of 1008487-003. Apply sealing and retaining compound, MIL-S-22473, Grade C, per ND 1002211 to threads, and torque screws to 9 ± 1 inch-pounds.
2. Three (3) plugs, P/N 1021322-002 (removed in step VII.E.2), are inserted into telescope cover protector fillet, P/N 1008496. Surfaces shall be flush.
3. Vacuum area to remove loose chips and dirt.

G. SEXTANT

1. Obtain sextant cover upper crown halves, P/N 1021320, and install using four (4) washers, P/N 1008486, and four (4) slotted head cap screws, P/N 1008487-001, apply sealing and retaining compound, MIL-S-22473, grade C. Torque screws to 9 ± 1 inch pounds.
2. Obtain four (4) plugs P/N 1021322-001, removed in step VII.E.5, and screw plugs into place so they are flush with outer surface.
3. Vacuum area to remove loose chips and dirt.

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VII. PROCEDURE (CONTINUED)

H. NAMEPLATES.

1. Transfer serial number and contract number from existing nameplate on Navigation Base and Optical Unit Assembly to new nameplate, P/N 1014650-19, supplied in retrofit kit. Imprint applicable three digit post modification dash number to pre-stamped part number, (1899950) on new identification plate as determined from section III. Use typewriter (with ribbon removed) to imprint information on new nameplate. (Height of typewriter characters should be 0.057 to 0.067 inches.)
2. Remove existing nameplate from Navigation Base and Optical Unit Assembly.
3. Clean nameplate mounting surface with MEK.
4. Apply MEK to activate adhesive on back of new nameplate. Allow activated adhesive to air dry until surface becomes tacky before performing next step.
5. Apply new nameplate to same location as occupied by old nameplate.

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VII. H. PROCEDURE (CONTINUED)

6. Transfer serial number and contract number from existing nameplate on Optical Unit Assembly to new nameplate, P/N 1012196, supplied in retrofit kit. Imprint applicable three digit post modification dash number to pre-stamped part number, (1021368) on new identification plate as determined from section III. Use typewriter (with ribbon removed) to imprint information on new nameplate. (Height of typewriter characters should be 0.057 to 0.067 inches.)
7. Remove existing nameplate from Optical Unit Assembly.
8. Clean nameplate mounting surface with MEK.
9. Abrade back nameplate, P/N 1012196, and clean with MEK. Apply epoxy adhesive, P/N 1011541, to back of nameplate.
10. Apply new nameplate to same location as occupied by old nameplate.
11. Update applicable records as directed in section VIII.
12. Dispose of removed parts in accordance with section IX.

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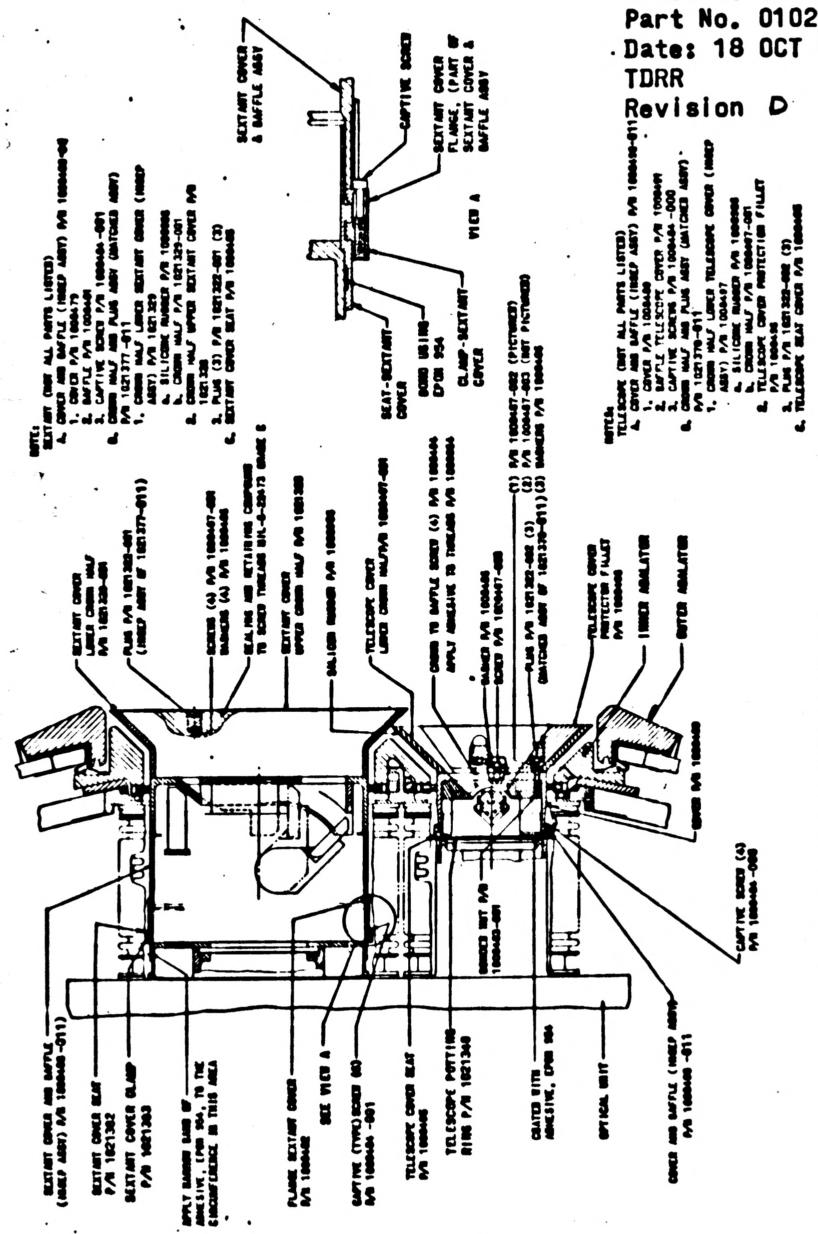

FIGURE 1. TELESCOPE AND SEXTANT ASSEMBLIES (SIDE VIEW)

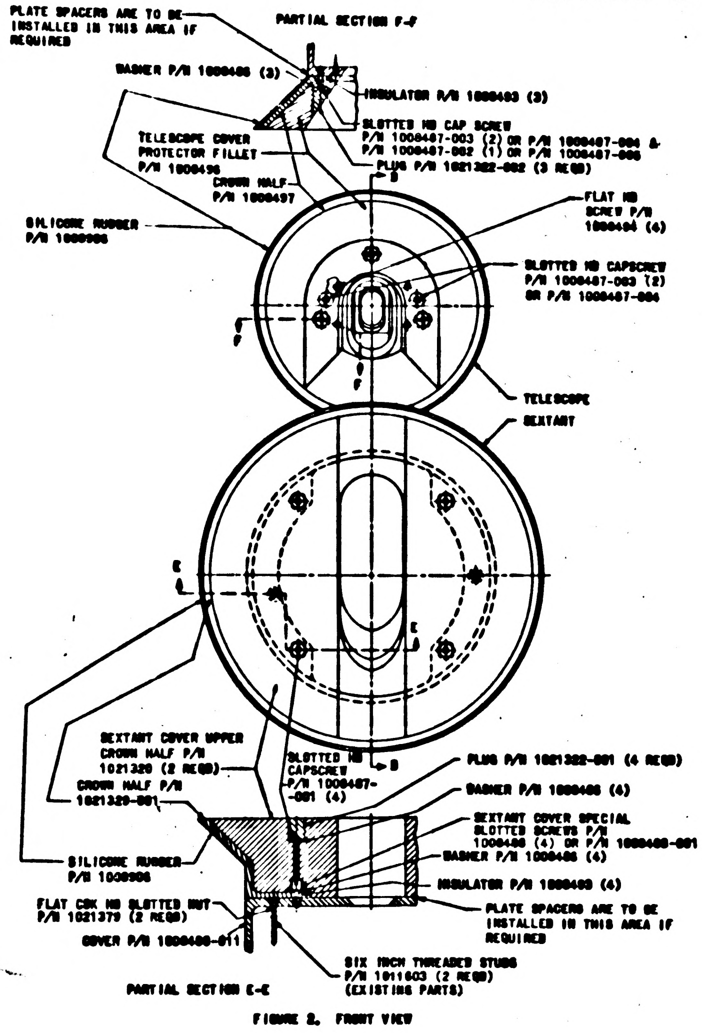
PLATE SPACERS ARE TO BE INSTALLED IN THIS AREA IF REQUIRED
PARTIAL SECTION F-F
WASHER P/N 1008486 (3)
INSULATOR P/N 1008493 (3)
SLOTTED HD CAP SCREW P/N 1008487-003 (2) OR P/N 1008487-004 & P/N 1008487-002 (1) OR P/N 1008487-006
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
PLUG P/N 1021322-002 (3 REQD)
CROWN HALF P/N 1008497
SILICONE RUBBER P/N 1008906
FLAT HD SCREW P/N 1008494 (4)
SLOTTED HD CAPSCREW P/N 1008487-003 (2) OR P/N 1008487-004
F
F
TELESCOPE
SEXTANT
E
E
SEXTANT COVER UPPER CROWN HALF P/N 1021320 (2 REQD)
CROWN HALF P/N 1021329-001
SLOTTED HD CAPSCREW P/N 1008487-001 (4)
D
PLUG P/N 1021322-001 (4 REQD)
WASHER P/N 1008486 (4)
SEXTANT COVER SPECIAL SLOTTED SCREWS P/N 1008488 (4) OR P/N 1008488-001 (4)
WASHER P/N 1008486 (4)
SILICONE RUBBER P/N 1008906
INSULATOR P/N 1008493 (4)
FLAT CSK HD SLOTTED NUT P/N 1021379 (2 REQD)
PLATE SPACERS ARE TO BE INSTALLED IN THIS AREA IF REQUIRED
COVER P/N 1008488-011
SIX INCH THREADED STUDS P/N 1011603 (2 REQD) (EXISTING PARTS)
PARTIAL SECTION E-E

FIGURE 2. FRONT VIEW

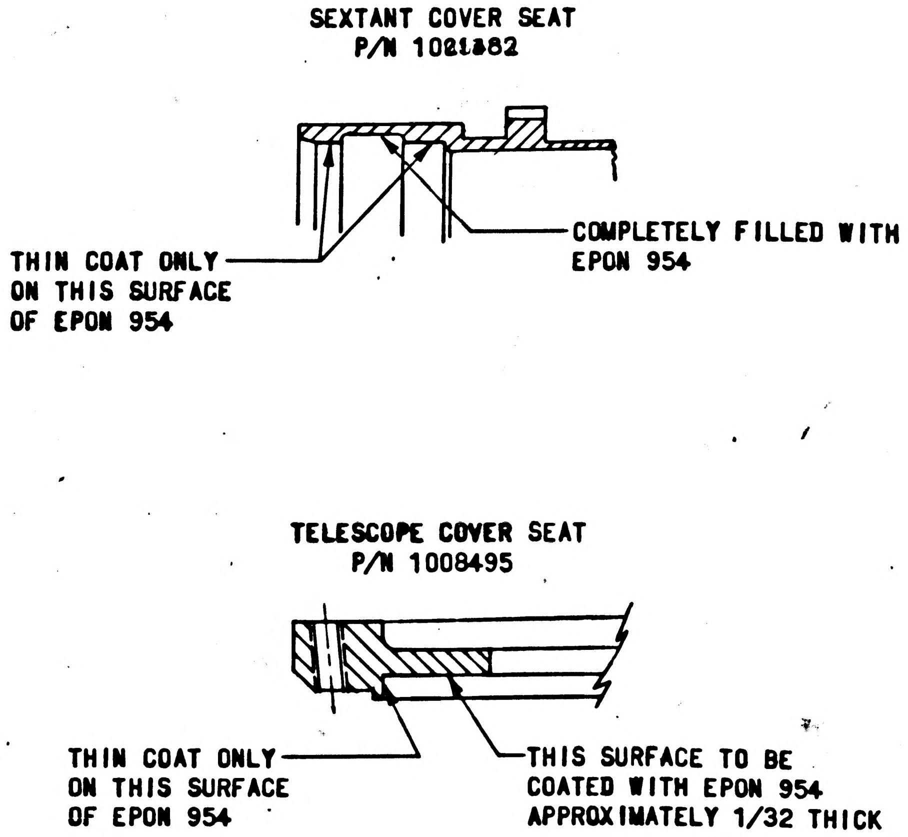
SEXTANT COVER SEAT
P/N 1021862
THIN COAT ONLY ON THIS SURFACE OF EPON 954
COMPLETELY FILLED WITH EPON 954
TELESCOPE COVER SEAT
P/N 1008495
THIN COAT ONLY ON THIS SURFACE OF EPON 954
THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 THICK

Figure 3. APPLICATION OF ADHESIVE

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

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VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.
2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.
3. Repair - If a repair; check the repair block.
4. Complete the chart as follows:
    a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.
    b. Qty. - Insert the quantity of the added and/or removed part.
    c. Part Name - Insert the name of the added and/or removed part.
    d. P/N - Insert the part number of the added and/or removed part.
    e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.
    f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

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VIII. MODIFICATION DESIGNATION (CONTINUED)

    g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.
2. Make necessary entry in the Equipment Inventory Record sheet.
3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

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VIII. MODIFICATION DESIGNATION

E. Significant part number changes resulting from this modification are listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

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RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ________ GAN # ________

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No.1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR STOWAGE UNIT EYEPIECES, P/N 1021255-031, P/N 1021255-041, AND EYEPIECE STOWAGE CASE, P/N 1021314-011 (ECP-ACSK-0456)
ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			~~MIT~~	NASA	
A	31792	ALL INITIAL RELEASE		—	11/3/66

Prepared by Konrad K Ronsethe Date 17 Oct 1966

P.C. Engineering Approval / H. Miller Date

Design Review Board Approval For ICD Coord. W Stameris Date 31 Oct 66

MIT/IL Approval Date

NASA Approval Aw P. Jacob Date

MIT Reliability Date

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Stowage Unit Eyepiece. The modification is being performed to reduce the force required to close the Eyepiece Stowage Unit door and to prevent the eyepiece stowage case door from opening during earth landing shock.

II. AUTHORITY

This retrofit is authorized by ECP-ACSK-0456.
CCA-497-0354

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
Stowage Unit Eyepiece	1021255-031	1021255-051
Stowage Unit Eyepiece	1021255-041	1021255-061
Eyepiece Stowage Case	1021314-011	1021314-021

IV. PRIORITY CHANGES

RIB 0102647 (ECP 407)

V. RELATED CHANGES

Not applicable

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102693, consisting of the following items is required to modify the Stowage Unit Eyepiece.

Qty	Part Number	Description
1	0102663	Retrofit Instruction Bulletin
2	1021371	Stop, spring
2	1021372-002	Spring cover
4	MS24622-17	Screw, pan head
1/2 oz	1010661	Epoxy resin
1/2 oz	1010679	Adhesive activator
4	MS20426AD4-3	(1897063-203) Rivet, flat head
2	1021374	Tab, catch
4	1021314-007	Shim, hinge

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	N/A	Marking India Ink
1	*Schwaab Stamp & Seal Co., type AAG-0	Rubber stamp, 1/8 inch, 13 band, alpha numerical
1	ND1002187	Bonding specification
AR	FED-TT-735	Isopropyl alcohol
AR	Dupont type TF	Cleaning agent, Freon
1	1016130-002	Shim, slide locating
AR	1011541	Adhesive, non rigid two component
1	ND1002219	Bonding specification
AR	MIL-C-5541, class 2 type 1, grade B	Alodine 12005

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and unserstand complete RIB prior to attempting this modification.

VII. A. PROCEDURE (CONTINUED)

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

3. Ink markings.

   a. Markings to be removed should be removed using isopropyl alcohol.

   b. New markings shall meet requirements of ND1002019.

4. Where marking is specified, hand marking is acceptable.

B. DETAILED INSTRUCTIONS. Perform modification as follows: (Modification to be performed at AC Electronics facilities)

1. Obtain spare eyepiece stowage case assembly, P/N 1021314-011 and place on work bench.

2. Open case cover.

3. Remove six (6) flat head screws, P/N MS21207C4-6, retaining strike catches, P/N 1021312, to case cover and retain. See figure 1.

VII. B. PROCEDURE (CONTINUED)

4. Rework strike catches per figure 2.

5. Locate and remove strike catch identification mark, "P/N 1021312" and remark with "P/N 1021376".

6. Remove excess material around strike catch mounting holes on door, to ensure screws will fully seat when strike catches are mounted.

7. Install two (2) strike catches using hardware retained in step 3, per figure 3. Apply adhesive, P/N 1010679 and 1010661, to threads of screws per ND 1002187.

8. Remove six (6) pan head screws, P/N MS24622-16, which retain two (2) clamping catches, P/N 1021262, and two (2) tension springs, P/N 1021264, to case. Dispose of tension springs per section IX. See figure 1.

9. Remove rivets retaining tab catches, P/N 1021261, to spring catches, P/N 1021260, of clamping catch assemblies. Dispose of tab catches per section IX. Retain remaining parts.

10. Obtain four (4) flat head rivets, P/N MS20426AD4-3, and two (2) tab catches, P/N 1021374, from retrofit kit.

VII. B. PROCEDURE (CONTINUED)

11. Assemble tab, P/N 1021374, catches and plate mounting tabs, P/N 1021270, to spring catch, P/N 1021260, and rivet using rivets obtained in step 10. See figure 4 for reference.

12. Locate and remove clamping catch identification number, P/N 1021262, and remark with P/N 1021375.

13. Obtain two (2) spring covers, P/N 1021372-002, and spring stops, P/N 1021371, from retrofit kit.

14. Install two (2) each, clamping catches, P/N 1021375, spring covers, P/N 1021372-002, and spring stops, P/N 1021371, using four (4) MS24622-17, pan head screws obtained from retrofit kit and two (2) pan head screws, MS24622-16, from six (6) removed in step 8. Dispose of remaining pan head screws per section IX. Assemble and install per figure 3.

15. Position spring stop, P/N 1021371, such that when the door is closed it will unlatch when only one clamping catch, P/N 1021375, is depressed at a time. A minimum of 0.003 gap must be maintained between spring stop, P/N 1021371, and cover spring, P/N 1021372-002, when door is closed*. After above adjustment has been accomplished, remove one screw at a time, apply adhesive, P/N 1010679 and 1010661, to screw threads per ND 1002187, and replace. After adhesive has been applied to all screws, recheck adjustment to ensure proper functioning of door latches.

*See figure 6 if problems occur.

VII. B. PROCEDURE (CONTINUED)

16. Locate eyepiece stowage case P/N "1021314-011". Lineout "-011" and remark with "-021".

17. Send modified eyepiece storage case, P/N 1021314-021, and remaining retrofit kit parts to field site for installation in accordance with paragraph C.

18. Update applicable records per section VIII.

19. Dispose of parts removed per section IX.

C. EYEPIECE STOWAGE UNIT, P/N 1021314-021, INSTALLATION PROCEDURE (FIELD)

1. Remove eyepiece stowage case, P/N 1021314-011, from spacecraft.

2. Locate identification plate on modified unit. Line out present dash number and serial number and rubber stamp new dash number adjacent to lined out dash number in accordance with ND 1002019 and table 1. Obtain serial number from unit removed in step 1 and mark adjacent to lined out serial number.

3. Install modified eyepiece stowage case, P/N 1021314-021, in spacecraft and dispose of eyepiece stowage case removed from spacecraft in accordance with section IX.

VII. C. PROCEDURE (CONTINUED)

4 8. Measure the distance between the clamping catch, P/N 1021375, of eyepiece stowage case and the annunciator panel and support assembly, P/N 1021272, when the clamping catch is disengaged. (See figure 5.) The gap shall be between 0.050 to 0.060. If the gap is not between 0.050 to 0.060, remove case from spacecraft and either shim door hinge, P/N 1021265, or case hinge P/N 1021265, as required using hinge shims, P/N 1021314-007, as required to obtain 0.050 to 0.060 tolerance. Removing one screw at a time, apply adhesive, P/N 1010679 and 1010661, to all threads of hinge screws, P/N MS24622-16, per ND 1002187. Torque button head screws, P/N 1010618-15, of hinges to 5 to 6 inch pounds.

5 5. Update applicable records per section VIII.

6 6. Dispose of parts removed per section IX.

Table 1. Identification Plate Information

Name	Pre-modification P/N	Post-modification P/N
Stowage Unit Eyepiece (G & N System 12)	1021255-031	1021255-051
Stowage Unit Eyepiece (G & N Systems 111,121,124)	1021255-041	1021255-061
Eyepiece Stowage Case (Spare)	1021314-011	1021314-021

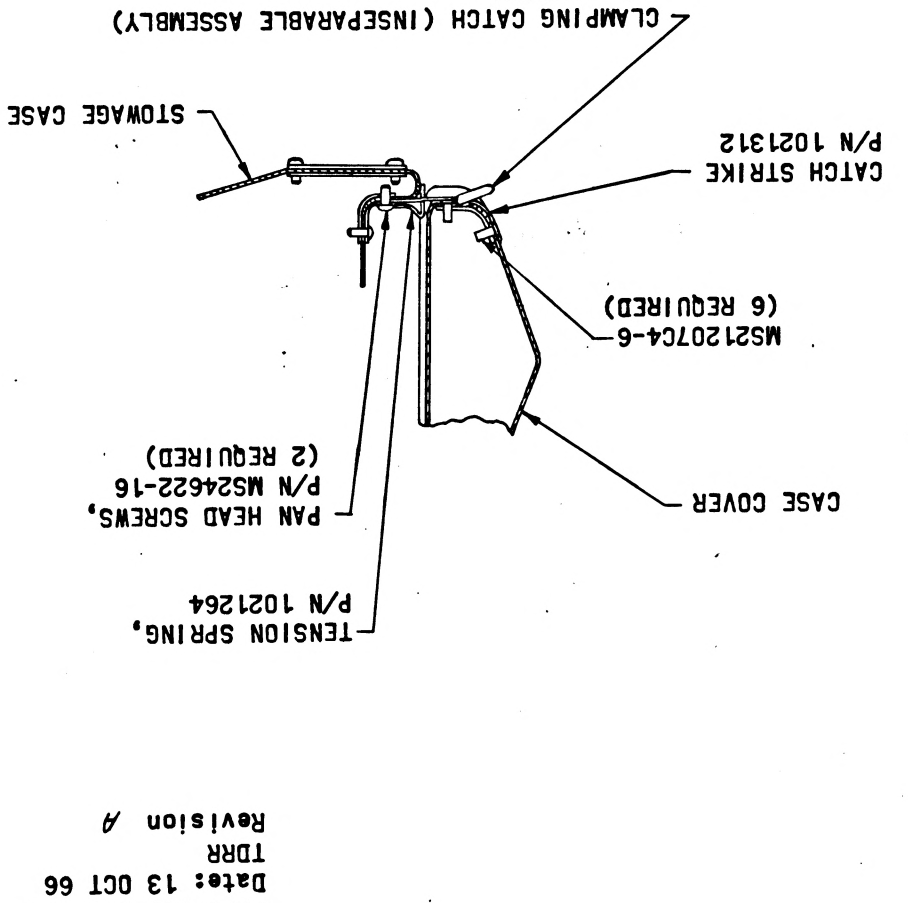

TENSION SPRING,
P/N 1021264
PAN HEAD SCREWS,
P/N MS24622-16
(2 REQUIRED)
STOWAGE CASE
CASE COVER
MS21207C4-6
(6 REQUIRED)
CATCH STRIKE
P/N 1021312
CLAMPING CATCH (INSEPARABLE ASSEMBLY)
P/N 1021262

Figure 1. STOWAGE UNIT EYEPIECE. (PARTIAL VIEW OF AREA TO BE MODIFIED, OLD CONFIGURATION)

Step 1. REMOVE MATERIAL ON ANGLE AS INDICATED
Step 2. REMOVE MATERIAL AT A 40° ANGLE 0.020 IN. FROM EDGE AS INDICATED
Step 3. COUNTERSINK TWO (2) HOLES SHOWN ON FRONT VIEW 100° TO .300 DIA.
Step 4. ALODINE REWORKED SURFACES PER MIL-C-5541, CLASS 2, TYPE 1, GRADE B

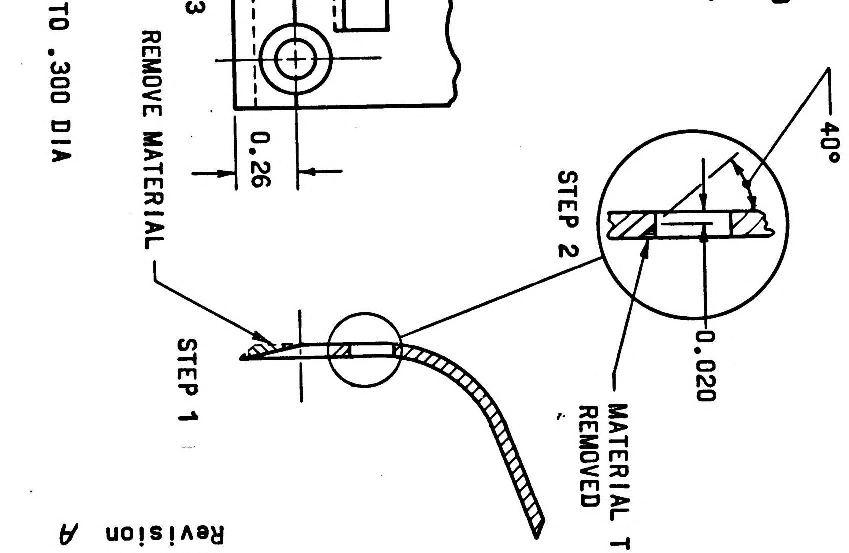

40°
0.020
MATERIAL TO BE
REMOVED
STEP 2
STEP 1
REMOVE MATERIAL
STEP 3
0.26
.125
.129 THRU
COUNTERSINK 100° TO .300 DIA
2 PLACES

Figure 2. STRIKE, CATCH REWORK, P/N 1021376

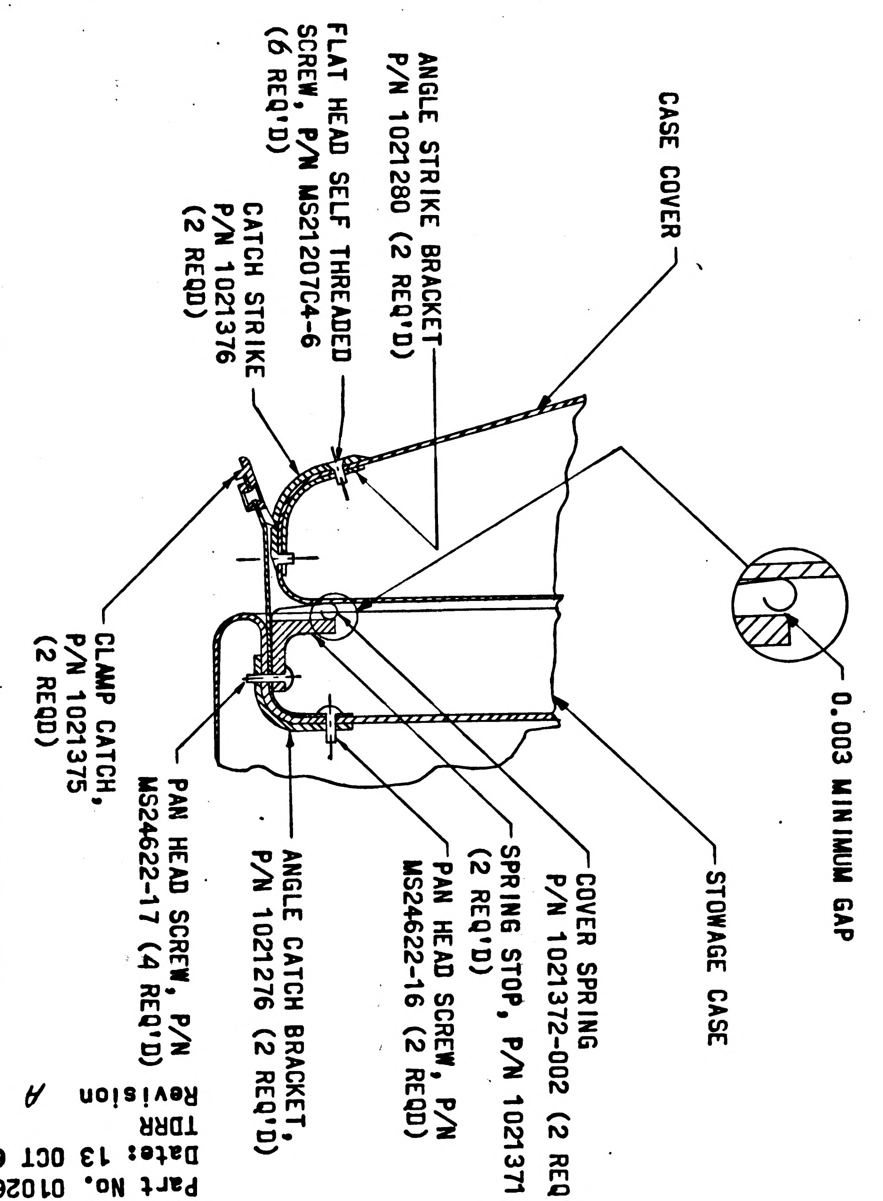

CASE COVER
0.003 MINIMUM GAP
STOWAGE CASE
COVER SPRING
P/N 1021372-002 (2 REQ'D)
SPRING STOP, P/N 1021371,
(2 REQ'D)
PAN HEAD SCREW, P/N
MS24622-16 (2 REQD)
ANGLE CATCH BRACKET,
P/N 1021276 (2 REQ'D)
PAN HEAD SCREW, P/N
MS24622-17 (4 REQ'D)
CLAMP CATCH,
P/N 1021375
(2 REQD)
ANGLE STRIKE BRACKET
P/N 1021280 (2 REQ'D)
FLAT HEAD SELF THREADED
SCREW, P/N MS21207C4-6
(6 REQ'D)
CATCH STRIKE
P/N 1021376
(2 REQD)

Figure 3. STOWAGE UNIT EYEPIECE. (PARTIAL VIEW OF AREA BEING MODIFIED)

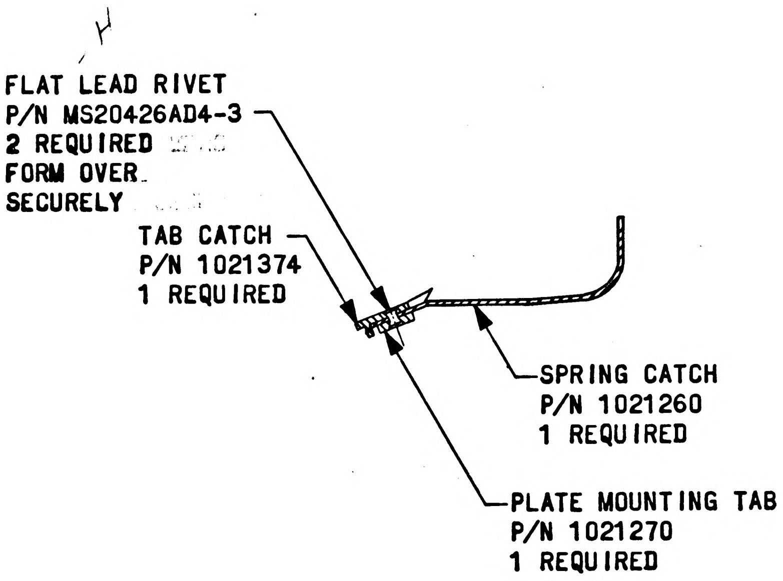

FLAT LEAD RIVET
P/N MS20426AD4-3
2 REQUIRED
FORM OVER
SECURELY
TAB CATCH
P/N 1021374
1 REQUIRED
SPRING CATCH
P/N 1021260
1 REQUIRED
PLATE MOUNTING TAB
P/N 1021270
1 REQUIRED

Figure 4. CATCH, CLAMPING P/N 1021375 (INSEPARABLE ASSEMBLY)

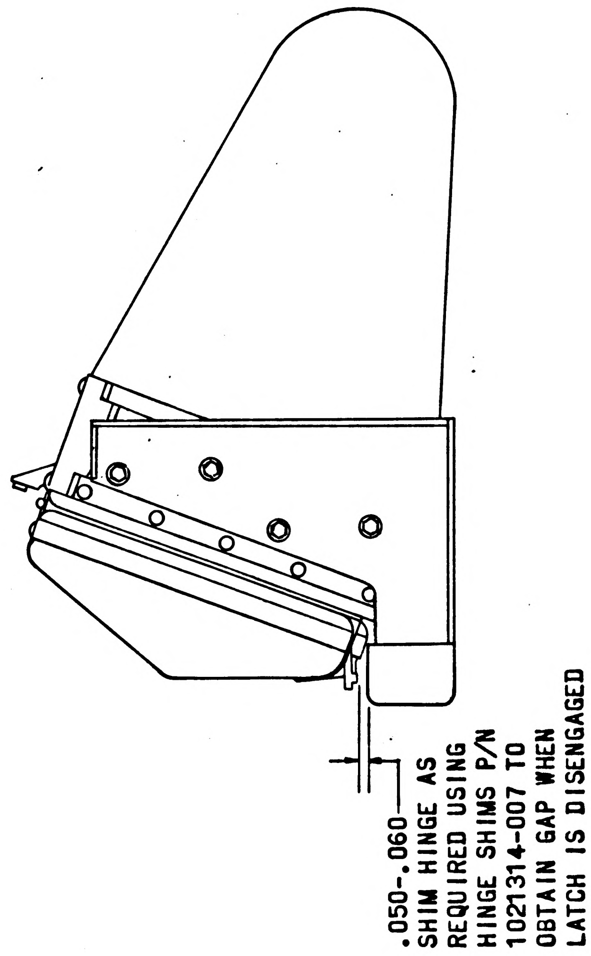
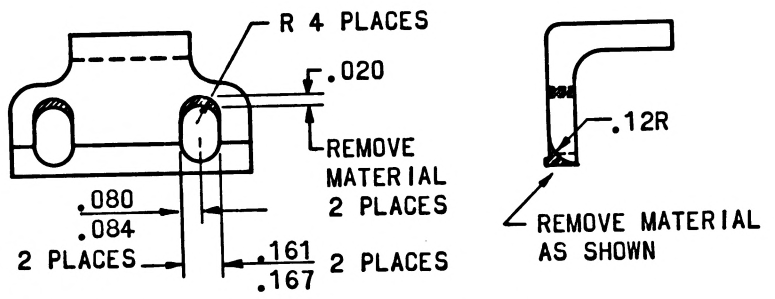

.050-.060
SHIM HINGE AS
REQUIRED USING
HINGE SHIMS P/N
1021314-007 TO
OBTAIN GAP WHEN
LATCH IS DISENGAGED

Figure 5. STOWAGE UNIT EYEPIECE


R 4 PLACES
.020
REMOVE
MATERIAL
2 PLACES
.080
.084
2 PLACES
.161
.167
2 PLACES
.12R
REMOVE MATERIAL
AS SHOWN

PERMISSIBLE REWORK OF STOP SPRING, P/N 1021371, IF REQUIRED, TO OBTAIN 0.003 GAP IN STEP 15 OF PARAGRAPH VII.B.

NOTE:
ALODINE MACHINED SURFACES PER MIL-C-5441 CLASS II GRADE B TYPE I

Figure 6. STOP, SPRING P/N 1021371, PERMISSIBLE MODIFICATION

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. MODIFICATION DESIGNATION (CONTINUED)

E. The following part number changes resulted from this modification.

Name	Pre-modification P/N	Post-modification P/N
Eyepiece Stowage Unit (Inseparable Assembly)	1021314-011	1021314-021
Clamping Catch Assembly	1021262	1021375
Strike Catch	1021312	1021376
Stowage Unit Eyepiece	1021255-041	1021255-061
Stowage Unit Eyepiece	1021255-031	1021255-051

IX. DISPOSITION OF PARTS REMOVED

Return Eyepiece Stowage Unit, P/N 1021314-011, (removed from spacecraft) to AC Electronics Logistics Department bondroom.

Scrap all other removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

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Revision A

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ________ G&N # ______

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification

DATE	
SIGNED	

Above MODS Installed

DATE	
SIGNED	

ACC Form No. 1a
2/23/66

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Revision A

Date: ____________

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ____________ P/N: ____________ S/N: ______

ECP NO.: ____________ Retrofit Kit No.: ____________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ____________

50

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Part No. 0102664
Date: 30 SEPT 66
TDRR 32513
Revision B

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR G & N INDICATOR CONTROL PANEL ASSEMBLY, P/N 2014578-011 AND RETICLE BRIGHTNESS CONTROL ASSEMBLY, P/N 2014656-011 (ECP-ACSK-0457)

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			MIT	NASA	
A	CM 216543	1, 4, 7			12 NOV 66
B	32513	ALL INITIAL RELEASE		—	5 JAN 67

Prepared by Konrad K Konetzke Date 3 Oct 1966

P.C. Engineering Approval Date 6 OCT 1966

Design Review Board Approval Date 30 Dec 66

MIT/IL Approval Date

NASA Approval Date 1/3/67

MIT Reliability Date

Sheet 2 of 22
Part No. 0102664
Date: 30 SEPT 66
TDRR
Revision B

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the G & N Indicator Control Panel Assembly. This modification is being performed to provide a suitable cover over the exposed switch mechanisms which will serve to inhibit the possible introduction of any loose particles of significant size.

II. AUTHORITY

This retrofit is authorized by ECP-ACSK-0457. (CCA-0497-355)

III. UNITS AFFECTED

Name	Pre-modification P/N	Post-modification P/N
G & N Indicator Control Panel Assembly (G&N systems 203 through 207 and spares)	2014578-011	2014578-021
Reticle Brightness Control Assembly (Spares)	2014656-011	2014656-021

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IV. PRIORITY CHANGES

Not applicable.

V. RELATED CHANGES

Not applicable.

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102694, consisting of the following items is required for this modification;

Qty	Part Number	Description
1	0102664	Retrofit Instruction Bulletin
3	2021238-001	Cover, switch
2	2021238-002	Cover, switch
1	2021238-003	Cover, switch
1	2021238-004	Cover, switch
2	2021238-005	Cover, switch
2	2021238-006	Cover, switch
1	2021239	Shield, switch, attitude impulse
1	2021240	Cover, shield
1	2021241	Spacer, cover
1	2021242	Cover, Reticle brightness
4	1010477-13	Screw, flat head, 100°, selflocking

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VI. A. MATERIALS REQUIRED (CONTINUED)

Qty	Part Number	Description
4	NAS1352C02-4	Screw, Soc. Hd. Cap
4	1010617-2	Nut, Hex
2	MS35233-9	Screw, pan head, slotted
1	1004260-545	Nameplate

B. One retrofit kit, P/N 8102695, consisting of the following items is required to modify Reticle Brightness Control Assembly, P/N 2014656-011 (spares).

Qty	Part Number	Description
1	0102664	Retrofit Instruction Bulletin
1	2021242	Cover, reticle brightness
1	2021241	Spacer, cover
2	MS35233-9	Screw, pan head slotted

C. Materials and special tools required but not supplied in kit are as follows;

Qty	Part Number	Description
1	ND1002219	Process specification for bonding with a non-rigid epoxy adhesive
AR	MIL-T-23594 Type II	Teflon Tape
AR	N/A	Marking India ink
AR	1001861	Nylon gloves
AR	N/A	Lint free tissue
AR	Dupont type TF	Cleaning agent, Freon
AR	FED-TT-735	Isopropyl alcohol
AR	1011541	Adhesive, non rigid, two component
1	2014578	Drawing

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.
2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.
3. New markings shall meet requirements of ND 1002019.
4. Where marking is specified, hand marking is acceptable.

B. PERFORM MODIFICATION TO G & N INDICATOR CONTROL PANEL ASSEMBLY, P/N 2014578-011 IN ACCORDANCE WITH PARAGRAPH C. PERFORM MODIFICATION TO RETICLE BRIGHTNESS CONTROL ASSEMBLY, P/N 2014656-011, (SPARES), IN ACCORDANCE WITH PARAGRAPH D.

C. G & N INDICATOR CONTROL PANEL ASSEMBLY, P/N 2014578-011. Obtain retrofit kit, P/N 8102694, and perform modification as follows:

NOTE: Do not damage wiring during modification.

VII. C. PROCEDURE (CONTINUED)

1. Remove right handle assembly, P/N 2014764-011, from panel, G & N Indicator Control (Inseparable) (Panel), P/N 2014626, and retain.

   NOTE: When removing and installing MARK pushbutton cap, P/N 1010457-1, take care not to damage MARK and MARK REJECT panel.

2. Remove MARK pushbutton cap, P/N 1010457-1.
3. Remove four (4) hex flat head screws, P/N 1010630-4, nuts, P/N 1010617-2, and washers, P/N 6014527, retaining MARK and MARK REJECT panel to switch support, P/N 2014658, and retain.
4. Remove mounting hardware and panel spacers, P/N 2014763, from MARK, (S6), P/N 1010904-2, and MARK REJECT (S7), P/N 1010904-1, switches and retain.
5. Remove MARK and MARK REJECT panel and retain.
6. Carefully move electroluminescent (EL) lamp until four (4) flat head selflocking screws, P/N 1010477-12, retaining attitude impulse switch (S8), P/N 2014700-011, can be removed. Remove screws and dispose per section IX.
7. Obtain attitude impulse shield, P/N 2021239, and four (4) flat head selflocking screws, P/N 1010477-13, from kit.

VII. C. PROCEDURE (CONTINUED)

8. Install attitude impulse shield, P/N 2021239, on attitude impulse switch (S8), P/N 2014700-011, and install switch and shield to switch support, P/N 2014658, using four (4) flat head selflocking screws, P/N 1010477-13 obtained in step 7. Remount switch S8 in original position.

8a. Obtain Teflon Tape, MIL-T-23594, Type II, and wrap the Peripery of the Attitude Impulse Shield, P/N 2021239, (installed in step 8) to cover the exposed slots.

9. Carefully reposition EL lamp to original position and install MARK and MARK REJECT panel removed in step 5, using hardware removed in step 3. Do not tighten hardware at this time.
10. Obtain two (2) switch covers, P/N 2021238-002, from kit.
11. Remove keying washers from MARK (S6) and MARK REJECT (S7) switches and install covers obtained in step 10 on switches.

    NOTE: During switch installation, the EL lamp and MARK REJECT panel should be positioned properly to ensure that the EL lamp is not pinched by the switch mounting hardware.

12. Reinstall MARK (S6) and MARK REJECT (S7) switches onto switch support, P/N 2014658, using mounting hardware and panel spacers removed in step 4. Torque switches to 48 inch pounds. See drawing 2014578, detail B-B for switch installation.

VII. C. PROCEDURE (CONTINUED)

13. Tighten mounting hardware installed in step 9 to requirements of drawing 2014578, detail A-A.
14. Obtain shield cover, P/N 2021240, four (4) socket head cap screws, P/N NAS1352C02-4, and four (4) hex nuts, P/N 1010617-2 from kit. Install shield cover, P/N 2021240, onto attitude impulse switch shield, P/N 2021239, and secure using four (4) socket head cap screws, P/N NAS1352C02-4 and hex nuts, P/N 1010617-2.
15. Reinstall MARK pushbutton cap, P/N 1010457-1, removed in step 2.
16. Reinstall handle assembly, P/N 2014764-011, removed in step 1.

    NOTE: Torque the following bushing mounted switches to 48 inch pounds.

17. Remove mounting hardware from UP TELEMETRY switch (S10), P/N 1010905-3, and retain.
18. Obtain switch cover, P/N 2021238-001, from kit, remove switch S10 from panel, P/N 2014626 and install switch cover on switch.
19. Reinstall switch (S10) P/N 1010905-3 in original position on panel, P/N 2014626, using mounting hardware retained in step 17 and torque.

VII. C. PROCEDURE (CONTINUED)

20. Remove mounting hardware from CONDITION LAMPS (S12) switch, P/N 1010903-8, and retain.

21. Obtain one (1) each switch cover, P/N 2021238-005 and P/N 2021238-006, from kit.

22. Install switch cover, P/N 2021238-006 over CONDITION LAMPS (S12) switch.

NOTE: If required, prior to performing step 23, cut material from switch cover, P/N 2021238-005, until it fits properly over EL lamp (DS2) wiring.

23. Install CONDITION LAMPS (S12) switch and switch cover, P/N 2021238-006, into switch cover, P/N 2021238-005.

24. Reinstall CONDITION LAMPS (S12) switch and switch covers in original position on panel, P/N 2014626, using hardware retained in step 20 and torque.

25. Remove mounting hardware from COUPLING switch (S4), P/N 1010905-5, and retain.

26. Obtain switch cover, P/N 2021238-001 from kit, remove COUPLING switch (S4) from panel, P/N 2014626, and install switch cover on switch (S4).

27. Reinstall COUPLING switch (S4) in original position on panel, P/N 2014626, using mounting hardware retained in step 25 and torque.

VII. C. PROCEDURE (CONTINUED)

28. Remove mounting hardware from SPEED switch (S1), P/N 1010902-6, and retain.

29. Obtain switch cover, P/N 2021238-004, from kit. Remove SPEED switch (S1) from panel, P/N 2014626, and install switch cover on switch.

30. Reinstall SPEED switch (S1) in original position on panel, P/N 2014626, using mounting hardware retained in step 28 and torque.

31. Remove mounting hardware from MODE switch (S3), P/N 1010903-9, and retain.

32. Obtain one (1) each switch cover, P/N 2021238-005, and P/N 2021238-006, from kit.

33. Remove MODE switch (S3) from panel, P/N 2014626, and install switch cover, P/N 2021238-006, over MODE switch (S3).

NOTE: If required, prior to performing step 34, cut material from switch cover P/N 2021238-005, until it fits properly over EL lamp (DS14) wiring.

34. Install MODE switch (S3) and switch cover, P/N 2021238-006, into switch cover, P/N 2021238-005.

35. Reinstall MODE switch (S3) and switch covers in original position on panel, P/N 2014626, using hardware retained in step 31 and torque.

VII. C. PROCEDURE (CONTINUED)

36. Remove mounting hardware from TELESCOPE TRUNNION switch (S5), P/N 1010902-4, and retain.

37. Obtain switch cover, P/N 2021238-001 from kit. Remove TELESCOPE TRUNNION switch (S5) from panel, P/N 2014626, and install switch cover on switch.

38. Reinstall TELESCOPE TRUNNION switch (S5) in original position on panel, P/N 2014626, using mounting hardware retained in step 36 and torque.

39. Remove two (2) allen head screws, P/N NAS1352C02LL3, from front of TRACKER switch (S2), P/N 1010902-5, and remove switch blockout plate, P/N 2021201, and switch blockout bushing, P/N 2021200, and retain.

40. Remove mounting hardware from TRACKER switch (S2) and retain.

41. Obtain switch cover, P/N 2021238-003, from kit. Remove TRACKER switch (S2) from panel, P/N 2014626, and install switch cover on switch.

42. Reinstall TRACKER switch (S2), in original position on panel, P/N 2014626, using mounting hardware retained in step 40 and torque.

43. Reinstall switch blockout hardware removed in step 39 per note 11 of drawing 2014578.

VII. C. PROCEDURE (CONTINUED)

44. Remove cable clamp on reticle brightness control assembly, P/N 2014656-011, and retain.

45. Remove two (2) mounting socket head cap screws, P/N 1001489-2, from reticle brightness control assembly, P/N 2014656-011, and retain.

46. Locate reticle brightness control assembly identification number 2014656-011. Remove "-011" and replace with "-021" in accordance with ND 1002019.

47. Remove two (2) pan head slotted screws, P/N MS35233-7, which retain switch (S11), P/N 1010901-1, to mounting bracket, P/N 2014638. Retain flat washers and dispose of pan head slotted screws per section IX.

48. Obtain reticle brightness cover, P/N 2021242, cover spacer, P/N 2021241, and two (2) pan head slotted screws, P/N MS35233-9, from kit.

49. Retaining switch (S11), P/N 1010901-1, and actuator, P/N 1010457-5, in original position, install reticle brightness cover, P/N 2021242 and cover spacer, P/N 2021241, over switch actuating mechanism using two (2) pan head slotted screws, P/N MS35233-9, obtained in step 48, and flat washers retained in step 47.

VII. C. PROCEDURE (CONTINUED)

50. Reinstall reticle brightness control assembly, P/N 2014656-021, using hardware retained in step 45.

51. Reinstall cable clamp removed and retained in step 44.

52. Obtain nameplate, P/N 1004260-545, from kit.

53. Transfer serial number from existing nameplate on panel, P/N 2014626, to new nameplate. Use typewriter with ribbon removed to imprint data. (Height of typewriter characters shall be 0.057 to 0.067 inches.)

54. Clean old nameplate using isopropyl alcohol and freon.

CAUTION: The epoxy adhesive contains ingredients which are capable of producing skin irretations, skin and eye burns, sensitization and dermatitis. Avoid skin contact with either of the two components. If skin contact occurs, remove adhesive with ispropyl alcohol and freon or rubbing alcohol followed by a thorough washing of the affected skin. Prevent contact with eyes or clothing and avoid ingestion and inhalation of fumes. Remove contaminated clothing and wash before reuse. When preparing the adhesive, the use of disposable plastic gloves is required. The adhesive shall be prepared in a well ventilated area, preferably under an exhaust hood.

VII. C. PROCEDURE (CONTINUED)

55. Obtain epoxy adhesive, P/N 1011541, and apply to new nameplate in accordance with ND 1002219, method II.

56. Install new nameplate over old nameplate. Wipe excess adhesive from nameplate using lint free tissue.

57. Cure adhesive at room temperature for a minimum of 24 hours. See ND 1002219, method II for reference.

58. Update applicable records as directed in section VIII.

59. Dispose of removed parts per section IX.

D. RETICLE BRIGHTNESS CONTROL ASSEMBLY, P/N 2014656-011, (SPARES). Obtain retrofit kit, P/N 8102695, and perform modification as follows:

1. Obtain reticle brightness control assembly, P/N 2014656-011, from spares.

2. Locate reticle brightness control assembly identification number 2014656-011. Remove "-011" and remark with "-021" in accordance with ND 1002019.

D.
VII. C. PROCEDURE (CONTINUED)

3. Remove two (2) pan head slotted screws, P/N MS35233-7, which retain switch (S11) P/N 1010901-1, to mounting bracket, P/N 2014638. Retain flat washers and dispose of pan head slotted screws per section IX.

4. Retaining switch (S11), P/N 1010901-1, and actuator, P/N 1010457-5, in original position, install reticle brightness cover, P/N 2021242, and cover spacer, P/N 2021242, over switch actuating mechanism using two (2) pan head slotted screws, P/N MS35233-9, contained in kit, and flat washers retained in step 3.

5. Update applicable records as directed in section VIII.

6. Dispose of removed parts per section IX.

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

    a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

    b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

    c. Equip. S/N - List the serial number for each assembly listed in the first column.

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VIII. MODIFICATION DESIGNATION (CONTINUED)

d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

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VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

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VIII. MODIFICATION DESIGNATION (CONTINUED)

d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

Sheet 20 of 22
Part No. 0102664
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Revision B

VIII. MODIFICATION DESIGNATION (CONTINUED)

E. Significant part number changes resulting from this modification are as follows:

Name	Pre-modification P/N	Post-modification P/N
Reticle Brightness Control Assembly	2014656-011	2014656-021
G & N Indicator Control Panel Assembly	2014578-011	2014578-021

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

Typical- [illegible]

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Date: 30 SEPT 66
TDRR
Revision B

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______________ Date: __________ G&N # ______

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

ACC Form No. 1a
2/23/66

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Part No. 0102664
Date: 30 SEPT 66
TDRR
Revision B

Date: __________

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ______________ P/N: ______________ S/N: ______

ECP NO.: ______________ Retrofit Kit No.: ______________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. __________

01/12/67m

Sheet 1 of 21
Part No. 0102673
Date: 8 DEC 66
TDRR 33013
Revision A

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR OPTICAL UNIT AND BELLOWS ASSEMBLY, P/N 2010790-021, -031, AND -041.

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			[illegible]	NASA	
A	33013	ALL INITIAL RELEASE	EnA	—	16 FEB 67

Prepared by Konrad K Konatzke Jr Date 13 Dec 1966

P.C. Engineering Approval C.H. H. Miller Date 12/21/66

Design Review Board Approval W Stamens Date 14 Feb 67

MIT/IL Approval EJ Date

NASA Approval A [illegible] Date [illegible]

MIT Reliability Date

Sheet 2 of 21
Part No. 0102673
Date: 8 DEC 66
TDRR
Revision A

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Optical Unit and Bellows Assembly. This modification is being performed to add the Cover and Baffle Assembly, P/N 1008490-011 (SCT) and Cover and Baffle Assembly, P/N 1008480-011 (SXT) part of astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This Retrofit is authorized by CCA497-0309, in lieu of approval of ECP 0428.

III. UNITS AFFECTED

G & N System	Name	Pre-modification P/N	Post-modification P/N
204 & 205	Optical Unit and Bellows Assembly	2010790-021	2010790-061
206	Optical Unit and Bellows Assembly	2010790-031	2010790-071
207, 208 & 209	Optical Unit and Bellows Assembly	2010790-041	2010790-081

Sheet 3 of 21
Part No. 0102673
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Revision A

IV. PRIORITY CHANGES

N/A

V. RELATED CHANGES

RIB'S 0102674 and 0102675

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102704, consisting of the following items is required to modify the Navigation Base and Optical Unit Assembly.

Qty	Part Number	Description
1	0102673	Retrofit Instruction Bulletin
1	1008490-011	Cover and Baffle Telescope (Insep Assy)
1	1008480-011	Cover and Baffle Sextant (Insep Assy)
1	1008495	Seat, Telescope
4	1008494	Screw, Flat Head
4	1008484-000	Screw, captive
2	1021379	Fastener, screw tube, flat hd
1	1021383	Clamp, sextant cover
6	1008484-001	Screw, captive
1	1021340	Potting ring, telescope
1	1021382	Seat, sextant cover
1 qt	1008903-1	Epoxy Resin) EPON 954
1 pt	1008903-2	Curing Agent) EPON 954

Sheet 4 of
Part No. 0102673
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VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	FED-TT-I-735	Isopropyl alcohol
AR	DuPont Type TF	Freon
AR	N/A	Adhesive (MIL-S-22473, grade C) seating and retaining compound
1	ND1002329-001	Process specification for bonding with 1008903 adhesive (EPON 954)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	N/A	Marking India Ink
1	*Schwaab Stamp & Seal Co., Type AAG-0	Rubber stamp, 1/8 inch, 13 band, alpha numerical

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

B. DETAILED INSTRUCTIONS. Obtain Retrofit Kit, P/N 8102704, and perform modifications to telescope head, in accordance with paragraph C, and sextant head, in accordance with paragraph D.

C. TELESCOPE HEAD.

1. Remove existing cover, P/N 2012547, and associated hardware from telescope head and dispose as per direction given in section IX.

VII. C. PROCEDURE (CONTINUED)

2. Obtain telescope cover seat, P/N 1008495, and cover and baffle, P/N 1008490-011, install four (4) captive screws, P/N 1008484-000, into telescope cover and baffle assembly. Assemble seat and cover to telescope head. Orient assembly so telescope scans 45° off the optics center line in direction of worm shaft bearing retaining cap, P/N 2011186, and seat the assembly on the telescope prism mount support, P/N 2011185-000 or 011 for a fit check. Check for proper seating of assembly, proper clearance of optics, and mounting screw hole alignment.

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

NOTE: Do not clean painted surfaces with MEK.

NOTE: When loosening four (4) captive screws, P/N 1008484-000, loosen no more than 2 turns per screw, alternately until loose.

3. Remove telescope cover seat from cover assembly and clean telescope cover seat with MEK. Rinse with isopropyl alcohol and freon.

4. Install telescope potting ring, P/N 1021340, between telescope head seating surface and telescope cover seat, P/N 1008495, See figure 1.

VII. C. PROCEDURE (CONTINUED)

5. Assemble telescope cover and baffle, P/N 1008490-011, to telescope cover seat, P/N 1008495. Align the four (4) holes of cover and baffle with holes in telescope cover seat and attach with four (4) captive screws, P/N 1008484-000. Torque screws 5 to 6 inch pounds.

6. Obtain adhesive, P/N 1008903, (hereafter referred to as EPON 954) and prepare in accordance with ND 1002329-001.

7. Apply a narrow band of adhesive EPON 954 to telescope cover seat. (See figure 3.)

8. Clean adhesive from all surfaces not to be bonded. Install telescope cover seat making certain alignment repeats trial fit orientation.

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N. Form R, and allow to dry.

9. Apply adhesive, MIL-S-22473, grade C PER ND 1002211 to threads of flat head screws, P/N 1008494. Insert screws through cover and baffle, P/N 1008490-011 and torque assembly to telescope head 4 ± 1 inch pounds. Ensure assembly is fully seated to telescope before torquing screws. Check for proper clearance of optics and telescope cover.

VII. C. PROCEDURE (CONTINUED)

NOTE: Rotate telescope by hand every 15 minutes for 1 hour.

10. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

D. SEXTANT HEAD.

1. Remove existing cover, P/N 2012675, from sextant head. Do NOT remove the two (2) 6 inch long threaded studs, P/N 2011603. Discard slotted nuts, P/N 2011602, and cover, P/N 2012675, in accordance with section IX.

CAUTION: Avoid any damage to flex print circuit board.

NOTE: If any interference problems are encountered, reorient flex print to provide clearance.

2. Trial fit sextant cover seat, P/N 1021382, to sextant head. Check for proper seating to sextant head.

3. Rotate sextant so that sextant flex print circuit board junction is in lowest position.

VII. D. PROCEDURE (CONTINUED)

CAUTION: Move mirror by using top of mirror and move it very slowly from stop to stop. Do NOT touch mirror surface.

NOTE: Ensure assembly does not bind with flex print during or after installation.

4. Assemble clamp, P/N 1021383, to seat, P/N 1021382, and align tapped holes in clamp with grooves on circumference of seat. Install 6 captive screws, P/N 1008484-001, into cover and baffle assembly, P/N 1008480-011. Do not turn the threaded portion of the screws completely through the tapped holes, but leave approximately one thread engaged to hold screws in alignment. Temporarily attach cover and baffle assembly to seat, P/N 1021383, and clamp, P/N 1021382, using the 6 captive screws (1008484-001) and two screw tube fasteners, P/N 1021379, to long studs. Check clearance between sextant mirror and sextant cover and baffle assembly, P/N 1008480-011. Carefully move mirror from stop to stop and check clearance on each side. Rotate cover and baffle assembly to provide approximately 1/8 inch clearance between mirror, mirror mount, and mirror bracket.

5. Remove sextant cover seat, clamp and sextant cover and baffle assembly. (Separate cover seat and clamp from cover and baffle assembly.) Leave six (6) captive screws, P/N 1008484-001, captivated in sextant cover and baffle assembly, P/N 1008480-011, but back screws out about one turn so that approximately one (1) thread is engaged thus holding screws in alignment.

VII. D. PROCEDURE (CONTINUED)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

CAUTION: Do not apply MEK to painted surfaces.

6. Clean sextant cover seat with MEK. Rinse with isopropyl alcohol and freon.

7. Apply a narrow band of adhesive EPON 954 to sextant cover seat, P/N 1021382, see figure 3. Remove any excess adhesive. Clean adhesive from all surfaces not to be bonded.

8. Carefully install sextant cover seat, P/N 1021382, over flex print circuit board and seat properly to sextant housing, orient to location obtained during trial fit (step 2). Assemble clamp, P/N 1021383, to seat and align tapped holes in clamp with grooves on circumference of seat.

9. Lower sextant cover and baffle assembly onto sextant cover clamp and seat. Align holes and secure assembly to clamp and seat with six (6) captive screws, P/N 1008484-001. Torque 5 to 6 inch pounds. Check clearance as described in paragraph (4).

VII. D. PROCEDURE (CONTINUED)

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N, Form R, and allow to dry.

10. Apply adhesive, MIL-S-22473, grade C PER ND 1002211 to threads of two (2) screw tube fasteners, P/N 102137 and torque to 4 ± 1 inch pounds. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

11. Remove potting ring, P/N 1021340, from telescope. Remove potting ring by pulling attached strings until ring splits apart. After ring splits, pull away from telescope assembly and dispose of potting ring in accordance with section IX.

12. Locate P/N 2010790 on Optical Unit and Bellows Assembly. Remove dash number and replace with new dash number in accordance with section III, Units Affected.

13. Update applicable records as directed in section VIII.

14. Dispose of removed parts in accordance with section IX.

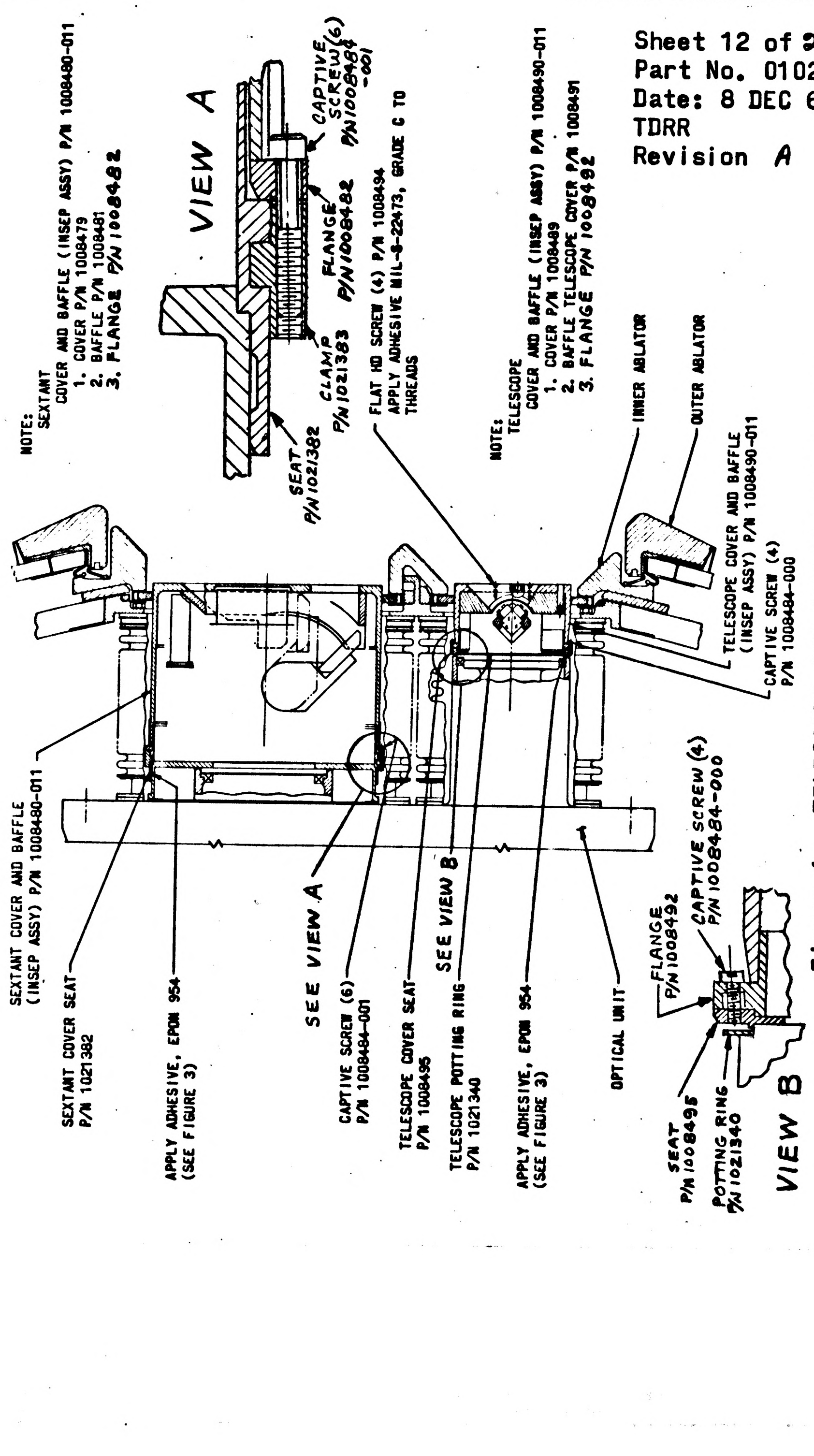
NOTE:
SEXTANT
COVER AND BAFFLE (INSEP ASSY) P/N 1008490-011
1. COVER P/N 1008479
2. BAFFLE P/N 1008481
3. FLANGE P/N 1008482
VIEW A
CAPTIVE SCREW (6) P/N 1008484-001
FLANGE P/N 1008482
CLAMP P/N 1021383
SEAT P/N 1021382
FLAT HD SCREW (4) P/N 1008494
APPLY ADHESIVE MIL-S-22473, GRADE C TO THREADS
NOTE:
TELESCOPE
COVER AND BAFFLE (INSEP ASSY) P/N 1008490-011
1. COVER P/N 1008489
2. BAFFLE TELESCOPE COVER P/N 1008491
3. FLANGE P/N 1008492
INNER ABLATOR
OUTER ABLATOR
TELESCOPE COVER AND BAFFLE (INSEP ASSY) P/N 1008490-011
CAPTIVE SCREW (4) P/N 1008484-000
SEXTANT COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
SEXTANT COVER SEAT P/N 1021382
APPLY ADHESIVE, EPON 954 (SEE FIGURE 3)
SEE VIEW A
CAPTIVE SCREW (6) P/N 1008484-001
TELESCOPE COVER SEAT P/N 1008495
SEE VIEW B
TELESCOPE POTTING RING P/N 1021340
APPLY ADHESIVE, EPON 954 (SEE FIGURE 3)
OPTICAL UNIT
FLANGE P/N 1008492
CAPTIVE SCREW (4) P/N 1008484-000
SEAT P/N 1008495
POTTING RING P/N 1021340
VIEW B

Figure 1. TELESCOPE AND SEXTANT ASSEMBLIES (SIDE VIEW)

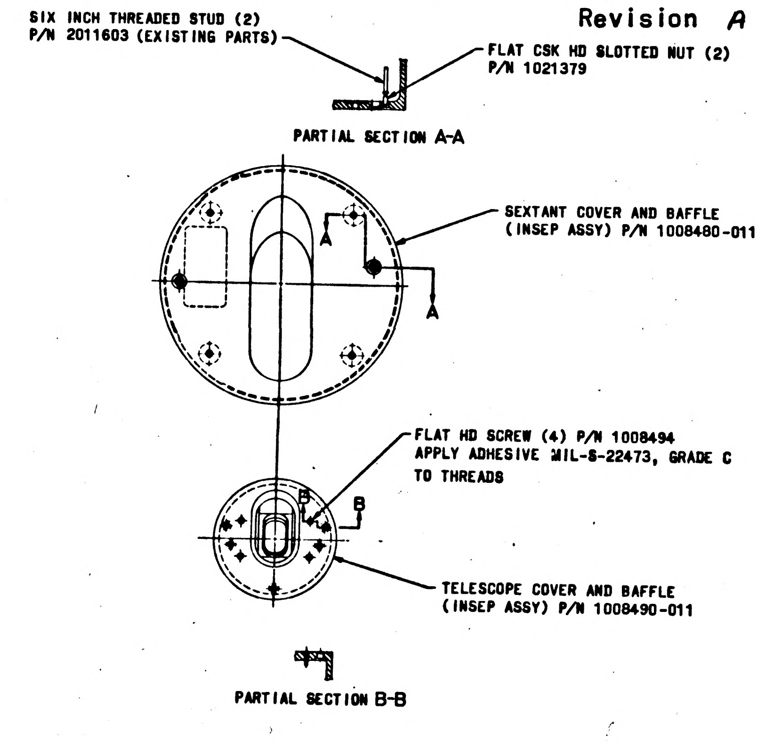
SIX INCH THREADED STUD (2)
P/N 2011603 (EXISTING PARTS)
FLAT CSK HD SLOTTED NUT (2)
P/N 1021379
PARTIAL SECTION A-A
SEXTANT COVER AND BAFFLE
(INSEP ASSY) P/N 1008480-011
A
A
FLAT HD SCREW (4) P/N 1008494
APPLY ADHESIVE MIL-S-22473, GRADE C
TO THREADS
B
B
TELESCOPE COVER AND BAFFLE
(INSEP ASSY) P/N 1008490-011
PARTIAL SECTION B-B

Figure 2. FRONT VIEW

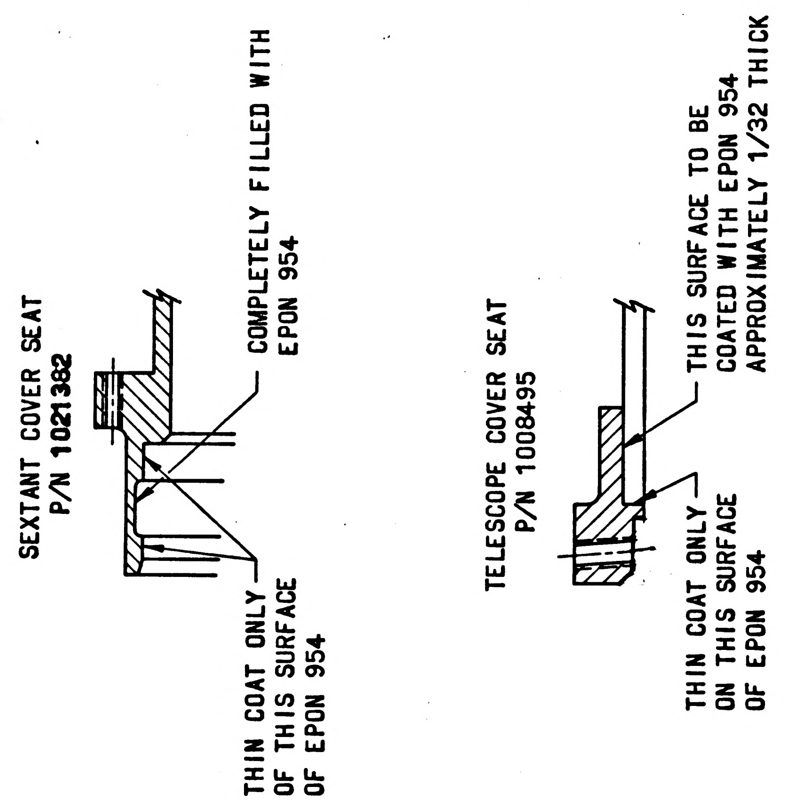
SEXTANT COVER SEAT
P/N 1021382
COMPLETELY FILLED WITH
EPON 954
THIN COAT ONLY
OF THIS SURFACE
OF EPON 954
TELESCOPE COVER SEAT
P/N 1008495
THIS SURFACE TO BE
COATED WITH EPON 954
APPROXIMATELY 1/32 THICK
THIN COAT ONLY
ON THIS SURFACE
OF EPON 954

Figure 3. APPLICATION OF ADHESIVE

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. MODIFICATION DESIGNATION (CONTINUED)

E. Significant part number changes resulting from this modification are as listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______________ Date: __________ G&N # ______

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

Sheet 21 of 21
Part No. 0102673
Date: 8 DEC 66
TDRP 33013
Revision A

ACC Form No. 1a
2/23/66

Date: ______

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ______ P/N: ______ S/N: ______

ECP NO.: ______ Retrofit Kit No.: ______

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ______

01/12/67

Sheet 1 of 21
Part No. 0102673
Date: 8 DEC 66
TDRR 33013
Revision B

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR OPTICAL UNIT AND BELLOWS ASSEMBLY, P/N 2010790-021, -031, AND -041.

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			[redacted]	NASA	
A	33013	ALL INITIAL RELEASE	EnA	—	16 Feb 67
B	33026	1,2,3,6,7,12+13	TA	—	3-3-67

Prepared by Karl K Konatzke Jr Date 13 Dec 1966

P.C. Engineering Approval E.H. W. Miller Date 12/21/66

Design Review Board Approval W Stamens Date 14 Feb 67

MIT/IL Approval BT Date______

NASA Approval A [illegible] Date 7 [illegible] 61

MIT Reliability______ Date______

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Optical Unit and Bellows Assembly. This modification is being performed to add the Cover and Baffle Assembly, P/N 1008490-021 (SCT) and Cover and Baffle Assembly, P/N 1008480-011 (SXT) part of astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This Retrofit is authorized by CCA497-0309, in lieu of approval of ECP 0428.

III. UNITS AFFECTED

G & N System	Name	Pre-modification P/N	Post-modification P/N
204 & 205	Optical Unit and Bellows Assembly	2010790-021	2010790-061
206	Optical Unit and Bellows Assembly	2010790-031	2010790-071
207, 208 & 209	Optical Unit and Bellows Assembly	2010790-041	2010790-081

IV. PRIORITY CHANGES

N/A

V. RELATED CHANGES

RIB'S 0102674 and 0102675

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102704, consisting of the following items is required to modify the Navigation Base and Optical Unit Assembly.

Qty	Part Number	Description
1	0102673	Retrofit Instruction Bulletin
1	1008490-021	Cover and Baffle Telescope (Insep Assy)
1	1008480-011	Cover and Baffle Sextant (Insep Assy)
1	1008495	Seat, Telescope
4	1008494	Screw, Flat Head
4	1008484-000	Screw, captive
2	1021379	Fastener, screw tube, flat hd
1	1021383	Clamp, sextant cover
6	1008484-001	Screw, captive
1	1021340	Potting ring, telescope
1	1021382	Seat, sextant cover
1 qt	1008903-1	Epoxy Resin) EPON 954
1 pt	1008903-2	Curing Agent)

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	FED-TT-I-735	Isopropyl alcohol
AR	DuPont Type TF	Freon
AR	N/A	Adhesive (MIL-S-22473, grade C) seating and retaining compound
1	ND1002329-001	Process specification for bonding with 1008903 adhesive (EPON 954)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	N/A	Marking India Ink
1	*Schwaab Stamp & Seal Co., Type AAG-0	Rubber stamp, 1/8 inch, 13 band, alpha numerical

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

B. DETAILED INSTRUCTIONS. Obtain Retrofit Kit, P/N 8102704, and perform modifications to telescope head, in accordance with paragraph C, and sextant head, in accordance with paragraph D.

C. TELESCOPE HEAD.

1. Remove existing cover, P/N 2012547, and associated hardware from telescope head and dispose as per direction given in section IX.

VII. C. PROCEDURE (CONTINUED)

2. Obtain telescope cover seat, P/N 1008495, and cover and baffle, P/N 1008490-021, install four (4) captive screws, P/N 1008484-000, into telescope cover and baffle assembly. Assemble seat and cover to telescope head. Orient assembly so telescope scans 45° off the optics center line in direction of worm shaft bearing retaining cap, P/N 2011186, and seat the assembly on the telescope prism mount support, P/N 2011185-000 or 011 for a fit check. Check for proper seating of assembly, proper clearance of optics, and mounting screw hole alignment.

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

NOTE: Do not clean painted surfaces with MEK.

NOTE: When loosening four (4) captive screws, P/N 1008484-000, loosen no more than 2 turns per screw, alternately until loose.

3. Remove telescope cover seat from cover assembly and clean telescope cover seat with MEK. Rinse with isopropyl alcohol and freon.

4. Install telescope potting ring, P/N 1021340, between telescope head seating surface and telescope cover seat, P/N 1008495, See figure 1.

VII. C. PROCEDURE (CONTINUED)

5. Assemble telescope cover and baffle, P/N 1008490-021, to telescope cover seat, P/N 1008495. Align the four (4) holes of cover and baffle with holes in telescope cover seat and attach with four (4) captive screws, P/N 1008484-000. Torque screws 5 to 6 inch pounds.

6. Obtain adhesive, P/N 1008903, (hereafter referred to as EPON 954) and prepare in accordance with ND 1002329-001.

7. Apply a narrow band of adhesive EPON 954 to telescope cover seat. (See figure 3.)

8. Clean adhesive from all surfaces not to be bonded. Install telescope cover seat making certain alignment repeats trial fit orientation.

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N. Form R, and allow to dry.

9. Apply adhesive, MIL-S-22473, grade C PER ND 1002211 to threads of flat head screws, P/N 1008494. Insert screws through cover and baffle, P/N 1008490-021 and torque assembly to telescope head 4 ± 1 inch pounds. Ensure assembly is fully seated to telescope before torquing screws. Check for proper clearance of optics and telescope cover.

VII. C. PROCEDURE (CONTINUED)

NOTE: Rotate telescope by hand every 15 minutes for 1 hour.

10. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

D. SEXTANT HEAD.

1. Remove existing cover, P/N 2012675, from sextant head. Do NOT remove the two (2) 6 inch long threaded studs, P/N 2011603. Discard slotted nuts, P/N 2011602, and cover, P/N 2012675, in accordance with section IX.

CAUTION: Avoid any damage to flex print circuit board.

NOTE: If any interference problems are encountered, reorient flex print to provide clearance.

2. Trial fit sextant cover seat, P/N 1021382, to sextant head. Check for proper seating to sextant head.

3. Rotate sextant so that sextant flex print circuit board junction is in lowest position.

VII. D. PROCEDURE (CONTINUED)

CAUTION: Move mirror by using top of mirror and move it very slowly from stop to stop. Do NOT touch mirror surface.

NOTE: Ensure assembly does not bind with flex print during or after installation.

4. Assemble clamp, P/N 1021383, to seat, P/N 1021382, and align tapped holes in clamp with grooves on circumference of seat. Install 6 captive screws, P/N 1008484-001, into cover and baffle assembly, P/N 1008480-011. Do not turn the threaded portion of the screws completely through the tapped holes, but leave approximately one thread engaged to hold screws in alignment. Temporarily attach cover and baffle assembly to seat, P/N 1021383, and clamp, P/N 1021382, using the 6 captive screws (1008484-001) and two screw tube fasteners, P/N 1021379, to long studs. Check clearance between sextant mirror and sextant cover and baffle assembly, P/N 1008480-011. Carefully move mirror from stop to stop and check clearance on each side. Rotate cover and baffle assembly to provide approximately 1/8 inch clearance between mirror, mirror mount, and mirror bracket.

5. Remove sextant cover seat, clamp and sextant cover and baffle assembly. (Separate cover seat and clamp from cover and baffle assembly.) Leave six (6) captive screws, P/N 1008484-001, captivated in sextant cover and baffle assembly, P/N 1008480-011, but back screws out about one turn so that approximately one (1) thread is engaged thus holding screws in alignment.

VII. D. PROCEDURE (CONTINUED)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

CAUTION: Do not apply MEK to painted surfaces.

6. Clean sextant cover seat with MEK. Rinse with isopropyl alcohol and freon.

7. Apply a narrow band of adhesive EPON 954 to sextant cover seat, P/N 1021382, see figure 3. Remove any excess adhesive. Clean adhesive from all surfaces not to be bonded.

8. Carefully install sextant cover seat, P/N 1021382, over flex print circuit board and seat properly to sextant housing, orient to location obtained during trial fit (step 2). Assemble clamp, P/N 1021383, to seat and align tapped holes in clamp with grooves on circumference of seat.

9. Lower sextant cover and baffle assembly onto sextant cover clamp and seat. Align holes and secure assembly to clamp and seat with six (6) captive screws, P/N 1008484-001. Torque 5 to 6 inch pounds. Check clearance as described in paragraph (4).

VII. D. PROCEDURE (CONTINUED)

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N, Form R, and allow to dry.

10. Apply adhesive, MIL-S-22473, grade C PER MD 1002211 to threads of two (2) screw tube fasteners, P/N 1021379, and torque to 4 ± 1 inch pounds. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

11. Remove potting ring, P/N 1021340, from telescope. Remove potting ring by pulling attached strings until ring splits apart. After ring splits, pull away from telescope assembly and dispose of potting ring in accordance with section IX.

12. Locate P/N 2010790 on Optical Unit and Bellows Assembly. Remove dash number and replace with new dash number in accordance with section III, Units Affected.

13. Update applicable records as directed in section VIII.

14. Dispose of removed parts in accordance with section IX.

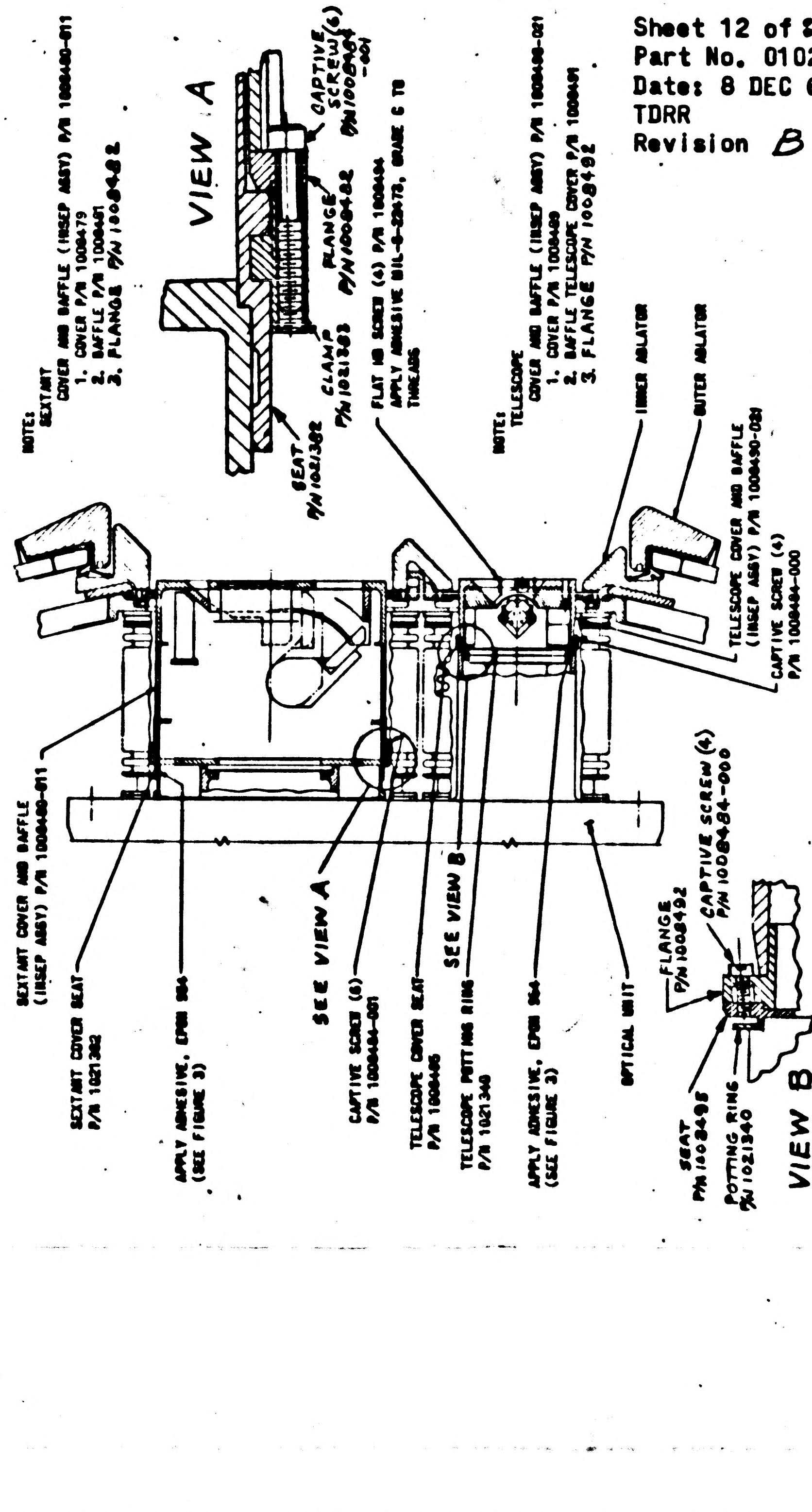
NOTE:
SEXTANT
COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
1. COVER P/N 1008479
2. BAFFLE P/N 1008481
3. FLANGE P/N 1008482
VIEW A
SEAT P/N 1021382
CLAMP P/N 1021383
FLANGE P/N 1008482
CAPTIVE SCREW(6) P/N 1008484-001
FLAT HD SCREW (4) P/N 1008494
APPLY ADHESIVE MIL-S-22473, GRADE C TO THREADS
NOTE:
TELESCOPE
COVER AND BAFFLE (INSEP ASSY) P/N 1008490-021
1. COVER P/N 1008489
2. BAFFLE TELESCOPE COVER P/N 1008491
3. FLANGE P/N 1008492
INNER ABLATOR
OUTER ABLATOR
TELESCOPE COVER AND BAFFLE (INSEP ASSY) P/N 1008490-021
CAPTIVE SCREW (4) P/N 1008484-000
SEXTANT COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
SEXTANT COVER SEAT P/N 1021382
APPLY ADHESIVE, EPON 954 (SEE FIGURE 3)
SEE VIEW A
CAPTIVE SCREW (6) P/N 1008484-001
TELESCOPE COVER SEAT P/N 1008495
SEE VIEW B
TELESCOPE POTTING RING P/N 1021340
APPLY ADHESIVE, EPON 954 (SEE FIGURE 3)
OPTICAL UNIT
FLANGE P/N 1008492
CAPTIVE SCREW (4) P/N 1008484-000
SEAT P/N 1008495
POTTING RING P/N 1021340
VIEW B

Figure 1. TELESCOPE AND SEXTANT ASSEMBLIES (SIDE VIEW)

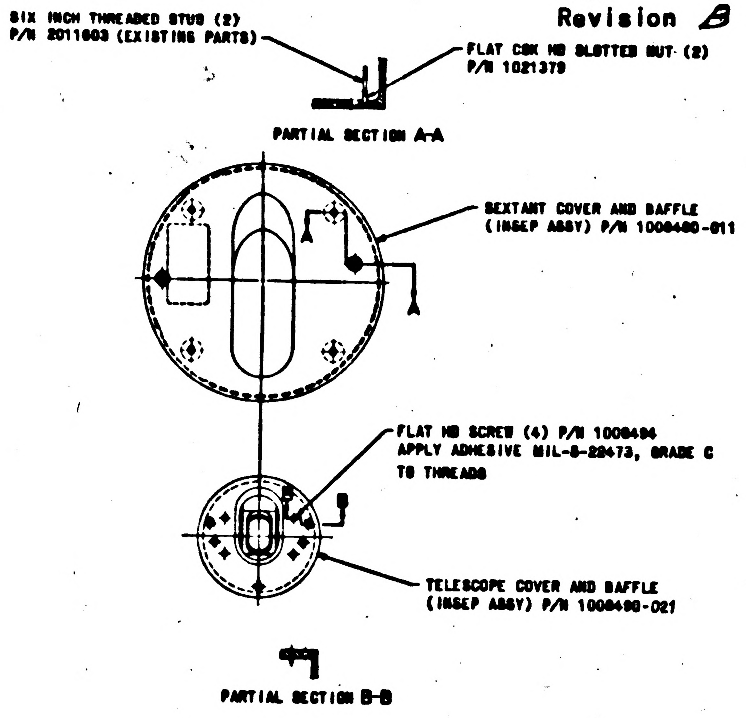
SIX INCH THREADED STUD (2)
P/N 2011603 (EXISTING PARTS)
FLAT CSK HD SLOTTED NUT (2)
P/N 1021379
PARTIAL SECTION A-A
SEXTANT COVER AND BAFFLE
(INSEP ASSY) P/N 1008480-011
FLAT HD SCREW (4) P/N 1008494
APPLY ADHESIVE MIL-S-22473, GRADE C
TO THREADS
TELESCOPE COVER AND BAFFLE
(INSEP ASSY) P/N 1008490-021
PARTIAL SECTION B-B

Figure 2. FRONT VIEW

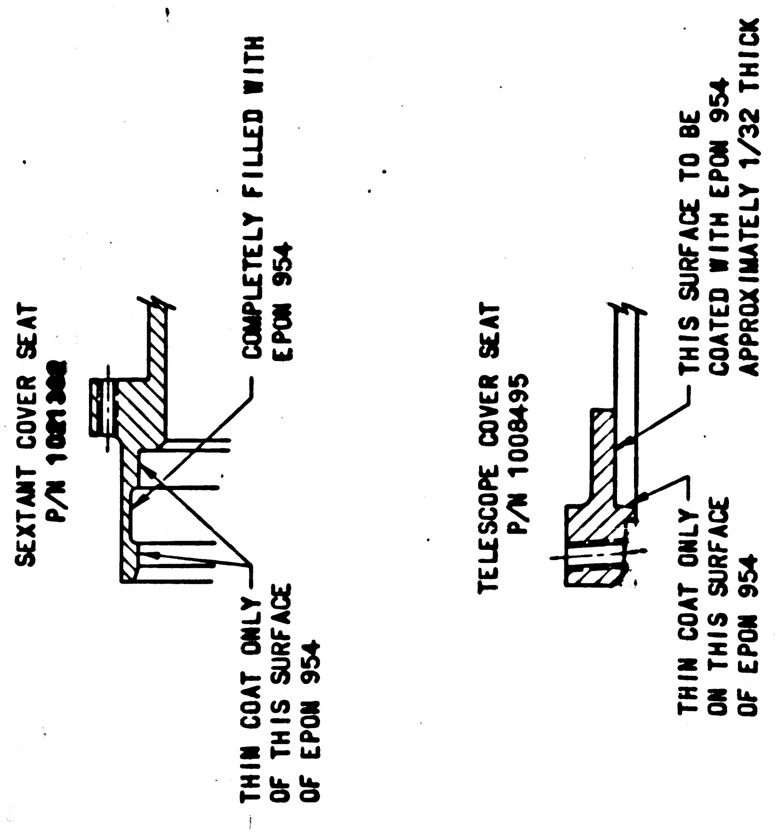
SEXTANT COVER SEAT
P/N 1021308
COMPLETELY FILLED WITH
EPON 954
THIN COAT ONLY
OF THIS SURFACE
OF EPON 954
TELESCOPE COVER SEAT
P/N 1008495
THIS SURFACE TO BE
COATED WITH EPON 954
APPROXIMATELY 1/32 THICK
THIN COAT ONLY
ON THIS SURFACE
OF EPON 954

Figure 3. APPLICATION OF ADHESIVE

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. MODIFICATION DESIGNATION (CONTINUED)

E. Significant part number changes resulting from this modification are as listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______________ Date: ________ OAN # ________

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

Sheet 21 of 21
Part No. 0102673
Date· 8 DEC 66
TDRR 33013
Revision A

ACC Form No. 1a
2/23/66

Date: ____________

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ______________________ P/N: ______________ S/N: ______

ECP NO.: ________________ Retrofit Kit No.: ______________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ____________

1/12/67

Sheet 1 of 21
Part No. 0102673
Date: 8 DEC 66
TDRR 33013
Revision C

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR OPTICAL UNIT AND BELLOWS ASSEMBLY, P/N 2010790-021, -031, AND -041.

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			[redacted]	NASA	
Ⓜ A	33013	ALL INITIAL RELEASE	EmA	—	16 Feb 67
Ⓜ B	33026	1,2,3,6,7,12 & 13	TA	—	3-3-67
C	33229	1,4 & 17			3-22-67

Prepared by Konrad K Konatzke Jr Date 13 Dec 1966

P.C. Engineering Approval E.H. D. Miller Mul Date 12/21/66

Design Review Board Approval W Stameris Date 14 Feb 67

MIT/IL Approval ET Date

NASA Approval Date 2/1/61

MIT Reliability Date

Sheet 2 of 21
Part No. 0102673
Date: 8 DEC 66
TDRR
Revision B

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the modification of the Optical Unit and Bellows Assembly. This modification is being performed to add the Cover and Baffle Assembly, P/N 1008490-021 (SCT) and Cover and Baffle Assembly, P/N 1008480-011 (SXT) part of astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This Retrofit is authorized by CCA497-0309, in lieu of approval of ECP 0428.

III. UNITS AFFECTED

G & N System	Name	Pre-modification P/N	Post-modification P/N
204 & 205	Optical Unit and Bellows Assembly	2010790-021	2010790-061
206	Optical Unit and Bellows Assembly	2010790-031	2010790-071
207, 208 & 209	Optical Unit and Bellows Assembly	2010790-041	2010790-081

Sheet 3 of 21
Part No. 0102673
Date: 8 DEC 66
TDRR
Revision B

IV. PRIORITY CHANGES

N/A

V. RELATED CHANGES

RIB'S 0102674 and 0102675

VI. MATERIALS REQUIRED

A. One Retrofit Kit, P/N 8102704, consisting of the following items is required to modify the Navigation Base and Optical Unit Assembly.

Qty	Part Number	Description
1	0102673	Retrofit Instruction Bulletin
1	1008490-021	Cover and Baffle Telescope (Insep Assy)
1	1008480-011	Cover and Baffle Sextant (Insep Assy)
1	1008495	Seat, Telescope
4	1008494	Screw, Flat Head
4	1008484-000	Screw, captive
2	1021379	Fastener, screw tube, flat hd
1	1021383	Clamp, sextant cover
6	1008484-001	Screw, captive
1	1021340	Potting ring, telescope
1	1021382	Seat, sextant cover
1 qt	1008903-1	Epoxy Resin) EPON 954
1 pt	1008903-2	Curing Agent)

Sheet 4 of
Part No. 0102673
Date: 8 DEC 66
TDRR
Revision C

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in kit are as follows:

Qty	Part Number	Description
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	FED-TT-I-735	Isopropyl alcohol
AR	DuPont Type TF	Freon
AR	N/A	Adhesive (MIL-S-22473, grade C) seating and retaining compound
1	ND1002329-001	Process specification for bonding with 1008903 adhesive (EPON 954)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	N/A	Marking India Ink
1	*Schwaab Stamp & Seal Co., Type AAG-0	Rubber stamp, 1/8 inch, 13 band, alpha numerical
AR	N/A	Trichloroethylene

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

B. DETAILED INSTRUCTIONS.

Obtain Retrofit Kit, P/N 8102704, and perform modifications to telescope head, in accordance with paragraph C, and sextant head, in accordance with paragraph D.

C. TELESCOPE HEAD.

1. Remove existing cover, P/N 2012547, and associated hardware from telescope head and dispose as per direction given in section IX.

VII. C. PROCEDURE (CONTINUED)

2. Obtain telescope cover seat, P/N 1008495, and cover and baffle, P/N 1008490-021, install four (4) captive screws, P/N 1008484-000, into telescope cover and baffle assembly. Assemble seat and cover to telescope head. Orient assembly so telescope scans 45° off the optics center line in direction of worm shaft bearing retaining cap, P/N 2011186, and seat the assembly on the telescope prism mount support, P/N 2011185-000 or 011 for a fit check. Check for proper seating of assembly, proper clearance of optics, and mounting screw hole alignment.

   WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

   NOTE: Do not clean painted surfaces with MEK.

   NOTE: When loosening four (4) captive screws, P/N 1008484-000, loosen no more than 2 turns per screw, alternately until loose.

3. Remove telescope cover seat from cover assembly and clean telescope cover seat with MEK. Rinse with isopropyl alcohol and freon.

4. Install telescope potting ring, P/N 1021340, between telescope head seating surface and telescope cover seat, P/N 1008495. See figure 1.

VII. C. PROCEDURE (CONTINUED)

5. Assemble telescope cover and baffle, P/N 1008490-021, to telescope cover seat, P/N 1008495. Align the four (4) holes of cover and baffle with holes in telescope cover seat and attach with four (4) captive screws, P/N 1008484-000. Torque screws 5 to 6 inch pounds.

6. Obtain adhesive, P/N 1008903, (hereafter referred to as EPON 954) and prepare in accordance with ND 1002329-001.

7. Apply a narrow band of adhesive EPON 954 to telescope cover seat. (See figure 3.)

8. Clean adhesive from all surfaces not to be bonded. Install telescope cover seat making certain alignment repeats trial fit orientation.

   NOTE: Before applying adhesive, per MIL-S-22473, [illegible] clean parts in Trichloroethylene, then Freon, air dry, and apply surface primer, MIL-S-22473 Grade N, Form R, and allow to dry.

9. Apply adhesive, MIL-S-22473, grade C per ND 1002211 to threads of flat head screws, P/N 1008494. Insert screws through cover and baffle, P/N 1008490-021 and torque assembly to telescope head 4 ± 1 inch pounds. Ensure assembly is fully seated to telescope before torquing screws. Check for proper clearance of optics and telescope cover.

VII. C. PROCEDURE (CONTINUED)

NOTE: Rotate telescope by hand every 15 minutes for 1 hour.

10. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

D. SEXTANT HEAD.

1. Remove existing cover, P/N 2012675, from sextant head. Do NOT remove the two (2) 6 inch long threaded studs, P/N 2011603. Discard slotted nuts, P/N 2011602, and cover, P/N 2012675, in accordance with section IX.

   CAUTION: Avoid any damage to flex print circuit board.

   NOTE: If any interference problems are encountered, reorient flex print to provide clearance.

2. Trial fit sextant cover seat, P/N 1021382, to sextant head. Check for proper seating to sextant head.

3. Rotate sextant so that sextant flex print circuit board junction is in lowest position.

VII. D. PROCEDURE (CONTINUED)

CAUTION: Move mirror by using top of mirror and move it very slowly from stop to stop. Do NOT touch mirror surface.

NOTE: Ensure assembly does not bind with flex print during or after installation.

4. Assemble clamp, P/N 1021383, to seat, P/N 1021382, and align tapped holes in clamp with grooves on circumference of seat. Install 6 captive screws, P/N 1008484-001, into cover and baffle assembly, P/N 1008480-011. Do not turn the threaded portion of the screws completely through the tapped holes, but leave approximately one thread engaged to hold screws in alignment. Temporarily attach cover and baffle assembly to seat, P/N 1021383, and clamp, P/N 1021382, using the 6 captive screws (1008484-001) and two screw tube fasteners, P/N 1021379, to long studs. Check clearance between sextant mirror and sextant cover and baffle assembly, P/N 1008480-011. Carefully move mirror from stop to stop and check clearance on each side. Rotate cover and baffle assembly to provide approximately 1/8 inch clearance between mirror, mirror mount, and mirror bracket.

5. Remove sextant cover seat, clamp and sextant cover and baffle assembly. (Separate cover seat and clamp from cover and baffle assembly.) Leave six (6) captive screws, P/N 1008484-001, captivated in sextant cover and baffle assembly, P/N 1008480-011, but back screws out about one turn so that approximately one (1) thread is engaged thus holding screws in alignment.

VII. D. PROCEDURE (CONTINUED)

WARNING: Methyl-Ethyl-Ketone (MEK) is toxic and inflammable. When using this solvent, provide adequate ventilation, avoid inhalation of fumes, do not allow solvent to contact skin, and do not expose solvent to heat or open flames.

CAUTION: Do not apply MEK to painted surfaces.

6. Clean sextant cover seat with MEK. Rinse with isopropyl alcohol and freon.

7. Apply a narrow band of adhesive EPON 954 to sextant cover seat, P/N 1021382, see figure 3. Remove any excess adhesive. Clean adhesive from all surfaces not to be bonded.

8. Carefully install sextant cover seat, P/N 1021382, over flex print circuit board and seat properly to sextant housing, orient to location obtained during trial fit (step 2). Assemble clamp, P/N 1021383, to seat and align tapped holes in clamp with grooves on circumference of seat.

9. Lower sextant cover and baffle assembly onto sextant cover clamp and seat. Align holes and secure assembly to clamp and seat with six (6) captive screws, P/N 1008484-001. Torque 5 to 6 inch pounds. Check clearance as described in paragraph (4).

VII. D. PROCEDURE (CONTINUED)

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473 Grade N, Form R, and allow to dry.

10. Apply adhesive, MIL-S-22473, grade C to threads of two (2) screw tube fasteners, P/N 1021379, and torque to 4 ± 1 inch pounds. Allow adhesive to cure for a minimum of 16 to 24 hours at room temperature.

PER MO 1002111

11. Remove potting ring, P/N 1021340, from telescope. Remove potting ring by pulling attached strings until ring splits apart. After ring splits, pull away from telescope assembly and dispose of potting ring in accordance with section IX.

12. Locate P/N 2010790 on Optical Unit and Bellows Assembly. Remove dash number and replace with new dash number in accordance with section III, Units Affected.

13. Update applicable records as directed in section VIII.

14. Dispose of removed parts in accordance with section IX.

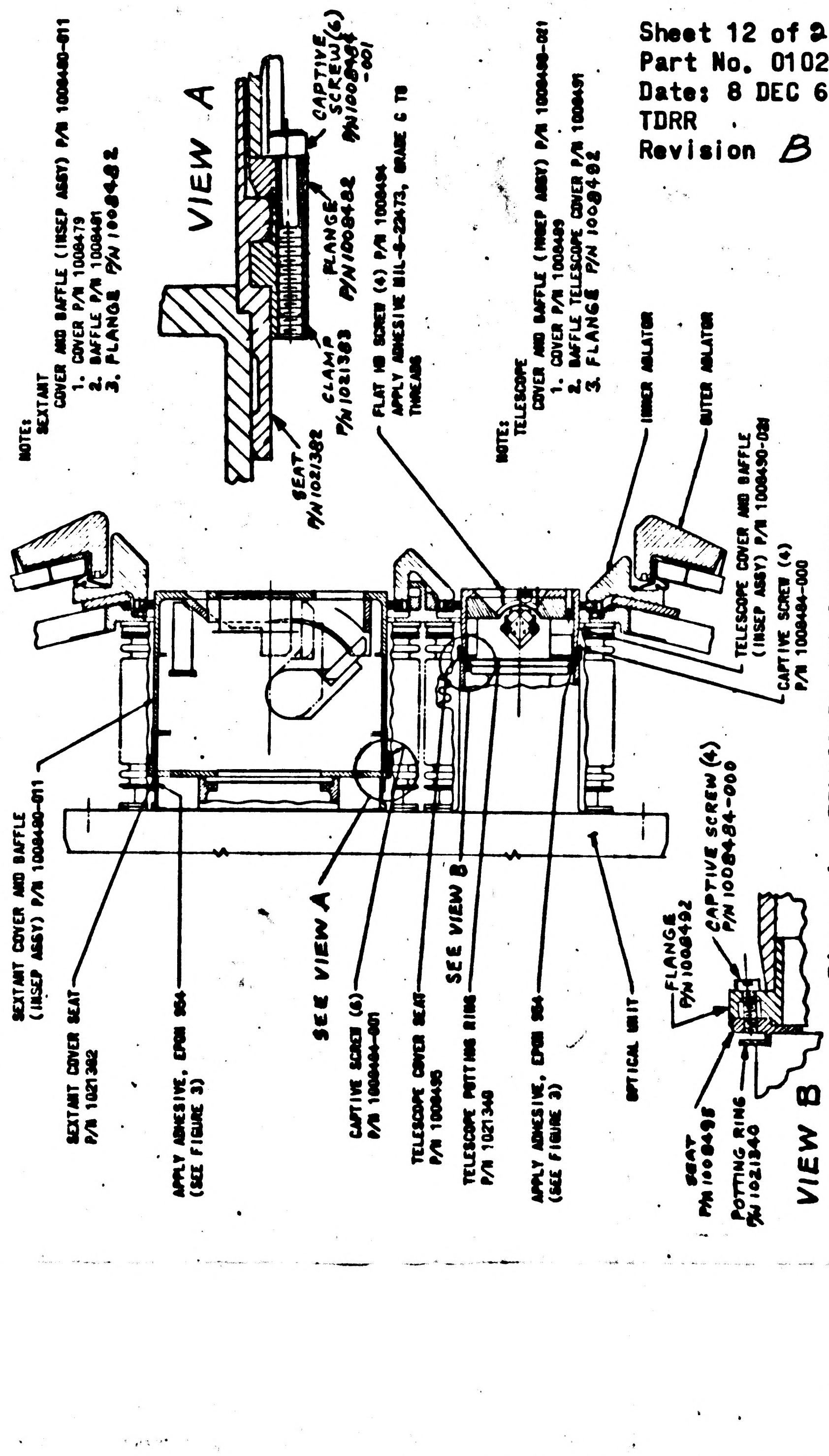
NOTE:
SEXTANT
COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
1. COVER P/N 1008479
2. BAFFLE P/N 1008481
3. FLANGE P/N 1008482
VIEW A
SEAT P/N 1021382
CLAMP P/N 1021383
FLANGE P/N 1008482
CAPTIVE SCREW (6) P/N 1008484-001
FLAT HD SCREW (4) P/N 1008494
APPLY ADHESIVE MIL-S-22473, GRADE C TO THREADS
NOTE:
TELESCOPE
COVER AND BAFFLE (INSEP ASSY) P/N 1008480-021
1. COVER P/N 1008489
2. BAFFLE TELESCOPE COVER P/N 1008491
3. FLANGE P/N 1008492
INNER ABLATOR
OUTER ABLATOR
TELESCOPE COVER AND BAFFLE (INSEP ASSY) P/N 1008490-031
CAPTIVE SCREW (4) P/N 1008484-000
SEXTANT COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
SEXTANT COVER SEAT P/N 1021382
APPLY ADHESIVE, EPON 954 (SEE FIGURE 3)
SEE VIEW A
CAPTIVE SCREW (6) P/N 1008484-001
TELESCOPE COVER SEAT P/N 1008495
SEE VIEW B
TELESCOPE POTTING RING P/N 1021340
APPLY ADHESIVE, EPON 954 (SEE FIGURE 3)
OPTICAL UNIT
FLANGE P/N 1008492
CAPTIVE SCREW (4) P/N 1008484-000
SEAT P/N 1008495
POTTING RING P/N 1021340
VIEW B

Figure 1. TELESCOPE AND SEXTANT ASSEMBLIES (SIDE VIEW)

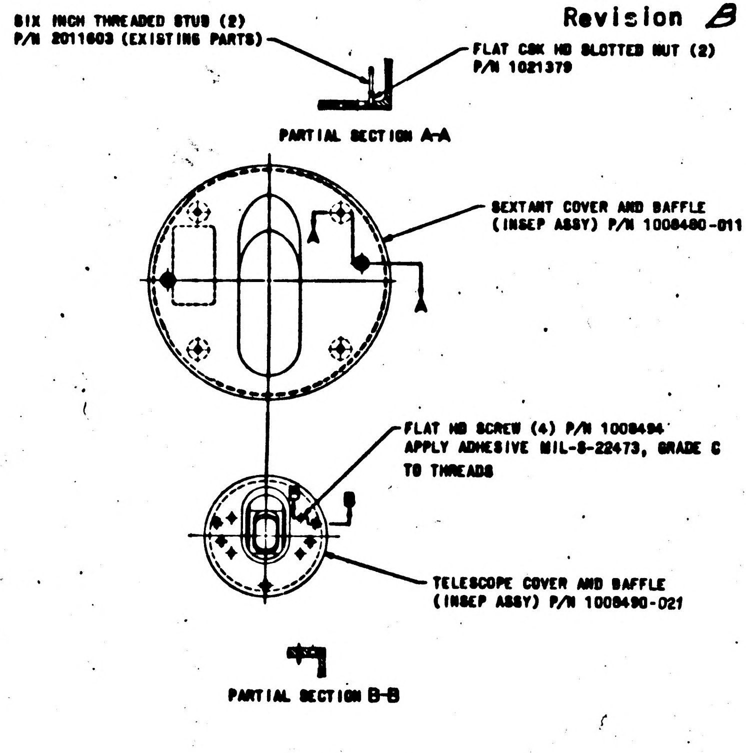
SIX INCH THREADED STUD (2)
P/N 2011603 (EXISTING PARTS)
FLAT CSK HD SLOTTED NUT (2)
P/N 1021379
PARTIAL SECTION A-A
SEXTANT COVER AND BAFFLE
(INSEP ASSY) P/N 1008490-011
FLAT HD SCREW (4) P/N 1008494
APPLY ADHESIVE MIL-S-22473, GRADE C
TO THREADS
TELESCOPE COVER AND BAFFLE
(INSEP ASSY) P/N 1008490-021
PARTIAL SECTION B-B

Figure 2. FRONT VIEW

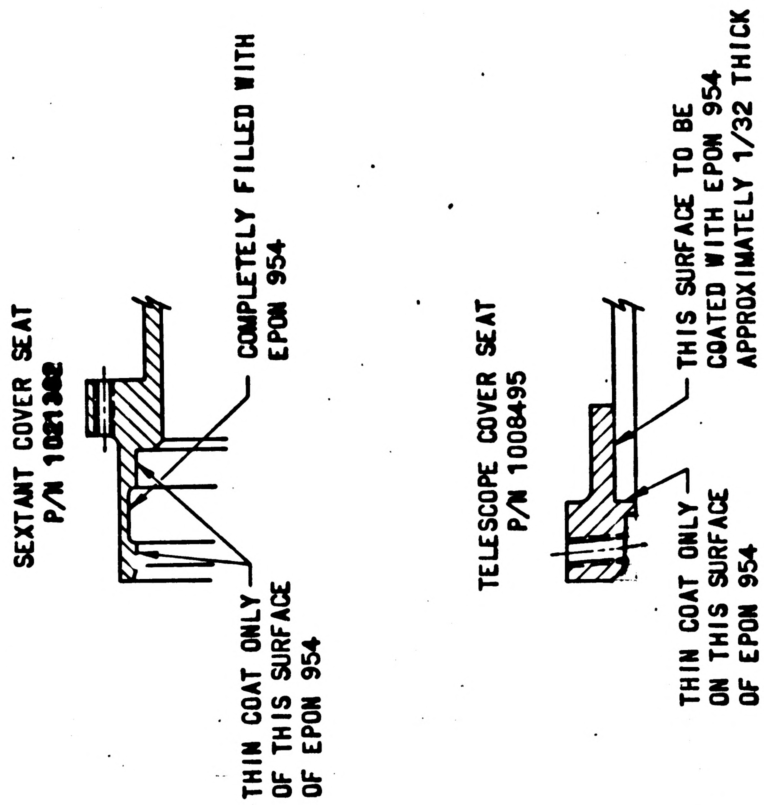
SEXTANT COVER SEAT
P/N 1021302
COMPLETELY FILLED WITH
EPON 954
THIN COAT ONLY
OF THIS SURFACE
OF EPON 954
TELESCOPE COVER SEAT
P/N 1008495
THIS SURFACE TO BE
COATED WITH EPON 954
APPROXIMATELY 1/32 THICK
THIN COAT ONLY
ON THIS SURFACE
OF EPON 954

Figure 3. APPLICATION OF ADHESIVE

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

   e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

   f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

   g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

VIII. MODIFICATION DESIGNATION (CONTINUED)

E. Significant part number changes resulting from this modification are as listed in section III.

IX. DISPOSITION OF PARTS REMOVED

Scrap removed parts via AC Electronics form MIL-127 or equivalent.

ACC Form No. 1
2/23/66

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______________ Date: ________ G&N # ________

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

ACC Form No. 1a
2/23/66

Sheet 21 of 21
Part No. 0102673
Date: 8 DEC 66
TDRR 33013
Revision A

Date: ____________

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ____________________ P/N: ________________ S/N: ______

ECP NO.: ________________ Retrofit Kit No.: ________________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ____________

0/12/67m

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR INSTALLATION OF ASTROSEXTANT PASSIVE THERMAL PROTECTION SYSTEM ASSEMBLY, P/N 1021373-051, ONTO G&N SYSTEMS 204 THROUGH 209.
ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			[redacted]	NASA	
A	33013	ALL INITIAL RELEASE		—	16 FEB 67

Prepared by Konrad K Forsythe Date 16 Dec 66
P.C. Engineering Approval H. Miller Date 12/27/66
Design Review Board Approval Date 14 Feb 67
MIT/IL Approval Date
NASA Approval Date
MIT Reliability Date

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the installation of the Astrosextant Passive Thermal Protection System. This modification is being performed to add crown halves and retainer blocks to the cover and baffle assembly. This modification is being performed to add the astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This retrofit is authorized by CCA497-0309, in lieu of approval of ECP 0428.

III. UNITS AFFECTED

Name	Part Number
Astrosextant Passive Thermal Protection System Assembly (For G&N System 204 through 209)	1021373-051

IV. PRIORITY CHANGES

RIB 0102673

V. RELATED CHANGES

RIB 0102673

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102705, consisting of the following items is required to modify the Astrosextant Passive Thermal Protection System Assembly.

Qty	Part Number	Description
1	0102674	Retrofit Instruction Bulletin
1	1021378-021	Crown Half & Plug Assy Sextant (Matched Assy)
1	1021377-021	Crown Half & Plug Assy Telescope (Matched Assy)
4	1008487-001	Screw, slotted hd. cap
1	1008487-002	Screw, slotted hd. cap
4	1008487-003	Screw, slotted hd. cap
13	1008486	Washer, flat
4	1008488-000	Screw, slotted, special
7	1008493	Insulator

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in the kit are as follows:

Qty	Part Number	Description
1	Locating Fixture-SXT	Retainer Assy MX117143
AR	Dupont type TF	Freon cleaning agent
AR	FED-TT-I-735	Isopropyl alcohol
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	N/A	Adhesive (MIL-S-22473, Grade C) Sealing and retaining compound

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

B. PRE-INSTALLATION PROCEDURE.

1. When NAA supplied inner ablator assembly is installed (see figures 1 and 2), perform trial fit of sextant and telescope crown, to determine amount of material to be removed from inner ablator assembly to provide .187 gap clearance.

2. Obtain crown half and plug assembly, P/N 1021377 -021. Remove fillet protector and plugs but identify plugs so they may be returned in same holes.

3. Assemble and match crown half lower telescope cover to cover and baffle assembly with two (2) screws, P/N 1008487-003, and two (2) washers, P/N 1008486.

VII. B. PROCEDURE (CONTINUED)

NOTE: Ensure sextant lower crown half, P/N 1021329, slot openings are installed parallel to slot openings in cover and baffle assembly, P/N 1008480-011.

4. Obtain crown half upper sextant cover, P/N 1021320. (Part of crown half and plug assembly, P/N 1021378 -021). Remove plugs, P/N 1021322-001, identify plugs in order to reassemble in same holes.

5. Install crown half lower sextant cover, P/N 1021329, to sextant cover and baffle assembly, P/N 1008480 -011, using four (4) insulators, P/N 1008493, four (4) washers, P/N 1008486, and four (4) sextant cover special slotted screws, P/N 1008488-000.

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473, Grade N, Form R, and allow to dry.

NOTE: There shall be a minimum of 1/32 inch clearance between crown halves of the sextant lower crown half and telescope lower crown half when the sextant and telescope are each rotated 360° with respect to one another. If 1/32 inch clearance is obtained, remove screws and apply sealing and retaining compound, MIL-S-22473, grade C, PER ND 1002211 to threads of sextant's (4) special slotted screws, P/N 1008488-000, and telescope's (2) slotted head cap screws, P/N 1008487-003, torque to 9 ± 1 inch pounds, and skip to step VII.C.1. If clearance is not obtained, perform step 6.

VII. B. PROCEDURE (CONTINUED)

6. Remove sextant lower crown half and telescope lower crown half. Remove material from telescope lower crown half until there is a minimum clearance of 1/32 inch between crown halves. See figure 1. Replace sextant and telescope lower crown halves and apply sealing and retaining compound, MIL-S-22473, grade C, PER ND 1002211 to threads of screws and torque to 9 ± 1 inch pounds.

C. CROWN HALF INSTALLATION FOR TELESCOPE.

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473, Grade N, Form R, and allow to dry.

1. Position and orient fillet, protector, P/N 1008496, to lower crown half. Install 3 insulators P/N 1008493 into appropriate holes in the lower crown half. Attach with total of three screws (one (1), P/N 1008487-002, two (2), P/N 1008487-003) and three (3) washers, P/N 1008486. Apply sealing and retaining compound, MIL-S-22473, grade C PER ND 1002211 to threads. Torque screws to 9 ± 1 inch pounds.

2. Obtain three (3) plugs, P/N 1021322-002, removed in step VII.B.2, and insert them into telescope cover protector fillet, P/N 1008496, until their surfaces are flush with outer surfaces.

3. Vacuum area to remove loose chips and dirt.

VII. PROCEDURE (CONTINUED)

D. CROWN HALF INSTALLATION FOR SEXTANT.

NOTE: Before applying adhesive per MIL-S-22473, apply surface primer, MIL-S-22473, Grade N, Form R, and allow to dry.

NOTE: Use retainer assembly locating fixture (SXT) MX117143 to assure proper location of crown halves. See figure 3 for reference.

1. Obtain sextant cover upper crown halves, P/N 1021320, and install using four (4) washers, P/N 1008486, and four (4) slotted head cap screws, P/N 1008487-001, apply sealing and retaining compound, MIL-S-22473, grade C, PER ND 1002211 Torque screws to 9 ± 1 inch pounds.

2. Obtain four (4) plugs P/N 1021322-001, removed in step VII.B.4, and screw plugs into place so they are flush with outer surface.

3. Vacuum area to remove loose chips and dirt.

4. Update applicable records as directed in section VIII.

5. Scrap removed parts via AC Electronics form MIL-127 or equivalent.

NOTE:
SEXTANT (ALL PARTS NOT LISTED)
A. CROWN HALF AND PLUG ASSY
(MATCHED ASSY) P/N 1021378-021
1. CROWN HALF LOWER SEXTANT COVER
(INSEP ASSY) P/N 1021329
a. SILICONE RUBBER P/N 1008906
b. CROWN HALF P/N 1021329-001
2. CROWN HALF UPPER SEXTANT
COVER (2) P/N 1021320
3. PLUG (3) P/N 1021322-001
B. DUST COVER RETAINER ASSY (2)
P/N 1021358-021

NOTE:
TELESCOPE (ALL PARTS NOT LISTED)
A. CROWN HALF AND PLUG ASSY
(MATCHED ASSY) P/N 1021377-021
1. CROWN HALF LOWER TELESCOPE COVER
(INSEP ASSY) P/N 1008497
a. SILICONE RUBBER P/N 1008906
b. CROWN HALF P/N 1008497-001
2. TELESCOPE COVER PROTECTOR
FILLET P/N 1008496
3. PLUG (3) P/N 1021322-002
B. DUST COVER RETAINER ASSY (2)
P/N 1021358-011

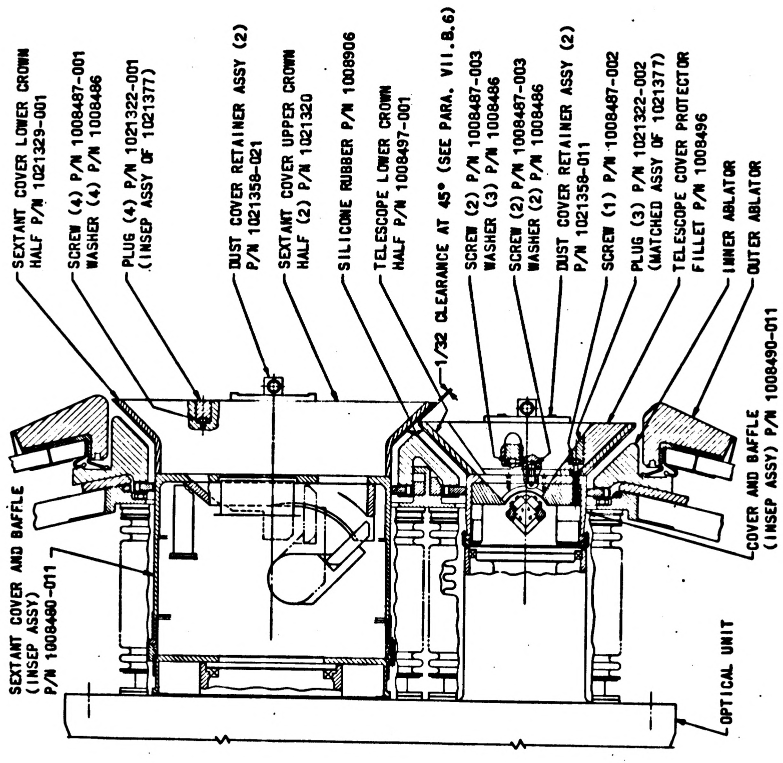
SEXTANT COVER LOWER CROWN HALF P/N 1021329-001
SCREW (4) P/N 1008487-001
WASHER (4) P/N 1008486
PLUG (4) P/N 1021322-001 (INSEP ASSY OF 1021377)
DUST COVER RETAINER ASSY (2) P/N 1021358-021
SEXTANT COVER UPPER CROWN HALF (2) P/N 1021320
SILICONE RUBBER P/N 1008906
TELESCOPE LOWER CROWN HALF P/N 1008497-001
1/32 CLEARANCE AT 45° (SEE PARA. VII.B.6)
SCREW (2) P/N 1008487-003
WASHER (3) P/N 1008486
SCREW (2) P/N 1008487-003
WASHER (2) P/N 1008486
DUST COVER RETAINER ASSY (2) P/N 1021358-011
SCREW (1) P/N 1008487-002
PLUG (3) P/N 1021322-002 (MATCHED ASSY OF 1021377)
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
INNER ABLATOR
OUTER ABLATOR
COVER AND BAFFLE (INSEP ASSY) P/N 1008490-011
SEXTANT COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011
OPTICAL UNIT

Figure 1. SIDE VIEW

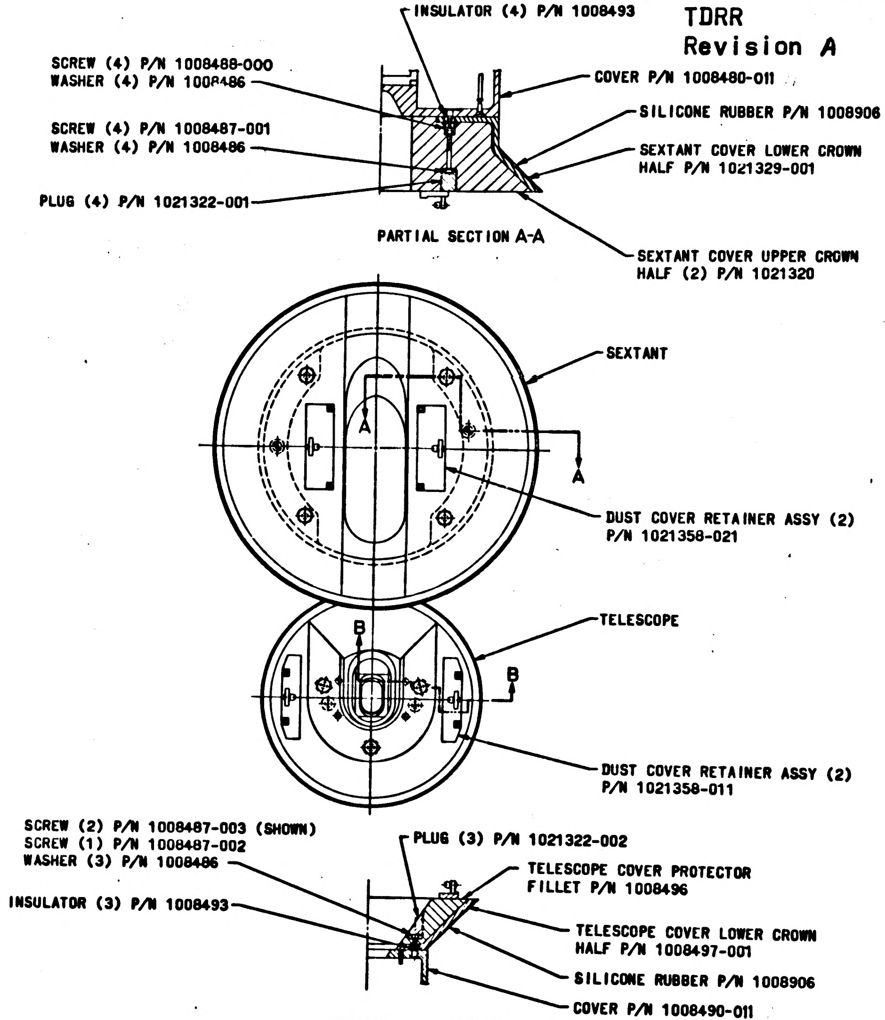
INSULATOR (4) P/N 1008493
SCREW (4) P/N 1008488-000
WASHER (4) P/N 1008486
SCREW (4) P/N 1008487-001
WASHER (4) P/N 1008486
PLUG (4) P/N 1021322-001
COVER P/N 1008480-011
SILICONE RUBBER P/N 1008906
SEXTANT COVER LOWER CROWN HALF P/N 1021329-001
SEXTANT COVER UPPER CROWN HALF (2) P/N 1021320
PARTIAL SECTION A-A
SEXTANT
A
A
DUST COVER RETAINER ASSY (2) P/N 1021358-021
TELESCOPE
B
B
DUST COVER RETAINER ASSY (2) P/N 1021358-011
SCREW (2) P/N 1008487-003 (SHOWN)
SCREW (1) P/N 1008487-002
WASHER (3) P/N 1008486
INSULATOR (3) P/N 1008493
PLUG (3) P/N 1021322-002
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
TELESCOPE COVER LOWER CROWN HALF P/N 1008497-001
SILICONE RUBBER P/N 1008906
COVER P/N 1008490-011
PARTIAL SECTION B-B

FIGURE 2. FRONT VIEW

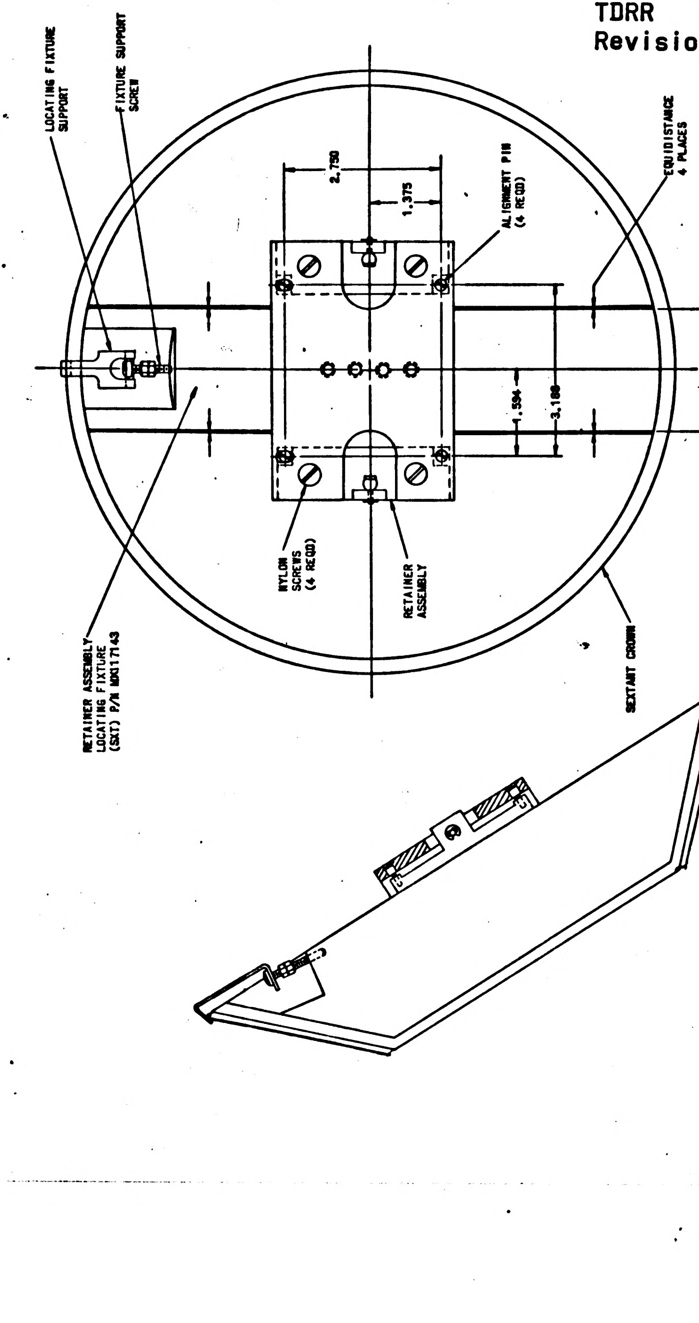
LOCATING FIXTURE SUPPORT
FIXTURE SUPPORT SCREW
2.750
1.375
ALIGNMENT PIN (4 REQD)
EQUIDISTANCE 4 PLACES
2.00
1.594
3.188
NYLON SCREWS (4 REQD)
RETAINER ASSEMBLY
RETAINER ASSEMBLY LOCATING FIXTURE (SXT) P/N MX17143
SEXTANT CROWN

FIGURE 3. SEXTANT CROWN WITH LOCATING FIXTURE AND RETAINER ASSEMBLIES INSTALLED

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

VIII. MODIFICATION DESIGNATION (CONTINUED)

d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

ACC Form No. 1
2/23/66

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ________ G&N # ______

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

Sheet 17 of 17
Part No. 0102674
Date: 13 DEC 66
TDRR 33013
Revision A

ACC Form No. 1a
2/23/66

Date: ____________

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ____________ P/N: ____________ S/N: ______

ECP NO.: ____________ Retrofit Kit No.: ____________

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ____________

01/12/07

NASA

RETROFIT INSTRUCTION BULLETIN (RIB) FOR INSTALLATION OF ASTROSEXTANT PASSIVE THERMAL PROTECTION SYSTEM ASSEMBLY, P/N 1021373-051, ONTO G&N SYSTEMS 204 THROUGH 209.

ORIGINATOR: AC ELECTRONICS DIVISION, GMC

REVISION LETTER	TDRR	PAGES REVISED	APPROVALS		DATE
			[redacted]	NASA	
Ⓜ A	33013	ALL INITIAL RELEASE		—	16 FEB 67
B	33230	1,6,7&8			22 MAR 67

Prepared by ________ Date 16 Dec 66

P.C. Engineering Approval ________ Date 12/27/66

Design Review Board Approval ________ Date 14 Feb 67

MIT/IL Approval ________ Date ________

NASA Approval ________ Date ________

MIT Reliability ________ Date ________

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) is to provide instructions for the installation of the Astrosextant Passive Thermal Protection System. This modification is being performed to add crown halves and retainer blocks to the cover and baffle assembly. This modification is being performed to add the astrosextant passive thermal protective system to prevent thermal damage to the optics and bellows on reentry.

II. AUTHORITY

This retrofit is authorized by CCA497-0309, in lieu of approval of ECP 0428.

III. UNITS AFFECTED

Name	Part Number
Astrosextant Passive Thermal Protection System Assembly (For G&N System 204 through 209)	1021373-051

IV. PRIORITY CHANGES

RIB 0102673

V. RELATED CHANGES

RIB 0102673

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8102705, consisting of the following items is required to modify the Astrosextant Passive Thermal Protection System Assembly.

Qty	Part Number	Description
1	0102674	Retrofit Instruction Bulletin
1	1021378-021	Crown Half & Plug Assy Sextant (Matched Assy)
1	1021377-021	Crown Half & Plug Assy Telescope (Matched Assy)
4	1008487-001	Screw, slotted hd. cap
1	1008487-002	Screw, slotted hd. cap
4	1008487-003	Screw, slotted hd. cap
13	1008486	Washer, flat
4	1008488-000	Screw, slotted, special
7	1008493	Insulator

VI. MATERIALS REQUIRED (CONTINUED)

B. Materials and special tools required but not supplied in the kit are as follows:

Qty	Part Number	Description
1	Locating Fixture-SXT	Retainer Assy MX117143
AR	Dupont type TF	Freon cleaning agent
AR	FED-TT-I-735	Isopropyl alcohol
AR	TT-M-261	Methyl-Ethyl-Ketone (MEK)
AR	N/A	Surface Primer (MIL-S-22473, Grade N, Form R)
AR	N/A	Adhesive (MIL-S-22473, Grade C) Sealing and retaining compound
AR	N/A	Trichloroethylene

VII. PROCEDURE

A. GENERAL REQUIREMENTS.

1. Read and understand complete RIB prior to attempting this modification.

2. All workmanship shall meet requirements defined in Workmanship Standard, AC-STD-1, dated 15 January 1965.

B. PRE-INSTALLATION PROCEDURE.

1. When NAA supplied inner ablator assembly is installed (see figures 1 and 2), perform trial fit of sextant and telescope crown, to determine amount of material to be removed from inner ablator assembly to provide .187 gap clearance.

2. Obtain crown half and plug assembly, P/N 1021377 -021. Remove fillet protector and plugs but identify plugs so they may be returned in same holes.

3. Assemble and match crown half lower telescope cover to cover and baffle assembly with two (2) screws, P/N 1008487-003, and two (2) washers, P/N 1008486.

VII. B. PROCEDURE (CONTINUED)

NOTE: Ensure sextant lower crown half, P/N 1021329, slot openings are installed parallel to slot openings in cover and baffle assembly, P/N 1008480-011

4. Obtain crown half upper sextant cover, P/N 1021320. (Part of crown half and plug assembly, P/N 1021378 -021). Remove plugs, P/N 1021322-001, identify plugs in order to reassemble in same holes.

5. Install crown half lower sextant cover, P/N 1021329, to sextant cover and baffle assembly, P/N 1008480 -011, using four (4) insulators, P/N 1008493, four (4) washers, P/N 1008486, and four (4) sextant cover special slotted screws, P/N 1008488-000.

   NOTE: Before applying adhesive, per MIL-S-22473, clean parts in Trichloroethylene, then Freon, air dry, and apply surface primer, MIL-S-22473, Grade N, Form R, and allow to dry.

   NOTE: There shall be a minimum of 1/32 inch clearance between crown halves of the sextant lower crown half and telescope lower crown half when the sextant and telescope are each rotated 360° with respect to one another. If 1/32 inch clearance is obtained, remove screws and apply sealing and retaining compound, MIL-S-22473, grade C, per ND1002211 to threads of sextant's (4) special slotted screws, P/N 1008488-000, and telescope's (2) slotted head cap screws, P/N 1008487-003, torque to 9 ± 1 inch pounds, and skip to step VII.C.1. If clearance is not obtained, perform step 6.

VII. B. PROCEDURE (CONTINUED)

6. Remove sextant lower crown half and telescope lower crown half. Remove material from telescope lower crown half until there is a minimum clearance of 1/32 inch between crown halves. See figure 1. Replace sextant and telescope lower crown halves and apply sealing and retaining compound, MIL-S-22473, grade C, per ND 1002211 to threads of screws and torque to 9 ± 1 inch pounds.

C. CROWN HLAF INSTALLATION FOR TELESCOPE.

NOTE: Before applying adhesive, per MIL-S-22473, clean parts in Trichloroethylene, then Freon, air dry, and apply surface primer, MIL-S-22473, Grade N, Form R, and allow to dry.

1. Position and orient fillet, protector, P/N 1008496, to lower crown half. Install 3 insulators P/N 1008493 into appropriate holes in the lower crown half. Attach with total of three screws (one (1), P/N 1008487-002, two (2), P/N 1008487-003) and three (3) washers, P/N 1008486. Apply sealing and retaining compound, MIL-S-22473, grade C per ND 1002211 to threads. Torque screws to 9 ± 1 inch pounds.

2. Obtain three (3) plugs, P/N 1021322-002, removed in step VII.B.2, and insert them into telescope cover protector fillet, P/N 1008496, until their surfaces are flush with outer surfaces.

3. Vacuum area to remove loose chips and dirt.

VII. PROCEDURE (CONTINUED)

D. CROWN HALF INSTALLATION FOR SEXTANT.

NOTE: Before applying adhesive, per MIL-S-22473, clean parts in Trichloroethylene, then Freon, air dry, and apply surface primer, MIL-S-22473, Grade N, Form R, and allow to dry.

NOTE: Use retainer assembly locating fixture (SXT) MX117143 to assure proper location of crown halves. See figure 3 for reference.

1. Obtain sextant cover upper crown halves, P/N 1021320, and install using four (4) washers, P/N 1008486, and four (4) slotted head cap screws, P/N 1008487-001, apply sealing and retaining compound, MIL-S-22473, grade C, per ND 1002211. Torque screws to 9 ± 1 inch pounds.

2. Obtain four (4) plugs P/N 1021322-001, removed in step VII.B.4, and screw plugs into place so they are flush with outer surface.

3. Vacuum area to remove loose chips and dirt.

4. Update applicable records as directed in section VIII.

5. Scrap removed parts via AC Electronics form MIL-127 or equivalent.

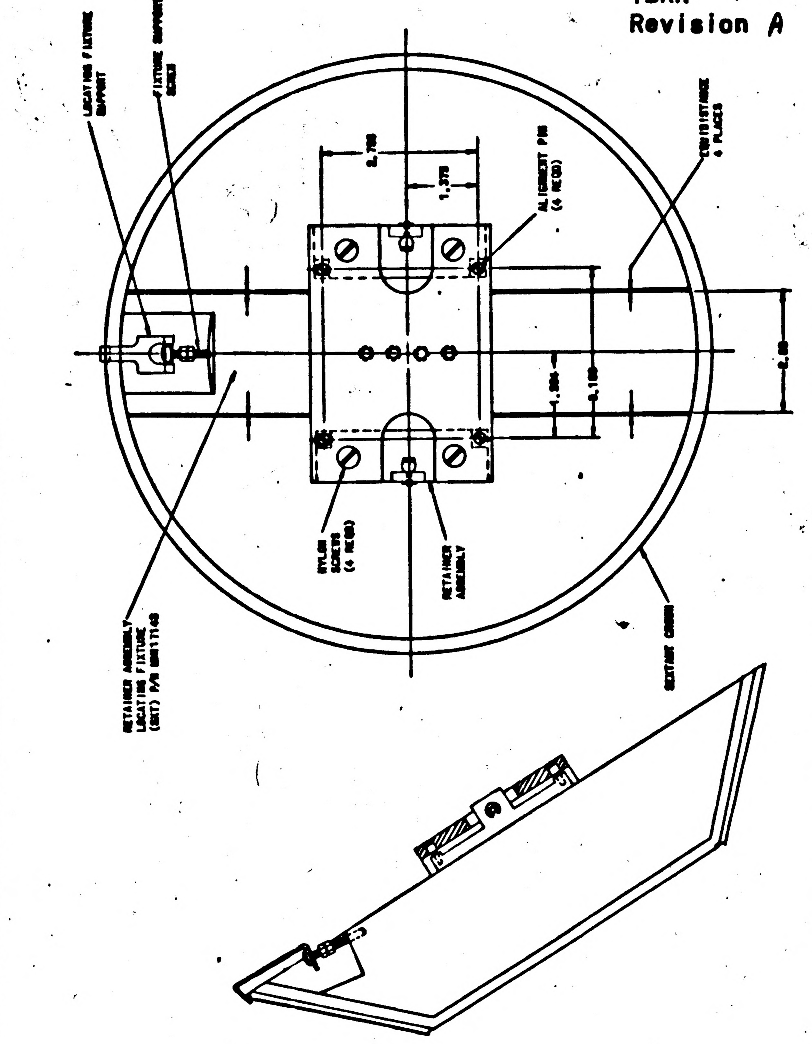
LOCATING FIXTURE SUPPORT
FIXTURE SUPPORT SCREW
2.750
1.375
ALIGNMENT PIN (4 REQD)
4 PLACES
2.00
.188
1.384
NYLON SCREWS (4 REQD)
RETAINER ASSEMBLY
RETAINER ASSEMBLY LOCATING FIXTURE (SET)
SEXTANT CROWN

FIGURE 8. SEXTANT CROWN WITH LOCATING FIXTURE AND RETAINER ASSEMBLIES INSTALLED

VIII. MODIFICATION DESIGNATION

A. Complete Apollo Configuration Control (ACC) form no. 1 as follows:

NOTE: One reproducible master of ACC form no. 1 shall be completed for each retrofit or repair accomplished on Apollo airborne GFP equipment.

1. Insert name of reporting facility, date retrofit or repair is initiated, and the G & N number which is being retrofitted or repaired. If a spare is being changed, enter the word "SPARE" instead of a G & N number.

2. Complete the chart as follows:

   a. Equipment Name - List the name of each serialized assembly involved in the retrofit or repair, starting with the highest assembly down to the lowest repairable subassembly.

   b. Equip. P/N Prior to Repair/Ret. - List the part number for each assembly listed in the first column prior to its repair or retrofit.

   c. Equip. S/N - List the serial number for each assembly listed in the first column.

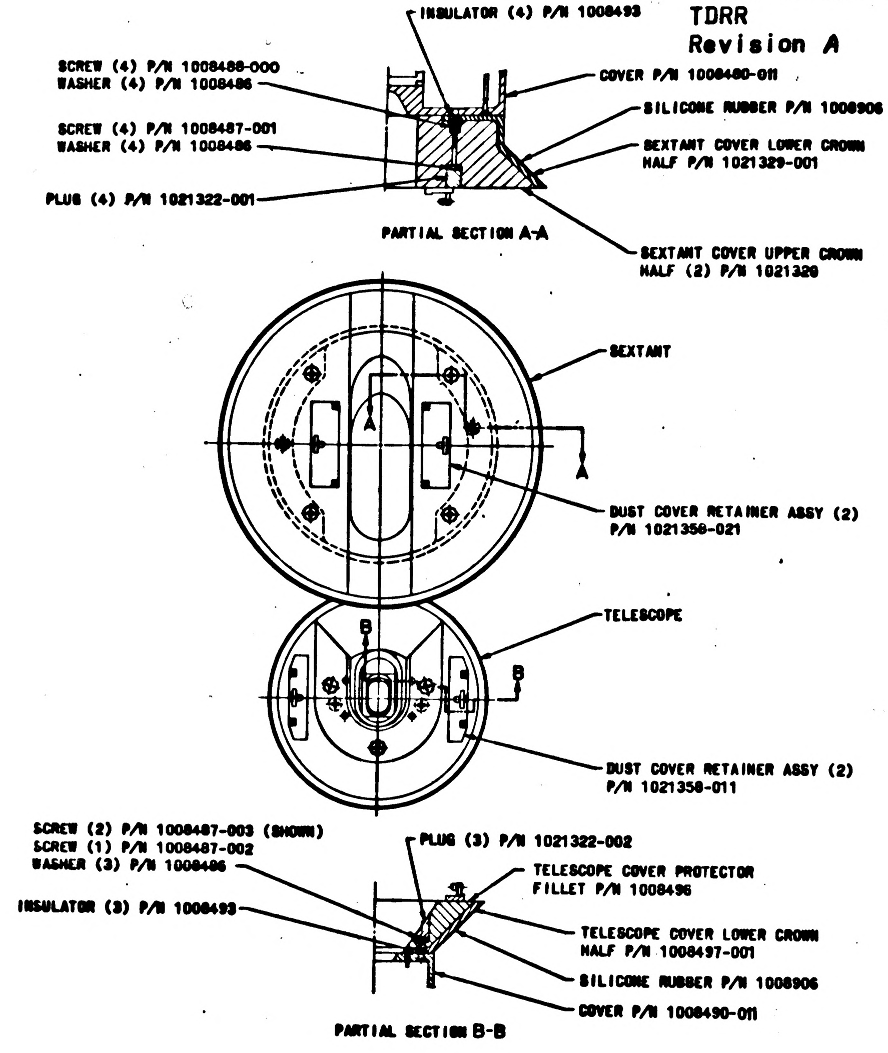
INSULATOR (4) P/N 1008493
SCREW (4) P/N 1008488-000
WASHER (4) P/N 1008486
COVER P/N 1008480-011
SILICONE RUBBER P/N 1008906
SCREW (4) P/N 1008487-001
WASHER (4) P/N 1008486
SEXTANT COVER LOWER CROWN HALF P/N 1021329-001
PLUG (4) P/N 1021322-001
PARTIAL SECTION A-A
SEXTANT COVER UPPER CROWN HALF (2) P/N 1021320
SEXTANT
A
A
DUST COVER RETAINER ASSY (2) P/N 1021356-021
TELESCOPE
B
B
DUST COVER RETAINER ASSY (2) P/N 1021356-011
SCREW (2) P/N 1008487-003 (SHOWN)
SCREW (1) P/N 1008487-002
WASHER (3) P/N 1008486
PLUG (3) P/N 1021322-002
TELESCOPE COVER PROTECTOR FILLET P/N 1008496
INSULATOR (3) P/N 1008493
TELESCOPE COVER LOWER CROWN HALF P/N 1008497-001
SILICONE RUBBER P/N 1008906
COVER P/N 1008490-011
PARTIAL SECTION B-B

FIGURE 2. FRONT VIEW

NOTE:
SEXTANT (ALL PARTS NOT LISTED)
A. CROWN HALF AND PLUG ASSY
(MATCHED ASSY) P/N 1021378-031
1. CROWN HALF LOWER SEXTANT COVER
(INSEP ASSY) P/N 1021329
a. SILICONE RUBBER P/N 1008906
b. CROWN HALF P/N 1021329-001
2. CROWN HALF UPPER SEXTANT
COVER (2) P/N 1021320
3. PLUG (3) P/N 1021322-001
B. DUST COVER RETAINER ASSY (2)
P/N 1021356-021

NOTE:
TELESCOPE (ALL PARTS NOT LISTED)
A. CROWN HALF AND PLUG ASSY
(MATCHED ASSY) P/N 1021377-031
1. CROWN HALF LOWER TELESCOPE COVER
(INSEP ASSY) P/N 1008497
a. SILICONE RUBBER P/N 1008906
b. CROWN HALF P/N 1008497-001
2. TELESCOPE COVER PROTECTOR
FILLET P/N 1008496
3. PLUG (3) P/N 1021322-002
B. DUST COVER RETAINER ASSY (2)
P/N 1021356-011

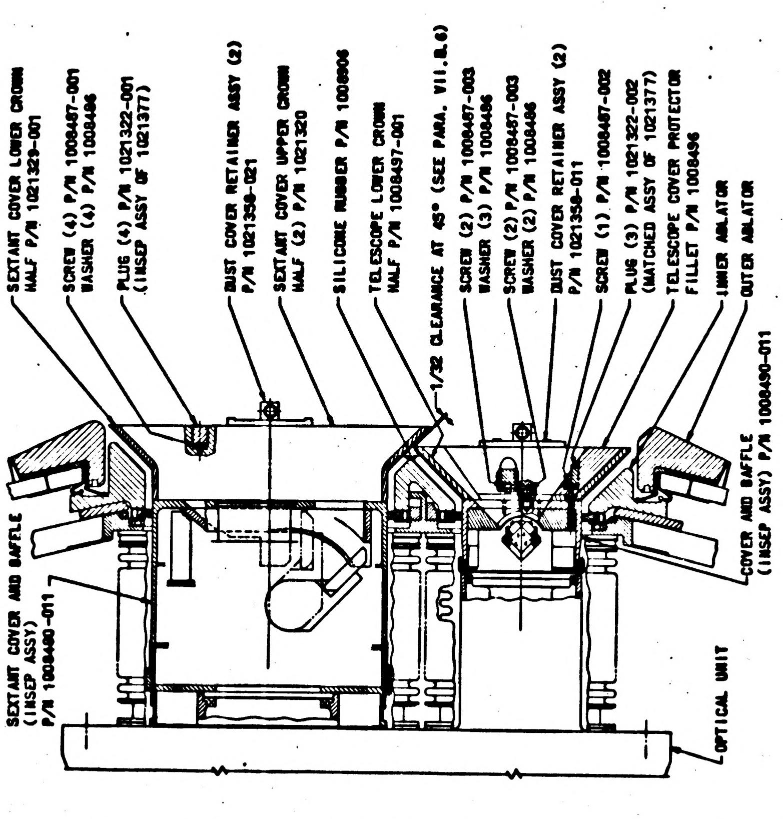
SEXTANT COVER LOWER CROWN HALF P/N 1021329-001
SCREW (4) P/N 1008487-001
WASHER (4) P/N 1008486
PLUG (4) P/N 1021322-001 (INSEP ASSY OF 1021377)
DUST COVER RETAINER ASSY (2) P/N 1021356-021
SEXTANT COVER UPPER CROWN HALF (2) P/N 1021320
SILICONE RUBBER P/N 1008906
TELESCOPE LOWER CROWN HALF P/N 1008497-001
1/32 CLEARANCE AT 45° (SEE PARA. VII.B.6)
SCREW (2) P/N 1008487-003
WASHER (3) P/N 1008486
SCREW (2) P/N 1008487-003
WASHER (2) P/N 1008486
DUST COVER RETAINER ASSY (2) P/N 1021356-011
SCREW (1) P/N 1008487-002
PLUG (3) P/N 1021322-002 (MATCHED ASSY OF 1021377)
TELESCOPE COVER PROTECTOR
FILLET P/N 1008496
INNER ABLATOR
OUTER ABLATOR
COVER AND BAFFLE (INSEP ASSY) P/N 1008490-011
OPTICAL UNIT
SEXTANT COVER AND BAFFLE (INSEP ASSY) P/N 1008480-011

Figure 1. SIDE VIEW

VIII. MODIFICATION DESIGNATION (CONTINUED)

d. Retrofit Installed - List the ECP number and the retrofit kit part number of the retrofit. The ECP number shall be the same for each item of equipment. Insert N/A for repairs.

e. Equip. P/N or MD Sym. After Rep./Ret. - Upon completion of the repair or retrofit, list the newly assigned part number or modification symbol. Insert N/A if there is no part number change or modification symbol assignment.

f. Additional Information - Add any additional pertinent information.

3. Above MODS Installed - The individual responsible for the retrofit or repair shall enter the date the change was completed and sign the form.

4. Q. A. Verification - The Quality Assurance individual responsible for inspecting the retrofit or repair shall enter the date of verification and sign the form.

B. Complete Apollo Configuration Control (ACC) form no. 1a as follows:

NOTE: One or more reproducible masters of ACC form no. 1a shall be completed for each serialized assembly listed on ACC form no. 1 in which parts as assemblies were added and/or removed during retrofit or repair.

VIII. MODIFICATION DESIGNATION (CONTINUED)

1. Equipment Name, P/N, S/N - Insert the equipment name, part number, and serial number of the assembly being repaired or retrofitted.

2. ECP No., Retrofit Kit No. - If a retrofit, insert the ECP and retrofit kit numbers.

3. Repair - If a repair; check the repair block.

4. Complete the chart as follows:

   a. Parts A/R - Insert "A" or "R" indicating if the part is added or removed.

   b. Qty. - Insert the quantity of the added and/or removed part.

   c. Part Name - Insert the name of the added and/or removed part.

   d. P/N - Insert the part number of the added and/or removed part.

   e. S/N - Insert the serial number of the added and/or removed part if it has one. If it has no serial number, leave blank.

   f. Lot No. - Insert the lot number of the added and/or removed part if it has one. If it has no lot number, leave blank.

VIII. MODIFICATION DESIGNATION (CONTINUED)

g. Additional Information - Add any additional pertinent information.

5. Equipment P/N After Rep./Ret. - Insert the newly assigned part number or N/A if there is no part number change after repair or retrofit.

C. Copies of ACC Forms no. 1 and 1a should be made and retained by the reporting facility. The reproducible masters shall be forwarded to the following address as soon as possible after its completion.

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53201

Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

D. Update the Acceptance Data Package as follows:

1. Insert the Kit Acceptance Data List in the Unit Acceptance Data List.

2. Make necessary entry in the Equipment Inventory Record sheet.

3. Record performance of the modification on existing Unit History Record sheet (Referencing this RIB) and start a new Unit History Record sheet for the new part number unit. Retain old Unit History Record sheet in Acceptance Data Package.

ACC Form No. 1
2/23/66

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______________ Date: ________ GAN # ______

The following information must be submitted to Apollo Program Office, Department 32-31, AC Electronics - Milwaukee upon the completion of any retrofit or repair performed on Apollo GFP equipment.

For in-house retrofit effort, this report will be submitted to Department 08-48 for processing and then forwarded to Department 32-31.

All MD symbols or P/N changes affecting each of the following levels of equipment shall be reported below. Parts added or removed shall be reported on ACC Form No. 1a for each of the following levels of equipment.

BLACK BOXES, REPARABLE SUB-ASSEMBLIES

Equipment Name	Equip. P/N Prior to Repair/Ret.	Equip. S/N	Retrofit Installed		Equip. P/N or MD Sym. After Rep./Ret.	Additional Information
			ECP No.	Kit P/N		

Q.A. Verification
DATE
SIGNED

Above MODS Installed
DATE
SIGNED

ACC Form No. 1a
2/23/66

Date: ______

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Part No. 0102674
Date: 13 DEC 66
TDRR 33013
Revision A

RETROFIT OR REPAIR COMPLIANCE REPORT

Equipment Name: ______ P/N: ______ S/N: ______

ECP NO.: ______ Retrofit Kit No.: ______

Repair: ☐

*Parts A/R	Qty.	Part Name	P/N	S/N	Lot No.	Additional Information

* Parts
A - Added
R - Removed

Equipment P/N After Rep/Ret. ______

Sheet 1 of 7
RIB No. 0104072
Date 23 NOV 65
TDRR No. 24221
Revision A
Class A.

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
ORIGINATOR - RAYTHEON COMPANY

Ⓜ

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A		3, 4, 5, 6, 7			

Prepared by ____ Date 11/10/65

P.C. Engineering
Approval D. O'Bryant ____ 11-19-65 Date 11/11/65

DRB Approval ____ Date 11/22/65

MIT Reliability Approval ____ Date 11/22/65

MIT/IL Approval ____ CCB Date 23 NOV 65

NASA Approval A. C. METZGER Date ____

I. **PURPOSE:**

Retrofit instructions for AGC Calibration System, part number 1014217. The following provision will be incorporated by this change:

1. To add a Digital Ohmmeter in the Calibration System to facilitate Block I and Block I (100 Series) Computer Subsystem Checkout.

II. **AUTHORITY:**

This retrofit is authorized by NAS 9-497.

III. **UNITS AFFECTED:**

Name	Part No.	Retrofit S/N's	New Part No.
AGC Calibration System	1014217	RAY2 thru RAY6	1020344-011
Handle Slide Assy	1014303-2	RAY 2 thru RAY6	1020211-011

IV. **PRIORITY CHANGES:**

RIB No. 0104042

V. **RELATED CHANGES:**

None

VI. **MATERIAL REQUIRED:**

1. One (1) retrofit kit, part number 8104091, containing the following:

Item	Quantity	Nomenclature	Part No.
a.	1	Right hand bracket	1020430
b.	1	Left hand bracket	1020431
c.	1	Digital ohmmeter	1006438
d.	4	Flat head screw	MS35200-54
e.	1	Identification plate	1020085
f.	1	Identification plate	1020086
g.	2	Serrated strip grommet	1001662-3
h.	1	Retrofit Instruction Bulletin	0104072
i.	4	Drive screw	AN535-4-4

2. Material required but not supplied in kit:

Item	Quantity	Nomenclature	Part No.
a.	A/R	Wire, Electrical Blk.	MIL-W-16878/4-E24
b.	A/R	Solder	ND 1002075
c.	A/R	Black ink	1006271-10
d.	A/R	Cotton swabs	N/A
e.	A/R	Masking tape, 1/2-inch wide	/ N/A
f.	A/R	Lacing tape	1006458-004
g.	A/R	Insulation sleeving, AWG10	MIL-I-631, Type F, Form UA, Grade A, Class 1, Category 1
h.	A/R	Chem-Stripper	N/A
i.	A/R	Isopropyl alcohol	TT-I-735
j.	A/R	Methyl ethyl keytone	TT-M-261
k.	A/R	Cement	MIL-C-4003
l.	A/R	Self curing adhesive	1006981

3. Recommended tools required but not supplied in kit:

Item	Quantity	Nomenclature	Part No.
a.	1	Keyhole saw	Lafayette HG-731 or equivalent
b.	1	Assorted five piece file set	Lafayette HG-456 or equivalent

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Engineering Drawing, Printing Recorder, Reworked	1020210, Rev D
b.	Engineering Drawing, Recorder and Digital Ohmmeter Assembly	1020211, Rev C
c.	Engineering Drawing, AGC Calibration System Console Assembly	1020344, Rev B
d.	Job Description Card	JDC 04827, Rev-
e.	Job Description Card	JDC 04828, Rev-
f.	Workmanship Standard	AC-STD-1 (3 March 1964)

VII. **PROCEDURE:**

1. General Instructions

   a. Check SIDL for latest revision to this RIB.

   b. Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outlined herein.

   c. Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

   d. All workmanship shall meet standards as defined in Workmanship Standard AC-STD-1, dated 3 March 1964.

   e. Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

2. Retrofit the Calibration System (1014217) using retrofit kit 8104091.

   a. Disconnect the power and signal cables on the rear of the Recorder Unit.

   b. Unfasten the recorder front panel hardware and remove the recorder from the cabinet.

   c. Unbutton the recorder rear hinged panel and hinge the panel down.

   d. Remove the recorder top cover panel by sliding the panel rearward.

   e. Refer to view A-A on engineering drawing 1020210. Face the rear of the recorder and remove the small plate located below and to the left of the hinged panel and to the right of the Blue Ribbon connector.

   f. Remove the hardware securing the blank front panel of the recorder unit and remove the blank front panel. Retain the hardware for reassembly.

   g. Refer to section B-B on engineering drawing 1020210. Locate the two (2) printed circuit board connector mounting cutouts (XA15-1 and XA14-1) on the partition located approximately 2/3 rds from the front of the unit.

   h. Remove the adjacent printed circuit boards from the partition and cover the electrical components in the area of the connector cutouts with masking tape for protection against metal filings during rework.

i. Using a keyhole saw, remove metal around uncovered connector mounting holes on the rear of the unit (view A-A of engineering drawing 1020210) and remove metal from around connector mounting holes (XA15-1 and XA14-1) on partition (section B-B of engineering drawing 1020210). Remove burrs and sharp edges with a file.

j. Assemble grommet, (1001662-3) supplied in kit, as required around enlarged connector cutouts (view A-A and section B-B of engineering drawing 1020210)using adhesive (1006981).

k. Replace printed circuit boards and remove the masking tape from components.

l. Refer to drawing 1020210 and relocate connectors on printed circuit boards to positions shown.

m. Locate the small square cutout in the same partition as the printed circuit board connector cutouts. Assemble grommet, (1001662-3) supplied in kit, to the cutout (section B-B of engineering drawing 1020210) using adhesive (1006981) as required.

n. Assemble right hand bracket (1020430), and left hand bracket (1020431) supplied in kit to front of recorder unit where blank panel was removed. Use hardware retained from disassembly.

o. Remove the four screws securing connectors J101 and J102 (Blue Ribbon Connectors) to the rear of the Digital Recorder.

p. Pull out the connectors carefully to allow access to the pins on the rear of the connectors.

q. Unsolder the wire connected to pin 9 of connector J102. Cut off the exposed conductor and tie the wire back using lacing tape, 1006458-004.

r. Strip 3/16-inch and tin, a 6-inch length of number 24 AWG black teflon insulated wire.

s. Run the unstripped end into the J101 connector cutout and out the J102 connector cutout.

t. Unsolder the wire removed in step s and the stripped end of the black teflon wire.

u. Twist together the wire removed in step s and the stripped end of the black teflon wire.

v. Place a 5/8-inch length of insulation sleeving (MIL-I-631) over the twisted pair.

w. Solder the twisted pair to pin 48 of connector J101.

x. Slide the sleeving installed in step v over pin 48 of connector J101.

---

y. Cut the black teflon wire to the proper length for soldering to pin 9 of connector J102.

z. Strip the wire 1/8-inch and tin.

aa. Place a 5/8-inch length of insulation sleeving (MIL-I-631) over the wire.

ab. Solder the wire to pin 9 of connector J102.

ac. Slide the sleeving installed in step z over pin 9 of connector J102.

ad. Reinstall the two connectors using four screws removed in step n.

ae. Refer to section B-B on engineering drawing 1020211. Assemble digital ohmmeter 1006438, supplied in kit, half way into recorder unit. Install power cable through small square opening at bottom of partition. Install signal cable through enlarged connector cutouts at top of partition and through enlarged connector cutout on rear of recorder unit.

af. Install digital ohmmeter fully into recorder unit and secure to left and right hand brackets using four (4) flat head screws (MS35200-54) supplied in kit.

ag. Connect data output cable from digital ohmmeter to the bottom Blue Ribbon connector on the recorder (section A-A of engineering drawing 1020211).

ah. Replace the sliding top cover on the recorder unit; hinge up rear hinged panel and button in place.

ai. Use Chem-Stripper and cotton swabs and remove existing weight from the side of the assembly.

aj. Neutralize action of Chem-Stripper with isopropyl alcohol.

ak. Stencil .25-inch high characters "69.2" in the same location as the original weight using black ink (1006271-10).

al. Stencil .12-inch high characters "1020210-011 REV B" in the location shown on view C-C of engineering drawing 1020210, using black ink (1006271-10).

am. Remove the existing identification plate from the left side of the Recorder and Digital Ohmmeter Assembly. Clean the adhesive from the panel using adhesive solvent (TT-M-261).

---

an. Apply cement (MIL-C-4003) to the rear surface of the new identification plate (1020085), supplied in the kit, and install in the same position as the plate removed in step al.

ao. Install the Recorder and Digital Ohmmeter Assembly into the Calibration System cabinet and secure the front panel hardware.

ap. Connect the recorder and digital ohmmeter power cords to the power outlets in the cabinet.

aq. Connect the signal cable from top Blue Ribbon connector to the electronic counter unit. (Refer to section A-A of engineering drawing number 1020211.)

ar. Test the modified Calibration System per JDC's 04827 and 04828.

VIII. MODIFICATION DESIGNATION:

1. Drill out and remove the four (4) rivets and identification plate secured to the top of the Calibration System cabinet.

2. Install new identification plate (1020086), supplied in kit, in same location as old identification plate, using four (4) drive screws (AN535-4-4) supplied in kit.

IX. DISPOSITION OF REMOVED PARTS:

Scrap

Sheet 1 of 10
RIB No. 0104072
Date 23 NOV65
TDRR No. 24221
Revision B
Clas A.

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A		3, 4, 5, 6, 7			
B	27438	All	MM	AM	3/24/66

Prepared by ______ Date 11/19/65

P. C. Engineering
Approval D. O'Bryant ______ 11-19-65 Date 11/11/65

DRB Approval ______ Date 11/22/65

MIT Reliability Approval ______ Date 11/22/65

MIT/IL Approval ______ CCB Date 23 NOV65

NASA Approval A. C. METZGER Date ______

Sheet 2 of 10
RIB No. 0104072
Date
TDRR No.
Revision B

I. PURPOSE:

Retrofit instructions for AGC Calibration System, part number 1014217. The following provision will be incorporated by this change:

1. To add a Digital Ohmmeter in the Calibration System to facilitate Block I and Block I(100 Series) Computer Subsystem Checkout.

II. AUTHORITY:

This retrofit is authorized by NAS 9-497.

III. UNITS AFFECTED:

Name	Part No.	Retrofit S/N's	New Part No.
AGC Calibration System	1014217	RAY 2, 3, 5, 6	1020344-021
Handle Slide Assy	1014303-2	See units affected	1020211-021

IV. PRIORITY CHANGES:

RIB No. 0104042

V. RELATED CHANGES:

None

VI. MATERIAL REQUIRED:

1. One (1) retrofit kit, part number 8104167, containing the following:

Item	Qty.	Nomenclature	Part No.
a.	1	Frame	2106365
b.	1	Wire mesh	2016366
c.	18	Rivet, universal head	MS20470AD2-4

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Item	Qty	Nomenclature	Part No.
d.	1	Plate, identification	1020086
e.	4	Screw, drive	AN535-4-3
f.	1	Plate, identification	1020085
g.	1	Nameplate	1004260-256
h.	1	Nameplate	1004260-257
* i.	1	Retrofit Instruction Bulletin	0104097

* Item i, Retrofit Instruction Bulletin 0104097 is part of RKA 8104167, but is not pertinent to, nor used with this RIB.

2. One (1) retrofit kit, part number 8104091, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Right hand bracket	1020430
b.	1	Left hand bracket	1020431
c.	1	Digital ohmmeter	1006438
d.	4	Flat head screw	MS35200-54
e.	1	Identification plate	1020085
f.	1	Identification plate	1020086
g.	2	Serrated strip grommet	1001662-3
h.	1	Retrofit Instruction Bulletin	0104072
i.	4	Drive screw	AN535-4-4

3. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Wire, Electrical Blk.	MIL-W-16878/4-E24
b.	A/R	Solder	ND 1002075
c.	A/R	Black ink	1006271-10

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Item	Qty	Nomenclature	Part No.
d.	A/R	Cotton swabs	N/A
e.	A/R	Masking tape, 1/2-inch wide	N/A
f.	A/R	Lacint tape	1006458-004
g.	A/R	Insulation sleeving, AWG10	MIL-I-631, Type F, Form UA, Grade A, Class 1, Category 1
h.	A/R	Chem-Stripper	N/A
i.	A/R	Isopropyl alcohol	TT-I-735
j.	A/R	Methyl ethyl keytone	TT-M-261
k.	A/R	Adhesive	MIL-A-5092, Type II
l.	A/R	Self curing adhesive	1006981
m.	A/R	Toluene, technical grade	TT-T-548
n.	1	Stencil, .25-inch high characters "69.2" per ND 1002019	N/A
o	1	Stencil, .12-inch high characters "1020210-021 REV C" per ND 1002019	N/A

4. Recommended tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	Keyhole saw	Lafayette HG-731 or equivalent
b.	1	Assorted five piece file set	Lafayette HG-456 or equivalent

5. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Engineering Drawing Printing Recorder, Reworked	1020210

Item	Nomenclature	Document No.
b.	Engineering Drawing, Recorder and Digital Ohmmeter Assembly	1020211
c.	Engineering Drawing, AGC Calibration System Console Assembly	1020344
d.	Job Description Card	JDC 04827
e.	Job Description Card	JDC 04828
f.	Workmanship Standard	AC-STD-1 (3 March 1964)
g.	Touch-up of Anodized Aluminum	ND 1002040
h.	Marking General Specification for	ND 1002019
i.	Process Specification, Soldering of Electrical Connections	ND 1002071

VII. PROCEDURE:

1. General Instructions

   a. Check SIDL for latest revision to this RIB.

   b. Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outlined herein.

   c. Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

   d. All workmanship shall meet standards as defined in Workmanship Standard AC-STD-1, dated 3 March 1964.

   e. Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

2. Retrofit the Calibration System (1014217) using retrofit kit 8104091 and retrofit kit 8104067.

   a. Disconnect the power and signal cables on the rear of the Recorder Unit.

   b. Unfasten the recorder front panel hardware and remove the recorder from the cabinet.

   c. Unbutton the recorder rear hinged panel and hinge the panel down.

   d. Remove the recorder top cover panel by sliding the panel rearward.

   e. Remove bottom cover panel from recorder and retain hardware.

   f. Remove and discard felt lining from top cover, bottom cover, and inside of recorder case. Clean adhesive from panels using TT-T-548 (refer to engineering drawing 1020210).

   g. Rework top and bottom covers per engineering drawing 1020210. Touch-up surfaces of bare metal per ND 1002040.

   h. Rivet wire mesh and frame, supplied in kit, to top cover as shown on engineering drawing 1020210.

   i. Assemble bottom cover over rear section of recorder using four (4) flat heat screws. Discard remaining two (2) screws.

   j. Refer to view A-A on engineering drawing 1020210. Face the rear of the recorder and remove the small plate located below and to the left of the hinged panel and to the right of the Blue Ribbon connector.

   k. Remove the hardware securing the blank front panel of the recorder unit and remove the blank front panel. Retain the hardware for reassembly.

   l. Refer to section B-B on engineering drawing 1020210. Locate the two (2) printed circuit board connector mounting cutouts (XA15-1 and XA14-1) on the partition located approximately 2/3 rds from the front of the unit.

   m. Remove the adjacent printed circuit boards from the partition and cover the electrical components in the area of the connector cutouts with masking tape for protection against metal filings during rework.

   n. Using a keyhole saw, remove metal around uncovered connector mounting holes on the rear of the unit (view A-A of engineering drawing 1020210) and remove metal from around connector mounting holes (XA15-1 and XA14-1) on partition (section B-B of engineering drawing 1020210). Remove burrs and sharp edges with a file. Touch-up surfaces of bare metal per ND 1002040.

   o. Assemble grommet, (1001662-3) supplied in kit, as required around enlarged connector cutouts (view A-A and section B-B of engineering drawing 1020210) using adhesive (1006981).

   p. Replace printed circuit boards and remove the masking tape from components.

   q. Refer to drawing 1020210 and relocate connectors on printed circuit boards to positions shown.

   r. Locate the small square cutout in the same partition as the printed circuit board connector cutouts. Assemble grommet, (1001662-3) supplied in kit, to the cutout (section B-B of engineering drawing 1020210) using adhesive (1006981) as required.

   s. Assemble right hand bracket (1020430), and left hand bracket (1020431) supplied in kit to front of recorder unit where blank panel was removed. Use hardware retained from disassembly.

   t. Remove the four screws securing connectors J101 and J102 (Blue Ribbon Connectors) to the rear of the Digital Recorder.

   u. Pull out the connectors carefully to allow access to the pins on the rear of the connectors.

   v. Unsolder the wire connected to pin 9 of connector J102. Cut off the exposed conductor and tie the wire back using lacing tape, 1006458-004.

   w. Strip 3/16-inch and tin, a 6-inch length of number 24 AWG black teflon insulated wire.

   x. Run the unstripped end into the J101 connector cutout and out the J102 connector cutout.

   y. Unsolder the wire removed in step x and the stripped end of the black teflon wire.

   z. Twist together the wire removed in step x and the stripped end of the black teflon wire.

   aa. Place a 5/8-inch length of insulation sleeving (MIL-I-631) over the twisted pair.

   ab. Solder the twisted pair to pin 48 of connector J101.

   ac. Slide the sleeving installed in step aa over pin 48 of connector J101.

   ad. Cut the black teflon wire to the proper length for soldering to pin 9 of connector J102.

   ae. Strip the wire 1/8-inch and tin.

   af. Place a 5/8-inch length of insulation sleeving (MIL-I-631) over the wire.

   ag. Solder the wire to pin 9 of connector J102.

   ah. Slide the sleeving installed in step ae over pin 9 of connector J102.

   ai. Reinstall the two connectors using four screws removed in step s.

   aj. Refer to section B-B on engineering drawing 1020211. Assemble digital ohmmeter 1006438, supplied in kit, half way into recorder unit. Install power cable through small square opening at bottom of partition. Install signal cable through enlarged connector cutouts at top of partition and through enlarged connector cutout on rear of recorder unit.

   ak. Install digital ohmmeter fully into recorder unit and secure to left and right hand brackets using four (4) flat head screws (MS35200-54) supplied in kit.

   al. Connect data output cable from digital ohmmeter to the bottom Blue Ribbon connector on the recorder (section A-A of engineering drawing 1020211).

   am. Replace the sliding top cover on the recorder unit; hinge up rear hinged panel and button in place.

   an. Use Chem-Stripper and cotton swabs and remove existing weight from the side of the assembly.

ao. Neutralize action of Chem-Stripper with isopropyl alcohol.

ap. Stencil .25-inch high characters "69.2" in the same location as the original weight using black ink (1006271-10).

aq. Stencil .12-inch high characters "1020210-021 REV C" in the location shown on view C-C of engineering drawing 1020210, using black ink (1006271-10).

ar. Remove the existing identification plate from the left side of the Recorder and Digital Ohmmeter Assembly. Clean the adhesive from the panel using adhesive solvent (TT-M-261).

as. Apply cement (MIL-C-4003) to the rear surface of the new identification plate (1020085), supplied in the kit, and install in the same position as the plate removed in step ar.

at. Install the Recorder and Digital Ohmmeter Assembly into the Calibration System cabinet and secure the front panel hardware.

au. Connect the recorder and digital ohmmeter power cords to the power outlets in the cabinet.

av. Connect the signal cable from top Blue Ribbon connector to the electronic counter unit. (Refer to section A-A of engineering drawing number 1020211.)

aw. Inspect work performed to ensure quality in accordance with referenced documents.

ax. Test the modified Calibration System per JDC's 04827 and 04828.

ay. Complete attached form and return to addressee.

VIII. MODIFICATION DESIGNATION:

1. Drill out and remove the four (4) rivets and identification plate secured to the top of the Calibration System cabinet.
2. Install new identification plate (1020086), supplied in kit, in same location as old identification plate, using four (4) drive screws (AN535-4-4) supplied in kit.

IX. DISPOSITION OF REMOVED PARTS:

1. Return all unused parts of RKA 8104167 to stores for disposition. Scrap Retrofit Instruction Bulletin 0104097.
2. Scrap nameplate, rivets, felt lining and removed portion of cover.

Sheet 1 of 10
RIB No. 0104072
Date 23 NOV 65
TDRR No. 24221
Revision G —
Class A.

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A		3, 4, 5, 6, 7			
B	27438	All	MM	AM	3/24/66
C	29734	1, 3, 5, 9	MM		6/21/66

Prepared by George E. Palmer Jr Date 11/10/65

P.C. Engineering Approval D. O'Bryant R.L. Anderson 11-19-65 Date 11/11/65

DRB Approval A. Kurans Date 11/22/65

MIT Reliability Approval Date 11/22/65

MIT/IL Approval for CCB Date 23 NOV 65

A. C. METZGER

NASA Approval Date

Sheet 1 of 7
RIB No. 0104072
Date 23 NOV 65
TDRR No. 24221
Revision —
Class A.

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by George E. Palmer Jr. Date 11/10/65

P.C. Engineering
Approval D. O'Bryant R.L. Anderson 11-19-65 Date 11/11/65

DRB Approval Date 11/22/65

MIT Reliability Approval Date 11/22/65

MIT/IL Approval CCB Date 23 NOV 65

NASA Approval A. C. METZGER Date

I. PURPOSE:

Retrofit instructions for AGC Calibration System, part number 1014217. The following provision will be incorporated by this change:

1. To add a Digital Ohmmeter in the Calibration System to facilitate Block I and Block I (100 Series) Computer Subsystem Checkout.

II. AUTHORITY:

This retrofit is authorized by NAS 9-497.

III. UNITS AFFECTED:

Name	Part No.	Retrofit S/N's	New Part No.
AGC Calibration System	1014217	RAY2 thru RAY6	1020344-011
Handle Slide Assy	1014303-2	RAY 2 thru RAY6	1020211-011

IV. PRIORITY CHANGES:

RIB No. 0104042

V. RELATED CHANGES:

None

VI. MATERIAL REQUIRED:

1. One (1) retrofit kit, part number 8104091, containing the following:

Item	Quantity	Nomenclature	Part No.
a.	1	Right hand bracket	1020430
b.	1	Left hand bracket	1020431
c.	1	Digital ohmmeter	1006438
d.	4	Flat head screw	MS35200-54
e.	1	Identification plate	1020085
f.	1	Identification plate	1020086
g.	2	Serrated strip grommet	1001662-3
h.	1	Retrofit Instruction Bulletin	0104072
i.	4	Drive screw	AN535-4-4

2. Material required but not supplied in kit:

Item	Quantity	Nomenclature	Part No.
a.	A/R	Wire, Electrical Blk.	MIL-W-16878/4-E24
b.	A/R	Solder	ND 1002075
c.	A/R	Black ink	1006271-10
d.	A/R	Cotton swabs	N/A
e.	A/R	Masking tape, 1/2-inch wide	/ N/A
f.	A/R	Lacing tape	1006458-004
g.	A/R	Insulation sleeving, AWG10	MIL-I-631, Type F, Form UA, Grade A, Class 1, Category 1
h.	A/R	Chem-Stripper	N/A
i.	A/R	Isopropyl alcohol	TT-I-735
j.	A/R	Methyl ethyl keytone	TT-M-261
k.	A/R	Cement	MIL-C-4003
l.	A/R	Self curing adhesive	1006981

3. Recommended tools required but not supplied in kit:

Item	Quantity	Nomenclature	Part No.
a.	1	Keyhole saw	Lafayette HG-731 or equivalent
b.	1	Assorted five piece file set	Lafayette HG-456 or equivalent

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Engineering Drawing, Printing Recorder, Reworked	1020210, Rev D
b.	Engineering Drawing, Recorder and Digital Ohmmeter Assembly	1020211, Rev D
c.	Engineering Drawing, AGC Calibration System Console Assembly	1020344, Rev B
d.	Job Description Card	JDC 04827, Rev-
e.	Job Description Card	JDC 04828, Rev-
f.	Workmanship Standard	AC-STD-1 (3 March 1964)

VII. PROCEDURE:

1. General Instructions
   - a. Check SIDL for latest revision to this RIB.
   - b. Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outlined herein.
   - c. Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.
   - d. All workmanship shall meet standards as defined in Workmanship Standard AC-STD-1, dated 3 March 1964.
   - e. Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.
2. Retrofit the Calibration System (1014217) using retrofit kit 8104091.
   - a. Disconnect the power and signal cables on the rear of the Recorder Unit.
   - b. Unfasten the recorder front panel hardware and remove the recorder from the cabinet.
   - c. Unbutton the recorder rear hinged panel and hinge the panel down.
   - d. Remove the recorder top cover panel by sliding the panel rearward.
   - e. Refer to view A-A on engineering drawing 1020210. Face the rear of the recorder and remove the small plate located below and to the left of the hinged panel and to the right of the Blue Ribbon connector.
   - f. Remove the hardware securing the blank front panel of the recorder unit and remove the blank front panel. Retain the hardware for reassembly.
   - g. Refer to view B-B on engineering drawing 1020210. Locate the two (2) printed circuit board connector mounting cutouts (XA15-1 and XA14-1) on the partition located approximately 2/3 rds from the front of the unit.
   - h. Remove the adjacent printed circuit boards from the partition and cover the electrical components in the area of the connector cutouts with masking tape for protection against metal filings during rework.

i. Using a keyhole saw, remove metal around uncovered connector mounting holes on the rear of the unit (view A-A of engineering drawing 1020210) and remove metal from around connector mounting holes (XA15-1 and XA14-1) on partition (section B-B of engineering drawing 1020210). Remove burrs and sharp edges with a file.

j. Assemble grommet, (1001662-3) supplied in kit, as required around enlarged connector cutouts (view A-A and section B-B of engineering drawing 1020210) using adhesive (1006981).

k. Replace printed circuit boards and remove the masking tape from components.

l. Locate the small square cutout in the same partition as the printed circuit board connector cutouts. Assemble grommet, (1001662-3) supplied in kit, to the cutout (section B-B of engineering drawing 1020210) using adhesive (1006981) as required.

m. Assemble right hand bracket (1020430), and left hand bracket (1020431) supplied in kit to front of recorder unit where blank panel was removed. Use hardware retained from disassembly.

n. Remove the four screws securing connectors J101 and J102 (Blue Ribbon Connectors) to the rear of the Digital Recorder.

o. Pull out the connectors carefully to allow access to the pins on the rear of the connectors.

p. Unsolder the wire connected to pin 9 of connector J102. Cut off the exposed conductor and tie the wire back using lacing tape, 1006458-004.

q. Strip 3/16-inch and tin, a 6-inch length of number 24 AWG black teflon insulated wire.

r. Run the unstripped end into the J101 connector cutout and out the J102 connector cutout.

s. Unsolder the wire connected to pin 48 of connector J101.

t. Twist together the wire removed in step s and the stripped end of the black teflon wire.

u. Place a 5/8-inch length of insulation sleeving (MIL-I-631) over the twisted pair.

v. Solder the twisted pair to pin 48 of connector J101.

w. Slide the sleeving installed in step u over pin 48 of connector J101.

x. Cut the black teflon wire to the proper length for soldering to pin 9 of connector J102.

y. Strip the wire 1/8-inch and tin.

z. Place a 5/8-inch length of insulation sleeving (MIL-I-631) over the wire.

aa. Solder the wire to pin 9 of connector J102.

ab. Slide the sleeving installed in step z over pin 9 of connector J102.

ac. Reinstall the two connectors using four screws removed in step n.

ad. Refer to section B-B on engineering drawing 1020211. Assemble digital ohmmeter 1006438, supplied in kit, half way into recorder unit. Install power cable through ~~small square opening at bottom of partition~~. Install signal cable through enlarged connector cutouts at top of partition and through enlarged connector cutout on rear of recorder unit.

ae. Install digital ohmmeter fully into recorder unit and secure to left and right hand brackets using four (4) flat head screws (MS35200-54) supplied in kit.

af. Connect data output cable from digital ohmmeter to the bottom Blue Ribbon connector on the recorder (section A-A of engineering drawing 1020211).

ag. Replace the sliding top cover on the recorder unit; hinge up rear hinged panel and button in place.

ah. Use Chem-Stripper and cotton swabs and remove existing weight from the side of the assembly.

ai. Neutralize action of Chem-Stripper with isopropyl alcohol.

aj. Stencil .25-inch high characters "69.2" in the same location as the original weight using black ink (1006271-10).

ak. Stencil .12-inch high characters "1020210-011 REV B" in the location shown on view C-C of engineering drawing 1020210, using black ink (1006271-10).

al. Remove the existing identification plate from the left side of the Recorder and Digital Ohmmeter Assembly. Clean the adhesive from the panel using adhesive solvent (TT-M-261).

am. Apply cement (MIL-C-4003) to the rear surface of the new identification plate (1020085), supplied in the kit, and install in the same position as the plate removed in step al.

an. Install the Recorder and Digital Ohmmeter Assembly into the Calibration System cabinet and secure the front panel hardware.

ao. Connect the recorder and digital ohmmeter power cords to the power outlets in the cabinet.

ap. Connect the signal cable from top Blue Ribbon connector to the electronic counter unit. (Refer to section A-A of engineering drawing number 1020211.)

aq. Test the modified Calibration System per JDC's 04827 and 04828.

VIII. MODIFICATION DESIGNATION:

1. Drill out and remove the four (4) rivets and identification plate secured to the top of the Calibration System cabinet.

2. Install new identification plate (1020086), supplied in kit, in same location as old identification plate, using four (4) drive screws (AN535-4-4) supplied in kit.

IX. DISPOSITION OF REMOVED PARTS:

Scrap

Sheet 1 of 43
RIB No. 0104094
Date
TDRR No. 27887
Revision A

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
G&N TEST INTERCONNECTION SET
AUTHORIZED BY S.O.W. Paragraph 5.2.4.2 (NAS9-497)
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A	29114	1, 11-13, 17, 21, 22, 23, 35, 39, 40, 43, 18,	MM	AM	5-24-66

Prepared by ______ Date 7 March 1966

P. C. Engineering Approval ______ Date 4/7/66

DRB Approval A Harano Date 4/7/66

MIT Reliability Approval ______ Date ______

MIT/IL Approval ______ Date 8 Apr 66.

NASA Approval ______ Date 9 April 66

2. Retrofit the AGC/GSE Interconnection Kit, G&N System Test, part number (1020313), using retrofit kit part number 8104067, as follows:

   a. Refer to engineering drawing 1020313. Dispose of the following cables listed as per paragraph IX: Test Cable assembly, W204 (1020271), cable assembly W208 (1020279), and cable assembly W209 (1020284). The other items listed are to be retained for use in the new assembly.

   b. Remove the bandmarkers on W200 cable assembly (1020241), dispose of bandmarkers per paragraph IX.

      1) Remove outer sleeving (1006696-9) from cable being careful not to damage internal wires. Discard sleeving. Cut 31.5' ± 1.0" length of sleeving (ND 1002155, type III, 1 1/2 ID) supplied in kit 8104166. Measure 6.00 ± .50 at one end of sleeving. Cut through Zipper tubing and Aluminum foil but do not cut through braid. Discard cut piece. Cut a length of sleeving 4.00 ± .12 (MIL-I-631, Awg No. 4) supplied in kit 8104166, and assemble over braid. Remove from kit, quantity one terminal lug (MS25036-53) and crimp to end of braid per ND 1002206. Measure over-all length of sleeving to fit cable under retrofit accounting for 6.00 inch length required for grounding braid, and cut. Repeat above procedure for fabricating ground braid.

      2) Assemble fabricate sleeving to cable, using engineering drawing 2014463, centering sleeving on cable, and close tubing over cable using zipper tubing closing tool and solvent (1006699). Spot tie sleeving as shown using lacing tape (1006458-004).

      3) Remove hardware securing connector strain relief clamp to cable and rework hardware to length indicated in view S-S of reference drawing (2014463). Assemble sleeved ground braid under strain relief. Assemble terminal lug strain relief clamp using reworked hardware. Repeat procedure at other end of cable. Tighten all hardware and assemble to end of reworked strain-relief mtg. hardware, one each cap nut (MS24679-22) supplied in kit, 8104166.

   c. Refer to engineering drawing 2014463. Bond to the cable three bandmarkers (1006415-141), marked per drawing (2014463-011), supplied in kit 8104166, in the indicated locations. Use cotton swabs and adhesive (1006253) as required.

   d. Remove the bandmarkers from cable assembly W201 (1020242-1). Dispose of bandmarkers per paragraph IX.

      1) Remove outer sleeving (1006696-9) from cable being careful not to damage internal wires. Discard sleeving. Cut 31.5' + 1.0" length of sleeving (ND 1002155, type III, 1 1/2" ID), supplied in kit 8104166. Measure 6.00 ± .50 at one end of sleeving. Cut through zipper tubing

bc. Remove sleeving covering each of three large groups of shielded wires. Use care so as not to damage conductors in cable. Dispose of sleeving per paragraph IX.

bd. Tap shielded group of conductors containing 27 twisted pairs and three single white conductors, identify as Group I.

be. Tag shielded group containing 18 single white conductors, identify as Group III.

bf. Tag shielded group of conductors containing 9 twisted pairs and 2 single white conductors, identify as Group II.

bg. Assemble a 23.00 ± 1.00 length of zipper sleeving (1006696-4) over shielded group of wires marked "Group I", seal using solvent (1006699) and spot tie ends of zipper sleeving over the braid, immediately, behind ferrules terminating ends of braid, using lacing tape (1006458-004).

bh. Assemble a 23.00 ± 1.00 length of zipper sleeving (1006696-3) over shielded group of wires marked "Group II", seal using solvent (1006699) and spot tie ends of zipper sleeving over the braid, immediately behind ferrules terminating ends of braid, using lacing tape (1006458-004).

bi. Assemble a 23.00 inch ± 1.00 length of zipper sleeving (1006996-3) over shielded group of wires marked "Group III", seal using solvent (1006699) and spot tie ends of zipper sleeving over the braid, immediately behind ferrules terminating ends of braid, using lacing tape (1006458-004).

bil. Remove P1 and P2 connector backshells and retain. Retain mtg. hardware.

bi2. Remove lacing ties and remove clear sleeving on cable legs, at backshell. Discard sleeving and lacing tape.

bi3. Cut and assemble 4 pieces of 1.50 inch ± .06 length of zipper sleeving (1006696-7), supplied in kit, 8104170, to above cable legs, at backshell, seal using solvent (1006699) and spot tie using lacing tape (1006458-004) as shown on reference drawing (2016324.)

bi4. Re-assemble connector backshells using retained hardware.

bj. Refer to engineering drawing 2016334. Tie flat lace above three groups and loose conductors between J1 and P1 in indicated area using lacing tape (1006458-004).

bk. Remove the identification tags from the three groups and dispose of them per paragraph IX.

bkl. Cut 46.5 ± 1.0 length of sleeving (ND 1002155, type III, ID 1 5/8) supplied in kit 8104170. Measure 8.50 ± .25 at one end of sleeving. Cut through zipper tubing and aluminum foil, but do not cut through braid. Discard cut piece Measure 13.75 ± .50 at other end of sleeving and cut as above. Cut a 8.00 ± .25 length of sleeving (MIL-I-731 Awg No. 4) supplied in kit and assemble terminal lug (MS25036-53) to end of braid, crimping per ND1002206.

cv. Remove lacing tape securing J2 harness and J5 harness to the component board. Retain harness and board.

cw. Remove the mounting hardware securing TB1 (1006678-3) and TB2 (1006678-4) to the mounting supports. Retain TB's and mounting hardware.

cx. Remove mounting hardware securing mounting supports (1020273, 1020261, 1020274, and 1020275). Retain supports and mounting hardware.

cy. Remove mounting hardware securing mounting supports (1020272, 1020260, 1020280, and 1020281). Retain supports and mounting hardware.

cyl. Remove mounting hardware securing toggle switch, S1 (MS35058-23) and toggle switch guard (MS25224-1) to side of buffer circuit assy. Remount switch hdwr. and dispose of switch per para. IX. Retain switch guard for re-assembly.

NOTE: Mask connectors and remaining switch to protect them from metal particles caused from drilling.

cz. Refer to engineering drawing 2014287. Drill hole, in indicated position, .344/.347 using 8.8 mm (.3465 diameter) drill bit. Fabricate a template with a .75 diameter hole and abrade the paint around the hole just drilled.

da. Refer to engineering drawing 2014287. Drill four .158/.164 diameter holes, using #20 (.1610 diameter) drill, in locations indicated.

db. Chromate bare metal with chromate (MIL-C-5541 electrically conductive). Touch up any painted areas around reworked areas with paint (TT-E-529, Class B, Fed-STD-595, Color 26251) per MIL-F-P513, Type I.

dc. Remove stencil 1020293 REV (letter) from welded assembly using cotton swabs and Chem-Stripper as required.

dd. Stop action of Chem-Stripper using cotton swabs and isopropyl alcohol as required.

de. Refer to engineering drawing 2014287. Assemble self clinching nut (1006989-27), supplied in kit 8104068, to the indicated location.

df. Refer to engineering drawing 2014287. Stencil "2014287" and "E1" in the indicated locations using stenciling tool and black ink as required.

dfl. Refer to engineering drawing 2014254. Assemble switch, toggle (MS35059-23) supplied in kit, 8104068, and retained toggle switch guard to side of welded assembly, using hardware supplied with switch in position of switch removed in cyl.

dg. Install 2014398-011 component board assembly A5 (supplied in retrofit kit) to the welded assembly (2014287) using four (4) 1006480-005 spacer posts (supplied in retrofit kit) with the following hardware (supplied in retrofit kit: eight (8) flat washers, MS15795-805, four (4) lock washers.

MS35337-79, and eight (8) pan head screws, MS51957-28. Use MIL-S-22473, GR, HV sealing and retaining compound as a locking device for screws mounting the component board to the spacers.

dh. Obtain support bracket (1020280) and refer to engineering drawing 2014250. Drill and tap for No. 4 (.112 - 40UNCX 2 DIA helical insert per MS33646,) one hole in the location indicated.

di. Assemble helical insert (MS212208CO420) supplied in kit 8104068, into hole drilled and tapped in step dh.

dj. Remove stencil 1020280 from mounting support, using Methyl Ethyl Ketone and cotton swabs as required.

~~dk. Stop action of Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

dl. Refer to engineering drawing 2014250. Stencil 2014250 in indicated location using stenciling tool and black ink as required.

dm. Refer to engineering drawing 2014254. Assemble the mounting support (2014250) to the welded assembly 2014287, using retained hardware as indicated.

dn. Obtain support bracket (1020281) and refer to engineering drawing 2014251. Drill and tap for No. 4 (.112) - 40UNC X 2 helical insert per MS33646, indicated location.

do. Assemble to hole from step dn, a helical insert (MS21208CO420), supplied in kit 8104068.

dp. Remove stencil 1020281, using cotton swabs and Methyl Ethyl Ketone as required.

~~dq. Neutralize action of Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

dr. Refer to engineering drawing 2014251. Stencil 2014251 in indicated location using stenciling tool and black ink as required.

ds. Refer to engineering drawing 2014254. Assemble to the welded assembly the mounting support (2014251) using the retained hardware as indicated.

dt. Refer to engineering drawing 2014254. Assemble mounting support (2014250) to the welded assembly and to mounting support (2014251) using the retained hardware as indicated.

du. Obtain support bracket (1020272) and refer to engineering drawing 2014252. Drill and tap for No. 4 (.112 - 40UNCX 2 DIA) helical insert per MS33646, in location indicated.

dv. Assemble helical insert (MS21208CO420) into hole from step du.

dw. Remove stencil 1020272 using Methyl Ethyl Ketone and cotton swabs as required.

~~dx. Neutralize action of the Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

dy. Refer to engineering drawing 2014252. Stencil 2014252 in indicated location using stenciling tool and black ink as required.

dz. Refer to engineering drawing 2014254. Assemble the mounting support (2014252) to the welded assembly using retained hardware as indicated.

ea. Obtain support bracket (1020260) and refer to engineering drawing 2014253. Drill and tap for No. 4 (.112 - 40UNC X 2 DIA) helical insert per MS33646, in the indicated location.

eb. Assemble helical insert (MS21208CO420) supplied in kit 8104068, into hole from step ea.

ec. Remove stencil "1020260" using Methyl Ethyl Ketone and cotton swabs as required.

~~ed. Neutralize action of the Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

ee. Refer to engineering drawing 2014253. Stencil "2014253" in indicated location using stenciling tool and black ink as required.

ef. Refer to engineering drawing 2014254. Assemble mounting support (2014253) to welded assembly, using retained hardware as indicated.

eg. Refer to engineering drawing 2014254. Assemble mounting support (2014252) to the welded assembly and mounting support (2014253) using the retained hardware as indicated.

eh. Refer to engineering drawings 1020245 and 1020248. Desolder R2 thirty five places, circuit 1 thru 35. Use desoldering kit. Dispose of resistors per paragraph IX.

1a. Refer to engineering drawing 2014126. Cut leads to proper length. Strip .50 ± .06 and tin per ND 1002071.

1b. Refer to engineering drawing 2014126. Assemble bandmarker (1006415-130, marked per 2014126-011), supplied in kit 8104068, to the harness and secure using cotton swabs and adhesive (1006253) as required.

1c. Refer to engineering drawings 2014126, 2014129, and 2014162. Assemble wiring harness branched D, and wiring harness branched A to component board assembly A3 (2014262). Solder leads per ND 1002071, remove temporary identification and dispose of tags per paragraph IX.

1d. Refer to engineering drawing 2014254. Assemble connectors J1 and J4 to the welded assembly using retained hardware as indicated.

1e. Refer to engineering drawing 2014254. Assemble component board assembly A3 to mounting supports using retained hardware as indicated.

1f. Refer to engineering drawings 2014126 and 2014201. Assemble leads of wiring harness branched B (2014127) to the terminal boards TB 1 (1006688-3) and TB 2 (1006688-4), using the existing hardware to secure leads. Remove temporary identification from leads and dispose of tags per paragraph IX.

1g. Refer to engineering drawings 1020245 and 1020246. Desolder R2 thirty five places, circuit 1 thru 35, using desoldering tool. Dispose of resistors per paragraph IX.

1h. Refer to engineering drawing 2014434. Drill two .076/.079 holes using 5/64 (.0781 diameter) drill bit, in location indicated in lower left corner of board viewed from component side.

> WARNING: Methyl ethyl keytone gives off toxic vapors. Use only in a well ventilated area.

1i. Remove stencil "1020245-2 REV (letter)" and "1020246 REV (letter) ASSY", using methyl ethyl keytone, and cotton swabs as required.

1j. Refer to engineering drawing 2014434. Stencil "R1, R2, R3, and 37" in indicated locations. Use stenciling tool and white ink as required.

1k. Refer to engineering drawing 2014434. Stencil "2014434 and 2014260-021 ASSY" in indicated locations using stenciling tool and white ink as required.

jv. Refer to engineering drawing 2014254. Add the following jumpers, using wire electrical and sleeving supplied in kit, 8104068:

From	To
S2-1	S2-4
S2-4	S1-1

jw. Refer to engineering drawing 2014254. Assemble the two covers retained from disassembly to the buffer assembly using hardware retained from disassembly.

jx. Refer to engineering drawing 2014254. Assemble to the buffer assembly the nameplate (1004260-265), supplied in kit 8104068, using cotton swabs and cement (MIL-A-5092, Type II) as required.

jy. Perform continuity check per engineering drawing 2016384.

jz. Temporarily identify connectors P1, P2, and P3 of cable assembly, W205 (1020270) with a tag or any suitable method.

ka. Remove all bandmarkers from cable assembly.

kb. Remove lacing ties and remove outer sleeving (clear) from the three cable legs, being careful not to damage internal wires or braid. Discard sleeving.

kc. At this point, remove the connector cover at the connector end. Retain cover and mounting hardware.

kd. At this point, it is required that at least half of the potting compound at P4 connector end be removed, beginning where cable conductors enter the potting to allow for rework to the header.

The method advised for removing the potting is by using a dull wooden spike and digging the potting away. Caution must be used in removing potting so as not to damage the conductors.

ke. After the potting has been removed, pivot cable legs over remaining portion of potted connector. This will allow the header to be exposed, free of conductors, for rework.

kf. Lace the cable legs to the partially potted connector in order to immobilize. Mask all of the connector pins etc., and cable legs, in area of connector to prevent metal particals from becoming imbedded in cable. See engineering drawing (2014356) for area to be reworked, before covering cable.

kg. Remove stencil markings "1020253 REV (letter) " and "1020234 REV (letter) ASSY" from connector housing using Chem-Stripper and cotton swabs, as required

kh. Neutralize Chem-Stripper with isopropyl alcohol and cotton swabs, as required.

kd. Refer to engineering drawing 2014356. Drill and tap for two no. 6 (.138) -32 UNC-2B helical insert per MS33646, in location indicated.

kj. Assemble two helical inserts, (MS21208-CO620) supplied in kit, 8104177, into holes from step kd.

kk. At this point, remove all masking from connector and cut lacing tape securing cable legs to connector. Return legs to original position.

kl. Refer to engineering drawing 2016350. Locate cable leg between P4 and P1 connector designated at one end "E75" and "E76" at the other. Cut 9.50 ± .25 length of zipper tubing (1006696-4) supplied in kit, and assemble over this leg and close, using zipper tubing closing tool and solvent (1006699) as required.

km. Cut two pieces of zipper tubing (1006696-3) supplied in kit 9.50 ± .25 long and assemble over each of the other legs of the cable between P4 and P1 connectors. Close using zipper tubing closing tool, and solvent (1006699) as required.

kn. Refer to engineering drawing 2016360. Locate cable leg between P4 and P3 connector, designated at one end "E71" and "E77" at the other end. Cut 12.00 ± .25 length of zipper tubing (1006696-2) supplied in kit, and assemble over this leg, and close using zipper tubing closing tool and solvent (1006699) as required.

ko. Cut two pieces of zipper tubing (1006696-4) supplied in kit, 12.00 ± .25 long and assemble over each of the other legs of the cable between P4 and P3 connectors. Close using zipper tubing closing tool and solvent (1006699) as required.

kp. Refer to engineering drawing 2016360. Locate cable leg between P4 and P2 connectors, designated at one end "E66" and "E68" at the other. Cut 10.50 ± .25 length of zipper tubing (1006696-4) supplied in kit, and assemble over this leg, and close using zipper tubing closing tool, and solvent (1006699) as required.

kq. Cut two pieces of zipper tubing (1006996-3) supplied in kit, 10.50 ± .25 long and assemble over each of the other legs of the cable between P4 and P2 connectors. Close using zipper tubing closing tool, and solvent (1006699) as required.

1j. Refer to engineering drawing 2016356. Stencil "2016356" and "2016358-011 ASSY" to test connector housing using white ink (1006271-1) and air brush as required.

1k. Perform a continuity check using engineering drawing 2016360.

1l. Retain for use with the AGC/GSE Interconnection Set, G&N System Test, the following items contained in retrofit kit 8104166:

Item	Quantity	Nomenclature	Part No.
a.	1	Cable Assembly, W226	2014137-011
b.	1	Cable Assembly, W232	2014484-011
c.	1	Cable Assembly, W233	2014483-011
d.	1	Cable Assembly W234	2014482-011
e.	1	Self Test Assembly	2014392-011

1h. Complete the attached form and return to addressee.

VIII. MODIFICATION DESIGNATION:

Not applicable

IX. DISPOSITION OF REMOVED PARTS:

a. Scrap all temporary identification tags, bandmarkers, lacing tape, sleeving for cables, jumpers from component board, 78 resistors (1006760-36), and capacitors (CS13AFO10K).

b. Return to stock room for disposition 3 cables, W204 (1020271), W208 (1020279), and W209 (1020284), and toggle switch (MS35058-23).

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Revision B

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
G&N TEST INTERCONNECTION
AUTHORIZED BY S.O.W. Paragraph 5.2.4.2 (NAS9-497)
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A	29114	1, 11-13, 17, 21 22, 23, 35, 39,	MM	AM	5-24-66
B	29200	40, 43, 18, 39, 40	MM	AM	6-1-66

Prepared by ________ Date 7 March 1966

P.C. Engineering Approval ________ Date 4/7/66

DRB Approval ________ Date 4/7/66

MIT Reliability Approval ________ Date ________

MIT/IL Approval ________ Date 8 April 66.

NASA Approval ________ Date 9 April 66

jv. Refer to engineering drawing 2014254. Add the following jumpers, using wire electrical and sleeving supplied in kit, 8104068:

From	To
S2-1	S2-4
S2-4	S1-1

jw. Refer to engineering drawing 2014254. Assemble the two covers retained from disassembly to the buffer assembly using hardware retained from disassembly.

jx. Refer to engineering drawing 2014254. Assemble to the buffer assembly the nameplate (1004260-265), supplied in kit 8104068, using cotton swabs and cement (MIL-A-5092, Type II) as required.

jy. Perform continuity check per engineering drawing 2016384.

jz. Temporarily identify connectors P1, P2, and P3 of cable assembly, W205 (1020270) with a tag or any suitable method.

ka. Remove all bandmarkers from cable assembly.

kb. Remove lacing ties and remove outer sleeving (clear) from the three cable legs, being careful not to damage internal wires or braid. Discard sleeving.

kc. At this point, remove the connector cover at the connector end. Retain cover and mounting hardware.

kd. At this point, it is required that at least half of the potting compound at P4 connector end be removed, beginning where cable conductors enter the potting to allow for rework to the header.

The method advised for removing the potting is by using a dull wooden spike and digging the potting away. Caution must be used in removing potting so as not to damage the conductors.

ke. After the potting has been removed, pivot cable legs over remaining portion of potted connector. This will allow the header to be exposed, free of conductors, for rework.

kf. Lace the cable legs to the partially potted connector in order to immobilize. Mask all of the connector pins etc., and cable legs, in area of connector to prevent metal particles from becoming imbedded in cable. See engineering drawing (2016356) for area to be reworked, before covering cable.

kg. Remove stencil markings "1020253 REV (letter)" and "1020234 REV (letter) ASSY" from connector housing using Chem-Stripper and cotton swabs, as required

kh. Neutralize Chem-Stripper with isopropyl alcohol and cotton swabs, as required.

ki. Refer to engineering drawing 2016356. Drill and tap for two no. 6 (.138) -32 UNC-2B helical insert per MS33646, in location indicated.

kj. Assemble two helical inserts, (MS21208-CO620) supplied in kit, 8104177, into holes from step ki.

kk. At this point, remove all masking from connector and cut lacing tape securing cable legs to connector. Return legs to original position.

kl. Refer to engineering drawing 2016350. Locate cable leg between P4 and P1 connector designated at one end "E75" and "E76" at the other. Cut 9.50 ± .25 length of zipper tubing (1006696-4) supplied in kit, and assemble over this leg and close, using zipper tubing closing tool and solvent (1006699) as required.

km. Cut two pieces of zipper tubing (1006696-3) supplied in kit 9.50 ± .25 long and assemble over each of the other legs of the cable between P4 and P1 connectors. Close using zipper tubing closing tool, and solvent (1006699) as required.

kn. Refer to engineering drawing 2016360. Locate cable leg between P4 and P3 connector, designated at one end "E71" and "E77" at the other end. Cut 12.00 ± .25 length of zipper tubing (1006696-2) supplied in kit, and assemble over this leg, and close using zipper tubing closing tool and solvent (1006699) as required.

ko. Cut two pieces of zipper tubing (1006696-4) supplied in kit, 12.00 ± .25 long and assemble over each of the other legs of the cable between P4 and P3 connectors. Close using zipper tubing closing tool and solvent (1006699) as required.

kp. Refer to engineering drawing 2016360. Locate cable leg between P4 and P2 connectors, designated at one end "E66" and "E68" at the other. Cut 10.50 ± .25 length of zipper tubing (1006696-4) supplied in kit, and assemble over this leg, and close using zipper tubing closing tool, and solvent (1006699) as required.

kq. Cut two pieces of zipper tubing (1006996-3) supplied in kit, 10.50 ± .25 long and assemble over each of the other legs of the cable between P4 and P2 connectors. Close using zipper tubing closing tool, and solvent (1006699) as required.

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Revision C

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
G&N TEST INTERCONNECTION SET
AUTHORIZED BY S.O.W. Paragraph 5.2.4.2 (NAS 9-497)
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A	29114	1,11-13,17,21 22,23, 35,39,	MM	AM	5-24-66
B	29200	40,13, 18, [illegible] 39, 40	MM	AM	6-1-66
C	29334	1, 40-42	MM	AM	6-3-66

Prepared by ____________ Date 7 March '66

P. C. Engineering
Approval ____________ Date 4/7/66

DRB Approval A Harano Date 4/7/66

MIT Reliability Approval ____________ Date ____________

MIT/IL Approval ____________ Date 8 April 66.

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Revision D

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
G&N TEST INTERCONNECTION SET
AUTHORIZED BY S.O.W. Paragraph 5.2.4.2 (NAS9-497)
ORIGINATOR - RAYTHEON COMPANY

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A	29114	1, 11-13, 17, 21 22, 23, 35, 39,	MM	AM	5-24-66
B	29200	10, 13, 18, 1, 35, [illegible]	MM	AM	6-1-66
C	29334	1, 40-42	MM	AM	6-3-66
D	29371	1, 21, 22, 23, and 31	MM	AM	6-7-66

Prepared by ________ Date 7 March 1966

P.C. Engineering
Approval ________ Date 4/7/66

DRB Approval A Harano Date 4/7/66

MIT Reliability Approval ________ Date ________

MIT/IL Approval ________ Date 8 Apr 66.

NASA Approval ________ Date 9 April 66

cv. Remove lacing tape securing J2 harness and J5 harness to the component board. Retain harness and board.

cw. Remove the mounting hardware securing TB1 (1006678-3) and TB2 (1006678-4) to the mounting supports. Retain TB's and mounting hardware.

cx. Remove mounting hardware securing mounting supports (1020273, 1020261, 1020274, and 1020275). Retain supports and mounting hardware.

cy. Remove mounting hardware securing mounting supports (1020272, 1020260, 1020280, and 1020281). Retain supports and mounting hardware.

cyl. Remove mounting hardware securing toggle switch, S1 (MS35058-23) and toggle switch guard (MS25224-1) to side of buffer circuit assy. Remount switch hdwr. and dispose of switch per para. IX. Retain switch guard for re-assembly.

NOTE: Mask connectors and remaining switch to protect them from metal particles caused from drilling.

cz. Refer to engineering drawing 2014287. Drill hole, in indicated position, .344/.347 using 8.8 mm (.3465 diameter) drill bit. Fabricate a template with a .75 diameter hole and abrade the paint around the hole just drilled.

da. Refer to engineering drawing 2014287. Drill four .158/.164 diameter holes, using #20 (.1610 diameter) drill, in locations indicated.

db. Chromate bare metal with chromate (MIL-C-5541 electrically conductive). Touch up any painted areas around reworked areas with paint (TT-E-529, Class B, Fed-STD-595, Color 26251) per MIL-F-P513, Type I.

dc. Remove stencil 1020293 REV (letter) from welded assembly using cotton swabs and Chem-Stripper as required.

dd. Stop action of Chem-Stripper using cotton swabs and isopropyl alcohol as required.

de. Refer to engineering drawing 2014287. Assemble self clinching nut (1006989-27), supplied in kit 8104068, to the indicated location.

de1. Install hardware supplied in kit 8104068 (Lockwasher, MS35338-82; flat washer, MS15795-810; pan hd screw, MS51957-80) into "E1" insert.

df. Refer to engineering drawing 2014287. Stencil "2014287" and "E1" in the indicated locations using stenciling tool and black ink as required.

df1. Refer to engineering drawing 2014254. Assemble switch, toggle (MS35059-23) supplied in kit, 8104068, and retained toggle switch guard to side of welded assembly, using hardware supplied with switch in position of switch removed in cyl.

dg. Install 2014398-011 component board assembly A5 (supplied in retrofit kit) to the welded assembly (2014287) using four (4) 1006480-005 spacer posts (supplied in retrofit kit) with the following hardware (supplied in retrofit kit: eight (8) flat washers, MS15795-805, four (4) lock washers.

MS35337-79, and eight (8) pan head screws, MS51957-28. Use MIL-S-22473, GR, HV sealing and retaining compound as a locking device for screws mounting the component board to the spacers.

dh. Obtain support bracket (1020280) and refer to engineering drawing 2014250. Drill and tap for No. 4 (.112 - 40UNCX 2 DIA helical insert per MS33646,) one hole in the location indicated.

di. Assemble helical insert (MS212208CO420) supplied in kit 8104068, into hole drilled and tapped in step dh.

dj. Remove stencil 1020280 from mounting support, using Methyl Ethyl Ketone and cotton swabs as required.

~~dk. Stop action of Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

dl. Refer to engineering drawing 2014250. Stencil 2014250 in indicated location using stenciling tool and white ink as required.

dm. Refer to engineering drawing 2014254. Assemble the mounting support (2014250) to the welded assembly 2014287, using retained hardware as indicated.

dn. Obtain support bracket (1020281) and refer to engineering drawing 2014251. Drill and tap for No. 4 (.112) - 40UNC X 2 helical insert per MS33646, indicated location.

do. Assemble to hole from step dn, a helical insert (MS21208CO420), supplied in kit 8104068.

dp. Remove stencil 1020281, using cotton swabs and Methyl Ethyl Ketone as required.

~~dq. Neutralize action of Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

dr. Refer to engineering drawing 2014251. Stencil 2014251 in indicated location using stenciling tool and white ink as required.

ds. Refer to engineering drawing 2014254. Assemble to the welded assembly the mounting support (2014251) using the retained hardware as indicated.

dt. Refer to engineering drawing 2014254. Assemble mounting support (2014250) to the welded assembly and to mounting support (2014251) using the retained hardware as indicated.

du. Obtain support bracket (1020272) and refer to engineering drawing 2014252. Drill and tap for No. 4 (.112 - 40UNCX 2 DIA) helical insert per MS33646, in location indicated.

dv. Assemble helical insert (MS21208CO420) into hole from step du.

dw. Remove stencil 1020272 using Methyl Ethyl Ketone and cotton swabs as required.

~~dx. Neutralize action of the Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

dy. Refer to engineering drawing 2014252. Stencil 2014252 in indicated location using stenciling tool and white ink as required.

dz. Refer to engineering drawing 2014254. Assemble the mounting support (2014252) to the welded assembly using retained hardware as indicated.

ea. Obtain support bracket (1020260) and refer to engineering drawing 2014253. Drill and tap for No. 4 (.112 - 40UNC X 2 DIA) helical insert per MS33646, in the indicated location.

eb. Assemble helical insert (MS21208CO420) supplied in kit 8104068, into hole from step ea.

ec. Remove stencil "1020260" using Methyl Ethyl Ketone and cotton swabs as required.

~~ed. Neutralize action of the Chem-Stripper using cotton swabs and isopropyl alcohol as required.~~

ee. Refer to engineering drawing 2014253. Stencil "2014253" in indicated location using stenciling tool and white ink as required.

ef. Refer to engineering drawing 2014254. Assemble mounting support (2014253) to welded assembly, using retained hardware as indicated.

eg. Refer to engineering drawing 2014254. Assemble mounting support (2014252) to the welded assembly and mounting support (2014253) using the retained hardware as indicated.

eh. Refer to engineering drawings 1020245 and 1020248. Desolder R2 thirty five places, circuit 1 thru 35. Use desoldering kit. Dispose of resistors per paragraph IX.

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RIB No. 0104094
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NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
G&N TEST INTERCONNECTION SET
AUTHORIZED BY S.O.W. Paragraph 5.2.4.2 (NAS9-497)
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A	29114	1, 11-13, 17, 21 22, 23, 35, 39, 40, 43	MM	AM	5-24-66
B	29200	18, 1, 39, 40	MM	AM	6-1-66
C	29334	1, 40-42	MM	AM	6-3-66
D	29371	1, 21, 22, 23, and 31	MM	AM	6-7-66
E	30647	1, 2, 3, 3A, 6, 8, 11, 21-25, 27, 28, 29, 32-39, 43	CCB E.A.	N/A	8-18-66

Prepared by ______ Date 7 March 1966

P. C. Engineering
Approval D Obryant / ______ Date 4/7/66

DRB Approval aHarano Date 4/7/66

MIT Reliability Approval ______ Date ______

MIT/IL Approval WKupfer Date 8 April 66.

NASA Approval ______ Date 9 April 66

Sheet 1 of 11
RIB No. 0104107
Date 30 MAR 1967
TDRR No. 33458
Revision –

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
GSE COMPUTER TEST SET
AUTHORIZED BY ECP 509
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis O Smith Date Dec. 27, 1966

~~R.E.~~ Engineering Approval TB 12/29 L D Erwin 12/28/66 J Yakich 12/27/66 Date DEC 29, 1966

DRB Approval W Stameris Date 6 Jan 1967

MIT Reliability Approval________ Date________

MIT/IL Approval Dennis M. Scolamiero Date 5 January 1967

NASA Approval A C Met Date 1/9/67

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RIB No. 0104107
Date
TDRR No.
Revision

I. PURPOSE:

Retrofit instructions for the Computer Test Set to reduce noise on signal lines in the Programmer and Monitor Logic Plate Assembly No. 3 and the Self Test Assembly, and to correct a marginal timing condition in the asynchronous tape uplink operation circuitry in Logic Drawer No. 2.

II. AUTHORITY:

This retrofit is authorized by ECP 509, CCA 497-0409

III. UNITS AFFECTED:

Name	Part No.	Retrofit S/N	New Part No.
Computer Test Set	2014042-051	5-8, 11, 13-16, 19, 20-26	2014042-061
Drawer Assy, Programmer and Monitor	2014041-041	See Para VII 1.6	2014041-051
Logic Plate Assy No. 3	2014336-041	See Para VII 1.6	2014336-051
Self Test Assy	2014366-031	See Para VII 1.6	2014366-041
Self Test Logic Plate Assy	2014362-031	See Para VII 1.6	2014362-041
Logic Drawer No. 2 Assy	2014037-031	See Para VII 1.6	2014037-041
Logic Plate Assy No. 1	2014224-021	See Para VII 1.6	2014224-031

IV. PRIORITY CHANGES:

None.

V. RELATED CHANGES:

None.

VI. MATERIAL REQUIRED:

1. One retrofit kit, part no. 8104215, containing the following:

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Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104107
b.	3	Capacitor, 1 uf, 35 V	CS13AFC10K
c.	1	Capacitor, 750 pf, 500 V	CY22C751G
d.	5 ft.	Wire elec., blue, AWG 22	1006945-1
e.	6 in.	Sleeving, Insulation	1006776-197
f.	3 in.	Sleeving, Insulation, Clear AWG 8	MIL-I-631, Type F, Form Ua, Grade a, Class I, Category I
g.	1	Nameplate (CTS)	1004260-282
h.	1	Nameplate (P&M)	1004260-283
i.	1	Nameplate (Self Test)	1004260-279
j.	1	Nameplate (LD No. 2)	1004260-284
k.	1	Stencil, .12-inch high characters "031", "041", and "051" per ND 1002019	N/A
l.	1	Stencil, .08-inch high characters "RAY" and digits "0" through "9" per ND 1002019	N/A
m.	4	Drive Screws, Button Head	AN535-4-4
n.	1 oz.	Ink, White	1006271-1
o.	1 oz.	Ink, Black	1006271-10

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Chem-Stripper	N/A
b.	A/R	Isopropyl Alcohol	TT-I-735
c.	A/R	Cotton Swabs	N/A
d.	A/R	Methyl Ethyl Ketone	(MEK)
e.	A/R	Solder	ND 1002075
f.	A/R	Adhesive	MIL-A-5092, Type II

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3. Tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	Pocket Knife	N/A
b.	1	Stenciling tool, brush or air-operated equipment	N/A
c.	1	Soldering Gun Handle	Ungar #776 or equivalent
d.	1	Soldering Tip	Ungar #4039 or equivalent
e.	1	File Set	602 X-acto or equivalent
f.	1	Ball Peen Hammer	Stanley #310 or equivalent
g.	1	Cold Chisel	Stanley #443 or equivalent
h.	1	Wirewrap Gun	14B1-C
i.	1	Wirewrap Bit	26263
j.	1	Wirewrap Extraction Tool	500130
k.	1	Sleeve, Wirewrap Bit	18840

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Workmanship Standards	AC-STD-1 (3 Mar 64)
b.	General Specifications Soldering of Electrical Connections	ND 1002071
c.	Descriptions and Requirements, Marking, General	ND 1002019
d.	Computer Test Set Assembly	2014042
e.	Drawer Assembly, P&M	2014041
f.	Logic Plate Assembly No. 3, P&M	2014336
g.	Logic Plate No. 3 Diagram, P&M	2016452
h.	Self Test Assembly	2014366
i.	Self Test Logic Plate Assembly	2014362

3.14 Reference drawing 2014366. Bond new nameplate to the location indicated by the drawing using adhesive (MIL-A-5092) and cotton swabs.

3.15 Release slide lock and return the Self Test Drawer Assembly to its operating position. Secure handle hardware.

4. Retrofit Logic Drawer No. 2 Assembly, part no. 2014037-031, using retrofit kit 8104215 as follows:

4.1 Release Logic Drawer No. 2 by unscrewing knurled captive screws and pull the drawer out to its slide-lock position.

4.2 Lift up Logic Plate Assembly No. 1, part no. 2014224-021, to its slide-lock position and disconnect rear cable connectors. Remove assembly from Logic Drawer No. 2 by removing retaining screws (two places) and place in a clean area. Retain hardware.

4.3 Remove the black protective cover on the Logic Plate Assembly No. 1 by unscrewing the cross-head screws (16 places). Retain cover and screws for reassembly.

4.4 Using wirewrap tools, add and remove wires according to the chart provided below. When adding wire, use AWG No. 22 blue wire (1006945) provided in kit.

NOTE: Remove Z3 (top) level first, Z2 (middle) level second, Z1 (bottom) level last. Install Z1 level first, Z2 level second, Z3 level last.

REMOVE					ADD				
FROM	TO	ZL	CIRCUIT	CARD#	FROM	TO	ZL	CIRCUIT	CARD#
B29-19	B35-02	2	218-01	2151	B29-19	A33-06	2	218-02	2151
A26-04	B35-02	3	218-03	-	B35-02	A33-12	2	295-02	2301
					A26-04	A35-02	3	295-01	-
					A26-06	A33-02	3	262-03	3021
					A33-16	A33-03	2	296-01	2302
					A33-10	A33-01	3	274-08	3022

4.5 Remove stencil "021" from the part number on top of the frame support using cotton swabs and Chem-Stripper.

4.6 Neutralize the action of Chem-Stripper with isopropyl alcohol and cotton swabs.

4.7 Refer to drawing 2014224. Locate new stencil "031", provided in kit, and mark using white ink, provided in kit, and brush or air-operated equipment per ND 1002019.

4.8 Re-mount black protective cover and secure in place using hardware retained from step 4.3.

4.9 Re-mount Logic Plate Assembly No. 1 onto support brackets in chassis. Attach cable connectors and secure assembly with hardware retained from step 4.2. Lower plate and secure in place.

4.10 Remove the nameplate from the side of Logic Drawer No. 2 using a pocket knife being careful not to mar the surface of the assembly. Dispose of the nameplate per Paragraph IX.

4.11 Remove excess adhesive from assembly using Methyl Ethyl Ketone and cotton swabs.

WARNING:

Methyl Ethyl Ketone gives off toxic fumes and is flammable. Use only in a well-ventilated area and avoid open flames.

4.12 Remove nameplate (1004260-284) from kit. Note serial number on nameplate removed in step 4.10 and stencil the same number in the applicable block on the new nameplate using stencil supplied in kit ("RAY" etc.), black ink, supplied in kit, and brush or air-operated equipment. Stencil per ND 1002019.

4.13 Reference drawing 2014037. Bond new nameplate to the located indicated by the drawing using adhesive (MIL-A-5092) and cotton swabs.

4.14 Release slide lock and return Logic Drawer No. 2 to its operating position. Secure handle hardware.

5. Retest the Computer Test Set according to the following steps:

5.1 JDC 05146 (Tape Load Mode)

5.2 JDC 05135 (Tape Verify)

5.3 JDC 05163 (Tape Load Operation)

VIII. MODIFICATION DESIGNATION:

a. Note serial number on nameplate removed in step VII 2.1. Stencil the same serial number in applicable block on new nameplate (1004260-282) supplied in kit. Use black ink and applicable digits in stencil ("RAY" etc.) supplied in kit, and brush or air-brush.

b. Assemble nameplate to the top of the Computer Test Set using the button head drive screws (AN535-4-4) supplied in kit, and utilizing the existing holes in the cabinet.

IX. DISPOSITION OF REMOVED PARTS:

a. Scrap

X. REPORT OF ACCOMPLISHMENT:

a. Complete attached Form No. 53-9208 and return to addressee.

Sheet 1 of 6
RIB No. 0104113
Date 30 MAR 1967
TDRR No. 33436
Revision —

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
BLOCK II TEST CONNECTOR COVERS
AUTHORIZED BY ECP 474
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis D. Smith Date 18 Feb. 67

P.C. Engineering Approval W E Lund Date 22 FEB 67

DRB Approval W Stameris EC Hall Date 17 Mar 67

MIT Reliability Approval ____________ Date ____________

CCB ~~[illegible]~~ Approval Date 30 Mar 67

NASA Approval Date 20 March 67

Sheet 2 of 6
RIB No. 0104113
Date 30 MAR 1966
TDRR No. 33436
Revision

I. **PURPOSE:**

To provide a Block II test connector cover which will contain malco pins wired to connect certain pins on the test connector to ground to avoid extraneous "noise" to the computer during flight.

II. **AUTHORIZATION:**

This RIB is authorized by ECP. 474 CCA 497-0352

III. **UNITS AFFECTED:**

Name	Part Number	Retrofit S/N	New Part No.
AGC Computer Blk II	2003100-021	RAY 7, 6	2003100-081
AGC Computer Blk II	2003100-051	RAY 8	2003100-091
AGC Computer Blk II	2003100-011	RAY 1, 2, 5	2003100-111
AGC Computer Blk II	2003100-041	RAY 14	2003100-071
AGC Computer Blk II	2003100-031	RAY 9	2003100-061
AGC Computer Blk II	2003200-031	RAY 22, 19, 16, 18, 17, 20, 23	2003200-041
Test Connector	[illegible]		
Test Connector Cover	2004115	See Para. VII 1.5	2003099-011

IV. **PRIORITY CHANGES:**

RIB 0104109 to RAY 8 (System 602).

V. **RELATED CHANGES:**

None

Sheet 3 of 6
RIB No. 0104113
Date
TDRR No.
Revision

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104221, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104113
b.	1	Nameplate, blank	1004260-19
c.	1	Connector Cover	2003099-011

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
~~a.~~	~~A/R~~	~~Adhesive~~	[illegible]
b.	A/R	Chem-Stripper	N/A
c.	A/R	Cotton Swabs	N/A
d.	A/R	Methyl Ethyl Ketone (MEK)	TT-M-261
e.	A/R	Isopropyl Alcohol	TT-I-735

3. Tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	Pocket Knife	N/A
b.	1	Torque wrench, 0-25 inch-pounds	N/A
c.	1	Stenciling tool, brush air-operated equipment	N/A
d.	1	Stamp set .08/.10 inch-high characters and digits	N/A

Sheet 4 of 6
RIB No. 0104113
Date
TDRR No.
Revision

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Workmanship Standard	AC-STD-1 (3 Mar 64)
b.	Description and Requirements, [illegible] Marking, General	ND 1002019
c.	Computer Assembly	2003100
d.	Computer Assembly	2003200
e.	Connector Assembly	2003099-011
f.	Bonding	ND 1002004

VII. **PROCEDURE:**

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any part unless so directed. Do not deviate from the procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in paragraph VI, part 5, for applicable ND specifications.

1.5 Serial number marked after retrofit shall be the same serial number as before retrofit.

2. Retrofit AGC Computer, part no. 2003100-021, 011, 031, 041 and 051, using retrofit kit 8104221 as follows:

2.1 Reference drawing 2003100 and locate computer nameplate (1004657) on top of assembly. Remove this nameplate using a pocket knife and being careful not to mar the surface of the assembly. Do not dispose of nameplate until para. VIII of this RIB has been accomplished.

2.2 Remove all traces of adhesive using cotton swabs and Methyl Ethyl Ketone.

Sheet 1 of 8
RIB No. 0104108
Date 12 JAN 67
TDRR No. 32628
Revision —

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
GSE BUFFER BOX WIRING CHANGES
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis D. Smith Date 19 Dec. 1966

P.C. Engineering Approval Date 20 DEC 66

DRB Approval W Stameris Date 6 Jan 67

MIT Reliability Approval________ Date________

MIT/IL Approval Dennis M. Solomon Date 27 Dec. 1966

NASA Approval A C Date 1/9/67

I. PURPOSE:

Retrofit instructions to add jumper wires to the Component Board Assembly, part no. 2014265-021, of the GSE Buffer Box, part no. 2014254-021, to prevent Buffer Box circuitry from affecting AGC Erasable Memory after ACM NWGFRC and MAMU signals are added to test connector pins A52-904 and A52-906.

II. AUTHORITY:

This retrofit is authorized by ECP.0452 (CCA497-0371)

III. UNITS AFFECTED:

Name	Part No.	Retrofit S/N's	New Part No.
G&N Cable Set	2014255-031	RAY 1 thru 10, 11, 13, 15 & 16 thru 22	2014255-041
Buffer Circuit Assy.	2014254-021	See Units Affected	2014254-031
Component Board Assy. A1 & A4	2014267-021	See Units Affected	2014267-031
Component Board Assy. A4	2014265-021	See Units Affected	2016465-011

IV. PRIORITY CHANGES:

None

V. RELATED CHANGES:

RIB No. 0104050 (RKA 8104192)

VI. MATERIAL REQUIRED:

1. One retrofit kit, part number 8104216, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104108
b.	8-in	Wire, AWG No. 22, White	MIL-W-16878/4, E22
c.	1	Stencil, .12-inch high characters "2016465-011" stencil provided per ND 1002019	N/A
d.	1	Stencil, .08-inch high characters "RAY" and digits "0" through "9" per ND 1002019	N/A
e.	1	Nameplate	1004260-285
f.	3 oz.	Ink, White	1006271-1
g.	1 oz.	Ink, Black	1006271-11

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Solder	ND 1002075
b.	A/R	Chem-Stripper	N/A
c.	A/R	Isopropyl Alcohol	TT-I-735
d.	A/R	Methyl Ethyl Ketone (MEK)	TT-M-261
e.	A/R	Cotton Swabs	N/A
f.	A/R	Adhesive	MIL-A-5092, Type II

---

3. Recommended tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	Handle, soldering gun	Ungar Mod 776 or equivalent
b.	1	Tip, soldering	Ungar Mod 4039 or equivalent
c.	1	Stenciling tool, brush or air-operated equipment	N/A
d.	1	Knife, pocket	N/A

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Workmanship Standards	AC-STD-1 (3 Mar 64)
b.	General Specifications, Soldering of Electrical Connections	ND 1002071
c.	Description and Requirements, Marking, General	ND 1002019
d.	Buffer Circuit Assembly	2014254
e.	Buffer Box Schematic	2016464
f.	Buffer Box Component Board A4 Assembly	2016465
g.	G&N Cable Set	2014255

VII. PROCEDURE:

NOTE: This procedure is provided in three parts, specifically:

1. General Instructions
2. Modification of A4 Board
3. Retest procedures

1. General Instructions:

   1.1 Read and understand the complete procedure prior to attempting the retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outlined herein.

   1.2 Update the Post Acceptance Data Package (PADP) as progress is made through this RIB.

   1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

   1.4 Refer to documents listed in Paragraph VI, part 4, for applicable ND specifications.

   1.5 Inspect all work performed to ensure quality in accordance with referenced documents.

   1.6 Serial number stencil marked after retrofit shall be the same serial number as before retrofit.

2. Retrofit Buffer Circuit Assembly, part no. 2014254-021, using retrofit kit 8104216 as follows:

   2.1 Remove the Buffer Circuit Assembly from the G&N Cable Set, part no. 2014255-031.

   2.2 Remove Cover (1020310) which is adjacent to J8 connector and covers Component Board Assembly A4 (2014265-021) by removing 18 flat head screws (MS51959-31). Retain cover and screws for reassembly.

   2.3 Remove stencil marking "2014265-021" on Component Board Assembly A4 using cotton swabs and Methyl Ethyl Ketone.

> WARNING:
>
> Methyl Ethyl Ketone is toxic and flammable. Use only in a well ventilated area and avoid open flame.

   2.4 Stencil "2016465-011" in the same location using stencil and white ink provided in kit 8104216, and brush on or spray with air-operated equipment.

   NOTE: Mask surrounding area to avoid overspray if air-operated equipment is used.

   2.5 Reference Figure 1 of this RIB and cut a proper length of white wire AWG 22, provided in kit, and solder to R1 and R2 in Buffer Circuit 14 as shown in Figure 1. Solder per ND 1002071.

   2.6 Duplicate step 2.5 for Buffer Circuit 13.

   2.7 Reassemble Cover (1020310) using hardware retained in step 2.2.

3. Retest the equipment per the following steps:

   3.1 Perform a continuity check on connector J5 from pin b to pin R, and from pin b to pin T.

   NOTE: The resultant reading should be less than one ohm.

VIII. MODIFICATION DESIGNATION:

a. Remove the nameplate (1004260-265) on the Buffer Circuit Assembly, 2014254-021, using a pocket knife being careful not to mar the surface of the assembly.

b. Remove adhesive from assembly using Chem-Stripper and cotton swabs.

c. Neutralize action of Chem-Stripper with isopropyl alcohol.

d. Remove new nameplate (1004260-285) from kit and stencil the applicable serial number using stencil and white ink, provided in kit, and brush on or spray on per ND 1002019.

e. Refer to engineering drawing 2014254. Bond the nameplate to the indicated area using adhesive, MIL-A-5092, Type II, and cotton swabs.

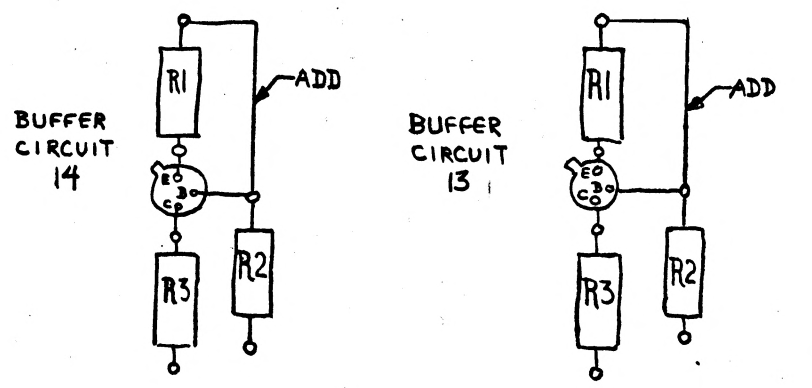


Figure 1. Buffer Box Wiring Additions

IX. DISPOSITION OF REMOVED PARTS:

Scrap.

X. REPORT OF ACCOMPLISHMENT:

Complete attached form Raytheon No. 53-9208 and return it to addressee.

RIB No. 0104108
Attachment "A"

VERIFICATION OF RETROFIT ACCOMPLISHMENT

RIB NO.____________________

RETROFIT KIT P/N__________S/N__________

END ITEM; OLD P/N________S/N________NEW P/N________S/N________

UNIT(S) AFFECT; OLD P/N_______S/N_______NEW P/N_______S/N_______

LOCATION____________________

RETROFIT KIT INSTALLED AND PADP UPDATED:

LEAD ENGINEER____________________DATE________________

GOVT. Q.C.____________________DATE________________

Form to be completed by the lead engineer responsible for the installation of the kit. Mail form to:

Logistics, Inventory Management and Configuration Control
Final Test Building, Box Number 7
Raytheon Company
Waltham, Massachusetts

Form No. 53-9208

WARNING:

Methyl Ethyl Ketone is toxic
and flammable. Use with
adequate ventilation and
avoid open flame.

2.3 Reference drawing 2003100 and locate A52 cover, part no. 2004115. Remove this cover by loosening captive screws and flat washers. Dispose of cover per Para. IX.

2.4 Remove new test connector cover, part no. 2003099-011, from retrofit kit and install it to the computer torquing 18-22 inch-pounds.

2.5 Record the serial number, stencilled on installed cover, in the Post Acceptance Data Package (PADP).

2.6 Reidentify computer per paragraph VIII of this RIB.

3. Retrofit AGC Computer, part no. 2003200-031, using retrofit kit 8104221 as follows:

   3.1 Reference drawing 2003200 and perform steps 2.1 through 2.5.

   3.2 Reidentify computer per paragraph VIII of this RIB.

4. Retest per the following JDC's at applicable locations:

   4.1 Raytheon JDC's 05370 and 05351.

   4.2 Field: JDC's 12208 (CMC) and 12618 (LGC).

VIII. MODIFICATION DESIGNATION:

1. Reidentify AGC Computer 2003100-021 as follows:

   1.1 Remove blank nameplate, part no. 1004260-19, from retrofit kit 8104221, and stamp "2003100-081" using stamping set and following the procedures of ND 1002019.

   1.2 Reference the nameplate removed in step VII 2.1 and stamp serial number and applicable data to the new nameplate. When this has been accomplished, dispose of old nameplate per Para. IX of this RIB.

   1.3 Reference drawing 2003100 and using adhesive, per ND 1002006 I, Type II, bond the nameplate to the computer.

---

2. Reidentify AGC Computer 2003100-051, 011, 041, and 031, following the same procedures as described in step 1 except that the dash numbers shall be as follows:

   2.1 2003100-051 becomes -091.

   2.2 2003100-011 becomes -111.

   2.3 2003100-041 becomes -071.

   2.4 2003100-031 becomes -061.

3. Reidentify AGC Computer 2003200-031 following the same procedures as described in step 1 except that the new dash number shall be "-041" and the drawing to be referenced is 2003200.

IX. DISPOSITION OF REMOVED PARTS:

1. Connector Cover to be returned to stockroom for disposition.
2. Nameplate (1004657) is to be scrapped.

X. REPORT OF ACCOMPLISHMENT:

Complete Raytheon Form No. 53-9208, and forward to addressee.

Complete and return ACC Form 1 Revised To:

AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin - 53201

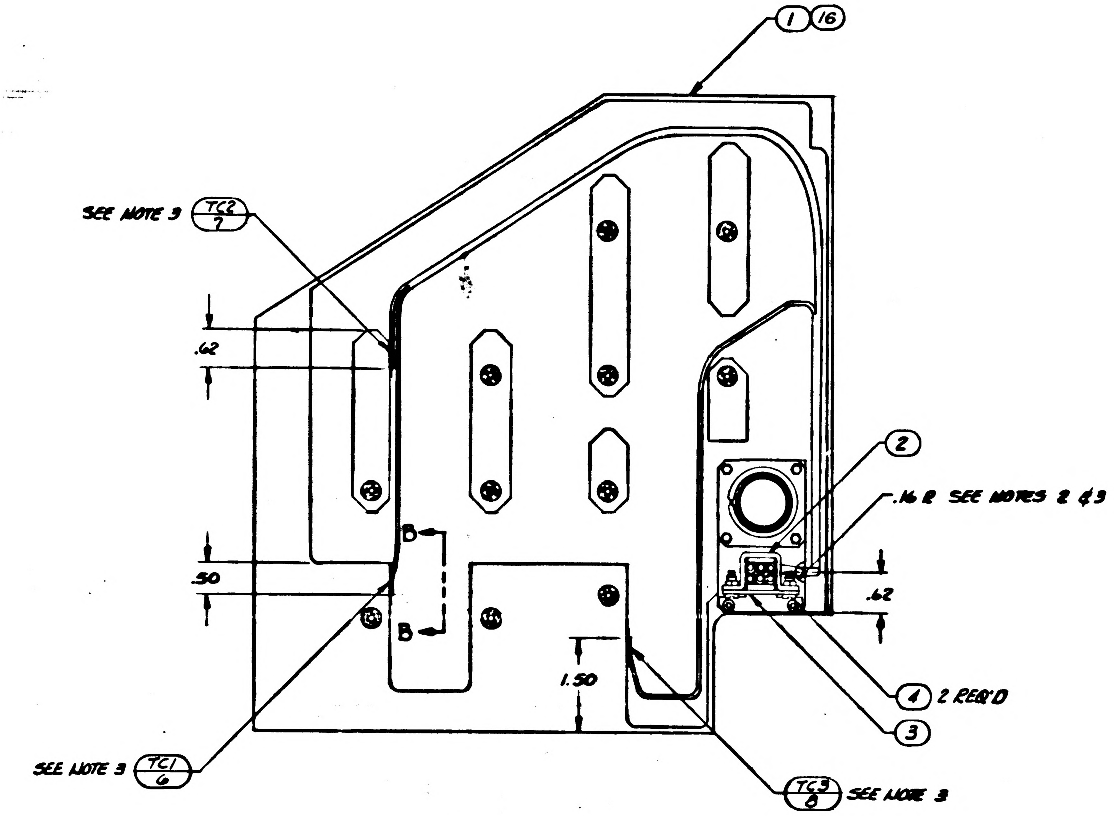
Attention: Mr. J. F. Pizzala
Dept. 32-31, Bldg. 2A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MACHINED METALLIC SURFACES TO BE FINISHED PER ND1002040.
3. THERMOCOUPLE LEADS TO BE BELOW SURFACE "A" AND COMPLETELY COVERED AND EMBEDDED IN ENCAPSULANT. FILL WITH ENCAPSULANT FLUSH TO .030 BELOW SURFACE "A" PER ND1002236.
4. EACH SLEEVE TO BE MARKED WITH IT'S RESPECTIVE THERMOCOUPLE TC DESIGNATION NUMBER PER ND1002019, BLACK, CHARACTERS .12 HIGH. SLEEVE TO BE LOCATED ALONG LENGTH OF THERMOCOUPLE LEADS BETWEEN THE BRACKET AND WHERE THE WIRES EMERGE FROM THE HEADER.
5. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER, 35A2.
6. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 14, BOND THERMOCOUPLE LEADS IN PLACE USING ITEM 15 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 14.
7. MEGGER ALL THERMOCOUPLE LEADS WITH 500V DC PER MIL-STD-202, METHOD 302. TO CHASSIS GROUND RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS.
8. BOND NAMEPLATE ITEM 10 PER ND1002219.
9. REPLACE PART WITH ITEM NUMBER INDICATED.
10. CUT THERMOCOUPLE LEADS TO ALLOW FOR A STRAIN LOOP OF .50 TO 1.00 INCH WHEN ITEM 11 IS POSITIONED IN BRACKET AS SHOWN. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH AND CRIMP ITEM 12 TO BLUE LEADS AND ITEM 13 TO RED LEAD PER ND1002032.
11. MOUNTING TORQUE FOR ITEM 5 TO BE 6.2 - 6.7 INCH POUNDS.
12. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
13. WHEN UNIT IS DELIVERED TO FIELD SITE, CLEAN AREAS TO BE SEALED ON THERMOCOUPLE BRACKET BY SCRUBBING, USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS. APPLY FILLET OF SEALANT 1006338-000 AT INTERFACE OF ITEM 2 AND THE MATING SURFACE OF ITEM 16. APPLY SEALANT TO HEAD OF ITEM 4 AND NUTS ON ITEM 2 COMPLETELY COVERING THE END OF ITEM 4. COVER HEAD OF ITEM 5 OVERLAPPING 1/16 ON ITEM 2.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
·	A	INITIAL RELEASE CLASS A PER TDRR 14103		27 MAY 66	
	B	REVISED PER TDRR 33289		29 MAR 67	



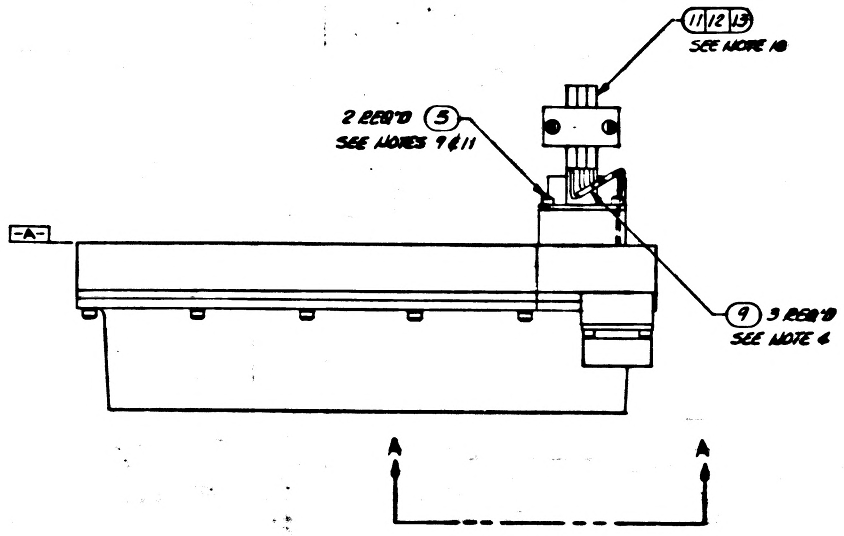
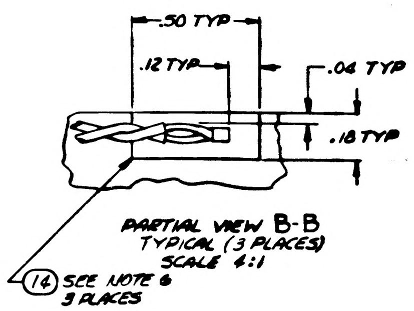
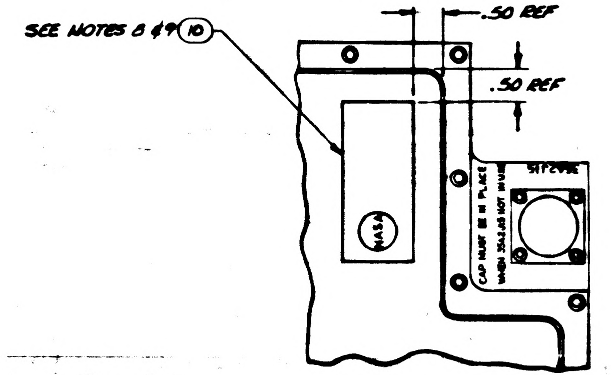


TABLE I

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)
TC 1	C/M PIPA CALIBRATION MODULE FOR X PIP	CG8265T
TC 2	BINARY CURRENT SWITCH MODULE FOR X PIP	CG8266T
TC 3	C/M PIPA CALIBRATION MODULE FOR Z PIP	CG8267T



PARTIAL VIEW B-B
TYPICAL (3 PLACES)
SCALE 4:1



PARTIAL VIEW A-A

			QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1	–		16	2007201-021	PIPA ELECTRONICS ASSEMBLY
SEE NOTE 12			AR	AR		15	2021593	ADHESIVE
			AR	AR		14	MIL-I-15126	INSULATING TAPE, TYPE MFT-2.5
SEE NOTE 12			3	3		13	1008883-003	CONTACT ELEC, CRIMP SOCKET
SEE NOTE 12			3	3		12	1008883-002	CONTACT ELEC, CRIMP, PIN
SEE NOTE 12			6	6		11	1008885-001	INSULATOR ASSEMBLY
			1	1		10	1004260-520	NAMEPLATE
SEE NOTE 12			3	3		9	1010490-142	INSULATION, SLEEVING
			1	1		8	2010746-002	THERMOCOUPLE, CONTACT
			1	1		7	2010746-003	THERMOCOUPLE, CONTACT
			1	1		6	2010746-004	THERMOCOUPLE, CONTACT
			2	2		5	NAS1352-04-16	SCREW, CAP, SOC HD
			2	2		4	MS35233-15	SCREW,
			1	1		3	2010738	CLAMP, RETAINING (INSEP ASSY)
			1	1		2	2010742	BRACKET, THERMOCOUPLE
			–	1		1	2007201-011	PIPA ELECTRONICS ASSEMBLY

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE 25 MAR 66
CHECKED
APPROVED MAY 66
CONTRACT NAS9-497
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PIPA ELECTRONICS AND
THERMOCOUPLE ASSEMBLY

SIZE E
CODE IDENT NO. 80230
2010745
SCALE 1:1
SHEET 1 OF 1

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

Sheet 1 of 18
RIB No. 0104117
Date 18 MAY 1967
TDRR No. 33814
Revision

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
BLOCK I DSKY VIBRATION PADS AND MODULE SCREENING
AUTHORIZED BY AC ECP 0441 R1
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis D. Smith Date 30 May 67

P.C. Engineering
Approval Eldon C Hall Date 5 May 67

DRB Approval W Stameris Date 5 may 67

MIT Reliability Approval________ Date________

CCB Approval Date 7/18/67

NASA Approval A CM Date 7/18/67

Sheet 2 of 18
RIB No. 0104117
Date
TDRR No.
Revision

I. **PURPOSE:**

To screen the Block I DSKY Relay Modules, part no. 1003824-011, to insure their optimum operation during vibration, and to add rubber isolators to the Block I AGC Main DSKY's, part nos. 1003563-031, and 1003707-031, and AGC Nav DSKY, part no. 1003706-031, to similarly insure their optimum operation during high frequency vibration.

II. **AUTHORITY:**

This retrofit is authorized by AC ECP 0441 R1. (CCA-497-0327)

III. **UNITS AFFECTED:**

Name	Part No.	Retrofit S/N	New Part No.
AGC Main DSKY	1003707-031	RAY 10	1003707-041
AGC Main DSKY	1003563-031	RAY 2, 6-9	1003563-041
AGC Nav DSKY	1003706-031	RAY 2, 3, 7, 8 9, and 10	1003706-041
Relay Module	1003824-011	See para VII, 1.5	1003824-011

IV. **PRIORITY CHANGES:**

None

V. **RELATED CHANGES:**

None

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104228, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104117
b.	8	Washer, Silastic	1004917
c.	2	Vibration Pad	1004922-001

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Item	Qty	Nomenclature	Part No.
d.	1	Vibration Pad	1004918
e.	2	Vibration Pad	1004922-002
f.	8	Vibration Washer	1004919-001
g.	24	Screws (Relay Modules replacements)	MS35233-13
h.	8	Stop Pin	1004916
i.	8	"O" Ring, Compound 77-84	NAS1593-006
j.	1 oz.	Resin	SCD-1010661
k.	1 oz.	Catalyst	SCD-1010679
l.	4 oz.	White Ink	1006271-2
m.	4 oz.	Adhesive	MIL-A-5092, Type II
n.	2	Stencil "0" thru "9" .08/.10 inch-high digits	ND 1002019
o.	1	Stencil "-041" .08/.10 inch-high digits	ND 1002019
p.	1	Stencil "USE IN D- ONLY" .08/.10 inch-high characters	ND 1002019
q.	1	Stencil "RELAY MODULES IN THIS DSKY MUST BE USED IN THE FOLLOWING POSITIONS ONLY" .08/.10 inch-high characters	ND 1002019
r.	1	Stencil "THIS DSKY CONTAINS THE FOLLOWING RELAY MODULES" .08/.10 inch-high characters	ND 1002019
s.	1	Stencil "POSITION MODULE D - S/N D - S/N D - S/N D - S/N" .08/.10 inch-high characters.	ND 1002019
t.	4 oz.	Silicone Rubber Compound RTV-102	SCD-1006338-000

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Date
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2. One retrofit kit, part number 8104229, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104117
b.	8	Washer, Silastic	1004917
c.	44	Vibration Washer	1004919-002
d.	24	Screws (Relay Modules replacements)	MS35233-13
e.	8	Stop Pin	1004916
f.	8	"O" Ring, Compound 77- 84	NAS1593-006
h.	4	Vibration Isolators	1004921
i.	4 oz.	White Ink	1006271-2
j.	4 oz.	Adhesive	MIL-A-5092, Type II
k.	24	Stencil "0" thru "9" .08/.10 inch-high digits	ND 1002019
l.	1	Stencil "-041" .08/.10 inch-high digits	ND 1002019
m.	1	Stencil "USE IN D- ONLY" .08/.10 inch-high characters	ND 1002019
n.	1	Stencil "RELAY MODULES IN THIS DSKY MUST BE USED IN THE FOLLOWING POSITIONS ONLY" .08/.10 inch-high characters	ND 1002019
o.	1	Stencil "THIS DSKY CONTAINS THE FOLLOWING RELAY MODULES" .08/.10 inch-high characters	ND 1002019
p.	1	Stencil "POSITION MODULE D - S/N D - S/N D - S/N D - S/N" .08/.10 inch-high characters	ND 1002019
q.	4 oz.	Silicone Rubber Compound RTV-102	SCD 1006338-000
r.	4	Grounding Straps	1004920

3. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Chem-Stripper	N/A
b.	A/R	Cotton Swabs	N/A
c.	A/R	Isoprophyl Alcohol	TT-I-735
d.	A/R	Masking Tape, Low Tack	MM #213

4. Tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	Torque Wrench, 0-25 inch-pounds	N/A
b.	1	Stenciling tool, brush or air-operated equipment	N/A

5. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Workmanship Standard	AC-STD-1, (3 Mar 64)
b.	Description and Requirements, Marking, General	ND 1002019
c.	AGC Main DSKY Assembly	1003707
d.	AGC Main DSKY Assembly	1003563
e.	AGC Nav DSKY Assembly	1003706
f.	Relay Module Assembly	1003824
g.	Sealing Requirements	ND 102187

VII. PROCEDURE:

NOTE: This portion (Section VII), of the retrofit is presented in seven paragraphs, specifically:

1. General Instructions
2. Relay Module Vibration
3. Nav DSKY Isolation
4. Nav DSKY Relay Modules Isolation
5. Main DSKY Isolation
6. Main DSKY Relay Modules Isolation
7. Nav and Main DSKY Vibration

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. Do not deviate from the procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard AC-STD-1, dated 3 March 1064.

1.4 Refer to documents listed in paragraph VI, part 5, for applicable ND specifications.

1.5 Serial number marked after retrofit shall be the same serial number as before retrofit.

2. Random vibration of the Relay Modules, part no. 1003824-011, is accomplished as follows:

2.1 Reference drawings 1003706, 1003563, and 1003707 and remove relay modules from their respective assemblies, i.e., Nav DSKY's and Main DSKY's.

WARNING:

Observe and comply with WARNING stenciled on side of Main DSKY's: "BEFORE REMOVING OR INSTALLING MODULES LOOSEN FOUR SCREWS MARKED A".

2.2 Clamp modules to the "sandwich fixture" and mount them to the head of the shaker. Perform random vibrations as follows simultaneously observing the Keyboard display to see if intermittent shorts are exhibited:

NOTE: Intermittent shorts indicate contamination particles which can cause relay failures.

2.2.1 Vibrate with relay headers up (non-operative) 0.5 g^2/HZ, 20 to 500 HZ, for two minutes.

2.2.2 Vibrate with relay headers down (operative) 1.0 g^2/HZ, 20 to 1000 HZ, for two minutes.

2.2.3 Vibrate with relay headers down (operative) 1.0 g^2/HZ, 20 to 500 HZ, for four minutes.

2.2.4 Vibrate with relay headers down (operative) 0.5 g^2/HZ, 20 to 500 HZ, for two minutes.

2.3 Utilize test modules as described in section VIII (step 1.3) of this RIB.

3. Retrofit Nav DSKY, part no. 1003706-031, using retrofit kit 8104228 as follows:

3.1 Reference drawing 1003706 and locate Alignment Pin Assembly, part no. 1003487-011.

3.2 Bond the vibration pad, part no. 1004918, provided in retrofit kit, to the Alignment Pin as shown on Figure 1. Bond per MIL-A-5092, Type II.

3.3 Retrieve from the retrofit kit, eight vibration washers, part no. 1004919-012. Install them to the mounting captive screws as follows:

3.3.1 Remove eight captive screws, part no. 1004545, and their flat washers, part no. MS15795-808, entirely from the front panel, part no. 1004874.

3.3.2 Fit one vibration washer over each screw leaving each flat washer in its original location abutting the screw head as shown in Figure 2.

3.4 Retrieve from the retrofit kit, four vibration pads of which two are part no. 1004922-002, and two are part no. 1004922-001. The former are for installation into the top half of the DSKY, the latter are for installation into the bottom half. Install as follows:

3.4.1 Install the two vibration pads, part no. 1004922-002, to the top half of the DSKY as shown in Figure 2, by bonding each strip with adhesive per MIL-A-5092, Type II.

3.4.2 Repeat step 3.4.1 for the bottom half of the DSKY using two vibration pads, part no. 1004922-001.

3.5 Reinstall the eight captive screws removed and retrofitted in step 3.3.

3.6 Reidentify the Nav DSKY, part no. 1003706-031, per the instructions contained in paragraph VIII of this RIB.

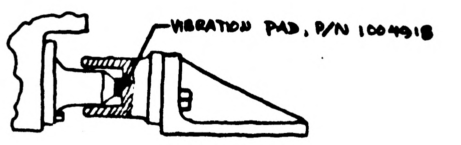

VIBRATION PAD, P/N 1004918

Figure 1. Alignment Pin

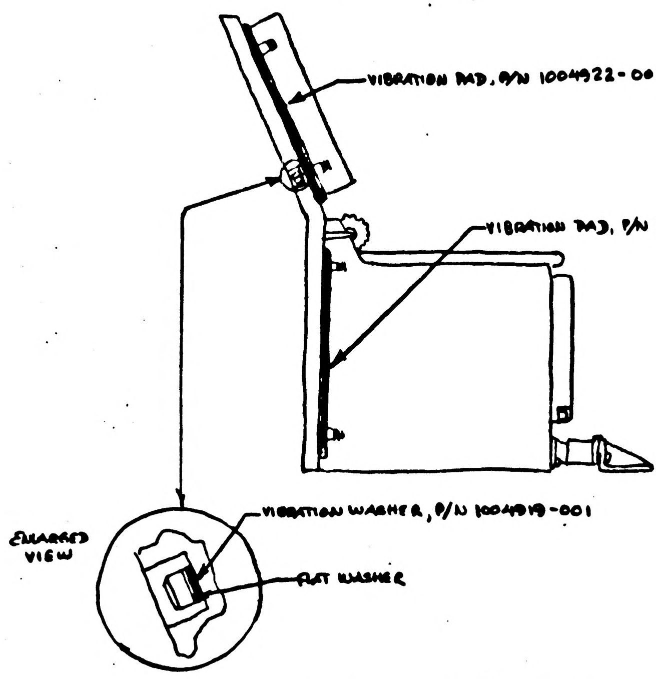

VIBRATION PAD, P/N 1004922-002
VIBRATION PAD, P/N 1004922-001
VIBRATION WASHER, P/N 1004919-001
FLAT WASHER
ENLARGED VIEW

Figure 2. Nav. DSKY Assembly.

---

4. Retrofit (four) Relay Modules, part no. 1003824-011, contained in the Nav DSKY, part no. 1003706-031, using retrofit kit 8104228 as follows:

   4.1 Reference drawing 1003824. Locate two Stop Pins, part no. 1004540. Remove these pins and replace with new pin assembly per Figure 4 of this RIB.

   NOTE: The new pin assembly consists of Stop Pin (1004540), "O" Ring (NAS-1593-006), and Vibration Washer (1004917). The "O" Ring is sealed by a Resin (SCD-1010661) Catalyst (SCD-1010679) Mixture applied per ND 1002187, Type II.

   4.2 Remove socket screws, part no. MS35457-1, six places. Utilizing original washers, part no. NAS620-4, replace removed screws with screws, part no. MD35233-13, provided in kit. Torque 10 inch-pounds. Dispose of removed screws per paragraph IX of this RIB.

   4.3 Replace relay modules into DSKY. Remove shims, part no. 1004665, and replace them with rubber washers, part no. 1004917, provided in retrofit kit.

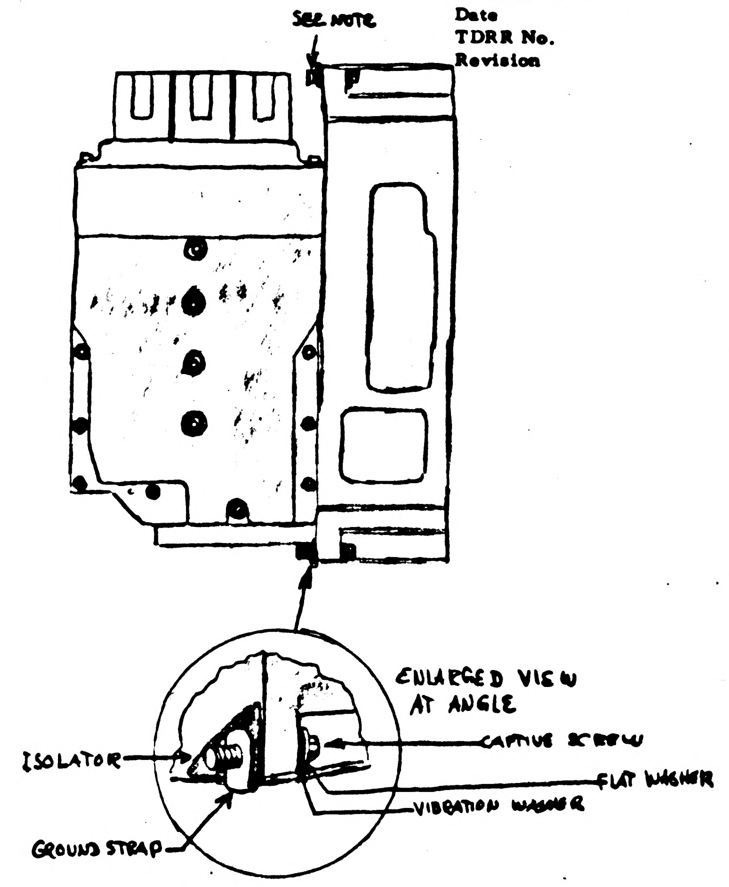
5. Retrofit the AGC Main DSKY, part no. 1003563-031 and part no. 1003707-031, using retrofit kit 8104229 as follows:

   5.1 Reference the applicable drawing (1003563 or 1003707) and remove the four captive screws, part no. 1004545, and four flat washers, part no. MS15795-808, from the front panel, part no. 1004682.

   5.2 Retrieve from retrofit kit four vibration isolators, part no. 1004921, four vibration washers, part number 1004919-002, and four ground straps, part number 1004920. Install the vibration washers to the screws as shown in Figure 3. Leave the flat washers in their original position abutting the screws heads.

   5.3 Reinstall the four captive screws and install the isolators and ground straps as shown in Figure 3.

   NOTE: Ground straps are wrapped around the isolators.


SEE NOTE
ENLARGED VIEW AT ANGLE
CAPTIVE SCREW
FLAT WASHER
VIBRATION WASHER
ISOLATOR
GROUND STRAP

NOTE: TYPICAL 4 PLACES.

Figure 3. Main DSKY Vibration and Grounding.

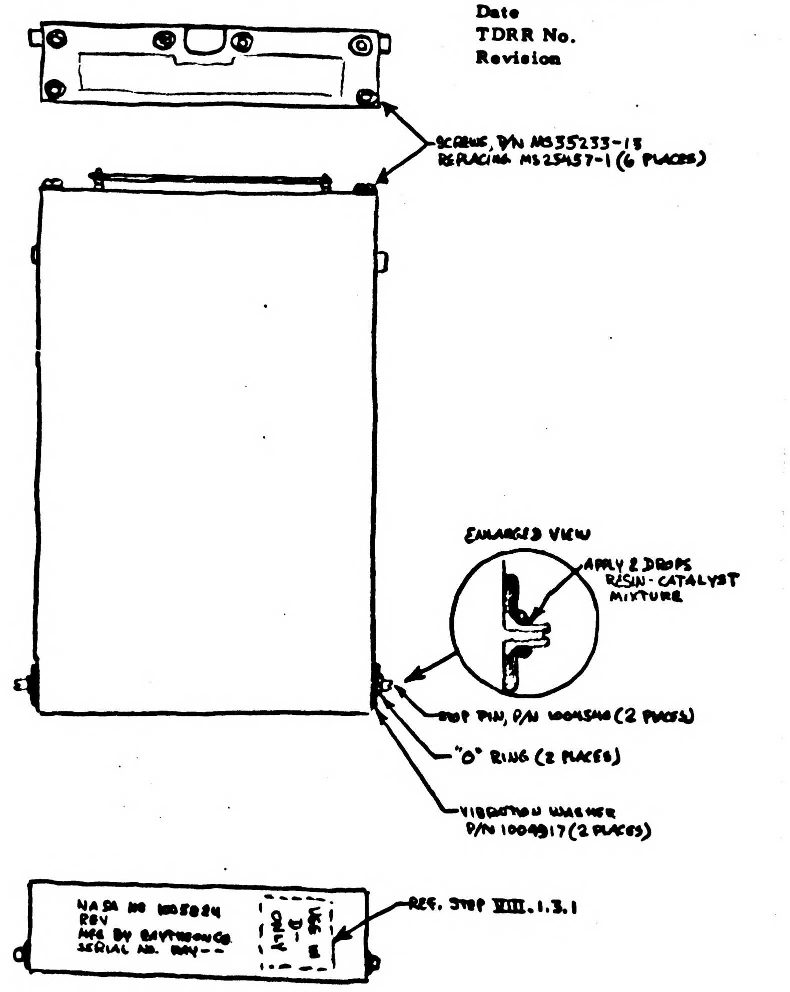

SCREWS, P/N MS35233-13
REPLACING MS35457-1 (6 PLACES)
ENLARGED VIEW
APPLY 2 DROPS RESIN-CATALYST MIXTURE
STOP PIN, P/N 1004540 (2 PLACES)
"O" RING (2 PLACES)
VIBRATION WASHER P/N 1004917 (2 PLACES)
NASA NO 1003824
REV
MFG BY RAYTHEON CO.
SERIAL NO. RAY--
REF. STEP VIII.1.3.1

Figure 4. Relay Module Retrofit and Marking.

5.4 Reidentify the Main DSKY per the instructions contained in paragraph VIII of this RIB.

6. Retrofit the (four) Relay Modules, part no. 1003824-011 contained in the Main DSKY, using retrofit kit 8104229 as follows:

6.1 Reference drawing 1003824. Locate two Stop Pins, part no. 1004540. Remove these pins and replace with new pin assembly per Figure 4 of this RIB. Reference step 4.1 and repeat for this retrofit.

6.2 Remove socket screws, part no. MD35457-1, six places. Retaining washers, part no. NAS620-4, replace removed screws with screws, part no. MS35233-13, provided in kit. Dispose of removed screws per paragraph IX of this RIB.

6.3 Replace relay modules in DSKY. Remove shims, part no. 1004665, and replace them with rubber washers, part no. 1004917, provided in retrofit kit.

7. Vibrate each of the Nav and Main DSKY's as follows:

7.1 Utilize tested modules (from VII.2) and assemble them to the DSKY.

7.2 Subject the DSKY to the following random vibration profile for two minutes along each axis:

7.2.1 3db/OCT roll-up from 10 HZ to 62 HZ (.06 g^2/HZ).

7.2.2 .06 g^2/HZ from 62 HZ to 380 HZ.

7.2.3 3db/OCT roll-off from 380 HZ to 2000 HZ.

VIII. MODIFICATION DESIGNATION:

1. Main and Nav DSKY (all part nos. affected by this RIB) are to be marked as follows:

NOTE: Both kits contain a [illegible] stencil with the digits "0" through "9" for applying Position and Module Serial Number. Use masking tape, MM #213, a low tack masking tape, for masking off non-applicable digits.

1.1 Unmanned DSKY's shall be marked in the location indicated in Figure 4 using white ink, part no. 1006271-1, per ND 1002019, using stencil provided in kit:

"Relay Modules in this DSKY must be used in the following positions only -

Position	Module
D-	S/N
D-	S/N
D-	S/N
D-	S/N"

1.2 Manned DSKY's shall be similarly marked with the exception of the stenciled paragraph which will state:

"This DSKY contains the following relay modules"

1.3 The relationship of relay module usage and marking is defined as follows:

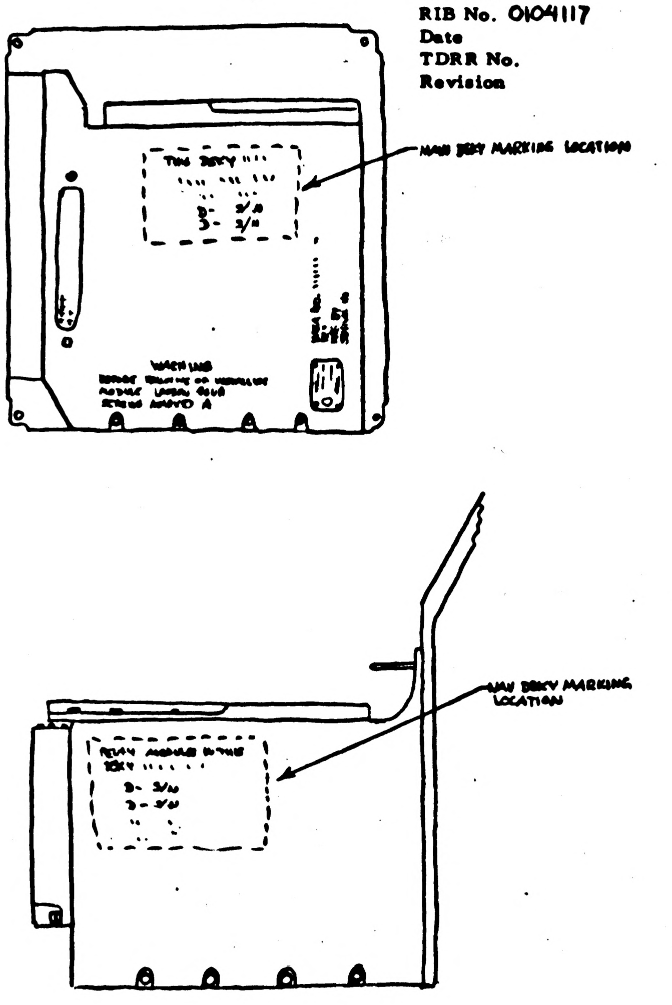


Figure 5. DSKY Marking (manned and unmanned).

1.3.1 Modules containing critical relays K37 through K42 which exhibited intermittent shorts may be used in DSKY's for both manned and unmanned flights provided they are used in positions where the failed relay is not wired in the DSKY circuit. These modules will be marked per Figure 4 and the following (stencil provided in kit):

"Use In
D-
Only"

1.3.2 All other modules which exhibit intermittent shorts in display shall be selectively used in DSKY's for unmanned flights only. Assign locations in which the failed relay is not wired into the DSKY harness. Mark as in step 1.3.1.

2. Reference drawing 1003707 and locate "-031" stenciled on AGC Main DSKY. Proceed as follows:

2.1 Using Chem-Stripper and cotton swabs, remove "-031".

2.2 Neutralize action of Chem-Stripper with Isoprophyl Alcohol and cotton swabs.

2.3 Using stencil provided in kit, white ink, and brush or air-operated equipment, stencil "-051" in the same location per ND 1002019.

3. Reference drawing 1003563 and locate "-031" stenciled on AGC Main DSKY. Proceed as in the same manner as steps 2.1 and 2.2, then, using stencil provided in kit, white ink, and brush or air-operated equipment, stencil "-041" in the same location per ND 1002019.

4. Reference drawing 1003824 and locate "-031" stenciled on AGC Nav DSKY. Proceed in the same manner as steps 2.1 and 2.2, then, using stencil provided in kit, white ink, and brush or air-operated equipment, stencil "-041" in the same location per MD 1002019.

IX. DISPOSITION OF REMOVED PARTS:

Scrap.

X. REPORT OF ACCOMPLISHMENT:

Complete AC Form 1 and Raytheon Form 53-9208 and return to applicable addresses.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

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' Part No. ~~RIB 0104117~~
' Date: ________
' TDRR ________
' Revision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N# ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

Indent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit			
					P/N	S/N		
	Main DSKY	1003707-031					1003707-051	
	Main DSKY	1003563-031					1003563-041	
	Nav DSKY	1003706-031					1003706-041	

PART II: A/B PARTS ADDED OR REMOVED

Indent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

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RIB No. 0104124
Date 31 JAN 67
TDRR No. 35564
Revision A

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
COMPUTER TEST SET NEWSPEAK PROGRAM AND G&N TEST
AUTHORIZED BY ECP 0536 + ECP 0674
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A	35618	1,2,7,8,12-15,18,19,22,23,26,29-31	MM		2-14-68

Prepared by Hollis D. Smith Date Aug. 8, 1967

P.C. Engineering Approval Date 11/10/67

DRB Approval Date 10/30/67 31 Oct 67

MIT Reliability Approval______ Date______

MIT/IL Approval______ Date______

NASA Approval Date 11/7/67

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Date
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Revision A

I. **PURPOSE:**

Changes to the Computer Test Set, part no. 2014042-061 modifying electrical functions in the Newspeak Program to enhance its diagnostic capability and aid in determining specific AGC restart problems. Changes to G&N Test Set, part no. 2014255-041, to reduce system noise.

II. **AUTHORITY:**

This retrofit is authorized by ECP - 0536, CCA 497-0518, and ECP-0674, CCA 497-533

III. **UNITS AFFECTED:**

Name	Part No.	Retrofit S/N's	New Part No.
Computer Test Set	2014042-061	RAY 3,5-8,11, 13-16,19-26	2014042-071
Logic Drawer Assembly No.1	2014036-041	Para.VII 1.5	2014036-051
Logic Drawer Assembly No.2	2014037-041	Para.VII 1.5	2014037-051
Logic Plate Assembly No. 4 Logic Drawer No. 1	2014218-011	Para.VII 1.5	2014218-021
Logic Plate Assembly No. 5 Logic Drawer No. 1	2014219-041	Para.VII 1.5	2014219-051
Logic Plate Assembly No. 6 Logic Drawer No. 1	2014228-041	Para.VII 1.5	2014228-051
Logic Plate Assembly No. 6 Logic Drawer No. 2	2014229-021	Para.VII 1.5	2014229-031
P & M Drawer	2014041-051	Para.VII 1.5	2014041-061
P & M Drawer, Logic Plate No.1	2014352-021	Para.VII 1.5	2014352-031
[illegible] M	[illegible]	[illegible]	[illegible]-031
Connector Plate Assembly	2014275-061	Para.VII 1.5	2014278-071
Logic Plate Assy No. 5 Logic Drawer No. 2	2014223-021	Para. VII 1.5	2014223-031

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Name	Part No.	Retrofit S/N's	New Part No.
P&M Drawer, Logic Plate No. 2	2014315-021	Para. VII 1.5	2014315-031
P&M Drawer, Logic Plate No. 3	2014336-051	Para. VII 1.5	2014336-061
Interconnection Plate Assembly,A18	2014046-031	Para. VII 1.5	2014046-041
Self Test Assembly	2014392-011	Para. VII 1.5	2014392-021
AGC/GSE Interconnection Set - G&N Test	2014255-041	RAY 2-4, 6-10, 12-13, 15-22	2014255-051
Self Test Assy	[illegible]	Para. VII 1.5	[illegible]
Buffer Circuit Assembly	2014254-031	Para. VII 1.5	2014254-041

IV. **PRIORITY CHANGES:**

None.

V. **RELATED CHANGES:**

None.

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104235, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Kit Assembly (CTS)	8104238
b.	1	Retrofit Kit Assembly (G&N TEST)	8104239

2. Material Required but not supplied in Kits

Item	Qty	Nomenclature	Part No.
a.	A/R	Chem-Stripper	N/A
b.	A/R	Isopropyl Alcohol	TT-I-735

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Item	Qty	Nomenclature	Part No.
c.	A/R	Adhesive	MIL-A-5092 Type II
d.	A/R	Methyl Ethyl Ketone (MEK)	TT-M261
e.	A/R	Solder	ND 1002075
f.	A/R	Sealing and Retaining Compound	MIL-S-22473 GR HV
g.	A/R	Grey Paint	TT-E-529
h.	A/R	Chromate	MIL-C-5541
i.	A/R	Solvent Sealer (for zipper tubing)	1006699
j.	A/R	Adhesive (for bandmarkers)	1006253

3. Recommended tools required but not supplied

Item	Qty	Nomenclature	Part No.
a.	1	Pocket Knife	N/A
b.	A/R	Cotton Swabs	N/A
c.	1	Stenciling tool, brush or air-operated equipment	N/A
d.	1	Diagonal pliers	Kraeuter #GG-5402
e.	1	Screwdriver	Snap-On #SSD-8
f.	1	Cross-Tip Screwdriver	Snap-On #SSDP-63
g.	1	Soldering Gun Handle	Ungar #766
h.	1	Soldering Tip	Ungar #4039
i.	1	Desoldering Kit	Ungar #270
j.	1	Wirewrap Gun	14B1-C

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Item	Qty	Nomenclature	Part No.
k.	1	Wirewrap Bit	26263
l.	1	Sleeve	18840
m.	1	Cutting and Skinning Accessories	A25406-1
n.	1	Wirewrap Extraction Tool	500130
o.	1	Crimping Tool	MS 3191-1
p.	1	Extracting Tool (Bendix & Burndy connectors)	N/A
q.	1	Heli-coil Insert Tool (4-40)	Heli-coil 7551-04
r.	1	Plug Tap	Heli-coil 04CPBH1
s.	1	Drill (size 29) (.136)	N/A
t.	1	Drill (size 31) (.120)	N/A
u.	1	Cold Chisel	Stanley #443
v.	1	Ball Peen Hammer	Stanley #310
w.	1	File Set	60 S X-Acto
x.	1	Mirror (2" square)	N/A
Y.	1	WIRE STRIPPER	IDEAL 45-187
Z.	1	ELECTRIC HAND DRILL ¼"	N/A
AA.	1	POSITIONER	MS3191-20A
AB.	1	INSERTION TOOL (BENDIX & BURNDY CONNECTORS)	N/A

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Computer Test Set Assembly Drawing	2014042
b.	Logic Diagram	2016473
c.	Logic Drawer Assembly No. 1 Drawing	2014036
d.	Logic Diagram	2016474
e.	Logic Drawer Assembly No. 2 Drawing	2014037
f.	P & M Drawer Assembly	2014041
g.	Logic Plate Assembly No. 4, Logic Drawer No. 1	2014218
h.	AGC/GSE Interconnection Diagram	2016402
i.	Logic Plate Assembly No. 5, Logic Drawer No. 1	2014219
j.	AGC/GSE Interconnection Diagram	2016403
k.	Logic Plate Assembly No. 6, Logic Drawer No. 1	2014228
l.	AGC/GSE Interconnection Diagram	2016405
m.	Logic Plate Assembly No. 6, Logic Drawer No. 2	2014229
n.	AGC/GSE Interconnection Diagram	2016417
o.	P & M Drawer Assembly Drawing	2014315
p.	AGC/GSE Interconnection Diagram	2016418
q.	P & M Drawer, Logic Plate No. 1	2014352

Item	Nomenclature	Document No.
r.	Interconnection Diagram	2016454
s.	Interconnection Diagram	2016455
t.	P & M Drawer, Logic Plate No. 3	2014336
u.	Procurement Specification, CTS	PS2016026
v.	Interconnection Plate Assembly, A18 Plate	2014046
w.	Logic Diagram, Drawer #1, PLT 4	2016477
x.	Self Test Assembly Drawing	2014392
y.	Logic Diagram Drawer #1, PLT 5	2016478
z.	Electrical Schematic	[illegible]
aa.	Logic Diagram Drawer #1, PLT 6	2016474
bb.	Wiring Harness	2014190
cc.	P & M Front Panel (Electrical Schematic)	2014112
dd.	Interconnection Plate A18, Wirewrap List	2016484
ee.	Crimping of Solder-Less Connectors	MD 1002206
ff.	Interconnection Diagram	2016456
gg.	Workmanship Standard	AC-STD-1 (3 March 64)
hh.	Interconnection Diagram	2016443
ii.	General Specifications for Marking	MD 1002019
jj.	Connector Plate Assembly, A18	2014275

Item	Nomenclature	Document No.
kk.	Process Specification, Soldering of Electrical Connections	MD 1002071
ll.	Logic Diagram Plate 1, P & M	2016488
mm.	Logic Diagram	2016491
nn.	Interconnection Diagram	2016451
oo.	Front Panel Assembly, P & M	2014231
pp.	Front Panel	2014230
qq.	AGC/GSE Interconnection Set (Procure. Spec.)	PS 2016004
rr.	Electrical Schematic, Self Test	2014157
ss.	Self Test Assembly	2014366
tt.	Logic Diagram - Logic Drawer 2 - Plate 5	2016494
uu.	Logic Plate Assembly No. 5, Drawer 2	2014223
vv.	Buffer Circuit Assembly	2014254
ww.	Mounting Support	2016500
xx.	Mounting Support	2016501
yy.	Self Test Assembly	2014392
zz.	Cover Assembly	2016495

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Item	Nomenclature	Document No.
aaa.	Wiring Harness	2016497
bbb.	Schematic - Self Test	2016486
ccc.	Schematic - Buffer Cir.	2016502

VII **PROCEDURE**

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outline herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable MD specifications.

1.5 Serial Number marked after retrofit shall be the same number as before retrofit.

2. Retrofit Computer Test Set, part number 2014042-061, using retrofit kit 8104238 as follows:

2.1 Remove the Computer Test Set nameplate located at the front center of the cabinet by filing off the heads of the drive screws. Drive the remaining portion of the drive screws into cabinet and dispose of nameplate per paragraph IX of this RIB.

2.2 Retrofit the Programmer and Monitor Assembly, part number 2014041-051, as follows:

2.2.1 Release the P & M Drawer Assembly and pull to slide lock position. Disconnect all connectors and grounding strap and remove drawer from cabinet.

2.2.2 Remove nameplate from side of P & M Drawer using a pocket knife. Dispose of nameplate per paragraph IX.

2.2.3 Remove excess adhesive using MEK and cotton swabs.

WARNING:

Methyl Ethyl Ketone is toxic and flammable. Use only in a well ventilated area and avoid open flame.

2.2.4 Lift Logic Plate Assembly No. 1 to the slide lock position and disconnect logic plate cable connectors. Remove plate from assembly.

2.2.5 Repeat step 2.2.4 for Logic Assembly No. 2 and No. 3.

2.2.6 Remove rear black protective cover from plate assemblies. Retain hardware.

2.2.7 Remove from kit (1) NOR Module (1014034), (2) lock washers (MS35338-79), (2) flat washers (1006997), (2) machine screws (MS51957-29), (2) program standoffs (1014212), and stencil marked "AC". Reference drawing 2014315 and proceed as follows:

2.2.7.1 Stencil "AC" at location A34 per MD 1002019.

2.2.7.2 Assemble NOR Module in location A34 with hardware from step 2.2.7 according to drawing 2014315.

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NOTE: Step 2.2.7 applies to Logic Plate No. 2 only.

2.2.8 Using Wire wrap installation and removal tools, remove and add wire (1006945-1, blue) between the following pins on wirewrap plate of Logic Plate Assembly No. 2.

NOTE: Remove Z3 (top) level first, Z2 (middle) level second, Z1 (bottom) level last. Install Z1 (bottom) level first, Z2 level second, Z3 level last.

REMOVE

FROM	TO	ZL	CKT. OR SIG.	CARD#	
A14-11	A12-04	1	43-01	1290	U P
A15-02	A16-02	1	40-01	1074	U P
A16-12	A18-02	1	57-01	1077	U P
A11-19	A13-19	2	322-03	*	
A11-19	A12-19	1	322-04	1064	U P
A12-19	A12-17	2	322-05	2257	U P
A12-15	A12-17	1	322-06	1228	U P
A12-13	A12-15	2	322-07	*	
A12-13	A16-13	1	322-08	1069	U P
A16-13	B05-10	2	322-09	2068	U P
A12-07	A14-07	1	42-01	1072	U P
A12-16	A17-02	2	55-01	2070	U P
A12-09	A14-12	1	41-01	1291	U P
A12-18	A17-17	1	56-01	1356	U P
A5-07	A31-14	1	34-01	1372	U
A16-01	A19-01	2	326-29	2162	U
A12-01	A16-01	1	326-30	1070	U
A11-01	A12-01	2	326-31	*	

(* indicates wire removal to gain access to lower Z level).

NOTE: Where capacitors are removed during retrofit, insure that capacitors are reinstalled and soldered per MD 1002071 (use heat sink if necessary when desoldering and soldering).

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ADD

FROM	TO	ZL	CKT. OR SIG.	CARD #
B5-04	A12-04	1	43-01	1290
A12-01	A19-01	3	326-30	3206
B6-16	A18-02	1	57-01	1077
A11-19	A13-19	2	322-03	*
A11-19	A14-18	1	322-04	1064
A14-18	A14-09	2	322-05	2257
A12-15	A14-09	1	322-06	1228
A12-13	A12-15	2	322-07	*
A12-13	B05-10	3	322-08	3018
A11-01	A12-01	2	326-31	*
A17-02	A14-07	1	42-01	1072
A17-08	A16-02	2	55-03	2162
A17-17	A14-17	1	41-01	1291
A10-08	A17-08	1	55-02	1356
B6-05	A10-08	2	55-01	2070
A5-07	B4-05	1	34-01	1372
A10-07	A34-02	1	337-01	1069
A17-11	A34-03	1	338-01	1074
A17-07	A34-06	2	339-01	2068
A18-11	A34-07	2	340-01	2279
A34-12	A34-16	2	341-01	2280
A34-16	A34-04	3	341-02	3019
A34-14	A33-08	2	342-01	2281
B4-03	A34-09	2	343-01	2282
A34-18	A33-19	2	344-01	2283
A33-18	A33-06	2	345-01	2284
A33-09	A33-02	2	346-01	2285
A33-02	A33-16	3	346-02	3020
A33-12	B35-02	2	347-01	2286

2.2.8.1 Add capacitor (CS13BF105K), provided in kit, in position as follows: (Ref. Designation C10).

NOTE: Do not add capacitor until all wirewrapping has been completed. See asterisks ($) next page.

From	To
A12-09	A14-20

NOTE: Solder & sleeve as shown in detail A of drawing 2014315. Use sleeving 1006776-197; MIL-I-631 supplied in kit.

ADD (cont)

FROM	TO	ZL	CKT. OR SIG.	CARD#
A31-07	A33-07	2	280-11	2287
A31-03	A33-17	2	196-02	2288
A33-11	A33-10	2	326-41	2289
A33-10	A33-01	3	326-42	3021
A33-01	A34-10	2	326-43	2290
A34-10	A34-11	3	326-44	3022
B4-04	A12-07	2	348-01	2291
A12-07	A12-05	3	348-02	3023
A12-05	A14-10	2	348-03	2292
A14-19	A14-08	3	348-04	3024
A14-08	B35-19	2	348-05	2293
A33-16	A16-12	2	346-03	2294
A2-09	A34-08	2	349-01	2295
A34-08	A34-05	3	349-02	3025
A12-09	A31-14	1	350-01	1070
A12-08	A12-16	2	351-01	2296
B6-13	A12-18	2	352-01	2297

$Add capacitor per step 2.2.8.1.

2.2.9 Using wirewrap installing and removal tools, remove and add wire (1006945-1 blue) between the following pins on wirewrap plate of Logic Plate Assembly No. 3.

NOTE: Reference notes in step 2.2.8.

REMOVE

FROM	TO	ZL	CKT. OR SIG.	CARD#	
A28-11	B28-17	1	151-01	1241	U P
B28-17	A30-08	2	151-02	2019	U P
B29-06	B34-11	[illegible]	260-09	*	
B28-06	B29-06	1	260-10	1131	U P
B17-06	B28-06	2	260-11	2201	U P
B3-16	B28-16	1	13-01	1203	U P
A7-01	A8-01	3	262-49	3023	U P
B31-17	B34-09	1	72-01	1312	U P

(*indicates wire removed only to gain access to lower Z level)

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD#	
A7-17	B34-04	2	109-02	2316	GOJAM
A30-04	A25-05	3	259-07	3043	BLK 2
B34-10	A35-19	3	259-10	3044	BLK 2
B17-19	A25-15	3	38-02	3045	
A11-09	A35-09	3	190-02	3046	
A35-18	B35-16	2	298-01	2317	EPAL
B29-19	A35-08	2	79-02	2318	T5
B12-12	B12-08	2	299-01	2319	PROG RST
B12-08	B13-12	3	299-02	3047	
B13-12	B14-12	2	299-03	2320	
B14-12	B15-08	3	299-04	3048	
B15-08	A25-14	2	299-05	3221	
A25-14	B35-05	3	299-06	3049	
A25-04	B25-03	3	273-00	3050	SRE
A28-11	A30-08	1	151-01	1241	
B28-17	B14-11	2	301-01	2019	
B29-06	B34-11	2	260-09	*	
B17-06	B29-06	3	206-10	3023	
B13-11	B28-06	2	300-01	2201	
B33-03	B28-16	1	302-01	1203	
B28-16	A8-12	2	302-02	2322	
B13-08	B12-12	3	299-00	3051	
B15-07	A8-02	2	303-01	2323	
B12-07	A8-03	2	304-01	2324	
B12-11	A8-13	2	305-01	2325	
B13-07	B28-07	1	306-01	1131	
B31-17	B33-05	1	72-01	1312	
A32-04	B35-13	2	307-01	2326	
B20-19	B34-09	2	308-01	2327	
B19-09	B20-09	3	264-13	3052	
A5-03	A18-09	2	309-01	2328	
A18-09	A18-01	3	309-02	3053	
A18-01	A31-01	2	309-03	2329	
A31-01	A31-03	3	309-04	3054	
A31-03	A31-08	2	309-05	2330	
A31-08	B33-04	3	309-06	3055	

2.2.9.1 Solder capacitor (CY15C471J) (Ref. Designation C24) in position (From: A05-02, To A05-20).

2.2.9.2 Solder capacitor, C513BP105K (replaces C513AP010K) between pins B34-13 and B34-20.

2.2.10 Using wirewrap installing tools add wire (1C06945-1 blue) between the following pins on wirewrap plate of Logic Plate Assembly No.1.

NOTE: Reference notes in step 2.2.8.

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD #
B1-19	B35-02	2	321-01	2272
B1-18	B35-19	2	322-01	2273

2.2.11 Remove stencil "-021" from part number on Logic Plate No. 1 using Chem-Stripper and cotton swabs as required.

2.2.12 Neutralize Chem-Stripper using isopropyl alcohol and cotton swabs as required.

2.2.13 Using stencil provided in kit, locate new stencil "-031" and mark using white ink and air brush or bursh per ND 1002019.

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2.2.14 Remove stencil "-021" from part number on Logic Plate No. 2 using Chem-Stripper and cotton swabs as required.

2.2.15 Neutralize Chem-Stripper using isopropyl alcohol and cotton swabs as required.

2.2.16 Using stencil provided in kit, locate new stencil "-031" and mark using white ink and brush or brush per ND 1002019.

2.2.17 Repeat steps 2.2.14, 15, and 16 for Logic Plate No. 3 using stencil "-061" provided in kit.

2.2.18 Replace protective black cover using retained hardware and staking compound furnished in kit and re-mount Logic Plate Assembly No.1 onto support brackets in chassis. Attach cable connectors, lower the plate and secure.

2.2.19 Repeat step 2.2.18 for Logic Plate Assembly No. 2, and Logic Plate Assembly No. 3.

2.2.20 Refer to drawing 2014041. Bond nameplate (1004260-286), supplied in kit, to the indicated location on the P&M Drawer useing adhesive (MIL-A-5092, Type II) and cotton swabs.

2.2.21 Note serial number on nameplate removed in step 2.2.2. Stencil same number in appliable block on new nameplate using black ink and stencil, provided in kit, and air brush or brush per ND 1002019.

2.2.25 Remount P&M Drawer onto cabinet slides. Connect rear cable connectors, push unit into cabinet and secure in place using handle hardware.

2.3 Retrofit Logic Drawer No. 1, part number 2014036-041, using retrofit kit 8104238 as follows:

2.3.1 Release Logic Drawer Assembly No. 1 from cabinet. Disconnect rear cable connectors and remove unit from cabinet.

2.3.2 Remove nameplate on side of chassis useing a pocket knife and dispose of this nameplate per paragraph IX of this RIB.

2.3.3 Remove excess adhesive with Methyl Ethyl Ketone and cotton swabs.

WARNING:

Methyl Ethyl Ketone is toxic and flammable. Use only in a well ventilated area and avoid open flame.

2.3.4 Lift Logic Plate Assembly No. 4 to slide lock position and disconnect Logic Plate cable connectors. Remove Plate from unit.

2.3.5 Repeat step 2.3.4 for Logic Plate Assembly No. 5.

2.3.6 Pivot Front Panel of Logic Drawer into down position.

2.3.7 Release Interconnector Plate Assembly No. 6 and pivot into down position.

2.3.8 Remove all cable connectors from rear of Interconnection Plate Assembly.

2.3.9 Remove hardware securing Interconnection Plate Pivot bracket to bottom of unit chassis. Remove Interconnection Plate from unit and retain mounting hardware.

2.3.10 Remove rear black protective cover from Plate Assembly No. 4. Retain hardware for reassembly.

2.3.11 Repeat step 2.3.10 for Logic Plate Assembly No. 5.

2.3.12 Repeat step 2.3.10 Interconnection Plate Assembly No. 6.

2.3.13 Using wirewrap tools, add wire (1006945, blue) between the following pins on wirewrap plate for Logic Plate Assembly No. 4.

NOTE: Reference note in step 2.2.8.

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD#
B2-11	B34-07	2	277-01	2320 WORLOC

2.3.14 Using wirewrap tools, add wire (1006945-1 blue) between the following pins on wirewrap plate for Logic Plate Assembly No. 5.

FROM	TO	ZL	CKT. OR SIG.	CARD#
A12-8	A16-6	2	295-03	2305
A12-9	B13-8	3	169-02	3036
A12-19	B2-10	3	258-00	3037
A12-18	B7-03	3	294-00	3038

(continued on next page)

NOTE: Reference note in step 2.2.8

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD#
B7-03	B8-03	2	294-01	2291
B8-03	A11-16	3	294-02	3021
A11-16	A16-16	2	294-03	2292
A16-16	A16-05	3	294-04	3022
A16-05	A16-08	2	294-05	2293
A16-08	A16-03	3	294-06	3023
A16-03	B16-03	2	294-07	2296
B16-03	A18-05	3	294-08	3024
A18-05	A18-03	2	294-09	2298
A18-03	A24-13	3	294-10	3026
A24-13	A24-05	2	294-11	2299
A24-05	A25-13	3	294-12	3027
A25-13	A26-02	2	294-13	2300
A26-02	A26-04	3	294-14	3028
A26-04	A32-03	2	294-15	2301
A32-03	A32-15	3	294-16	3029
A11-06	A16-06	3	295-02	3030
B9-16	A3-18	3	9-02	3031
B12-12	A26-14	2	23-02	2302
A16-18	A19-08	2	296-01	2303
A3-12	A19-17	2	297-01	2304
A14-10	A16-10	3	231-39	3032
A21-09	A19-09	3	233-08	3033
A3-01	A11-06	2	295-01	2294
A26-12	B26-02	2	123-00	2295
B2-10	A11-17	2	258-02	2297
A10-08	A11-07	3	169-07	3025
B16-19	A16-17	3	169-04	3034
A11-17	A16-07	3	258-03	3035

2.3.15 Using wirewrap tools, add ~~wirewrap wire~~ (1006945-1 blue) between the following pins on wirewrap plate for Interconnection Plate No. 6. REFERENCE NOTE IN STEP 2.2.8.

FROM	TO	ZL	CKT. OR SIG.	CARD #
B1-11	A32-01	2	439-01	2254
A32-12	A26-11	2	440-01	2255
A26-11	B1-12	3	440-02	3058
B16-09	A32-18	2	441-01	2256

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2.3.16 Remove stenciled dash numbers from plates 4, 5, and 6 using cotton swabs and Chem-Stripper.

2.3.17 Neutralize the action of Chem-Stripper using cotton swabs and isoproply alcohol.

2.3.18 Stencil in new dash numbers using the stencil provided in kit, white ink and brush or air brush as follows:

2.3.18.1 Plate No. 4, 2014218-011 becomes -021.

2.3.18.2 Plate No. 5, 2014219-041 becomes -051.

2.3.18.3 Plate No. 6, 2014228-041 becomes -051.

2.3.19 Re-install black cover removed from Logic Plate Assembly No. 4 and secure using hardware retained from step 2.3.10, and staking compound furnished in kit.

2.3.20 Repeat step 2.3.19 for Logic Plate Assembly No.5.

2.3.21 Repeat step 2.3.19 for Interconnection Plate No. 6.

2.3.22 Re-mount Interconnection Plate Assembly No. 6 into chassis and assembly pivot brackets to bottom of chassis using retained hardware.

2.3.23 Reconnect all cable connectors to Interconnection Plate No. 6 and pivot into up position. Secure in plate.

2.3.24 Pivot Front Panel into up position and secure in place.

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2.3.25 Re-mount Logic Plate Assembly No. 5 onto support brackets in chassis. Attach cable connectors, lower plate and secure in place.

2.3.26 Repeat step 2.3.25 for Logic Plate Assembly No. 4.

2.3.27 Refer to engineering drawing 2014036. Locate new nameplate (1004260-288), supplied in kit, on side of Logic Drawer No. 1. Bond using adhesive (MIL-A-5092, Type II) and cotton swabs.

2.3.28 Note serial number on nameplate removed in step 2.3.2. Stencil same number in the appropriate block on new nameplate using stencil provided in kit ("RAY" etc.), black ink and brush or air operated equipment.

2.3.29 Re-mount Logic Drawer Assembly No. 1 onto cabinet slides, connect rear cable connectors and grounding strap, push unit into cabinet and secure in place using handle hardware.

2.4 Retrofit the A18 Interconnection Plate Assembly, part no. 2014046-031, as follows:

2.4.1 Remove rear cover, between cabinet doors, by loosening screws. This exposes A18 Interconnection Plate wirewrap. Retain cover and mounting hardware.

2.4.2 Using wirewrap removal tools, remove wire from the following pins on wirewrap plate A2 of the A18 Interconnection Plate Assembly:

REMOVE

FROM	TO	ZL	CIRCUIT	CARD NO.
A2-07-04	A2-20-04	1	26-01	1024

ADD

FROM	TO	ZL	CIRCUIT	CARD NO.
A2-37-18	A2-11-18	2	111-01	2125
A2-10-18	A2-37-08	2	112-01	2126

2.4.3 Using wirewrap installation tools, add wire (1006945-1) between the following pins on the A18 Interconnection Plate Assembly.

ADD

FROM	TO	ZL	CIRCUIT	CARD NO.
A1-6-02	A2-24-05	3	516-01	H515
A2-8-14	A3-15-02	3	517-01	H516

2.4.4 Replace rear protective cover over A18 interconnection wirewrap pins, between rear doors, using retained hardware and cover from step 2.4.1.

2.4.5 Locate with aid of mirror part number "2014046-031" stenciled on the A18 Interconnection Plate Assembly. Remove the "2014046-031" using Chem-Stripper and Cotton swabs.

2.4.6 Neutralize the action of Chem-Stripper with isopropyl alcohol and cotton swabs.

2.4.7 Refer to eng.dwg.2014046 for part no. new stenciling location. Using stencil provided in kit, stencil "2014046-041" with black ink and brush or air-operated equipment per MD 1602019.

2.4.7.1 Remove hardware securing A18 (2014046) to cabinet. Retain hardware for reassembly.

2.4.7.2 Move A18 Assy so that part no.2014275-061 is visible.

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Sheet 23 of [illegible]
RIB No. 0104124
Date
TDRR No.
Revision A-

2.4.8 Remove -061 using Chem-Stripper and cotton swabs.

2.4.9 Repeat steps 2.4.6 & 2.4.7 except new dash number to be -071.

2.4.10 Remount A18 Assembly using retain hardware.

2.5 Retrofit Logic Drawer No. 2, part number 2014037-041, using retrofit kit 8104238 as follows:

2.5.1 Release Logic Drawer Assembly No. 2 from cabinet. Disconnect rear cable connector and grounding strap and remove unit from cabinet.

2.5.2 Remove nameplate on side of chassis using a pocket knife and dispose of this nameplate per paragraph IX of this RIB.

2.5.3 Remove excess adhesive with Methyl Ethyl Ketone and cotton swabs.

WARNING:
Methyl Ethyl Ketone is toxic
and flammable. Use only in
a well ventilated area and
avoid open flame.

2.5.4 Remove Logic Plate Assembly No. 6 following the same procedures as described in steps 2.3.6 through 2.3.9, and then remove black cover (retain hardware).

2.5.5 Using wirewrap tools, add wire (1006945-1 blue) between the following pins on wirewrap plate for Logic Plate Assembly No. 6.

NOTE: Reference note in step 2.2.8.

FROM	TO	ZL	CKT. OR SIG.	CARD #
B5-19	B31-11	2	454-01	2221
B1-01	B31-13	2	455-01	2222
A30-11	B32-03	2	456-01	2223

2.5.6 Remove stenciled dash number "-021" from plate No. 6 using cotton swabs and Chem-Stripper.

2.5.7 Neutralize the action of Chem-Stripper using cotton swabs and isopropyl alcohol.

2.5.8 Stencil in new dash number "-031" using the stencil provided in kit, white ink and brush or air brush per ND 1002019.

2.5.9 Reinstall black cover, using retained hardware and staking compound supplied in kit.

2.5.10 Re-Mount Logic Plate Assembly No. 6 onto support brackets in Logic Drawer No. 2. Reinstall connectors and secure.

2.5.11 Remove Logic Plate Assembly No. 5 following same procedures as described in step 2.5.4.

2.5.12 Add wire as in step 2.5.5 to the following pins:

FROM	TO	ZL	CKT. OR SIG.	CARD #
B6-13	B31-06	2	90-02	2348
A1-11	B31-16	2	280-01	2349

2.5.13 Reidentify and reinstall same as steps 2.5.6 through 2.5.10.

2.5.14 Refer to engineering drawing 2014037. Locate new nameplate (1004260-290), supplied in kit, on side of Logic Drawer No. 2. Bond using adhesive (MIL-A-5092, Type II) and cotton swabs.

2.5.15 Note serial number on removed nameplate and stencil same number in the applicable block on new nameplate using stencil provided in kit ("RAY" etc.), black ink and brush or air operated equipment.

2.5.16 Re-mount Logic Drawer No. 2 into cabinet, connect rear cable connectors and grounding strap. Slide drawer in and secure.

[illegible]

3. Retrofit AGC/GSE Interconnection Set, G&N Test, part no 2014255-041, using retrofit kit 8104239 as follows:

3.1 Retrofit Self Test Assembly (2014392-021) as follows:

3.1.1 Remove Cover Assembly (2016495) from Housing (2014413) retaining hardware for reassembly.

3.1.2 Delete tabs (both sides) on the four (4) grommets on the Cover Assembly (tabs are deleted to make way for the installation of the standoffs).

3.1.3 Reference drawing 2016495 and drill four (4) holes in the Cover Assembly per the requirements of that drawing. Use a number 29 drill.

NOTE: Drilled holes will be utilized for the installation of the Standoffs (1015981-009) in a forthcoming step.

3.1.4 Remove burrs from drill holes, chromate and touch up with gray paint as defined in "Notes" of drawing 2016495.

3.1.5 Remove cable clamps and two bandmarkers (1006415-131 and P3/J6). Retain clamps and P3/J6 bandmarker (care should be taken in removal of P3/J6 bandmarker so that it may be reused). Scrap large bandmarker.

3.1.6 Remove zipper tubing, undo lacing, remove strain relief clamp and pull back bushing on P1 connector. Repeat this procedure for the P3 connector and leg.

3.1.7 Cut harness leads A3 through A17 (code identification) back on the P3 leg as close to the P3 connector as possible.

NOTE: Do not cut short as wires are to be re-routed (observe 2016497, sheet 1).

3.1.8 Remove connector pins with cut wires from P3 connector (reference step 3.1.7).

3.1.9 Remove from retrofit kit preassembled leads (white, no. 22 wire) identified by code identification A131 through A147. Install them into proper connector location as shown on drawing 2016497.

3.1.10 Route wires cut step 3.1.7 as shown on drawing 2016497, sheet 1.

3.1.11 Lace (temporary lacing) jumpers and wires in place.

3.1.12 Fabricate jumpers using electrical wire (QQ-W-343, type S, AWG 22, soft coated a) by cutting to length to fit the following:

FROM:	TO:
S1E-5	S1E-8
S1E-10	S1B-1

3.1.13 Sleeve (1006776-21) wire and solder to the above locations per ND1002071.

3.1.14 Remove pins "A" and "Z" from P1 connector (these are dummy pins) using applicable removal tool.

3.1.15 Using white wire (MIL-W-16878/4E22) and two crimp pins (MS3192A20A) provided in kit, fabricate a jumper by stripping wire ends 1/4-inch and crimp pins to wire per ND1002206.

3.1.16 Insert finished jumper into "A" and "Z" locations in P1 connector.

3.1.17 Install Standoffs (1015981-009), provided in kit, to holes drilled in cover (step 3.1.3) and then install Component Board Assembly (2016499), provided in kit, to the Standoffs as shown in drawing 2014392.

3.1.18 Measure, cut and trim unattached wires from P1 per the information chart, sheet 2 of 2016497, and solder per ND 1002071 to designated points on the Component Board just installed.

3.1.19 Repeat step 3.1.18 for P3 wires.

3.1.20 Permanently lace the harness per ND 1002032 and then install new zipper tubing (1006696-[illegible]) provided in kit, per the notes in drawing 2016497 using solvent.

3.1.21 Reinstall cable clamps removed in step 3.1.5 and the bandmarker (P3/J6), also retained from that step, and the new bandmarker (1006415-131) provided in kit.

3.1.22 Reassemble connector strain relief clamps and bushings (P1 and P3 connectors - see step 3.1.6).

3.1.23 Reinstall cover (removed step 3.1.1) into housing using retained hardware.

3.2 Reidentify the Self Test Assembly (2014392-021) by removing the nameplate with a pocket knife (do not mar finish) and proceeding as follows:

3.2.1 Remove all adhesive residue with Methyl Ethyl Ketone and cotton swabs.

WARNING:
MEK is flammable and toxic.
Use with adequate ventilation
and avoid open flame.

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3.2.2 Remove new nameplate (1004260-289) from kit and stencil same serial number per ND1002019 using black ink and brush or air-operated equipment.

3.2.3 Reference drawing 2014392 and install new nameplate per the notes on that drawing.

3.3 Retrofit Buffer Circuit Assembly, part no. 2014254-031, using retrofit kit 8104239 as follows:

3.3.1 Remove (2) covers (1020310) and retain covers and hardware for reassembly.

3.3.2 Reference drawings 2016500 and 2016501 and drill holes two places (located on the drawing by the 5.312 dimension). These holes will be used to install the W1 Bus Bar in a later step.

3.3.3 Using Heli-coil insertion tool, insert (2) Heli-coils into drill holes after they have been prepared (tapped) per requirements of drawings. Install per MS33646. Heli-coils are provided in kit.

3.3.4 Desolder from Component Board A4 nine (9) resistors which are identified as R1-1 through R1-9. Dispose of these resistors per paragraph IX of this RIB.

3.3.5 Remove from retrofit kit (9) resistors (1006750-16) (220 ohm) and solder these resistors to the same locations as those removed in step 3.3.4, soldering per ND 1002071.

3.3.6 Desolder from Conponent Board A3 (2014262-021) twenty-three (23) resistors which are identified as R1-1 through R1-8 and R1-23 through R1-27.

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3.3.7 Remove from retrofit kit twenty-three (23) resistors (1006750-16) (220 ohm) and solder these resistors to the same locations as those removed in step 3.3.6.

3.3.7.1 Locate "-021" stenciling on component board A3 and remove using Chem-Stripper and cotton swabs.

3.3.7.2 Neutralize Chem-Stripper and restencil "-031" using provided stencil and white ink per ND1002019.

3.3.8 Turn over the Buffer Circuit Assy and resolder any printed circuit terminals which may have been loosened up during performance of steps 3.3.4 through 3.3.7 to insure good electrical contact.

3.3.9 Remove retrofit kit the W1 Bus Bar and install it to the Buffer Circuit Assembly using screws (MS51957-16) and applicable washers, also supplied in kit. Reference drawing 2014254 for the placement of this bus bar.

3.3.10 Remove from retrofit kit the premarked jumper wires with attached terminal lugs.

3.3.11 Determine proper length of jumpers by referring to jumper list on drawing 2014254. Cut and trim each jumper to a length that will allow the jumper to be attached (soldered) to an "E" point and to the bus bar in the shortest possible distance.

NOTE: Retrofit personnel may prefer cutting and soldering one wire at a time rather than cutting all the wires and then soldering. It is arbitrary.

3.3.12 Solder respective jumpers to "E" points shown in jumper list, soldering per ND1002071. Remove screws retaining component Board A4 so that it may be turned over. Retain screws.

3.3.13 Attach jumpers to bus bar using hardware supplied in retrofit kit.

NOTE: There are fourteen (14) terminals on the bus bar. It will be necessary to double up jumpers at intervals.

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3.3.14 Remove from retrofit kit one (1) orange wire (code identification H3) and one (1) black wire (code identification H23). Using crimping tool, crimp electrical contacts (MS3193A20A), also provided in kit, to these wires.

3.3.15 Unscrew J4 captive ring (inside of Buffer Circuit Assembly) and dislodge compressor ring. Slide both rings back over the harness.

NOTE: Contacts connot be inserted to connector unless pressure is relieved by performing step 3.3.15.

3.3.16 Insert wires from step 3.3.14 to J4 connector (through rings moved back in step 3.3.15 to locations "N" and "M" as follows:
H23 (black) to N
H3 (orange) to M

3.3.17 Solder the free end of the orange wire at A3-E99 (solder per ND 1002071).

3.3.18 Attach lug end of black wire to W1 bus bar.

3.3.19 Replace rings moved back in step 3.3.15.

3.3.20 Lace both wires to existing harness.

3.3.20.1 Locate "-031" stenciling on component board A4 and remove using Chem-Stripper and cotton swabs.

3.3.20.2 Neutralize Chem-Stripper and restencil "-041" using provided stencil and white ink per ND1002019.

3.3.21 Reinstall the Component Board A4 (2014267-041) to the Buffer Circuit Assembly using hardware retained from 3.3.12.

3.3.22 Reinstall the two covers removed in step 3.3.1 using covers and hardware retained from that step.

3.4 Reidentify the Buffer Circuit Assembly, part no. 2014254-031, by removing existing nameplate with a pocket knife (do not mar finish) and proceeding as follows:

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3.4.1 Remove all adhesive residue with Methyl Ethyl Ketone and cotton swabs.

WARNING:
MEK is flammable and toxic.
Use with adequate ventilation
and avoid open flame.

3.4.2 Remove new nameplate (1004260-29?) from retrofit kit and install it to the same location using adhesive MIL-A-5092, Type II.

4. Retest Procedure. Retest to the following JDCs:

1) 05126
2) 05451
3) 05143
4) 05144
5) 05172
6) 05153
7) 05154
8) 05155
9) 05156
10) 05160
11) 05161
12) 05162
13) 05450
14) 05453

VIII. **MODIFICATION DESIGNATION:**

1. Remove from kit 8104238 nameplate, part no. 1004260-287, and, using stencil provided in kit, stencil serial number with black ink and brush or air-operated equipment.

NOTE: Same serial number as removed nameplate.

2. Using button head drive screws, part no. AN 535-4-4, supplied in kit 8104238, secure the nameplate to the Computer Test Set in the same location as nameplate removed in step 2.1.

IX. **DISPOSITION OF REMOVED PARTS:**

Scrap all removed parts.

X. **REPORT OF ACCOMPLISHMENT:**

Complete AC Form 1 and Raytheon Form 53-9208 and return to applicable addressees.

[illegible]

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NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
COMPUTER TEST SET NEWSPEAK PROGRAM AND G&N TEST
AUTHORIZED BY ECP 0536 + ECP 0674
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis D. Smith Date Aug 8, 1967

P.C. Engineering Approval AJ Mariano Date 11/10/67

DRB Approval Date 10/30/67 31 Oct 67

MIT Reliability Approval ______ Date ______

MIT/IL Approval ______ Date ______

NASA Approval Date 11/7/67

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I. **PURPOSE:**

Changes to the Computer Test Set, part no. 201402-061, modifying electrical functions in the Newspeak Program to enhance its diagnostic capability and aid in determining specific AGC restart problems. Changes to G&N Test Set, part no. 2014255-041, to reduce system noise.

II. **AUTHORITY:**

This retrofit is authorized by ECP - 0536, CCA 497-0518, and ECP-0674, CCA 497-533

III. **UNITS AFFECTED:**

Name	Part No.	Retrofit S/N's	New Part No.
Computer Test Set	2014042-061	RAY 3,5-8,11, 13-16,19-26	2014043-071
Logic Drawer Assembly No.1	2014036-041	Para.VII 1.5	2014036-051
Logic Drawer Assembly No.2	2014037-041	Para.VII 1.5	2014037-051
Logic Plate Assembly No. 4 Logic Drawer No. 1	2014218-011	Para.VII 1.5	2014218-021
Logic Plate Assembly No. 5 L gic Drawer No. 1	2014219-041	Para.VII 1.5	2014219-051
Logic Plate Assembly No. 6 Logic Drawer No. 1	2014228-041	Para.VII 1.5	2014228-051
Logic Plate Assembly No. 6 Logic Drawer No. 2	2014229-021	Para.VII 1.5	2014229-031
P & M Drawer	2014041-051	Para.VII 1.5	2014041-061
P & M Drawer, Logic Plate No.1	2014352-021	Para.VII 1.5	2014352-031
Error Panel Assembly P & M	[illegible]	Para.VII 1.5	[illegible]
Connector Plate Assembly	2014275-061	Para.VII 1.5	2014275-071
Logic Plate Assy No. 5 Logic Drawer No. 2	2014223-021	Para. VII 1.5	2014223-031

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Name	Part No.	Retrofit S/N's	New Part No.
P&M Drawer, Logic Plate No. 2	2014315-021	Para. VII 1.5	2014315-031
P&M Drawer, Logic Plate No. 3	2014336-051	Para. VII 1.5	2014336-061
Interconnection Plate Assembly,A18	2014046-031	Para. VII 1.5	2014046-041
Self Test Assembly	2014392-011	Para. VII 1.5	2014392-021
AGC/GSE Interconnection Set - G&N Test	2014255-041	RAY 2-4, 6-10, 12-13, 15-22	2014255-051
Self Test Assy	[illegible]	Para. VII 1.5	[illegible]
Buffer Circuit Assembly	2014254-031	Para. VII 1.5	2014254-041

IV. **PRIORITY CHANGES:**

None.

V. **RELATED CHANGES:**

None.

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104235, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Kit Assembly (CTS)	8104238
b.	1	Retrofit Kit Assembly (G&N TEST)	8104239

2. Material Required but not supplied in kits:

Item	Qty	Nomenclauture	Part No.
a.	A/R	Chem-Stripper	N/A
b.	A/R	Isopropyl Alcohol	TT-I-735

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Item	Qty	Nomenclature	Part No.
c.	A/R	Adhesive	MIL-A-5092 Type II
d.	A/R	Methyl Ethyl Ketone (MEK)	TT-M261
e.	A/R	Solder	MD 1002075
f.	A/R	Sealing and Retaining Compound	MIL-S-22473 GR HV
g.	A/R	Grey Paint	TT-E-529
h.	A/R	Chromate	MIL-C-5541
i.	A/R	Solvent Sealer (for zipper tubing)	1006699
j.	A/R	Adhesive (for bandmarkers)	1006253

3. Recommended tools required but not supplied

Item	Qty	Nomenclature	Part No.
a.	1	Pocket Knife	N/A
b.	A/R	Cotton Swabs	N/A
c.	1	Stenciling tool, brush or air-operated equipment	N/A
d.	1	Diagonal pliers	Kraeuter #GG-5402
e.	1	Screwdriver	Snap-On #SSD-8
f.	1	Cross-Tip Screwdriver	Snap-On #SSDP-63
g.	1	Soldering Gun Handle	Ungar #766
h.	1	Soldering Tip	Ungar #4039
i.	1	Desoldering Kit	Unger #270
j.	1	Wirewrap Gun	14B1-C

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Item	Qty	Nomenclature	Part No.
k.	1	Wirewrap Bit	26263
l.	1	Sleeve	18840
m.	1	Cutting and Skinning Accessories	A25406-1
n.	1	Wirewrap Extraction Tool	500130
o.	1	Crimping Tool	MS 3191-1
p.	1	Extracting Tool (Bendix & Burndy connectors)	N/A
q.	1	Heli-coil Insert Tool (4-40)	Heli-coil 7551-04
r.	1	Plug Tap	Heli-coil 04CPBH1
s.	1	Drill (size 29) (.136)	N/A
t.	1	Drill (size 31) (.120)	N/A
u.	1	Cold Chisel	Stanley #443
v.	1	Ball Peen Hammer	Stanley #310
w.	1	File Set	60 S X-Acto
x.	1	Mirror (2" square)	N/A
Y.	1	WIRE STRIPPER	IDEAL 45-187
Z.	1	ELECTRIC HAND DRILL ¼"	N/A
AA.	1	POSITIONER	MS3191-20A
AB.	1	INSERTION TOOL (BENDIX & BURNDY CONNECTORS)	N/A

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4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Computer Test Set Assembly Drawing	2014042
b.	Logic Diagram	2016473
c.	Logic Drawer Assembly No. 1 Drawing	2014036
d.	Logic Diagram	2016474
e.	Logic Drawer Assembly No. 2 Drawing	2014037
f.	P & M Drawer Assembly	2014041
g.	Logic Plate Assembly No. 4, Logic Drawer No. 1	2014218
h.	AGC/GSE Interconnection Diagram	2016402
i.	Logic Plate Assembly No. 5, Logic Drawer No. 1	2014219
j.	AGC/GSE Interconnection Diagram	2016403
k.	Logic Plate Assembly No. 6, Logic Drawer No. 1	2014228
l.	AGC/GSE Interconnection Diagram	2016405
m.	Logic Plate Assembly No. 6, Logic Drawer No. 2	2014229
n.	AGC/GSE Interconnection Diagram	2016417
o.	P & M Drawer Assembly Drawing	2014315
p.	AGC/GSE Interconnection Diagram	2016418
q.	P & M Drawer, Logic Plate No. 1	2014352

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Item	Nomenclature	Document No.
r.	Interconnection Diagram	2016454
s.	Interconnection Diagram	2016455
t.	P & M Drawer, Logic Plate No. 3	2014336
u.	Procurement Specification, CTS	PS2016026
v.	Interconnection Plate Assembly, A18 Plate	2014046
w.	Logic Diagram, Drawer #1, PLT 4	2016477
x.	Self Test Assembly Drawing	2014392
y.	Logic Diagram Drawer #1, PLT 5	2016478
z.	Electrical Schematic	2016486
aa.	Logic Diagram Drawer #1, PLT 6	2016474
bb.	Wiring Harness	2014190
cc.	P & M Front Panel (Electrical Schematic)	2016487
dd.	Interconnection Plate A18, Wirewrap List	2016484
ee.	Crimping of Solder-Less Connectors	ND 1002206
ff.	Interconnection Diagram	2016456
gg.	Workmanship Standard	AC-STD-1 (3 March 64)
hh.	Interconnection Diagram	2016443
ii.	General Specifications for Marking	ND 1002019
jj.	Connector Plate Assembly, A18	2014275

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Item	Nomenclature	Document No.
kk.	Process Specification, Soldering of Electrical Connections	ND 1002071
ll.	Logic Diagram Plate 1, P & M	2016488
mm.	Logic Diagram	2016491
nn.	Interconnection Diagram	2016451
oo.	Front Panel Assembly, P & M	2014231
pp.	Front Panel	2014230
qq.	AGC/GSE Interconnection Set (Procure. Spec.)	PS 2016004
rr.	Electrical Schematic, Self Test	2016493
ss.	Self Test Assembly	2014366
tt.	Logic Diagram - Logic Drawer 2 - Plate 5	2016494
uu.	Logic Plate Assembly No. 5, Drawer 2	2014223
vv.	Buffer Circuit Assembly	2014254
ww.	Mounting Support	2016500
xx.	Mounting Support	2016501
yy.	Self Test Assembly	2014392
zz.	Cover Assembly	2016495

Item	Nomenclature	Document No.
aaa.	Wiring Harness	2016497
bbb.	Schematic - Self Test	2016486
ccc.	Schematic - Buffer Cir.	2016502

VII **PROCEDURE**

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outline herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial Number marked after retrofit shall be the same number as before retrofit.

2. Retrofit Computer Test Set, part number 2014042-061, using retrofit kit 8104238 as follows:

2.1 Remove the Computer Test Set nameplate located at

---

the front center of the cabinet by filing off the heads of the drive screws. Drive the remaining portion of the drive screws into cabinet and dispose of nameplate per paragraph IX of this RIB.

2.2 Retrofit the Programmer and Monitor Assembly, part number 2014041-051, as follows:

2.2.1 Release the P & M Drawer Assembly and pull to slide lock position. Disconnect all connectors and grounding strap and remove drawer from cabinet.

2.2.2 Remove nameplate from side of P & M Drawer using a pocket knife. Dispose of nameplate per paragraph IX.

2.2.3 Remove excess adhesive using MEK and cotton swabs.

WARNING:

Methyl Ethyl Ketone is toxic and flammable. Use only in a well ventilated area and avoid open flame.

2.2.4 Lift Logic Plate Assembly No. 1 to the slide lock position and disconnect logic plate cable connectors. Remove plate from assembly.

2.2.5 Repeat step 2.2.4 for Logic Assembly No. 2 and No. 3.

2.2.6 Remove rear black protective cover from plate assemblies. Retain hardware.

2.2.7 Remove from kit (1) NOR Module (1014034), (2) lock washers (MS35338-79), (2) flat washers (1006997), (2) machine screws (MS51957-29), (2) program standoffs (1014212), and stencil marked "AC". Reference drawing 2014315 and proceed as follows:

2.2.7.1 Stencil "AC" at location A34 per ND 1002019.

2.2.7.2 Assemble NOR Module in location A34 with hardware from step 2.2.7 according to drawing 2014315.

NOTE: Step 2.2.7 applies to Logic Plate No. 2 only.

2.2.8 Using Wire wrap installation and removal tools, remove and add wire (1006945-1, blue) between the following pins on wirewrap plate of Logic Plate Assembly No. 2.

NOTE: Remove Z3 (top) level first, Z2 (middle) level second, Z1 (bottom) level last. Install Z1 (bottom) level first, Z2 level second, Z3 level last.

REMOVE

FROM	TO	ZL	CKT. OR SIG.	CARD#	
A14-11	A12-04	1	43-01	1290	U P
A15-02	A16-02	1	40-01	1074	U P
A16-12	A18-02	1	57-01	1077	U P
A11-19	A13-19	2	322-03	*	
A11-19	A12-19	1	322-04	1064	U P
A12-19	A12-17	2	322-05	2257	U P
A12-15	A12-17	1	322-06	1228	U P
A12-13	A12-15	2	322-07	*	
A12-13	A16-13	1	322-08	1069	U P
A16-13	B05-10	2	322-09	2068	U P
A12-07	A14-07	1	42-01	1072	U P
A12-16	A17-02	2	55-01	2070	U P
A12-09	A14-17	1	41-01	1291	U P
A12-18	A17-17	1	56-01	1356	U P
A5-07	A31-14	1	34-01	1372	U
A16-01	A19-01	2	326-29	2162	U
A12-01	A16-01	1	326-30	1070	U
A11-01	A12-01	2	326-31	*	

(* indicates wire removal to gain access to lower Z level).

NOTE: Where capacitors are removed during retrofit, insure that capacitors are reinstalled and soldered per ND 1002071 (use heat sink if necessary when desoldering and soldering).

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD #
B5-04	A12-04	1	43-01	1290
A12-01	A19-01	3	326-30	3206
B6-16	A18-02	1	57-01	1077
A11-19	A13-19	2	322-03	*
A11-19	A14-18	1	322-04	1064
A14-18	A14-09	2	322-05	2257
A12-15	A14-09	1	322-06	1228
A12-13	A12-15	2	322-07	*
A12-13	B05-10	3	322-08	3018
A11-01	A12-01	2	326-31	*
A17-02	A14-07	1	42-01	1072
A17-08	A16-02	2	55-03	2162
A17-17	A14-17	1	41-01	1291
A10-08	A17-08	1	55-02	1356
B6-05	A10-08	2	55-01	2070
A5-07	B4-05	1	34-01	1372
A10-07	A34-02	1	337-01	1069
A17-11	A34-03	1	338-01	1074
A17-07	A34-06	2	339-01	2068
A18-11	A34-07	2	340-01	2279
A34-12	A34-16	2	341-01	2280
A34-16	A34-04	3	341-02	3019
A34-14	A33-08	2	342-01	2281
B4-03	A34-09	2	343-01	2282
A34-18	A33-19	2	344-01	2283
A33-18	A33-06	2	345-01	2284
A33-09	A33-02	2	346-01	2285
A33-02	A33-16	3	346-02	3020
A33-12	B35-02	2	347-01	2286

2.2.8.1 Add capacitor (CS13BF105K), provided in kit, in position as follows: (Ref. Designation C10).

NOTE: Do not add capacitor until all wirewrapping has been completed. See asterisks ($) next page.

From	To
A12-09	A14-20

NOTE: Solder & sleeve as shown in detail A of drawing 2014315. Use sleeving 1006271-10& MIL-I-631 supplied in kit.

ADD (cont)

FROM	TO	ZL	CKT. OR SIG.	CARD#
A31-07	A33-07	2	280-11	2287
A31-03	A33-17	2	196-02	2288
A33-11	A33-10	2	326-41	2289
A33-10	A33-01	3	326-42	3021
A33-01	A34-10	2	326-43	2290
A34-10	A34-11	3	326-44	3022
B4-04	A12-07	2	348-01	2291
A12-07	A12-05	3	348-02	3023
A12-05	A14-10	2	348-03	2292
A14-19	A14-08	3	348-04	3024
A14-08	B35-19	2	348-05	2293
A33-16	A16-12	2	346-03	2294
A2-09	A34-08	2	349-01	2295
A34-08	A34-05	3	349-02	3025
A12-09	A31-14	1	350-01	1070
A12-08	A12-16	2	351-01	2296
B6-13	A12-18	2	352-01	2297

*Add capacitor per step 2.2.8.1.

2.2.9 Using wirewrap installing and removal tools, remove and add wire (1006934-1 blue) between the following pins on wirewrap plate of Logic Plate Assembly No. 3.

NOTE: Reference notes in step 2.2.8.

REMOVE

FROM	TO	ZL	CKT. OR SIG.	CARD#	
A28-11	B28-17	1	151-01	1241	U P
B28-17	A30-08	2	151-02	2019	U P
B29-06	B34-11	2	260-09	*	
B28-06	B29-06	1	260-10	1131	U P
B17-06	B28-06	2	260-11	2201	U P
B3-16	B28-16	1	13-01	1203	U P
A7-01	A8-01	3	262-49	3023	U P
B31-17	B34-09	1	72-01	1312	U P

(*indicates wire removed only to gain access to lower Z level)

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD#	
A7-17	B34-04	2	109-02	2316	GOJAM
A30-04	A25-05	3	259-07	3043	BLK 2
B34-10	A35-19	3	259-10	3044	BLK 2
B17-19	A25-15	3	38-02	3045	
A11-09	A35-09	3	190-02	3046	
A35-18	B35-16	2	298-01	2317	EPAL
B29-19	A35-08	2	79-02	2318	T5
B12-12	B12-08	2	299-01	2319	PROG RST
B12-08	B13-12	3	299-02	3047	
B13-12	B14-12	2	299-03	2320	
B14-12	B15-08	3	299-04	3048	
B15-08	A25-14	2	299-05	3221	
A25-14	B35-05	3	299-06	3049	
A25-04	B25-03	3	273-00	3050	SRE
A28-11	A30-08	1	151-01	1241	
B28-17	B14-11	2	301-01	2019	
B29-06	B34-11	2	260-09	*	
B17-06	B29-06	3	206-10	3023	
B13-11	B28-06	2	300-01	2201	
B33-03	B28-16	1	302-01	1203	
B28-16	A8-12	2	302-02	2322	
B13-08	B12-12	3	299-00	3051	
B15-07	A8-02	2	303-01	2323	
B12-07	A8-03	2	304-01	2324	
B12-11	A8-13	2	305-01	2325	
B13-07	B28-07	1	306-01	1131	
B31-17	B33-05	1	72-01	1312	
A32-04	B35-13	2	307-01	2326	
B20-19	B34-09	2	308-01	2327	
B19-09	B20-09	3	264-13	3052	
A5-03	A18-09	2	309-01	2328	
A18-09	A18-01	3	309-02	3053	
A18-01	A31-01	2	309-03	2329	
A31-01	A31-03	3	309-04	3054	
A31-03	A31-08	2	309-05	2330	
A31-08	B33-04	3	309-06	3055	

2.2.9.1 Solder capacitor (CY15C471J) (Ref. Designation C24) in position (From: A05-02, To A05-20).

2.2.9.2 Solder capacitor (CS13AF010K) between pins B34-13 and B34-20.

2.2.10 Using wirewrap installing tools add wire (1006934-1 blue) between the following pins on wirewrap plate of Logic Plate Assembly No.1.

NOTE: Reference notes in step 2.2.8.

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD #
B1-19	B35-02	2	321-01	2272
B1-18	B35-19	2	322-01	2273

2.2.11 Remove stencil "-021" from part number on Logic Plate No. 1 using Chem-Stripper and cotton swabs as required.

2.2.12 Neutralize Chem-Stripper using isopropyl alcohol and cotton swabs as required.

2.2.13 Using stencil provided in kit, locate new stencil "-031" and mark using white ink and air brush or bursh per ND 1002019.

2.2.14 Remove stencil "-021" from part number on Logic Plate No. 2 using Chem-Stripper and cotton swabs as required.

2.2.15 Neutralize Chem-Stripper using isopropyl alcohol and cotton swabs as required.

2.2.16 Using stencil provided in kit, locate new stencil "-031" and mark using white ink and brush or brush per ND 1002019.

2.2.17 Repeat steps 2.2.14, 15, and 16 for Logic Plate No. 3 using stencil "-061" provided in kit.

2.2.18 Replace protective black cover using retained hardware and staking compound furnished in kit and re-mount Logic Plate Assembly No.1 onto support brackets in chassis. Attach cable connectors, lower the plate and secure.

2.2.19 Repeat step 2.2.18 for Logic Plate Assembly No. 2, and Logic Plate Assembly No. 3.

2.2.20 Refer to drawing 2014041. Bond nameplate (1004260-286), supplied in kit, to the indicated location on the P&M Drawer useing adhesive (MIL-A-5092, Type II) and cotton swabs.

2.2.21 Note serial number on nameplate removed in step 2.2.2. Stencil same number in applicable block on new nameplate using black ink and stencil, provided in kit, and air brush or brush per ND 1002019.

2.2.25 Remount P&M Drawer onto cabinet slides. Connect rear cable connectors, push unit into cabinet and secure in place using handle hardware.

2.3 Retrofit Logic Drawer No. 1, part number 2014036-041, using retrofit kit 8104238 as follows:

2.3.1 Release Logic Drawer Assembly No. 1 from cabinet. Disconnect rear cable connectors and remove unit from cabinet.

2.3.2 Remove nameplate on side of chassis useing a pocket knife and dispose of this nameplate per paragraph IX of this RIB.

2.3.3 Remove excess adhesive with Methyl Ethyl Ketone and cotton swabs.

WARNING:

Methyl Ethyl Ketone is toxic and flammable. Use only in a well ventilated area and avoid open flame.

2.3.4 Lift Logic Plate Assembly No. 4 to slide lock position and disconnect Logic Plate cable connectors. Remove Plate from unit.

2.3.5 Repeat step 2.3.4 for Logic Plate Assembly No. 5.

2.3.6 Pivot Front Panel of Logic Drawer into down position.

2.3.7 Release Interconnector Plate Assembly No. 6 and pivot into down position.

2.3.8 Remove all cable connectors from rear of Interconnection Plate Assembly.

2.3.9 Remove hardware securing Interconnection Plate Pivot bracket to bottom of unit chassis. Remove Interconnection Plate from unit and retain mounting hardware.

2.3.10 Remove rear black protective cover from Plate Assembly No. 4. Retain hardware for reassembly.

2.3.11 Repeat step 2.3.10 for Logic Plate Assembly No. 5.

2.3.12 Repeat step 2.3.10 Interconnection Plate Assembly No. 6.

2.3.13 Using wirewrap tools, add wire (1006945, blue) between the following pins on wirewrap plate for Logic Plate Assembly No. 4.

NOTE: Reference note in step 2.2.8.

ADD

FROM	TO	ZL	CKT. OR. SIG.	CARD#
B2-11	B34-07	2	277-01	2320 WORLOC

2.3.14 Using wirewrap tools, add wire (1006945, blue) between the following pins on wirewrap plate for Logic Plate Assembly No. 5.

FROM	TO	ZL	CKT. OR SIG.	CARD#
A12-8	A16-6	2	295-03	2305
A12-9	B13-8	3	169-02	3036
A12-19	B2-10	3	258-00	3037
A12-18	B7-03	3	294-00	3038

(continued on next page)

NOTE: Reference note in step 2.2.8

ADD

FROM	TO	ZL	CKT. OR SIG.	CARD#
B7-03	B8-03	2	294-01	2291
B8-03	A11-16	3	294-02	3021
A11-16	A16-16	2	294-03	2292
A16-16	A16-05	3	294-04	3022
A16-05	A16-08	2	294-05	2293
A16-08	A16-03	3	294-06	3023
A16-03	B16-03	2	294-07	2296
B16-03	A18-05	3	294-08	3024
A18-05	A18-03	2	294-09	2298
A18-03	A24-13	3	294-10	3026
A24-13	A24-05	2	294-11	2299
A24-05	A25-13	3	294-12	3027
A25-13	A26-02	2	294-13	2300
A26-02	A26-04	3	294-14	3028
A26-04	A32-03	2	294-15	2301
A32-03	A32-15	3	294-16	3029
A11-06	A16-06	3	295-02	3030
B9-16	A3-18	3	9-02	3031
B12-12	A26-14	2	23-02	2302
A16-18	A19-08	2	296-01	2303
A3-12	A19-17	2	297-01	2304
A14-10	A16-10	3	231-39	3032
A21-09	A19-09	3	233-08	3033
A3-01	A11-06	2	295-01	2294
A26-12	B26-02	2	123-00	2295
B2-10	A11-17	2	258-02	2297
A10-08	A11-07	3	169-07	3025
B16-19	A16-17	3	169-04	3034
A11-17	A16-07	3	258-03	3035

2.3.15 Using wirewrap tools, add wirewrap wire (1006945, blue) between the following pins on wirewrap plate for Interconnection Plate No. 6. REFERENCE NOTE IN STEP 2.2.8.

FROM	TO	ZL	CKT. OR SIG.	CARD #
B1-11	A32-01	2	439-01	2254
A32-12	A26-11	2	440-01	2255
A26-11	B1-12	3	440-02	3058
B16-09	A32-18	2	441-01	2256

2.3.16 Remove stenciled dash numbers from plates 4, 5, and 6 using cotton swabs and Chem-Stripper.

2.3.17 Neutralize the action of Chem-Stripper using cotton swabs and isoproply alcohol.

2.3.18 Stencil in new dash numbers using the stencil provided in kit, white ink and brush or air brush as follows:

2.3.18.1 Plate No. 4, 2014218-011 becomes -021.

2.3.18.2 Plate No. 5, 2014219-041 becomes -051.

2.3.18.3 Plate No. 6, 2014228-041 becomes -051.

2.3.19 Re-install black cover removed from Logic Plate Assembly No. 4 and secure using hardware retained from step 2.3.10, and staking compound furnished in kit.

2.3.20 Repeat step 2.3.19 for Logic Plate Assembly No.5.

2.3.21 Repeat step 2.3.19 for Interconnection Plate No. 6.

2.3.22 Re-mount Interconnection Plate Assembly No. 6 into chassis and assembly pivot brackets to bottom of chassis using retained hardware.

2.3.23 Reconnect all cable connectors to Interconnection Plate No. 6 and pivot into up position. Secure in plate.

2.3.24 Pivot Front Panel into up position and secure in place.

2.3.25 Re-mount Logic Plate Assembly No. 5 onto support brackets in chassis. Attach cable connectors, lower plate and secure in place.

2.3.26 Repeat step 2.3.25 for Logic Plate Assembly No. 4.

2.3.27 Refer to engineering drawing 2014036. Locate new nameplate (1004260-288), supplied in kit, on side of Logic Drawer No. 1. Bond using adhesive (MIL-A-5092, Type II) and cotton swabs.

2.3.28 Note serial number on nameplate removed in step 2.3.2. Stencil same number in the appropriate block on new nameplate using stencil provided in kit ("RAY" etc.), black ink and brush or air operated equipment.

2.3.29 Re-mount Logic Drawer Assembly No. 1 onto cabinet slides, connect rear cable connectors and grounding strap, push unit into cabinet and secure in place using handle hardware.

2.4 Retrofit the A18 Interconnection Plate Assembly, part no. 2014046-031, as follows:

2.4.1 Remove rear cover, between cabinet doors, by loosening screws. This exposes A18 Interconnection Plate wirewrap. Retain cover and mounting hardware.

2.4.2 Using wirewrap removal tools, remove wire from the following pins on wirewrap plate A2 of the A18 Interconnection Plate Assembly:

REMOVE

FROM	TO	ZL	CIRCUIT	CARD NO.
A2-07-04	A2-20-04	1	26-01	1024

ADD

FROM	TO	ZL	CIRCUIT	CARD NO.
A2-37-18	A2-11-18	2	111-01	2125
A2-10-18	A2-37-08	2	112-01	2126

2.4.3 Using wirewrap installation tools, add wire (1006271-1) between the following pins on the A18 Interconnection Plate Assembly.

ADD

FROM	TO	ZL	CIRCUIT	CARD NO.
A1-6-02	A2-24-05	3	516-01	H515
A2-8-14	A3-15-02	3	517-01	H516

2.4.4 Replace rear protective cover over A18 interconnection wirewrap pins, between rear doors, using retained hardware and cover from step 2.4.1.

2.4.5 Locate with aid of mirror part number "2014046-031" stenciled on the A18 Interconnection Plate Assembly. Remove the "031" using Chem-Stripper and Cotton swabs.

2.4.6 Neutralize the action of Chem-Stripper with isopropyl alcohol and cotton swabs.

2.4.7 Using stencil provided in kit, stencil "041" with white ink and brush or air-operated equipment per ND 1002019.

2.4.8 With aid of mirror, locate part number "2014875-061" on bottom of A18 Connector Plate. Remove -061 using Chem-Stripper and cotton swabs.

2.4.9 Repeat steps 2.4.6 & 2.4.7. except new dash number to be -071.

2.5 Retrofit Logic Drawer No. 2, part number 2014037-041, using retrofit kit 8104238 as follows:

2.5.1 Release Logic Drawer Assembly No. 2 from cabinet. Disconnect rear cable connector and grounding strap and remove unit from cabinet.

2.5.2 Remove nameplate on side of chassis using a pocket knife and dispose of this nameplate per paragraph IX of this RIB.

2.5.3 Remove excess adhesive with Methyl Ethyl Ketone and cotton swabs.

WARNING:
Methyl Ethyl Ketone is toxic
and flammable. Use only in
a well ventilated area and
avoid open flame.

2.5.4 Remove Logic Plate Assembly No. 6 following the same procedures as described in steps 2.3.6 through 2.3.9, and then remove black cover (retain hardware).

2.5.5 Using wirewrap tools, add wire (1006945, blue) between the following pins on wirewrap plate for Logic Plate Assembly No. 6.

NOTE: Reference note in step 2.2.8.

FROM	TO	ZL	CKT. OR SIG.	CARD #
B5-19	B31-11	2	454-01	2221
B1-01	B31-13	2	455-01	2222
A30-11	B32-03	2	456-01	2223

2.5.6 Remove stenciled dash number "-021" from plate No. 6 using cotton swabs and Chem-Stripper.

2.5.7 Neutralize the action of Chem-Stripper using cotton swabs and isopropyl alcohol.

2.5.8 Stencil in new dash number "-031" using the stencil provided in kit, white ink and brush or air brush per ND 1002019.

2.5.9 Reinstall black cover, using retained hardware and staking compound supplied in kit.

2.5.10 Re-Mount Logic Plate Assembly No. 6 onto support brackets in Logic Drawer No. 2. Reinstall connectors and secure.

2.5.11 Remove Logic Plate Assembly No. 5 following same procedures as described in step 2.5.4.

2.5.12 Add wire as in step 2.5.5 to the following pins:

FROM	TO	ZL	CKT. OR SIG.	CARD #
B6-13	B31-06	2	90-02	2348
A1-11	B31-16	2	280-01	2349

2.5.13 Reidentify and reinstall same as steps 2.5.6 through 2.5.10.

2.5.14 Refer to engineering drawing 2014037. Locate new nameplate (1004260-290), supplied in kit, on side of Logic Drawer No. 2. Bond using adhesive (MIL-A-5092, Type II) and cotton swabs.

2.5.15 Note serial number on removed nameplate and stencil same number in the applicable block on new nameplate using stencil provided in kit ("RAY" etc.), black ink and brush or air operated equipment.

2.5.16 Re-mount Logic Drawer No. 2 into cabinet, connect rear cable connectors and grounding strap. Slide drawer in and secure.

2.6 Retrofit Self Test Assembly from part number [illegible]-041 to an -051 configuration by replacing existing nameplate with nameplate ([illegible]-2[illegible]) provided in retrofit kit 8[illegible]. Perform the changes in steps [illegible], [illegible], 2.4.1[illegible] and 2.5.18. Reference drawing [illegible]

3. Retrofit AGC/GSE Interconnection Set, G&N Test, part no 2014255-041, using retrofit kit 8104239 as follows:

3.1 Retrofit Self Test Assembly (2014392-021) as follows:

3.1.1 Remove Cover Assembly (2016495) from Housing (2014413) retaining hardware for reassembly.

3.1.2 Delete tabs (both sides) on the four (4) grommets on the Cover Assembly (tabs are deleted to make way for the installation of the standoffs).

3.1.3 Reference drawing 2016495 and drill four (4) holes in the Cover Assembly per the requirements of that drawing. Use a number 29 drill.

NOTE: Drilled holes will be utilized for the installation of the Standoffs (1015981-009) in a forthcoming step.

3.1.4 Remove burrs from drill holes, chromate and touch up with gray paint as defined in "Notes" of drawing 2016495.

3.1.5 Remove cable clamps and two bandmarkers (1006415-131 and P3/J6). Retain clamps and P3/J6 bandmarker (care should be taken in removal of P3/J6 bandmarker so that it may be reused). Scrap large bandmarker.

3.1.6 Remove zipper tubing, undo lacing, remove strain relief clamp and pull back bushing on P1 connector. Repeat this procedure for the P3 connector and leg.

3.1.7 Cut harness leads A3 through A17 (code identification) back on the P3 leg as close to the P3 connector as possible.

NOTE: Do not cut short as wires are to be re-routed (observe 2016497, sheet 1).

3.1.8 Remove connector pins with cut wires from P3 connector (reference step 3.1.7).

3.1.9 Remove from retrofit kit preassembled leads (white, no. 22 wire) identified by code identification A131 through A147. Install them into proper connector location as shown on drawing 2016497.

3.1.10 Route wires cut step 3.1.7 as shown on drawing 2016497, sheet 1.

3.1.11 Lace (temporary lacing) jumpers and wires in place.

3.1.12 Fabricate jumpers using electrical wire (QQ-W-343, type S, AWG 22, soft coated a) by cutting to length to fit the following:

FROM:	**TO:**
S1E-5	S1E-8
S1E-10	S1B-1

3.1.13 Sleeve (1006776-21) wire and solder to the above locations per ND1002071.

3.1.14 Remove pins "A" and "Z" from P1 connector (these are dummy pins) using applicable removal tool.

3.1.15 Using white wire (MIL-W-16878/4E22) and two crimp pins (MS3192A20A), provided in kit, fabricate a jumper by stripping wire ends 1/4-inch and crimp pins to wire per ND1002206.

3.1.16 Insert finished jumper into "A" and "Z" locations in P1 connector.

3.1.17 Install Standoffs (1015981-009), provided in kit, to holes drilled in cover (step 3.1.3) and then install Component Board Assembly (2016499), provided in kit, to the Standoffs as shown in drawing 2014392.

3.1.18 Measure, cut and trim unattached wires from P1 per the information chart, sheet 2 of 2016497, and solder per ND 1002071 to designated points on the Component Board just installed.

3.1.19 Repeat step 3.1.18 for P3 wires.

3.1.20 Permanently lace the harness per ND 1002032 and then install new zipper tubing (1006696-2), provided in kit, per the notes in drawing 2016497 using solvent.

3.1.21 Reinstall cable clamps removed in step 3.1.5 and the bandmarker (P3/J6), also retained from that step, and the new bandmarker (1006415-131) provided in kit.

3.1.22 Reassemble connector strain relief clamps and bushings (P1 and P3 connectors - see step 3.1.6).

3.1.23 Reinstall cover (removed step 3.1.1) into housing using retained hardware.

3.2 Reidentify the Self Test Assembly (2014392-021) by removing the nameplate with a pocket knife (do not mar finish) and proceeding as follows:

3.2.1 Remove all adhesive residue with Methyl Ethyl Ketone and cotton swabs.

WARNING:
MEK is flammable and toxic.
Use with adequate ventilation
and avoid open flame.

3.2.2 Remove new nameplate (1004260-289) from kit and stencil same serial number per ND1002019 using black ink and brush or air-operated equipment.

3.2.3 Reference drawing 2014392 and install new nameplate per the notes on that drawing.

3.3 Retrofit Buffer Circuit Assembly, part no. 2014254-031, using retrofit kit 8104239 as follows:

3.3.1 Remove (2) covers (1020310) and retain covers and hardware for reassembly.

3.3.2 Reference drawings 2016500 and 2016501 and drill holes two places (located on the drawing by the 5.312 dimension). These holes will be used to install the W1 Bus Bar in a later step.

3.3.3 Using Heli-coil insertion tool, insert (2) Heli-coils into drill holes after they have been prepared (tapped) per requirements of drawings. Install per MS33646. Heli-coils are provided in kit.

3.3.4 Desolder from Component Board A4 nine (9) resistors which are identified as R1-1 through R1-9. Dispose of these resistors per paragraph IX of this RIB.

3.3.5 Remove from retrofit kit (9) resistors (1006750-16) (220 ohm) and solder these resistors to the same locations as those removed in step 3.3.4, soldering per ND 1002071.

3.3.6 Desolder from Conponent Board A3 (2014262-021) twenty-three (23) resistors which are identified as R1-1 through R1-18 and R1-23 through R1-27.

3.3.7 Remove from retrofit kit twenty-three (23) resistors (1006750-16) (220 ohm) and solder these resistors to the same locations as those removed in step 3.3.6.

3.3.8 Turn over the BUFFER CIRCUIT ASSY and resolder any printed circuit terminals which may have been loosened up during performance of steps 3.3.4 through 3.3.7 to insure good electrical contact.

3.3.9 Remove from retrofit kit the W1 Bus Bar and install it to the Buffer Circuit Assembly using screws (MS35335-58) and applicable washers, also supplied in kit. Reference drawing 2014254 for the placement of this bus bar.

3.3.10 Remove from retrofit kit the premarked jumper wires with attached terminal lugs.

3.3.11 Determine proper length of jumpers by referring to jumper list on drawing 2014254. Cut and trim each jumper to a length that will allow the jumper to be attached (soldered) to an "E" point and to the bus bar in the shortest possible distance.

NOTE: Retrofit personnel may prefer cutting and soldering one wire at a time rather than cutting all the wires and then soldering. It is arbitrary.

3.3.12 Solder respective jumpers to "E" points shown in jumper list, soldering per ND1002071. Remove screws retaining component Board A4 so that it may be turned over. Retain screws.

3.3.13 Attach jumpers to bus bar using hardware supplied in retrofit kit.

NOTE: There are fourteen (14) terminals on the bus bar. It will be necessary to double up jumpers at intervals.

3.3.14 Remove from retrofit kit one (1) orange wire (code identification H3) and one (1) black wire (code identification H23). Using crimping tool, crimp electrical contacts (MS3193A20A), also provided in kit, to these wires.

3.3.15 Unscrew J4 captive ring (inside of Buffer Circuit Assembly) and dislodge compressor ring. Slide both rings back over the harness.

NOTE: Contacts cannot be inserted to connector unless pressure is relieved by performing step 3.3.15.

3.3.16 Insert wires from step 3.3.14 to J4 connector (through rings moved back in step 3.3.15) to locations "N" and "M" as follows:

H23 (black) to N
H3 (orange) to M

3.3.17 Solder the free end of the orange wire at A3-E99 (solder per ND 1002071).

3.3.18 Attach lug end of black wire to W1 bus bar.

3.3.19 Replace rings moved back in step 3.3.15.

3.3.20 Lace both wires to existing harness.

3.3.21 Reinstall the Component Board A4 to the Buffer Circuit Assembly using hardware retained from 3.3.12.

3.3.22 Reinstall the two covers removed in step 3.3.1, using covers and hardware retained from that step.

3.4 Reidentify the Buffer Circuit Assembly, part no. 2014254-031, by removing existing nameplate with a pocket knife (do not mar finish) and proceeding as follows:

3.4.1 Remove all adhesive residue with Methyl Ethyl Ketone and cotton swabs.

WARNING:
MEK is flammable and toxic.
Use with adequate ventilation
and avoid open flame.

3.4.2 Remove new nameplate (1004260-29f) from retrofit kit and install it to the same location using adhesive MIL-A-5092, Type II.

4. Retest Procedure. Retest to the following JDCs:

1) 05451 Rev B
2) 05143 Rev B
3) 05144 Rev C
4) 05172 Rev A
5) 05153 Rev D
6) 05154 Rev D
7) 05155 Rev C
8) 05156 Rev C
9) 05160 Rev D
10) 05161 Rev E
11) 05162 Rev C
12) 05450 Rev B
13) 05453 Rev D

VIII. MODIFICATION DESIGNATION:

1. Remove from kit 8104238 nameplate, part no. 1004260-287, and, using stencil provided in kit, stencil serial number with black ink and brush or air-operated equipment.

NOTE: Same serial number as removed nameplate.

2. Using button head drive screws, part no. AN 535-4-4, supplied in kit 8104238, secure the nameplate to the Computer Test Set in the same location as nameplate removed in step 2.1.

IX. DISPOSITION OF REMOVED PARTS:

Scrap all removed parts.

X. REPORT OF ACCOMPLISHMENT:

Complete AC Form 1 (page 31a of this RIB) and Raytheon Form 53-9208 and return to applicable addressees.

NOTE TO [illegible]: Do not remove Attachment A. It is a contract requirement that Raytheon maintain an up-to-date record of equipment status and it is through the utilization of Raytheon Form 53-[illegible] that this requirement is fulfilled.

Sheet 1 of 12
RIB No. 0104126
Date 16 NOV 67
TDRR No. 35064
Revision A

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
AGC DSKY FLAMMABLE COMPONENTS AND CAP HOUSING REPLACEMENT
AUTHORIZED BY ECP-641 CCA 497-0600
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A	35258	1,2,4,5,6, 16,20	E.C.H.	A.C.M.	12-21-67

Prepared by ________ Date 3 November 1067

P.C. Engineering Approval ________ Date 6 Nov. 1967

DRB Approval ________ Date 8 Nov 1967 8 Nov 1967

MIT Reliability Approval ________ Date ________

CCB Approval ________ Date 16 NOV 67

NASA Approval ________ Date 11/8/67

I. **PURPOSE:**

Retrofit instructions for the removal and replacement of the Alarm Indicator and the nineteen Engraved Caps contained within the AGC DSKY, part number 2003994-011, 2003950-011, and 2003985-051, in order to comply with the requirements of MSC-A-66-3, Revision A (dated 5 June 1967), under Catagory B, non-metallic materials. This RIB also contains instructions for the removal and replacement of the Cap Housing Assembly and its spring with a new and improved design.

II. **AUTHORITY:**

This retrofit is authorized by ECP 641 CCA 497-0500

III. **UNITS AFFECTED:**

Name	Part No.	Serial No.	New Part No.
AGC DSKY	2003994-011	D3, D4, D7-D43	2003994-021
AGC DSKY	2003950-011	RAY 28, RAY 30	2003950-031
AGC DSKY	2003985-051	RAY 13	2003985-061

IV. **PRIORITY CHANGES:**

None.

V. **RELATED CHANGES:**

None.

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104241, containg the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104126
b.	19	Cap, Nomenclature	1005022
c.	1	IL/Cover Assembly	2003899-011

Item	Qty	Nomenclature	Part No.
d.	1	Nameplate	1004260-20
e.	19	"O" Ring	1006369
f.	38	Set Screw	AN565DC4H3
g.	1	Front Cover	2004739-[illegible]
h.	19	Cap Housing Assembly	2004738-011
i.	4	Screw, pan head, cross recessed	MS35216-1
j.	38	Spring, Cap Retaining	2004944
k.	4 oz	Silicone Compound	MIL-S-8660

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Sealing Compound	MIL-S-22473, Grade HV
b.	A/R	Freon TF	N/A
c.	A/R	Silicone Compound	1006879
d.	1	Foam rubber pad (approx. 1" thick)	N/A
e.	A/R	Toothpicks	N/A
f.	A/R	Cotton Swabs	N/A

3. Tools required but not supplied in kit:

NOTE: The tools required as specified herein are necessary for the retrofit, i.e., "or equivalent" does not apply to this listing.

Item	Qty	Nomenclature	Part No.
a.	1	Assembly Tool	AT-EX-A-22378
b.	1	Torque Tool Adapter	AT-EX-A22419
c.	1	Torque Adapter	AT-EX-A-22174
d.	1	"Jomite 5A" Torque Wrench	AT-EX-A21560
e.	2	Left Hand Twist Drill	Size #49
f.	2	Left Hand Twist Drill	Size #50
g.	2	Left Hand Twist Drill	Size #51
h.	6	.050-inch Hex Broaches	N/A
i.	1	Starrett Pin Vise (to .080-inch)	#162-B
j.	3	Plastic Shim Stock (.005-inch thick by 2-inch long)	"Artus"
k.	1 box	.050-inch Hex Keys (Short Arm) SP6 "Unbrako"	33-2
l.	1	0-100 inch-ounce Torque Wrench	N/A
m.	1	0-38 (or) 0-50 inch-pound Torque Wrench	N/A
n.	1	Marking Press	"NBR-ALL"

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
a.	Workmanship Standard	AC-STD-1(3Mar64)
b.	AGC DSKY Assembly Drawing	2003994
c.	Front Housing Assembly Drawing	2003949
d.	Pushbutton Switch Assembly Drawing	2003896
e.	Interconnection Diagram	2005954
f.	Procurement Specification	PS 2003994

Item	Nomenclature	Document No.
g.	Alarm Indicator Drawing	2003899
h.	Nomenclature Cap Assembly Drawing	1005022
i.	General Specifications, Marking	ND 1002019
j.	Serialization	ND 1002023
k.	Packing and Shipping	ND 1002214

VII. PROCEDURE:

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 Mar. 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial numbers of equipment affected by this retrofit are not changed by this retrofit.

2. Retrofit the AGC DSKY using retrofit kit 8104241 as follows:

NOTE: The following DSKY part Numbers are applicable:

2003994-011
2003950-011
2003985-051

2.1 Remove the AGC DSKY from the Handling Fixture, part no. 2001413, referencing Figure 1, according to the following procedure:

NOTE: White gloves or finger cots should be worn during retrofit for protection of equipment.

2.1.1 Remove the eight flat head screws (MS511960-66), eight flat washers (MS15795-808), eight lock washers (MS35650-104) which mount the Handling Fixture Panel (2014009) and remove the panel. Retain panel and hardware for reassembly.

2.1.2 Remove the eight pan head screws (MS351958-62), eight lock washers (MS35337-81), and eight flat washers (MS15795-808) located on the sides of the DSKY Cage (2014008) and remove the cage. Retain cage and hardware for reassembly.

2.1.3 Remove the eight pan head screws (MS51958-61) and eight flat washers (MS15795-808) that mount the DSKY Mounting Brackets (2014009) to the DSKY and remove the mounting brackets. Retain brackets and hardware for reassembly.

2.2 Insure that the Protective Cap (1006425) is in place on the J9 connector of the DSKY.

2.3 Place the DSKY face up (indicator lights side) on a foam rubber pad.

2.4 Reference Figure 2 and remove the eight socket head screws (1001489-59) and the eight flat washers (NAS-620C6), that mount the Front Cover (2004929-021) to the DSKY. Retain hardware for reassembly.

2.5 Remove the Front Cover from the DSKY by lifting up (slowly) while keeping the cover parallel to the front housing surfaces. Dispose of cover per paragraph IX of this RIB.

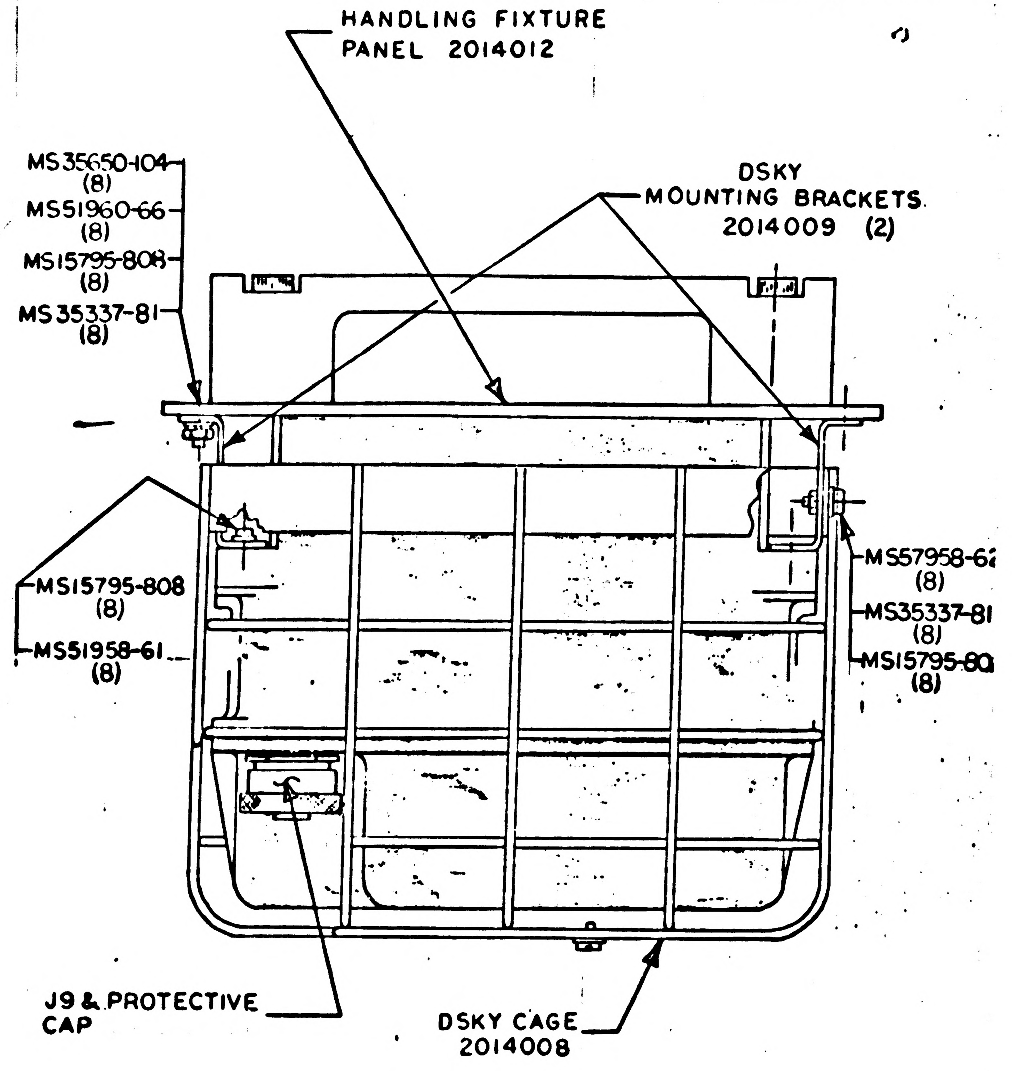

HANDLING FIXTURE
PANEL 2014012
MS35650-104 (8)
MS51960-66 (8)
MS15795-808 (8)
MS35337-81 (8)
DSKY
MOUNTING BRACKETS
2014009 (2)
MS57958-6 (8)
MS35337-81 (8)
MS15795-80 (8)
MS15795-808 (8)
MS51958-61 (8)
J9 & PROTECTIVE
CAP
DSKY CAGE
2014008

FIGURE 1

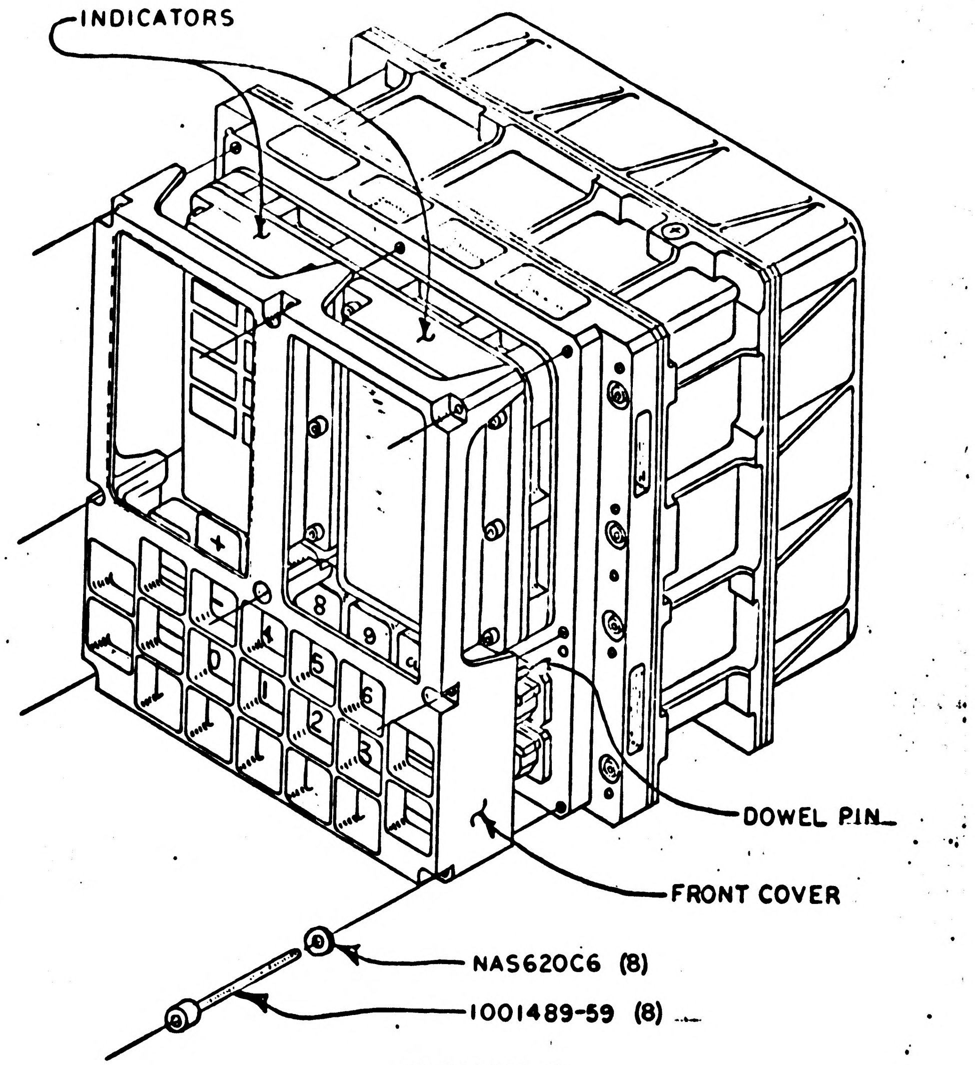

INDICATORS
+
8
9
0
4
5
6
2
3
DOWEL PIN
FRONT COVER
NAS620C6 (8)
1001489-59 (8)

FIGURE 2

2.6 Clean the area of the pushbutton switch assemblies and the indicator assemblies to insure that the surfaces are free of dust and foreign matter. Use Freon TF and cotton swabs for cleaning. Do not touch IL/EL faces.

2.7 Study Figure 3 to familiarize yourself with the general construction and assembly of the pushbutton switch assemblies before proceeding.

2.8 Remove the Engraved Cap (1006353) from the pushbutton switch assembly by depressing the Cap R-taining Spring (2004944) with a toothpick inserted through the slot in the Housing Assembly (2003926) as illustrated in Figure 4. Repeat this procedure for each of the nineteen assemblies. Dispose of caps and springs per paragraph IX of this RIB.

2.9 Remove the two set screws (AN565DC4113), one Cap Housing Assembly (2003926-011), one Shaft Assembly, (2003975-011), and one Compression Spring (2004941) from each of the 19 pushbutton switch assemblies as follows:

CAUTION

Do not disturb or damage the actuating arm of the Sensitive Switches (1010901),

NOTE: The set screws must be removed sequentially due to limited accessibility. Figure 5A illustrates the sequence for removing set screws from all switch assemblies: Figure 5B illustrates the sequence for removing set screws from an individual switch assembly.

NOTE: Check to insure that the hex socket of each set screw is free of foreign matter prior to inserting wrench into socket.

2.9.1 Insert an .050-inch allen hex wrench (the style used will depend on the location of the set screw) into the hex socket of the set screw. Keep the wrench fully bottomed in the socket and carefully apply a counter-clockwise torque to remove the set screw.

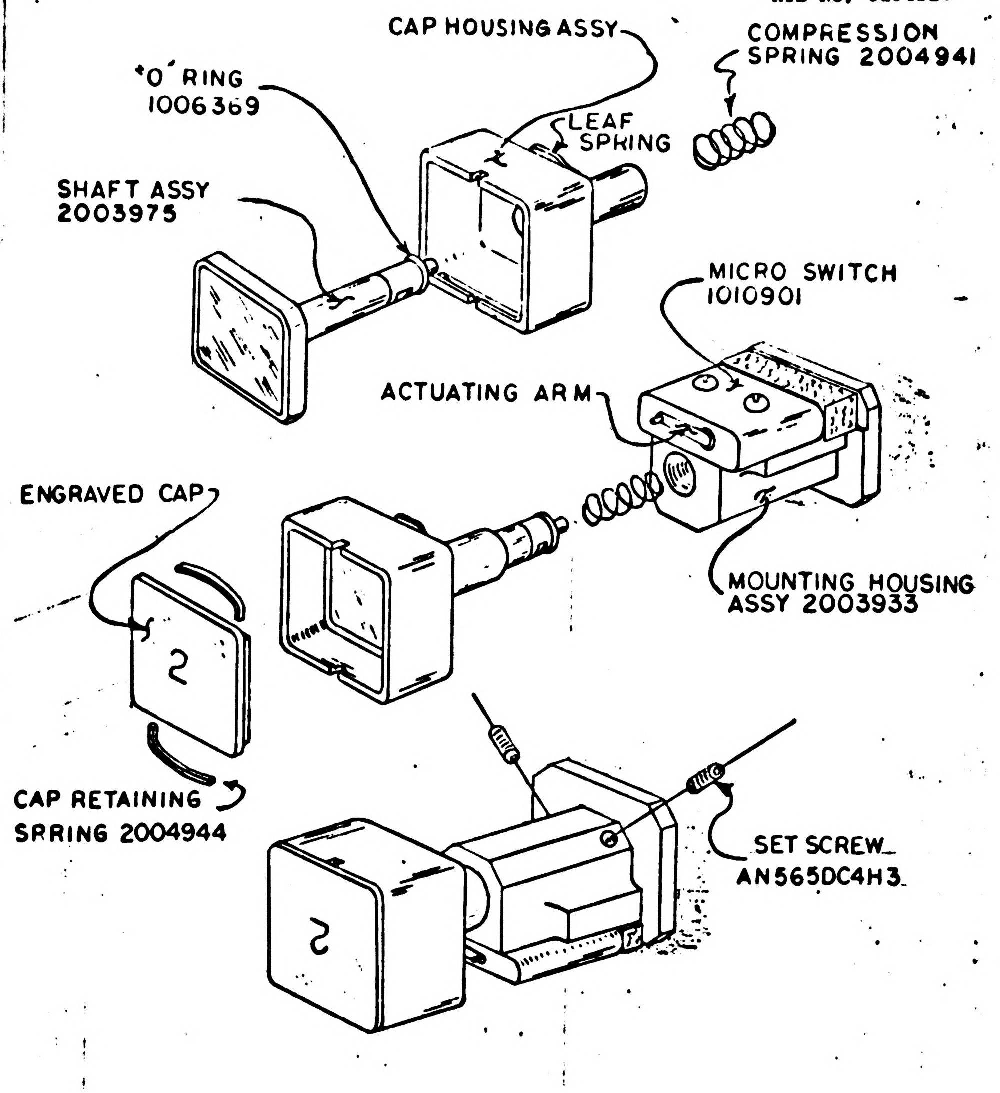

CAP HOUSING ASSY
'O' RING
1006369
SHAFT ASSY
2003975
LEAF SPRING
COMPRESSION SPRING 2004941
MICRO SWITCH
1010901
ACTUATING ARM
ENGRAVED CAP
2
MOUNTING HOUSING ASSY 2003933
CAP RETAINING SPRING 2004944
SET SCREW AN565DC4H3
2

FIGURE 3

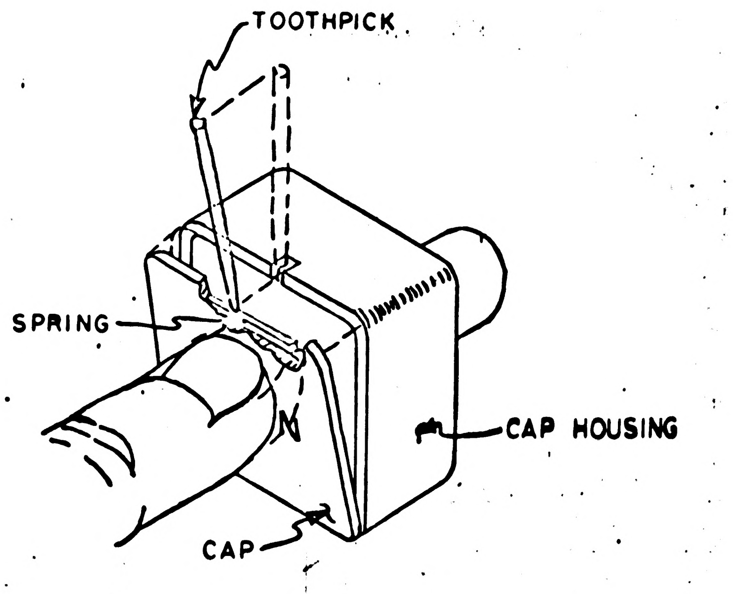

TOOTHPICK
SPRING
CAP HOUSING
CAP

FIGURE 4

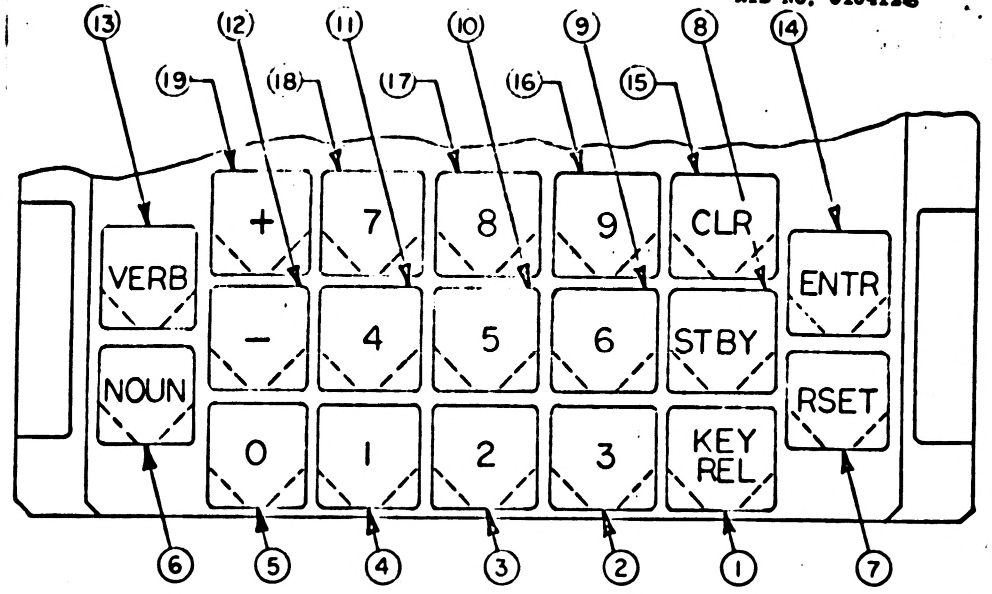
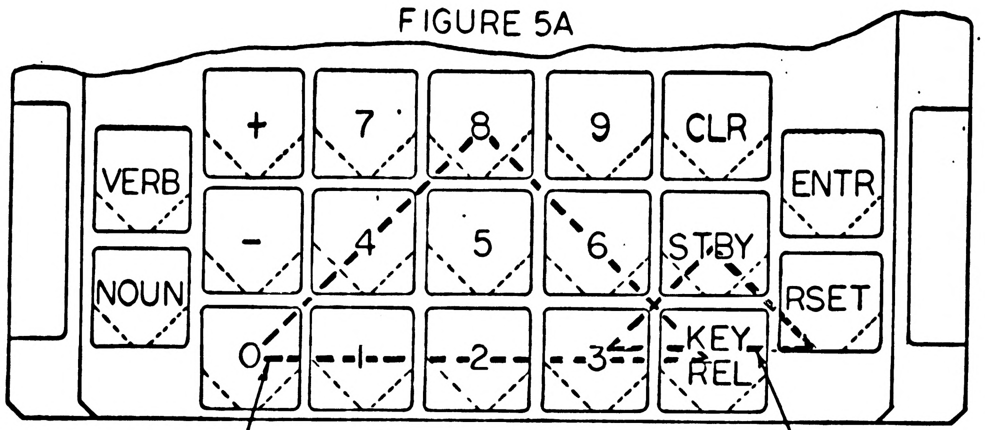

⑬
⑫
⑪
⑩
⑨
⑧
⑭
⑲
⑱
⑰
⑯
⑮
VERB
NOUN
+
7
8
9
CLR
ENTR
−
4
5
6
STBY
RSET
0
1
2
3
KEY REL
⑥
⑤
④
③
②
①
⑦

FIGURE 5A


VERB
NOUN
+
7
8
9
CLR
ENTR
−
4
5
6
STBY
RSET
0
1
2
3
KEY REL

TO REMOVE NO.8 START FROM THE LEFT-HAND CORNER NO.0 AND WORK TO THE RIGHT WITHIN THE TRIANGLE

TO REMOVE STBY USE THE SAME STEPS USED IN REMOVING NO.8

FIGURE 5B

CAUTION
Do not force the set screw.

2.9.2 Remove the second set screw in the same manner as step 2.9.1.

2.9.3 Discard all removed set screws per paragraph IX of this RIB.

2.9.4 Remove the cap housing assembly, shaft assembly, shaft assembly, "O" ring and compression spring by lifting gently upward while holding the cap housing assembly. Retain the shaft assembly (dispose of "O" Ring) and compression spring for reassembly. Dispose of cap housing assembly per paragraph IX of this RIB.

2.9.5 Visually inspect the shaft assembly and its component parts for wear or damage. Any parts found to be unsatisfactory shall be replaced with Class A parts obtained through the appropriate Field Site Supply area.

2.10 Reassemble each Pushbutton Switch Assembly as follows:

2.10.1 Remove from retrofit kit 8104241, new set screws (AN565DC4H3), for installation into the Mounting Housing Assembly (2003933).

2.10.2 Install all set screws three to five full turns and then back them out again to be sure that any residue "Locktite" has been removed and will not interfere with the proper seating of the shaft assembly.

2.10.3 Clean the thread of the set screws and the mounting housing with Freon TF and a cotton swab to insure that threads are free of any foreign matter.

2.10.4 Reinstall the two set screws into mounting housing of one key position approximately one or two turns.

2.10.5 Apply "Locktite" staking compound (MIL-S-22473, Type HV) to the threads of each of the two set screws using an artists brush or toothpick.

NOTE: Do not allow any staking compound to enter the hex socket portion.

2.10.6 Remove from retrofit kit new Cap Housing Assembly, part no. 2004738-01 and install to it the Shaft

Assembly (2003975). Repeat this procedure for the nineteen assemblies.

2.10.7 Install the Compression Spring, (2004941) (retained from step 2.9.4 as was the Shaft Assembly) and install it and "O" Ring (1006369) (provided in kit) to shaft.

2.10.8 Insert the entire assembly (Cap Housing, Shaft, and Spring) into the Mounting Housing Assembly (2003933)

NOTE: Ensure that the Shaft Assembly is fully bottomed in the Mounting Housing. Apply the necessary force by using the index finger with a finger cot on the face of the Shaft Assembly. More force may be necessary to fully seat the Shaft Assembly between the contact wires since this is an interference fit.

2.10.9 Using plastic shims and 093-inch plastic spacers as shown in Figure 6, align the Shaft Assembly and Cap Housing sub-assemblies.

2.10.10 Torque the two set screws of each mounting housing 2.5 to 2.8 inch-pounds after alignment requirements have been accomplished in step 2.10.9.

2.10.11 Repeat steps 2.10.7 through 2.10.10 until all 19 mounting housings have the shaft assembly, cap housing assembly and compression spring installed

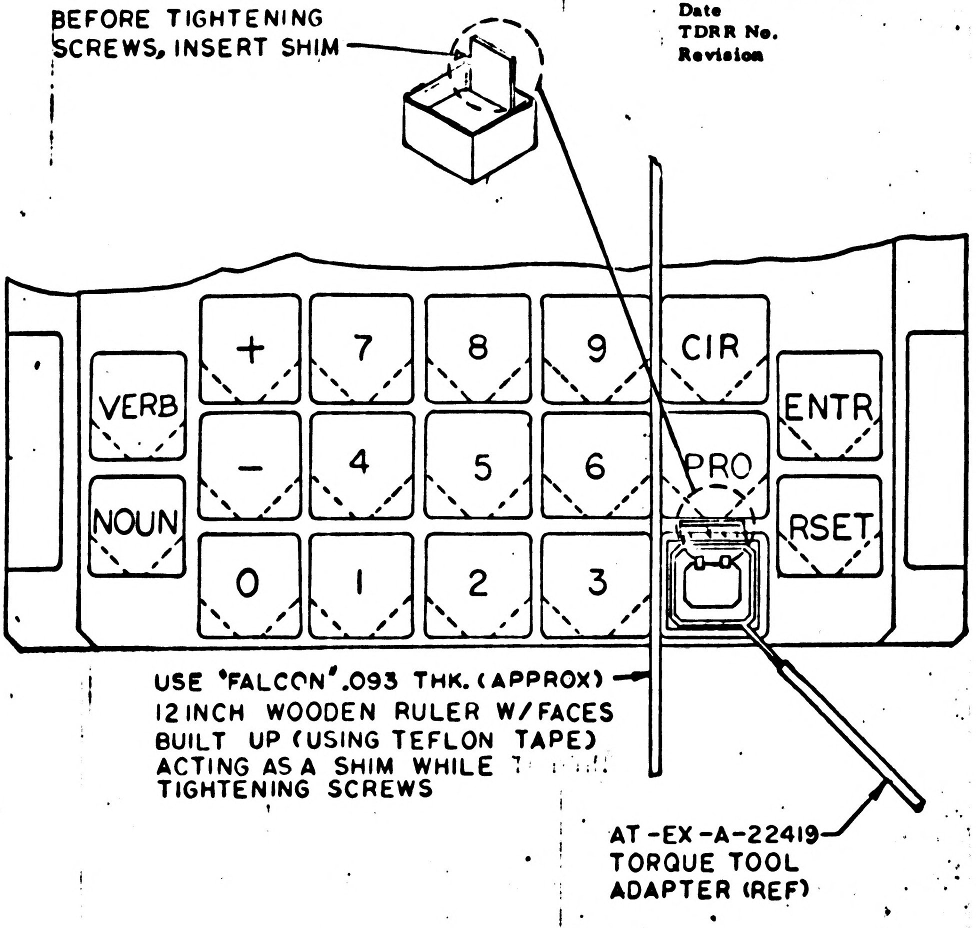
2.11 Install the 19 Engraved Caps,(1005028.),provided in kit, to the cap housing assemblies as follows:

2.11.1 Insure that each Cap Retaining Spring, part no. 2004944, is in place in the slots at the top and bottom of each engraved cap.

2.11.2 Select the cap of the proper nomenclature for a given key position and insert the bottom cap retaining spring (bottom of engraved cap) into the matching slot of the cap housing. See Figure 6.

2.11.3 Depress the upper cap retaining spring with a toothpick while lowering the engraved cap to the housing assembly and release the cap retaining spring (see Figure 4).

2.11.4 Check the engraved cap to be sure that it is properly held in position and in the correct


VERB
NOUN
+
7
8
9
CIR
−
4
5
6
PRO
0
1
2
3
ENTR
RSET

BEFORE TIGHTENING SCREWS, INSERT SHIM

USE "FALCON" .093 THK. (APPROX) 12 INCH WOODEN RULER W/FACES BUILT UP (USING TEFLON TAPE) ACTING AS A SHIM WHILE TIGHTENING SCREWS

AT-EX-A-22419 TORQUE TOOL ADAPTER (REF)

FIGURE 6

position with the proper nomenclature right side up.

2.12 Actuate the pushbutton switch assemblies several times to insure that the travel characteristics are proper and smooth throughout the travel distance.

2.13 Clean the area of the pushbutton switches and indicators free of dust, etc., with Freon TF and cotton swabs.

NOTE: Do not clean face surfaces of indicators.

2.14 Remove the Indicator Alarm (1006387) from the AGC DSKY as follows: (see Figure 7)

2.14.1 Remove the four socket head screws (MS16995-20) and four flat washers (MA8620C8) mounting the Alarm Indicator to the Front Housing Assembly. Dispose of screws per Paragraph IX.

2.14.2 Jack the Alarm Indicator from the Front Housing Assembly by turning the two jacking screws counter-clockwise a quarter-turn at a time. Alternate between the two screws so as to lift the indicator in parallel to its mounting surface while supporting the top portion of the indicator by hand maintaining the parallelism. Dispose of removed indicator per paragraph IX of this RIB.

2.15 Remove from retrofit kit IL/Cover Assembly, part no. 2003899-011. Avoid handling face of panel.

2.16 Clean the mating surfaces and inserts of the Front Housing Assembly carefully with Freon TF and cotton swabs (sparingly). Inspect rubber gasket for cleanliness.

2.17 Apply a thin coating of Silicone Compound (1006879) to the mating surfaces of the Front Housing Assembly (do not get any on the gasket or in the tapped holes)

2.17.1 Fill Female Connectors on the Front Housing Assy. which mate with the I/L Assy. with Silicone Compound, MIL-S-8660.

2.18 Gently lower the Alarm Indicator into position on the dowel pins of the Front Housing Assembly with the Indicator placed approximately parallel to its mating surfaces. See Figure 7.

2.19 Turn the six jacking screws (do not force) a quarter-turn at a time, alternating between each screw (criss-cross method) until the Indicator and Cover has been jacked down to the height of the bonded rubber gasket. See Figure 8.

NOTE: If any noticeable resistance is offered by the Indicator in the step above, stop immediately and remove the Indicator and inspect the screws, inserts, and contact pins prior to reinstalling.

2.20 Continue tightening the jacking screws a quarter-turn at a time (still alternating in a criss-cross manner) until a mounting torque of 8.5 to 9.5 inch-pounds has been achieved. See Figure 8 for sequencing.

CAUTION:

Torque down carefully to avoid putting any undue strain on any portion of the IL/Cover Assembly. and carefully avoid contact with face plate.

2.21 Clean the area of the pushbutton switches and indicators to insure that they are free of dust, silicone compound, etc., using Freon TF and cotton swabs.

NOTE: Do not clean face surface of indicators unless absolutely necessary (then use spray "Bon-Ami").

2.22 Assemble the Front Cover (2004739) provided in retrofit kit, to the Front Housing Assembly with eight socket head screws and flat washers (retained from step 2.4) by first lowering the Front Cover carefully into place on the Front Housing and then installing the screws and washers (reference Figure 9).

Sheet 18 of 22
KIB No. 0104126

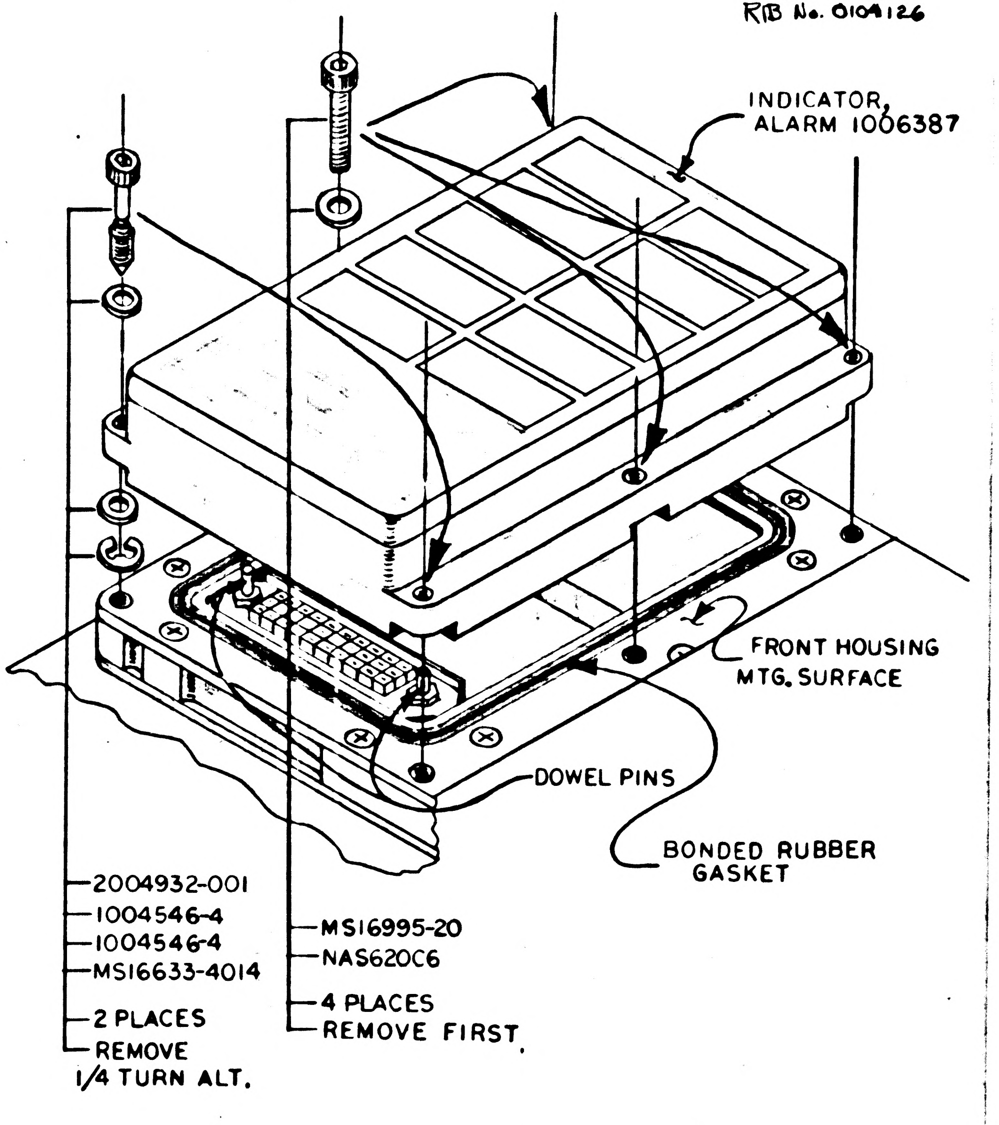
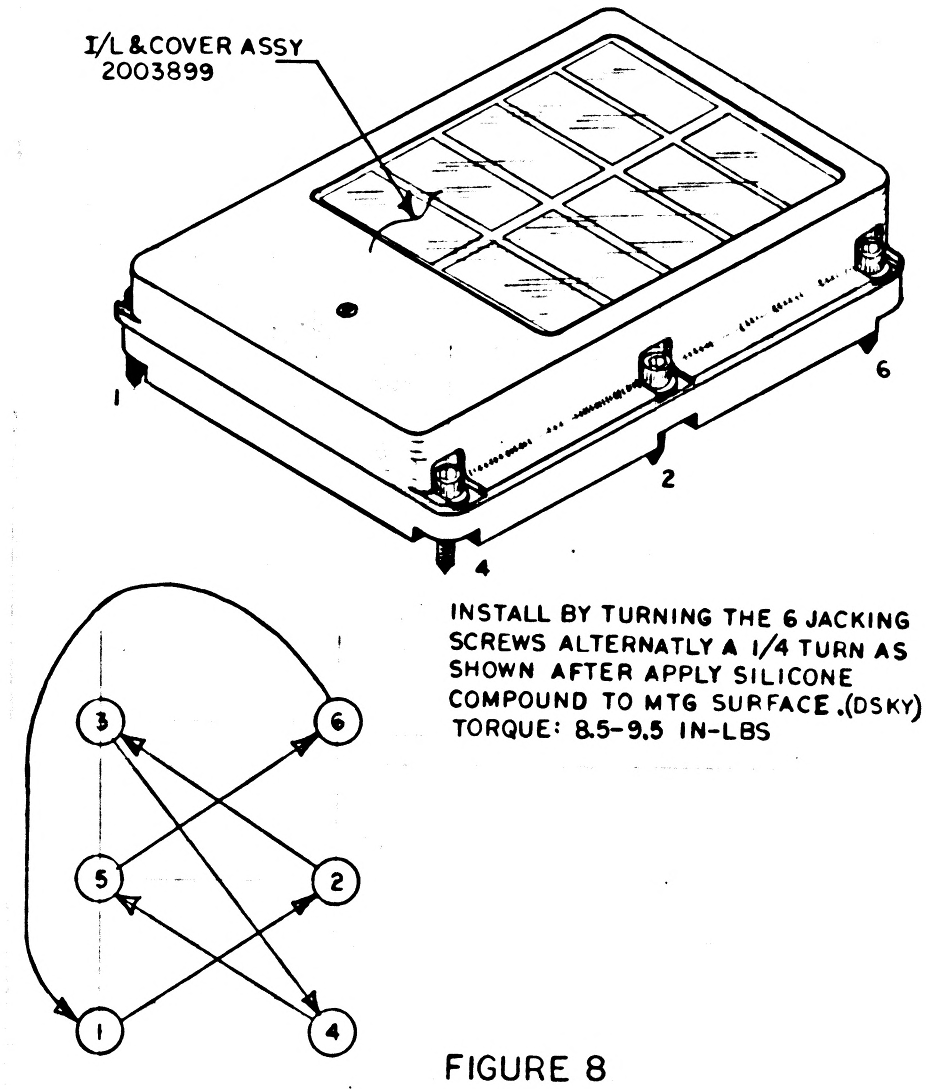

INDICATOR, ALARM 1006387
FRONT HOUSING MTG. SURFACE
DOWEL PINS
BONDED RUBBER GASKET
2004932-001
1004546-4
1004546-4
MS16633-4014
2 PLACES
REMOVE
1/4 TURN ALT.
MS16995-20
NAS620C6
4 PLACES
REMOVE FIRST.

FIGURE 7

Sheet 19 of 22
KIB No. 0104126


I/L & COVER ASSY 2003899
1
2
4
6
3
6
5
2
1
4

INSTALL BY TURNING THE 6 JACKING SCREWS ALTERNATLY A 1/4 TURN AS SHOWN AFTER APPLY SILICONE COMPOUND TO MTG SURFACE.(DSKY)
TORQUE: 8.5-9.5 IN-LBS

FIGURE 8

NOTE: Ensure that dowel pins
are properly aligned.

2.23 Torque the eight socket head screws 8 to 9 inch-pounds starting with the center screw and working outward around the perimeter of the cover.

2.24 Turn the AGC DSKY over carefully so that it is in a face down position on the pad. PAD MUST BE CLEAN.

2.25 Remove the four pan head cross recessed screws (MS35216-1) which mount the nameplate (1004260-20) to the rear cover of the DSKY and remove the nameplate. Dispose of nameplate and screws in accordance with Paragraph IX of this RIB.

2.26 Remove from retrofit kit, the new nameplate and its corresponding new screws (4) (MS35216-1) and proceed as follows:

2.26.1 Using stamping set stamp the [illegible] the applicable serial number and Part Nos. as follows:
if reworking 2003994-011 DSKY Part Nos will be 2003994-021,
if reworking 2003950-011 DSKY Part Nos will be 2003950-031
and if reworking 2003985-051 Part Nos will be 2003985-061.
Characters to be .08/.10 inches high per ND 1002019 and ND 1002023.

2.26.2 Clean the area of the rear cover where the nameplate is to be mounted. Use Freon TF and cotton swabs.

2.26.3 Place the nameplate in its proper location and install the four screws one to two turns only.

2.26.4 Apply Sealing Compound (MIL-S-22473, Grade HV) to the threads of the four screws.

2.26.5 Resume tightening the screws down until they are flush with the nameplate and then torque them 2.0 to 2.5 inch-pounds. Clean away any excess sealing compound that might have been squeezed out.

2.27 Reassemble the DSKY to its Handling Fixture as follows:

2.27.1 Assemble the two DSKY Mounting Brackets (2014009) to the DSKY. Make sure they are right side up and secure with eight pan head screws (MS51958-61, eight flat washers (MS15795-808) hardware retained from step 2.1.3. Torque the screws 25 ± 2 inch-pounds.

2.27.2 Assemble the DSKY Cage (2014008) to the DSKY Mounting Brackets using eight pan head screws, flat washers, and lock washers retained from step 2.1.2.

2.27.3 Assemble the Handling Fixture Panel (2014012) to the DSKY Mounting Brackets using eight flat head screws, flat washers, lock washers, and hex nuts retained from step 2.1.1.

3. Retest procedures:

3.1 Remove the Protective Cap (1006425) from the J9 connector of the DSKY.

3.2 Connect a variable 115 VAC 400 cps power supply to pins number 38 and 40 of the J9 DSKY connector (only) using an Adapter Cable (AC-EX-A-22379 or equivalent - female Deustch Connector or female connector pins) and a power source.

NOTE: The power supply used for testing may be one of the following: (a) a DSKY Test Station(Ray./Wal); (b) an AGC Computer/CTS combination, or (c) a black box suitable for the purpose intended having obtained prior approval for its use from applicable inspection agency.

3.3 Energise the power source increasing voltage to 75 VAC maximum at the DSKY.

3.4 Verify that the nineteen Shaft Assemblies of the Pushbutton Switch Assemblies are illuminated.

3.5 For IL retest in the sub-system configuration, retest per JDC 05783 using mylar tape per 05784.

NOTE: Set-up porcedures are listed in ND 1021042, Figure 7-8, page 7-31/7-32.
Also: Program ALLEREST is acceptable for testing of Indicator Lights.

VIII. MODIFICATION DESIGNATION:

Not Applicable. Re-identification was performed in step 2.26 of this RIB.

IX. DISPOSITION OF REMOVED PARTS:

All removed parts (IL Panel) (etc.), excluding miscellaneous screws and washers, are to be returned to Raytheon, Waltham, for disposition. Proper packing methods will be followed for all shipments, per ND 1002214.

X. REPORT OF ACCOMPLISHMENT:

For the purposes of records and logistics, it is requested that [illegible] forms, AC Form 1 and Raytheon Form 53-9208, be completed and returned to applicable addressees.

Sheet 1 of 22
RIB No. 0104126
Date 16 NOV 67
TDRR No. 35064
Revision

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
UNIVERSAL DSKY FLAMMABLE COMPONENTS AND CAP HOUSING REPLACEMENT
AUTHORIZED BY ECP-641 CCA 497-0600
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Phyllis D. Smith Date 3 November 1967

P.C. Engineering Approval G. Lacasse Date 6 Nov. 1967

DRB Approval W Stamenis Eldon C Hall Date 8 Nov 1967 8 Nov 1967

MIT Reliability Approval ________ Date ________

CCB ~~[illegible]~~ Approval Date 16 NOV 67

NASA Approval Date 11/8/67

I. **PURPOSE:**

Retrofit instructions for the removal and replacement of the Alarm Indicator and the nineteen Engraved Caps contained within the Universal DSKY, part number 2003994-011, 2003950-011, and 2003985-051, in order to comply with the requirements of MSC-A-66-3, Revision A (dated 5 June 1967), under Catagory B, non-metallic materials. This RIB also contains instructions for the removal and replacement of the Cap Housing Assembly and its spring with a new and improved design.

II. **AUTHORITY:**

This retrofit is authorized by ECP 641 CCA 497-0500

III. **UNITS AFFECTED:**

Name	Part No.	Serial No.	New Part No.
Universal DSKY	2003994-011	D3, D4, D7–D43	2003994-021
Universal DSKY	2003950-011	RAY 28, RAY 30	2003950-031
Universal DSKY	2003985-051	RAY 13	2003985-061

IV. **PRIORITY CHANGES:**

None.

V. **RELATED CHANGES:**

None.

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104241, containg the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104126
b.	19	Cap, Nomenclature	1005022
—c.	1	IL/Cover Assembly	2003899-011

Item	Qty	Nomenclature	Part No.
d.	1	Nameplate	1004260-20
e.	19	"O" Ring	1006369
f.	38	Set Screw	AN565DC4H3
—g.	1	Front Cover	2004739-[illegible]
h.	19	Cap Housing Assembly	2004738-011
i.	4	Screw, pan head, cross recessed	MS35216-1
j.	38	Spring, Cap Retaining	2004944
—k.	4 oz	Silicone Compound	MIL-S-8660

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Sealing Compound	MIL-S-22473, Grade HV
b.	A/R	Freon TF	N/A
c.	A/R	Silicone Compound	1006879
d.	1	Foam rubber pad (approx. 1" thick)	N/A
e.	A/R	Toothpicks	N/A
f.	A/R	Cotton Swabs	N/A

3. Tools required but not supplied in kit:

NOTE: The tools required as specified herein are necessary for the retrofit, i.e., "or equivalent" does not apply to this listing.

Item	Qty	Nomenclature	Part No.
a.	1	Assembly Tool	AT-EX-A-222378
b.	1	Torque Tool Adapter	AT-EX-A22419
c.	1	Torque Adapter	AT-EX-A-22174
d.	1	"Jomite 5A" Torque Wrench	AT-EX-A21560
e.	2	Left Hand Twist Drill	Size #49
f.	2	Left Hand Twist Drill	Size #50
g.	2	Left Hand Twist Drill	Size #51
h.	6	.050-inch Hex Broaches	N/A
i.	1	Starrett Pin Vise (to .080-inch)	#162-B
j.	3	Plastic Shim Stock (.005-inch thick by 2-inch long)	"Artus"
k.	1 box	.050-inch Hex Keys (Short Arm) SPS "Unbrako"	33-2
l.	1	0-100 inch-ounce Torque Wrench	N/A
m.	1	0-25 (or) 0-50 inch-ounce Torque Wrench	N/A
n.	1	Marking Press	"NBR-ALL"

4. Documents required but not supplied in kit:

Item	Nomenclature	Document No.
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c.	Front Housing Assembly Drawing	2003949
d.	Pushbutton Switch Assembly Drawing	2003896
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Item	Nomenclature	Document No.
g.	Alarm Indicator Drawing	2003899
h.	Nomenclature Cap Assembly Drawing	1005022
i.	General Specifications, Marking	ND 1002019
j.	Serialization	ND 1002023
k.	Packing and Shipping	ND 1002214

VII. PROCEDURE:

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 Mar. 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial numbers of equipment affected by this retrofit are not changed by this retrofit.

2. Retrofit the Universal DSKY using retrofit kit 8104241 as follows:

NOTE: The following DSKY part Numbers are applicable:

2003994-011
2003950-011
2003985-051

2.1 Remove the Universal DSKY from the Handling Fixture, part no. 2001413, referencing Figure 1, according to the following procedure:

NOTE: White gloves or finger cots should be worn during retrofit for protection of equipment.

2.1.1 Remove the eight flat head screws (MS511960-66), eight flat washers (MS15795-808), eight lock washers (MS35650-104) which mount the Handling Fixture Panel (2014009) and remove the panel. Retain panel and hardware for reassembly.

2.1.2 Remove the eight pan head screws (MS351958-62), eight lock washers (MS35337-81), and eight flat washers (MS15795-808) located on the sides of the DSKY Cage (2014008) and remove the cage. Retain cage and hardware for reassembly.

2.1.3 Remove the eight pan head screws (MS51958-61) and eight flat washers (MS15795-808) that mount the DSKY Mounting Brackets (2014009) to the DSKY and remove the mounting brackets. Retain brackets and hardware for reassembly.

2.2 Insure that the Protective Cap (1006425-14) is in place on the J9 connector of the DSKY.

2.3 Place the DSKY face up (indicator lights side) on a foam rubber pad.

2.4 Reference Figure 2 and remove the eight socket head screws (1001489-59) and the eight flat washers (NAS-620C6), that mount the Front Cover (2004929-021) to the DSKY. Retain hardware for reassembly.

2.5 Remove the Front Cover from the DSKY by lifting up (slowly) while keeping the cover parallel to the front housing surfaces. Dispose of cover per paragraph IX of this RIB.

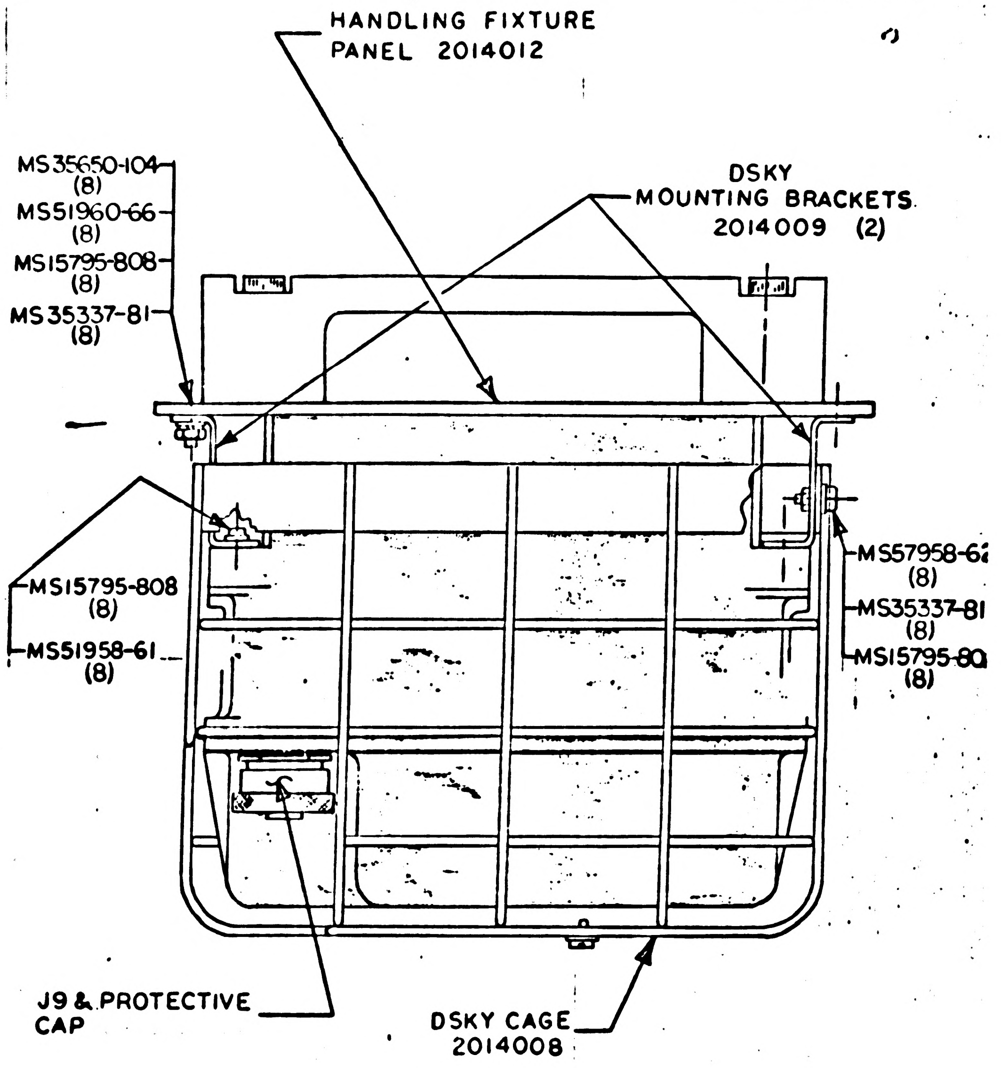

HANDLING FIXTURE
PANEL 2014012
DSKY
MOUNTING BRACKETS
2014009 (2)
MS35650-104
(8)
MS51960-66
(8)
MS15795-808
(8)
MS35337-81
(8)
MS15795-808
(8)
MS51958-61
(8)
MS57958-62
(8)
MS35337-81
(8)
MS15795-80
(8)
J9 & PROTECTIVE
CAP
DSKY CAGE
2014008

FIGURE I

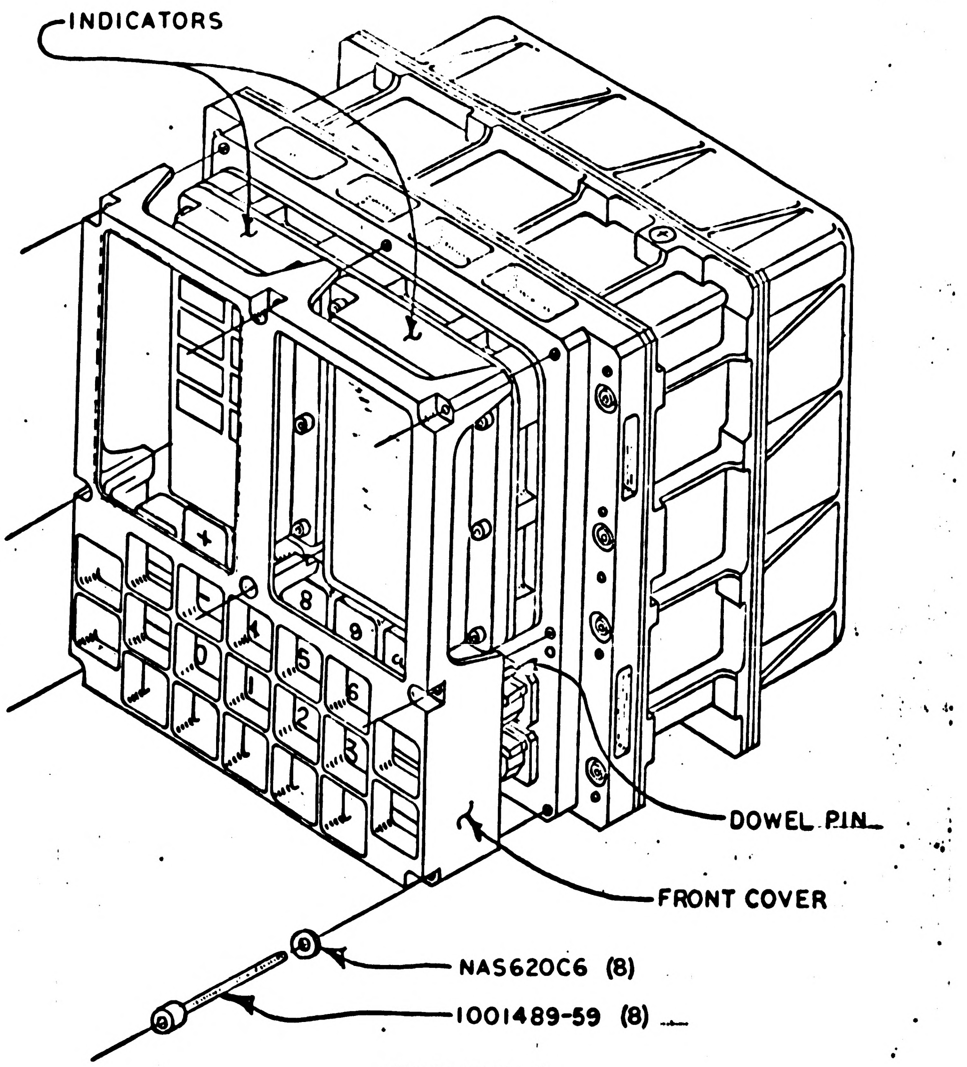

INDICATORS
+
8
9
4
5
6
2
3
DOWEL PIN
FRONT COVER
NAS620C6 (8)
1001489-59 (8)

FIGURE 2

2.6 Clean the area of the pushbutton switch assemblies and the indicator assemblies to insure that the surfaces are free of dust and foreign matter. Use Freon TF and cotton swabs for cleaning. Do not touch IL/EL faces.

2.7 Study Figure 3 to familiarize yourself with the general construction and assembly of the pushbutton switch assemblies before proceeding.

2.8 Remove the Engraved Cap (1006353) from the pushbutton switch assembly by depressing the Cap Retaining Spring (2004944) with a toothpick inserted through the slot in the Housing Assembly (2003926) as illustrated in Figure 4. Repeat this procedure for each of the nineteen assemblies. Dispose of caps and springs per paragraph IX of this RIB.

2.9 Remove the two set screws (AN565DC4113), one Cap Housing Assembly (2003926-011), one Shaft Assembly, (2003975-011), and one Compression Spring (2004941) from each of the 19 pushbutton switch assemblies as follows:

CAUTION

Do not disturb or damage the actuating arm of the Sensitive Switches (1010901),

NOTE: The set screws must be removed sequentially due to limited accessibility. Figure 5A illustrates the sequence for removing set screws from all switch assemblies: Figure 5B illustrates the sequence for removing set screws from an individual switch assembly.

NOTE: Check to insure that the hex socket of each set screw is free of foreign matter prior to inserting wrench into socket.

2.9.1 Insert an .050-inch allen hex wrench (the style used will depend on the location of the set screw) into the hex socket of the set screw. Keep the wrench fully bottomed in the socket and carefully apply a counter-clockwise torque to remove the set screw.

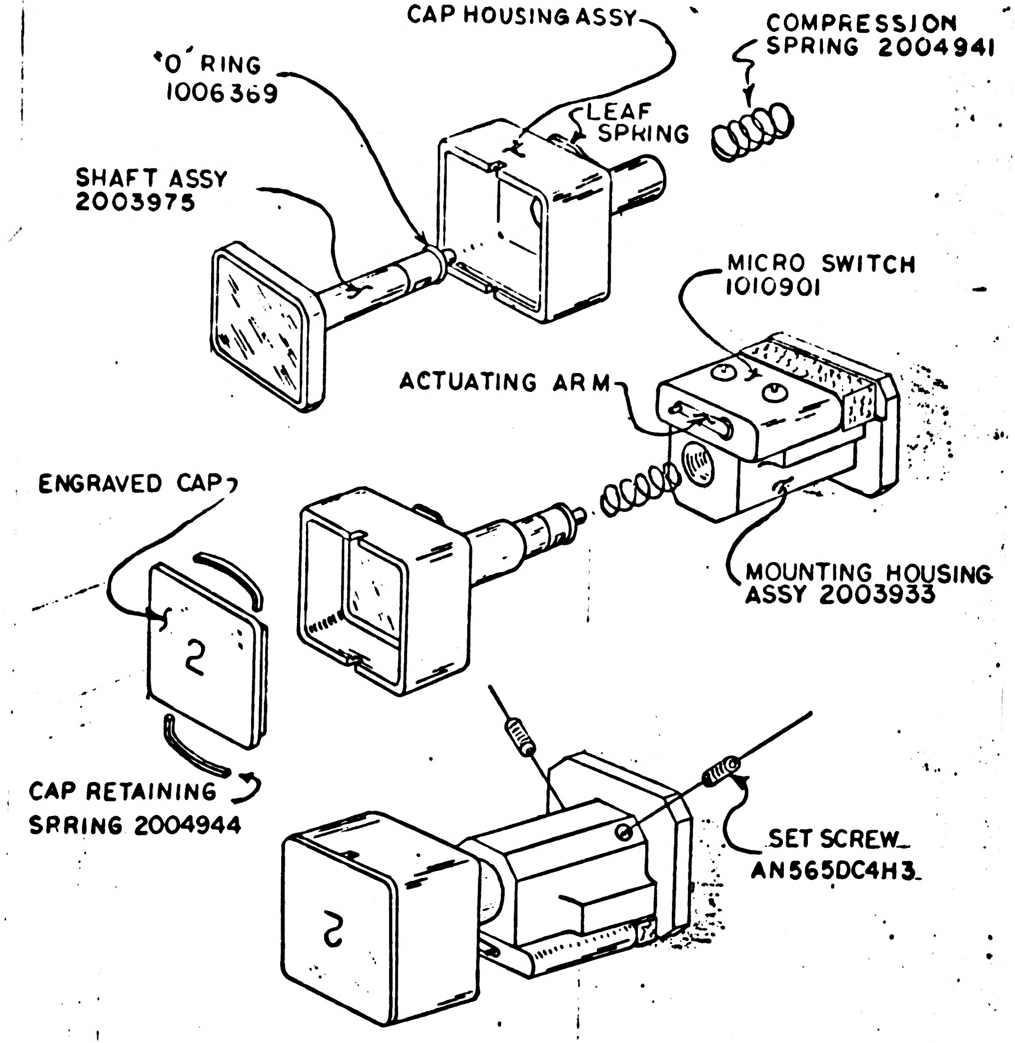

CAP HOUSING ASSY
COMPRESSION SPRING 2004941
'O' RING 1006369
LEAF SPRING
SHAFT ASSY 2003975
MICRO SWITCH 1010901
ACTUATING ARM
ENGRAVED CAP
2
MOUNTING HOUSING ASSY 2003933
CAP RETAINING SPRING 2004944
SET SCREW AN565DC4H3
2

FIGURE 3

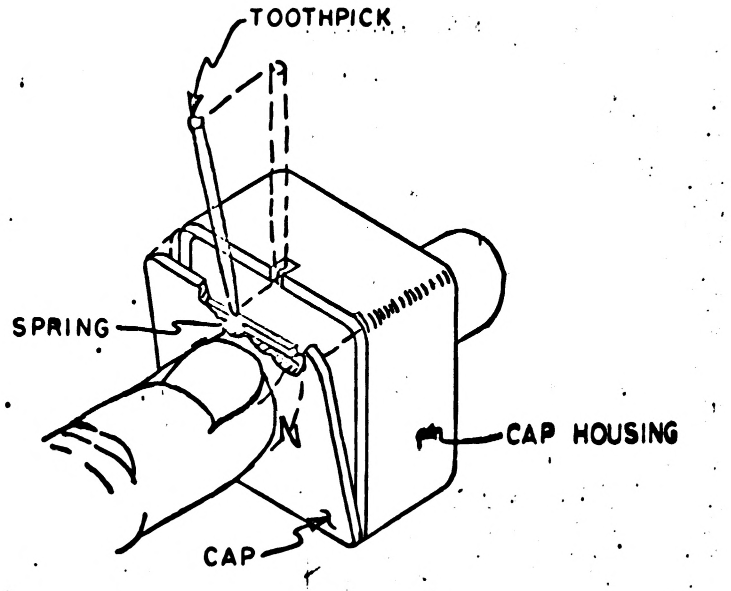

TOOTHPICK
SPRING
CAP HOUSING
CAP

FIGURE 4

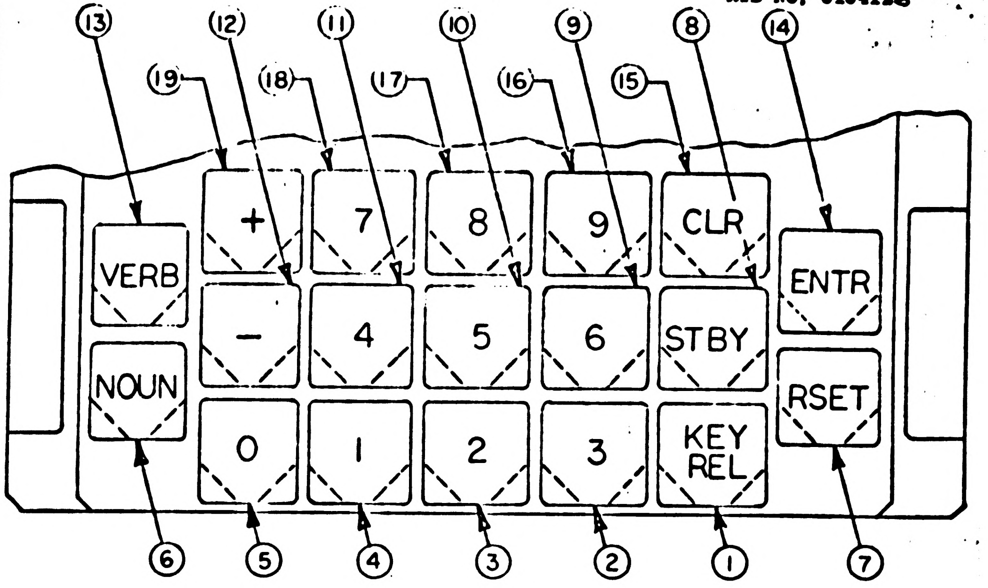
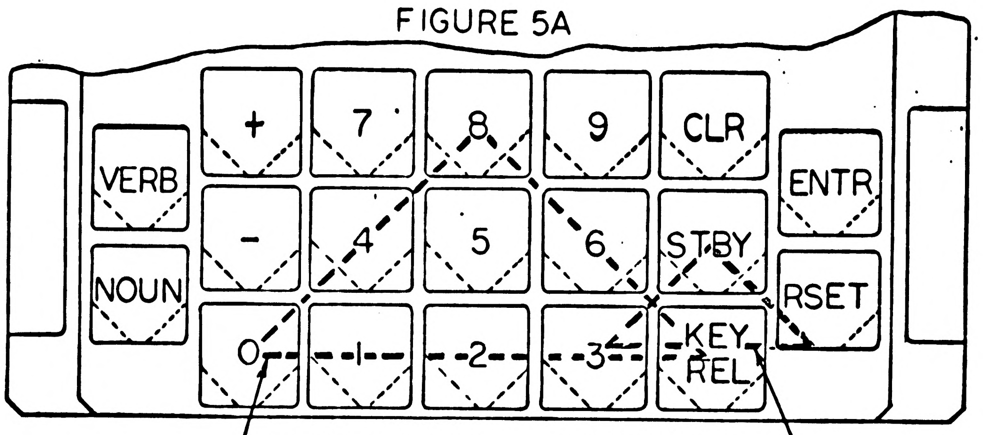

⑬
⑫
⑪
⑩
⑨
⑧
⑭
⑲
⑱
⑰
⑯
⑮
VERB
NOUN
+
7
8
9
CLR
ENTR
−
4
5
6
STBY
RSET
0
1
2
3
KEY REL
⑥
⑤
④
③
②
①
⑦

FIGURE 5A


VERB
NOUN
+
7
8
9
CLR
ENTR
−
4
5
6
STBY
RSET
0
1
2
3
KEY REL

TO REMOVE NO.8 START FROM THE LEFT-HAND CORNER NO.0 AND WORK TO THE RIGHT WITHIN THE TRIANGLE

TO REMOVE STBY USE THE SAME STEPS USED IN REMOVING NO.8

FIGURE 5B

CAUTION
Do not force the set screw.

2.9.2 Remove the second set screw in the same manner as step 2.9.1.

2.9.3 Discard all removed set screws per paragraph IX of this RIB.

2.9.4 Remove the cap housing assembly, shaft assembly, shaft assembly, "O" ring and compression spring by lifting gently upward while holding the cap housing assembly. Retain the shaft assembly (dispose of "O" Ring) and compression spring for reassembly. Dispose of cap housing assembly per paragraph IX of this RIB.

2.9.5 Visually inspect the shaft assembly and its component parts for wear or damage. Any parts found to be unsatisfactory shall be replaced with Class A parts obtained through the appropriate Field Site Supply area.

2.10 Reassemble each Pushbutton Switch Assembly as follows:

2.10.1 Remove from retrofit kit 8104041, new set screws (AN565DC4H3), for installation into the Mounting Housing Assembly (2003933).

2.10.2 Install all set screws three to five full turns and then back them out again to be sure that any residue "Locktite" has been removed and will not interfere with the proper seating of the shaft assembly.

2.10.3 Clean the thread of the set screws and the mounting housing with Freon TF and a cotton swab to insure that threads are free of any foreign matter.

2.10.4 Reinstall the two set screws into mounting housing of one key position approximately one or two turns.

2.10.5 Apply "Locktite" staking compound (MIL-S-22473, Type HV) to the threads of each of the two set screws using an artists brush or toothpick.

NOTE: Do not allow any staking compound to enter the hex socket portion.

2.10.6 Remove from retrofit kit new Cap Housing Assembly, part no. 2004738-011 and install to it the Shaft

Assembly (2003975). Repeat this procedure for the nineteen assemblies.

2.10.7 Install the Compression Spring, (2004941) (retained from step 2.9.4 as was the Shaft Assembly) and install it and "O" Ring (1006369) (provided in kit) to shaft.

2.10.8 Insert the entire assembly (Cap Housing, Shaft, and Spring) into the Mounting Housing Assembly (2003933)

NOTE: Ensure that the Shaft Assembly is fully bottomed in the Mounting Housing. Apply the necessary force by using the index finger with a finger cot on the face of the Shaft Assembly. More force may be necessary to fully seat the Shaft Assembly between the contact wires since this is an interference fit.

2.10.9 Using plastic shims and 093-inch plastic spacers as shown in Figure 6, align the Shaft Assembly and Cap Housing sub-assemblies.

2.10.10 Torque the two set screws of each mounting housing 2.5 to 2.8 inch-pounds after alignment requirements have been accomplished in step 2.10.9.

2.10.11 Repeat steps 2.10.7 through 2.10.10 until all 19 mounting housings have the shaft assembly, cap housing assembly and compression spring installed

2.11 Install the 19 Engraved Caps, (1005022,), provided in kit, to the cap housing assemblies as follows:

2.11.1 Insure that each Cap Retaining Spring, part no. 2004944, is in place in the slots at the top and bottom of each engraved cap.

2.11.2 Select the cap of the proper nomenclature for a given key position and insert the bottom cap retaining spring (bottom of engraved cap) into the matching slot of the cap housing. See Figure 6.

2.11.3 Depress the upper cap retaining spring with a toothpick while lowering the engraved cap to the housing assembly and release the cap retaining spring (see Figure 4).

2.11.4 Check the engraved cap to be sure that it is properly held in position and in the correct

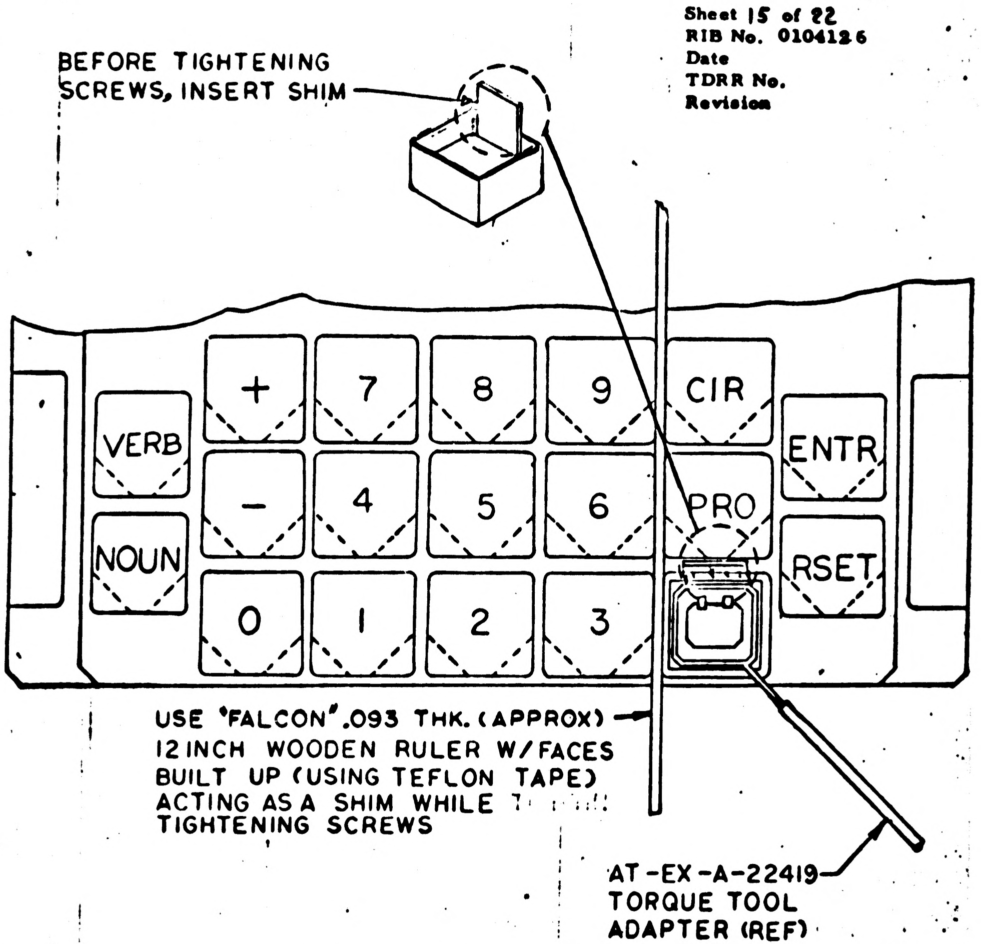

BEFORE TIGHTENING SCREWS, INSERT SHIM
VERB
NOUN
+
-
0
7
4
1
8
5
2
9
6
3
CIR
PRO
ENTR
RSET
USE 'FALCON'.093 THK. (APPROX) 12 INCH WOODEN RULER W/FACES BUILT UP (USING TEFLON TAPE) ACTING AS A SHIM WHILE TIGHTENING SCREWS
AT-EX-A-22419 TORQUE TOOL ADAPTER (REF)

FIGURE 6

position with the proper nomenclature right side up.

2.12 Actuate the pushbutton switch assemblies several times to insure that the travel characteristics are proper and smooth throughout the travel distance.

2.13 Clean the area of the pushbutton switches and indicators free of dust, etc., with Freon TF and cotton swabs.

NOTE: Do not clean face surfaces of indicators.

2.14 Remove the Indicator Alarm (1006387) from the Universal DSKY as follows: (see Figure 7)

2.14.1 Remove the four socket head screws (MS16995-20) and four flat washers (MAS620C8) mounting the Alarm Indicator to the Front Housing Assembly. Dispose of screws per Paragraph IX.

2.14.2 Jack the Alarm Indicator from the Front Housing Assembly by turning the two jacking screws counter-clockwise a quarter-turn at a time. Alternate between the two screws so as to lift the indicator in parallel to its mounting surface while supporting the top portion of the indicator by hand maintaining the parallelism. Dispose of removed indicator per paragraph IX of this RIB.

2.15 Remove from retrofit kit IL/Cover Assembly, part no. 2003899-011. Avoid handling face of panel.

2.16 Clean the mating surfaces and inserts of the Front Housing Assembly carefully with Freon TF and cotton swabs (sparingly). Inspect rubber gasket for cleanliness.

2.17 Apply a thin coating of Silicone Compound (1006879) to the mating surfaces of the Front Housing Assembly (do not get any on the gasket or in the tapped holes)

2.17.1 Fill Female Connectors on the Front Housing Assy. which mate with the I/L Assy. with Silicone Compound, MIL-S-8660.

2.18 Gently lower the Alarm Indicator into position on the dowel pins of the Front Housing Assembly with the Indicator placed approximately parallel to its mating Surfaces. See Figure 7.

2.19 Turn the six jacking screws (do not force) a quarter-turn at a time, alternating between each screw (criss-cross method) until the Indicator and Cover has been jacked down to the height of the bonded rubber gasket. See Figure 8.

NOTE: If any noticeable resistance is offered by the Indicator in the step above, stop immediately and remove the Indicator and inspect the screws, inserts, and contact pins prior to reinstalling.

2.20 Continue tightening the jacking screws a quarter-turn at a time (still alternating in a criss-cross manner) until a mounting torque of 8.5 to 9.5 inch-pounds has been achieved. See Figure 8 for sequencing.

CAUTION:

Torque down carefully to avoid putting any undue strain on any portion of the IL/Cover Assembly. and carefully avoid contact with face plate.

2.21 Clean the area of the pushbutton switches and indicators to insure that they are free of dust, silicone compound, etc., using Freon TF and cotton swabs.

NOTE: Do not clean face surface of indicators unless absolutely necessary (then use spray "Bon-Ami").

2.22 Assemble the Front Cover (2004739) provided in retrofit kit, to the Front Housing Assembly with eight socket head screws and flat washers (retained from step 2.4) by first lowering the Front Cover carefully into place on the Front Housing and then installing the screws and washers (reference Figure 2).

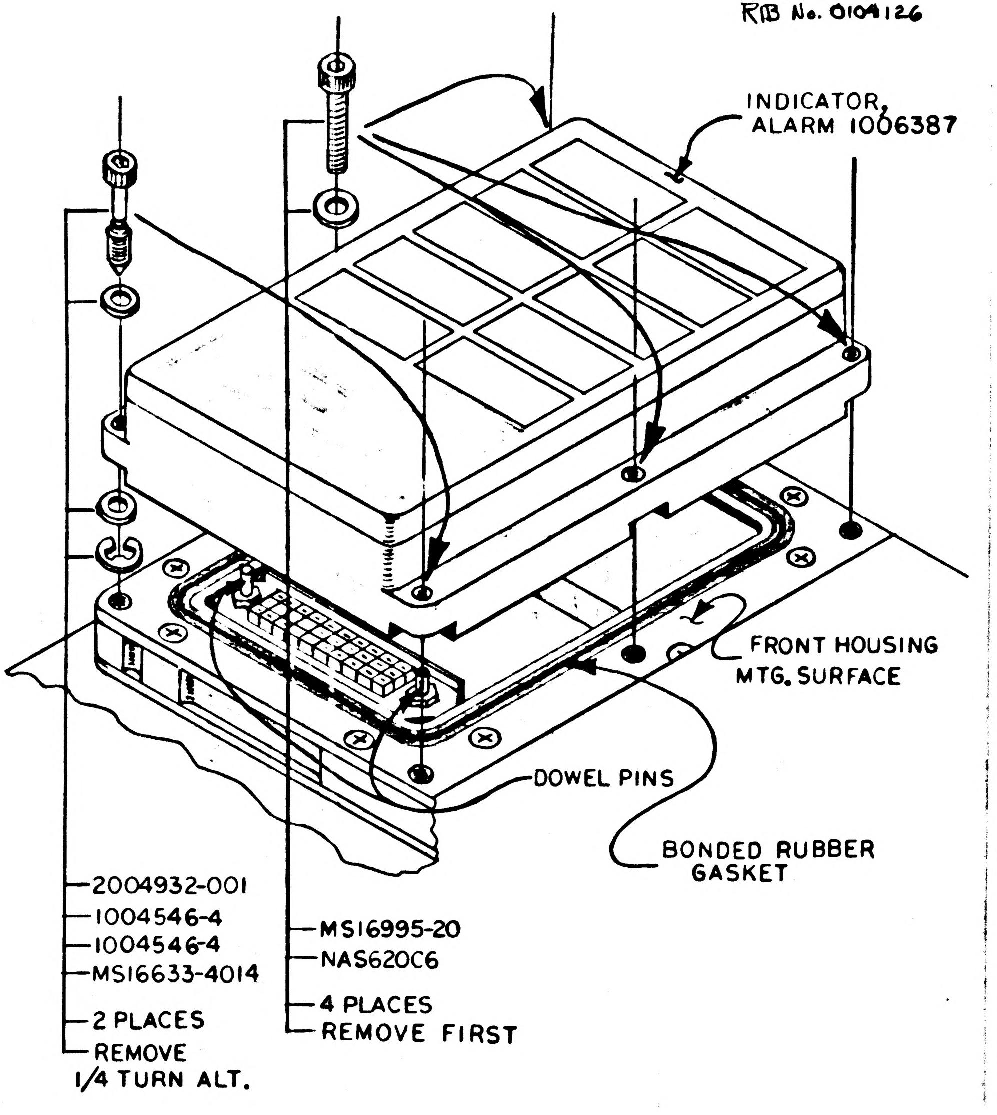
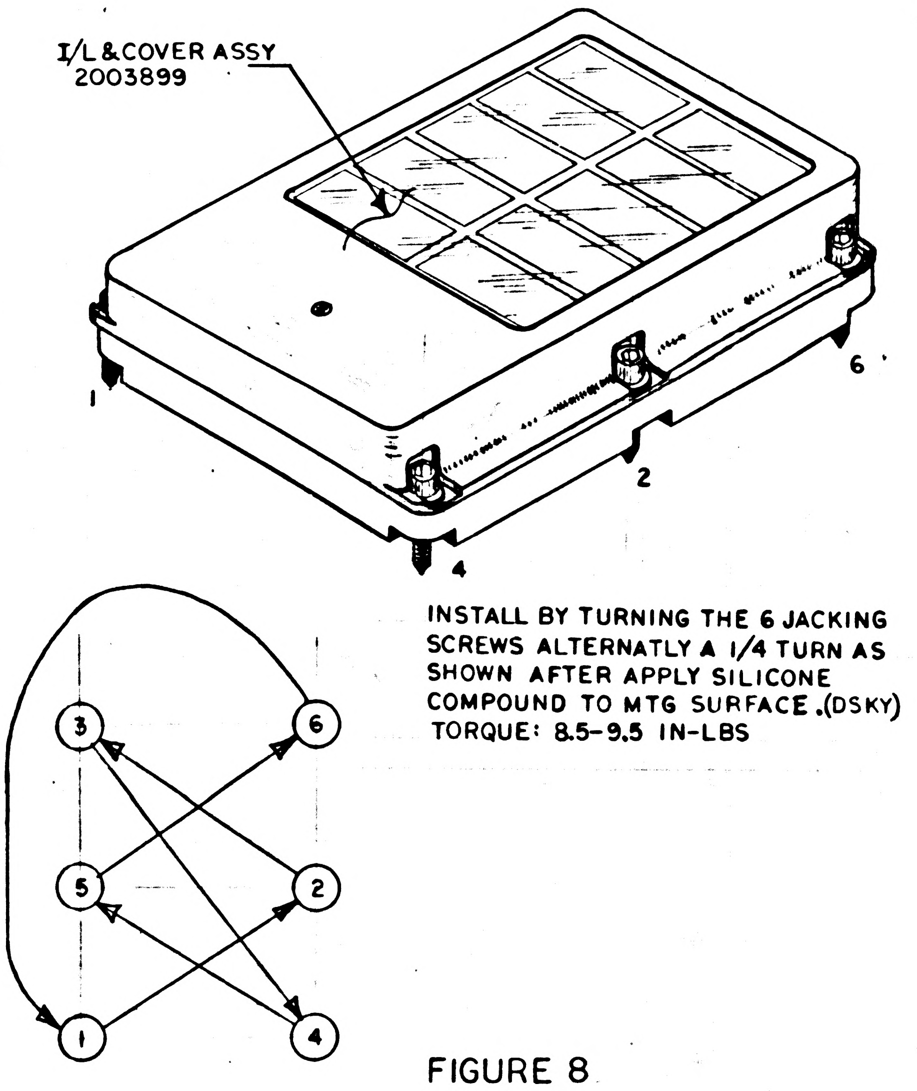

INDICATOR, ALARM 1006387
FRONT HOUSING MTG. SURFACE
DOWEL PINS
BONDED RUBBER GASKET
2004932-001
1004546-4
1004546-4
MS16633-4014
2 PLACES
REMOVE 1/4 TURN ALT.
MS16995-20
NAS620C6
4 PLACES
REMOVE FIRST

FIGURE 7


I/L & COVER ASSY 2003899
1
2
4
6
3
5
1
6
2
4

INSTALL BY TURNING THE 6 JACKING SCREWS ALTERNATLY A 1/4 TURN AS SHOWN AFTER APPLY SILICONE COMPOUND TO MTG SURFACE.(DSKY) TORQUE: 8.5-9.5 IN-LBS

FIGURE 8

NOTE: Ensure that dowel pins are properly aligned.

2.23 Torque the eight socket head screws 8 to 9 inch-pounds starting with the center screw and working outward around the perimeter of the cover.

2.24 Turn the Universal DSKY over carefully so that it is in a face down position on the pad. PAD MUST BE CLEAN.

2.25 Remove the four pan head cross recessed screws (MS35216-1) which mount the nameplate (1004260-20) to the rear cover of the DSKY and remove the nameplate. Dispose of nameplate and screws in accordance with Paragraph IX of this RIB.

2.26 Remove from retrofit kit, the new nameplate and its corresponding new screws (4) (MS35216-1) and proceed as follows:

2.26.1 Using stamping set stamp "Universal DSKY", the applicable serial number and Part Nos. as follows:
if reworking 2003994-011 DSKY Part Nos will be 2003994-021,
if reworking 2003950-011 DSKY Part Nos will be 2003950-031
and if reworking 2003985-051 Part Nos will be 2003985-061.
Characters to be .08/.10 inches high per ND 1002019 and ND 1002023.

2.26.2 Clean the area of the rear cover where the nameplate is to be mounted. Use Freon TF and cotton swabs.

2.26.3 Place the nameplate in its proper location and install the four screws one to two turns only.

2.26.4 Apply Sealing Compound (MIL-S-22473, Grade HV) to the threads of the four screws.

2.26.5 Resume tightening the screws down until they are flush with the nameplate and then torque them 2.0 to 2.5 inch-pounds. Clean away any excess sealing compound that might have been squeezed out.

2.27 Reassemble the DSKY to its Handling Fixture as follows:

2.27.1 Assemble the two DSKY Mounting Brackets (2014009) to the DSKY. Make sure they are right side up and secure with eight pan head screws (MS51958-61, eight flat washers (MS15795-808) hardware retained from step 2.1.3. Torque the screws 25 ± 2 inch-pounds.

2.27.2 Assemble the DSKY Cage (2014008) to the DSKY Mounting Brackets using eight pan head screws, flat washers, and lock washers retained from step 2.1.2.

2.27.3 Assemble the Handling Fixture Panel (2014012) to the DSKY Mounting Brackets using eight flat head screws, flat washers, lock washers, and hex nuts retained from step 2.1.1.

3. Retest procedures:

3.1 Remove the Protective Cap (1006425) from the J9 connector of the DSKY.

3.2 Connect a variable 115 VAC 400 cps power supply to pins number 38 and 40 of the J9 DSKY connector (only) using an Adapter Cable (AC-EX-A-22379 or equivalent - female Deustch Connector or female connector pins) and a power source.

NOTE: The power supply used for testing may be one of the following: (a) a DSKY Test Station (Ray./Wal); (b) an AGC Computer/CTS combination, or (c) a black box suitable for the purpose intended having obtained prior approval for its use from applicable inspection agency.

3.3 Energize the power source increasing voltage to 75 VAC maximum at the DSKY.

3.4 Verify that the nineteen Shaft Assemblies of the Pushbutton Switch Assemblies are illuminated.

3.5 For IL retest in the sub-system configuration, retest per JDC 05783 using mylar tape per 05784.

NOTE: Set-up porcedures are listed in ND 1021042, Figure 7-8, page 7-31/7-32. Also: Program ALLEREST is acceptable for testing of Indicator Lights.

VIII. MODIFICATION DESIGNATION:

Not Applicable. Re-identification was performed in step 2.26 of this RIB.

IX. DISPOSITION OF REMOVED PARTS:

All removed parts (IL Panel) (etc.), excluding miscellaneous screws and washers, are to be returned to Raytheon, Waltham, for disposition. Proper packing methods will be followed for all shipments, per ND 1002214.

X. REPORT OF ACCOMPLISHMENT:

For the purposes of records and logistics, it is requested that [illegible] forms, AC Form 1 and Raytheon Form 53-9208, be completed and returned to applicable addressees.

Sheet 1 of 12
RIB No. 0104127
Date 21 SEPT '67
TDRR No. 34681
Revision

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
SERIES 100 MAIN DSKY G&N FAILURE DETECT MODULE
AUTHORIZED BY ECP ACSK-642
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by ______ Date 30 AUG 67

P.C. Engineering
Approval ______ Date ______

DRB Approval E C Hall W Stameris Date 9/11/67 11 Sept 67

MIT Reliability Approval ______ Date ______

CCB Approval ______ Date 9/21/67

NASA Approval ______ Date 9/13/67

Sheet 2 of 12
RIB No. 0104127
Date
TDRR No.
Revision

I. **PURPOSE:**

Retrofit of the G&N Failure Detect Module, part no. 1003220-011, located in the Main DSKY, to reduce excessive noise on the input circuit. thereby eliminating erroneous alarm signals.

II. **AUTHORITY:**

This retrofit is authorized by ECP-ACSK-642
CCA-497-0482

III. **UNITS AFFECTED:**

Name	Part No.	Retrofit S/N	New Part No.
AGC Main DSKY (100 Series)	1003563-081	G&N 122 & 123	1003563-071
G&N Failure Detect Module	1003220-011	RAY 15-18	1003220-021

IV. **PRIORITY CHANGES:**

None.

V. **RELATED CHANGES:**

None.

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104243, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104127
b.	1	Capacitor, .01 mf	1006777-31
c.	2	Terminal, Insulated	1006708
d.	2	Contacts, Electrical	1010738-9
e.	2 ft.	Wire, Insulated (yellow)	1010789-016
f.	1	Component Holder	1004924
g.	.5 ft.	Sleeving	1006322-001
h.	.5 ft.	Sleeving	1006322-004

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Revision

Item	Qty	Nomenclature	Part No.
i.	1	Stencil, "-021" .10-inch high characters per ND 1002019	N/A
j.	3 oz.	Resin (black)	1006720
k.	3 oz.	Curing Agent	1006721
l.	3 oz.	Thinner	1006722
m.	3 oz.	Resin (Red)	1005009

NOTE: Items k, l. and m constitute the encapsulating material per ND 1002009, Method F, item m is to be used for the connector (Method E).

Item	Qty	Nomenclature	Part No.
n.	1	Screw	MS51959-13

1a. One retrofit kit, part number 8104240, containing the following:

Item	Qty.	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104127
b.	1	Stencil	N/A
c.	1	G&N Failure Detect Module (GFP)	1003220-021

2. Material required but not supplied in kit:

Item	Qty.	Nomenclature	Part No.
a.	A/R	Ink, Black, White	1006271-10,-1
b.	A/R	Chem-Stripper	N/A
c.	A/R	Isopropyl Alcohol	TT-I-735
d.	A/R	Chromate (ref. ND 1002040)	N/A

3. Tools required but not supplied in kit:

Item	Qty.	Nomenclature	Part No.
a.	1	Stenciling tool, brush or air-operated equipment	N/A
b.	1	Torque wrench, 0-50 inch-pounds	N/A
c.	1	Drill bit .117/.123-inch diameter	N/A
d.	1	Drill, 1/4 inch chuck	N/A
e.	1	Soldering Gun Handle	Ungar #776
f.	1	Soldering Tip	Ungar #4039

Sheet 4 of 12
RIB No. 0104127
Date
TDRR No.
Revision

4. Documents required but not supplied:

Item	Nomenclature	Document No.
a.	Workmanship Standard	AC-STD-1 (3 Mar. 4)
b.	AGC Keyboard and Display	1003563
c.	G&N Failure Detect Module	1003220
d.	Touch-Up of Anodized Aluminum and Magnesium	ND 1002040
e.	Marking Characters	ND 1002019
f.	Encapsulation of Electronic Assemblies	ND 1002009
g.	Epoxy Bonding of Metallic and Non-Metallic Materials	ND 1002004
h.	G&N Failure Detect Cable Assembly	1005731
i.	Soldering of Electronic Connectors	ND 1002071

VII. **PROCEDURE:**

NOTE: This Retrofit Instruction Bulletin is presented in four parts, viz:

1. General Instructions - applicable to all retrofit personnel.
2. Removal and Replacement of Failure Detect Module in DSKY - applicable to Field Site personnel.
3. Retrofit of Failure Detect Module - applicable to personnel at Raytheon, Waltham.
4. Retest Procedures - applicable to all retrofit personnel.

1. General Instructions·

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any parts unless so directed. No deviation should be made from any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) (Field only) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 19 4.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial numbers of equipment affected by this retrofit are not changed by this retrofit.

2. Removal and Replacement of G&N Failure Detect Module, part no. 1003220-011, in Block I, 100 Series AGC Main DSKY, part no. 10035 3-051, using retrofit kit 8104240:

2.1 Remove the hardware securing the DSKY to the handling fixture, or spacecraft, whichever is applicable and remove the DSKY. Retain hardware for reassembly.

2.2 Loosen the four screws marked "A" on the side of the relay tray housing.

2.3 Jack out the four relay modules by means of the four jacking screws on the relay module wirewrap plate.

2.4 Remove the four relay modules and record the thickness and location of shims (if any) on each of the modules stop pins. Retain for reassembly.

2.5 Remove the eight pan head screws securing the two stiffeners to the relay tray housing. Retain for reassembly.

2.6 Remove the two button head screws, two socket head screws and four flat washers securing the failure detect assembly to the relay tray housing. Back off the assembly from the connector by means of the assembly jacking screw. Retain hardware for reassembly.

2.7 Dispose of removed G&N Failure Detect Module part no. 1003220-011, by returning to stores for disposition as required in paragraph IX of this RIB.

2.8 Remove from retrofit kit 8104240 retrofitted G&N Failure Detect Module, part no. 1003220-021.

2.9 Assemble module to DSKY and reassemble DSKY by reversing the procedures in steps 2.1 through 2.6. Torque hardware per notes in drawing 1003563.

2.10 Locate "-051" stenciled on DSKY and remove with Chem-Stripper and cotton swabs.

2.11 Using white ink and stencil provided in kit, stencil "-071" in the same location per ND 1002019.

2.12 Reassemble DSKY to handling fixture or spacecraft, whichever is applicable.

2.13 Retest DSKY per step 4.1 of this RIB.

3. Retrofit of G&N Failure Detect Module, part no. 1003220-011, using retrofit kit 8104243:

3.1 Reference Figure 1 of this RIB and locate and drill .117/.123-inch diameter hole and countersink 82 degrees to .23/.24 diameter in the housing as shown in Figure 1.

3.2 Apply chromate to all raw metal surfaces per ND 1002040 except do not epoxy coat.

3.3 Remove cover, part no. 1004316 by removing phillips head screws five places. Retain for reassembly.

NOTE: Inspect interior of module and clean out any metal particles that may have resulted from drilling/countersinking.

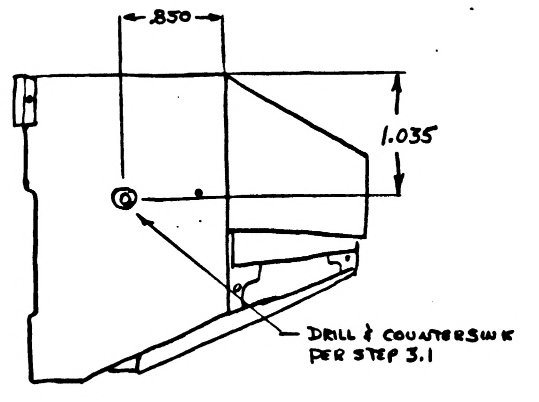

Figure 1. Dimensions for drilling housing.

3.4 Install capacitor (1006777-31), supplied in kit, into component block by inserting midway into block with leads extending both sides.

3.5 Solder leads of capacitor and two wires (1010789 yellow) to terminals of component block per ND 1002071.

NOTE: If component block is not supplied with terminals (1006708) already installed, install them by hand gently but firmly since their installation is a semi-interference fit.

3.6 Encapsulate component block/capacitor as shown in Figure 2 of this RIB using resin, curing agent, and thinner, supplied in kit, per Method F of ND 1002009.

3.7 Depot and remove pins 182 and 209 from Connector (05A9J1) as shown in Figure 3 of this RIB.

NOTE: Pin locations may be conclusively ascertained by removing connector gasket which will reveal pin numbers embossed on connector. A magnifying glass would assist in accurate reading.

3.8 Strip and install leads from component block into new pins (1010738-9), supplied in kit, per detail A and notes 4 and 5 of G&N Failure Detect Cable Assembly Drawing 1005731.

3.9 Install component block into G&N Failure Detect Assembly using screw (MS 51959-13), supplied in kit, and bond per ND 1002004, Type V. Torque screw 5-7 inch-pounds.

3.10 Install pins 182 and 209 back into connector and encapsulate depotted area per ND 1002009, Method E.

NOTE: Before proceeding to step 3.11, retest per step 4.2.

3.11 Locate "-011" stenciled on side of G&N Failure Detect Module and remove with Chem-Stripper and cotton swabs.

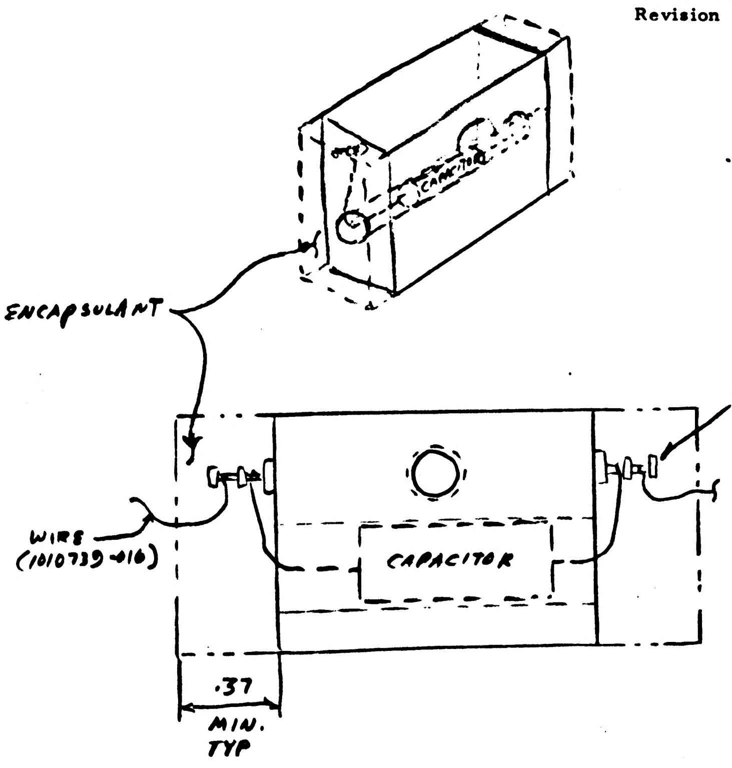

Figure 2. Encapsulation of Component Block and Capacitor.

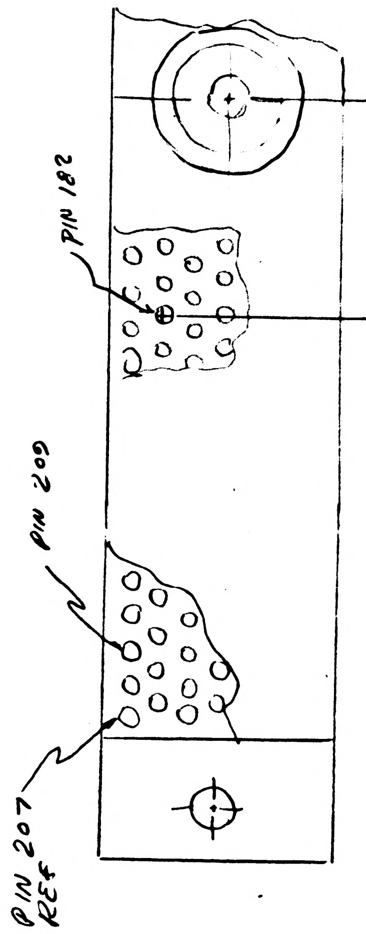

Figure 3. Location of Connector Pins 182 and 209.

3.12 Using black ink, brush or air-operated equipment, stencil "-021" per ND 1002019 using stencil provided in kit.

4. Retest procedures. Step 4.1 applies to field retrofit, step 4.2 applies to retrofit at Raytheon, Waltham.

4.1 Retest Block I, 100 Series Main DSKY in accordance with applicable JDC's in CSS Checkout Flowgrams of ND 1021041, Volume II.

4.2 Retest module as follows:

4.2.1 Retest to FTM 1003220 and the following JDC's: 05090, 05091, 05092, 05093 (see step 4.2.2) and 04310 (test for Night Watchman only).

4.2.2 Step 30 of "B. Procedure," of JDC 05093 is to be performed as shown in Figure 4 of this RIB for the purposes of this retrofit only.

VIII. MODIFICATION DESIGNATION:

Not Applicable. The reidentification of the DSKY was accomplished in steps 2.10 and 2.11 of this RIB.

IX. DISPOSITION OF REMOVED PARTS:

If retrofit is performed in field and Failure Detect Module is replaced, return removed module to stores for disposition.

X. REPORT OF ACCOMPLISHMENT:

Complete Raytheon Form 53-9208 and return to addressee.

Complete AC Form 1 (Page 12A of this RIB) and return to addressee.

---

30. Monitor oscilloscope and measure the following pulse parameters as indicated in Figure 1A and Figure 1B.

NOTE: Use Internal Trigger of oscilloscope.

Figure 1A Requirements

A.	Level (Hi)	0.6 ± 0.1 VDC
B.	Level (Lo)	NMT 0.2 VDC
C.	Pulse Width	6.0 ±0.6 usec
D.	Period Time	2.0 ±0.2 sec
E.	Rise Time	NMT 300 nsec
F.	Fall Time	NMT 300 nsec

Figure 1B Requirements

A.	Level (Hi)	1.2 ± 0.4 VDC below B+
B.	Level (Lo)	NMT 0.1 VDC below B+
C.	T Rise	NLT 3.5 usec NMT 5.0 usec

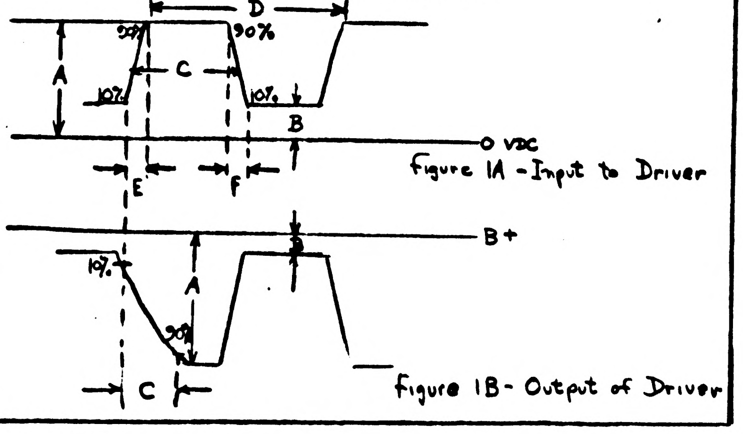

Figure 1A - Input to Driver

Figure 1B - Output of Driver

Figure 4. Replacement Step B.30 for JDC 05093.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 12A of 12
' Part No. R130104127
' Date: ____________
' TDRR ____________
' Revision ____________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ____________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

Sheet 1 of 11
RIB No. 0104134
Date 27 JUNE 68
TDRR No. 36461
Revision B

NASA
RETROFIT INSTRUCTION BULLETIN
AGC DSKY I/L & E/L GLASS REPLACEMENT
AUTHORIZED BY ECP 735 CCA-497-0583
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	
A	36485	1,3,6,7	E.C.H	W. S.	7/11/68
B	36593	1&2	E.C.H.	A.M.	7/26/68

Prepared by Hollis D. Smith Date 25 June 1968

P.C. Engineering Approval________ Date________

DRB Approval Ellen C Hall W Stamm Date 6/26/68 27 June 68

MIT Reliability Approval________ Date________

MIT/IL Approval________ Date________

NASA Approval Harry J. Howard Date 6/27/68

I. PURPOSE:

Retrofit instructions to install shatterproof glass covering the I/L and E/L lights of the AGC DSKY, part number 2003994-021, to afford fire proofing and avoid the possibility of broken glass within the spacecraft under the requirements of MSC-A66-3, Revision A.

II. AUTHORITY:

This retrofit is authorized by ECP 785 - CCA - 497 - 0588

III. UNITS AFFECTED:

Name	Part No.	Serial No.	New Part No.
AGC DSKY	2003994-021	RAY 50, RAY 64, 51, 48, 58	2003994-031

IV. PRIORITY CHANGES:

None.

V. RELATED CHANGES:

None

VI. MATERIAL REQUIRED:

1. One retrofit kit, part number 8104250, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104134
b.	1	(I/L) Cover Assembly	2003897-021
c.	1	(E/L) Cover Assembly	2003897-031
d.	1	Front Cover	2004739-001
e.	1	Nameplate	1004260-20
f.	2 oz.	Silicone Compound	MIL-S-8660
g.	4	Screws	MS 35216-1
h.	48	Flat Washers	NAS620C6
i.	12	Socket Hd Cap Screws	1001489-26
~~j.~~		~~[illegible] (glass installed)~~	~~[illegible]~~
k.	12	"O" Rings	

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Sealing Compound	MIL-S-22473, Grade HV
b.	A/R	Freon TF	N/A
c.	A/R	Silicone Compound	1006879
d.	1	Foam rubber pad (approx. 1" thick)	N/A
e.	A/R	Cotton Swabs	N/A

3. Tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	0-30 or 0-50 inch-pound Torque Wrench	N/A
b.	1	Marking Press	"NBR-ALL"

---

4. Documents required but not supplied in kit:

Item	Document	Document No.
a.	Workmanship Standard	AC-STD-1 (3 Mar 64)
b.	AGC DSKY Assembly Drawing	2003994
c.	Front Housing Assembly Drawing	2003949
~~d.~~	~~Procurement Specification~~	~~2003994~~
e.	I/L and Cover Assembly	2003899
f.	General Specifications, Marking	ND 1002019
g.	Serialization	ND 1002023
h.	Packing and Shipping	ND 1002214

VII. PROCEDURE:

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any part unless so directed. No deviation should be made from any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial numbers of equipment affected by this retrofit are not changed by this retrofit.

---

2. Retrofit the AGC DSKY using retrofit kit 8104250 as follows:

2.1 Remove the AGC DSKY from the Handling Fixture, part no. 2001413, according to the following procedure:

NOTE: Omit steps 2.1 through 2.3 if DSKY is already installed in the space craft.

2.1.1 Remove the eight flat head screws (MS51960-66), eight flat washers (MS15795-808), eight lock washers (MS35650-104) which mount the Handling Fixture Panel (2014009) and remove the panel. Retain panel and hardware for reassembly.

2.1.2 Remove the eight pan head screws (MS57968-62), eight lock washers (MS35337-81), and eight flat washers (MS15795-808) located on the sides of the DSKY Cage (2014008) and remove the cage. Retain cage and hardware for reassembly.

2.1.3 Remove the eight pan head screws (MS51958-61) and eight flat washers (MS15795-808) that mount the DSKY Mounting Brackets (2014009) to the DSKY and remove the brackets. Retain all items for reassembly.

2.2 Insure that the Protective Cap (1006425-14) is in place on the J9 connector of the DSKY.

2.3 Place the DSKY face up (indicator lights side) on a foam rubber pad.

2.4 Remove the eight socket head screws (1001489-59) and the eight flat washers (NAS-620C6) that mount the Front Cover (2004739-000) to the DSKY. Retain hardware for reassembly.

2.5 Remove the Front Cover from the DSKY by lifting it away slowly while keeping the cover parallel to the front housing surfaces. Dispose of Front Cover per paragraph IX of this RIB.

2.6 Remove the I/L and Cover Assembly (2003899-011) from the AGC DSKY as follows:

NOTE: The original I/L Cover was added to the I/L Assembly per RIB No. 0104126.

2.6.1 Jack the I/L and Cover Assembly from the Front Housing by turning the six jacking screws counterclockwise a quarter-turn at a time. Alternate between the six screws in a criss-cross manner so as to lift the assembly in parallel to its mounting surface.

2.7 Remove the I/L Cover from the I/L Assembly by removing the jacking screws from the cover by disengaging E Rings from the jacking screws and pulling the jacking screws free. Carefully separate the cover from the I/L. Dispose of the cover and hardware per paragraph IX of this RIB.

2.8 Clean the I/L Assembly with Freon and cotton swabs, using it sparingly, and insure that rubber gasket is clean.

CAUTION:

Do not clean acrylic face of I/L with Freon TF or allow any to come into contact with acrylic face.

2.9 Apply a thin coating of silicone compound (1006879) to the mating surfaces of the Front Housing Assembly. Be careful not to get any on the gasket or in the tapped holes.

2.10 Fill female connectors on the Front Housing Assembly which mate with the I/L Assembly with silicone compound (MIL-S-8660).

NOTE: Steps 2.9 and 2.10 utilize two different types of silicone compound.

2.11 Remove from retrofit kit new I/L Cover Assembly, part no. 2003897-021, and install it to the I/L Assembly as follows:

2.11.1 Remove from retrofit kit six flat washers (NAS620C6), and six socket head cap screws (1001489-26). Install a washer to each screw and insert the screws into the I/L Cover Assembly.

2.11.2 Remove from retrofit kit 18 flat washers (NAS620C6), divide them into groups of three, and place three washers over each screw thread where it protrudes through the I/L Cover Assembly.

2.11.3 Carefully lower the I/L Assembly over the cover so that the screws now protrude through the I/L Assembly as well as the cover, and the three washers on each screw act as shims providing a small gap between the I/L Cover and the I/L Assembly.

2.11.4 Remove from the retrofit kit six "O" Rings and slip a ring over each screw thread protruding through the I/L and Cover Assembly. The "O" Rings function to make the screws temporarily "captive" screws.

2.12 Return the I/L and Cover Assembly to the DSKY and alternately tighten down screws a quarter of a turn at a time until a mounting torque of 8.5 to 9.5 inch-pounds is achieved. The "O" Rings will "walk" up the screw threads to allow mating of surfaces.

CAUTION:

Insure that mating surfaces of DSKY and and I/L and Cover Assembly are correctly aligned and retrofit correctly performed before torquing down.

NOTE: THIS PAGE APPLIES IF E/L COVER ASSEMBLY - PART NO. 2003897-031 IS TO BE UTILIZED.

2.13 Remove from retrofit kit new E/L Cover Assembly, part no. 2003897-031, and install it to the E/L Assembly as follows:

2.13.1 Remove the E/L Assembly from the DSKY by removing four jacking screws (2004932-001), two socket head cap screws (MS16995), and their associated E rings and flat washers. Dispose of hardware per paragraph IX of this RIB.

2.13.2 Clean the E/L Assembly with Freon TF and cotton swabs (sparingly) and then apply a thin coating of silicone compound (1006879) to the mating surfaces.

CAUTION:

Do not clean acrylic face of E/L with Freon TF or allow any to come into contact with acrylic face.

2.13.3 Fill female connectors with silicone compound (MIL-S-8660).

NOTE: Steps 2.13.2 and 2.13.3 utilize two different types of silicone compound.

2.13.4 Reference steps 2.11 and 2.12 and perform the same procedure for the E/L Cover and Assembly, that is: installing socket head cap screws with washers, then inserting into cover, then adding three washers to each screw as shims, then placing cover onto E/L Assembly and adding "O" rings to make screws temporarily "captive."

CAUTION:

Insure that mating surfaces of DSKY and E/L and Cover Assembly are correctly aligned and retrofit correctly performed before torquing down.

2.14 Return the E/L and Cover Assembly to the DSKY and alternately tighten down screws a quarter turn at a time until a mounting torque of 8.5 to 9.5 inch-pounds is achieved.

2.15 Remove from retrofit kit new Front Cover, part no. 2004739-001, and carefully position it over the Front Housing Assembly to check clearances throughout.

2.16 Assemble the Front Cover to the DSKY using hardware retained from step 2.4. Tighten screws alternately.

2.17 Torque hardware to mounting torque of 8.5 to 9.5 inch-pounds.

3. Retest procedures:

Field site personnel will perform tests as necessary to assure that I/L and E/L lights correctly energize after completion of this retrofit.

VIII. **MODIFICATION DESIGNATION:**

1. Remove from retrofit kit the new nameplate and its corresponding new (4) screws (MS35216-1).
2. Using stamping set, stamp "AGC DSKY", the applicable S/N and the part numbers:

   2003994-031

3. Characters and digits are to be .08/.10 inches high per ND 1002019 and ND 1002023.
4. Remove existing nameplate and clean the area with Freon TF and cotton swabs. Dispose of removed nameplate per paragraph IX.
5. Place the new nameplate in the same location and install the four screws a few turns. Apply Sealing Compound (MIL-S-22473, Grade HV) to the threads and torque screws down 2.0 to 2.5 inch-pounds. Clean away any excess compound that might have been squeezed out.

IX. **DISPOSITION OF REMOVED PARTS:**

All removed parts, excluding miscellaneous screws and washers, are to be returned to Raytheon, Waltham. Pack for shipment per ND 1002214.

X. **REPORT OF ACCOMPLISHMENT:**

Complete forms (AC Form 1 and Raytheon Form 53-9208) and forward to addressees.

7

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 11 of 11
' Part No. RI 0104134
' Date: ________
' TDRR ________
' Revision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ____________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-06, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit			
					P/N	S/N		

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

Sheet 1 of 10
RIB No. 0104136
Date 10 JAN 69
TDRR No. 37180
Revision –

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
DSKY STATUS/CAUTION INDICATOR
AUTHORIZED BY ECP
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis D Smith Date 1 Dec. 68

P. C. Engineering
Approval__________ Date__________

DRB Approval ECHall wStameris Date 12/20/68

MIT Reliability Approval__________ Date__________

CCB Approval Date 1/10/69

NASA Approval Date 1/30

Sheet 2 of 10
RIB No. 0104136
Date
TDRR No.
Revision

I. **PURPOSE:**

Retrofit instructions to replace the AGC DSKY I/L Indicator with the (14 legend) Status/Caution Indicator, part number 1005025-001. The Cover Assembly is retained and installed to the 14 legend Indicator where applicable.

II. **AUTHORITY:**

This retrofit is authorized by ECP-ACSK-0739, CCA 497-0594

III. **UNITS AFFECTED:**

Name	Part No.	Ray S/N	New Part No.
AGC DSKY	2003994-041		2003994-061
AGC DSKY	2003994-051		2003994-071
AGC DSKY	2003950-051		2003950-071
AGC DSKY	2003985-041		2003985-091

IV. **PRIORITY CHANGES:**

RIB No. 0104135, RKA 8104251.*

V. **RELATED CHANGES:**

None.

VI. **MATERIAL REQUIRED:**

1. One retrofit kit, part number 8104252, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104136
b.	1	Indicator, Status/Caution	1005025-001

*Excluding 2003985-041

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Item	Qty	Nomenclature	Part No.
c.	6	Screws, jacking	2004932-004
d.	6	Ring, retaining	MS 16633-4014
e.	5 oz	Silicone Compound	1006879
f.	2 oz	Silicone Compound	1008954
g.	1	Nameplate	1004260-20
h.	4	Screws, pan head, cross recessed	MS 35216-1
i.	2 oz	Sealing Compound	1008953-004

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Cotton Swabs	N/A
b.	A/R	Freon TF	N/A

3. Tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	0-30 or 0-50 inch-pound Torque Wrench	N/A
b.	1	Marking Press	"NBR-ALL"

4. Documents required but not supplied in kit:

Item	Document	Document No.
a.	Workmanship Standard	AC-STD-1 (3 Mar 64)
*b.	DSKY Assembly Drawing	2003994
*c.	DSKY Assembly Drawing	2003985
*d.	DSKY Assembly Drawing	2003950
e.	General Specifications, Marking	ND 1002019

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RIB No. 0104136
Date
TDRR No.
Revision

Item	Document	Document No.
f.	Packing and Shipping	ND 1002214

* As applicable per site.

VII. **PROCEDURE:**

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any part unless so directed. No deviation should be made from any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial numbers of equipment affected by this retrofit are not changed by this retrofit.

2. Retrofit the AGC DSKY using retrofit kit 8104252 as follows:

2.1 Remove the AGC DSKY from the Handling Fixture, part no. 2001413, according to the following procedure:

NOTE: Omit steps 2.1 through 2.3 if DSKY is already installed in the space craft or subsystem.

2.1.1 Remove the eight flat head screws (MS51960-66), eight flat washers (MS15795-808), eight lock washers (MS35650-104) which mount the Handling Fixture Panel (2014012) and remove the panel. Retain panel and hardware for reassembly.

2.1.2 Remove the eight pan head screws (MS57958-62) eight lock washers (MS35337-81), and eight flat washers (MS15795-808) located on the sides of the DSKY Cage (2014008) and remove the cage. Retain cage and hardware for reassembly.

2.1.3 Remove the eight pan head screws (MS51958-61) and eight flat washers (MS15795-808) that mount the DSKY Mounting Brackets (2014009) to the DSKY and remove the brackets. Retain all items for reassembly.

2.2 Insure that the Protective Cap (1006425-14) is in place on the J9 connector of the DSKY.

2.3 Place the DSKY face up (indicator light side) on a foam rubber pad.

NOTE: The instructions that follow are universal for all DSKYs which have been retrofitted per RIB No. 0104135, excluding DSKY part no. 2003985-041. Disregard references to the new I/L cover for this configuration.

2.4 Remove the eight socket head screws (1001489-59) and the eight flat washers (NAS-620C6) that mount the Front Cover to the DSKY. Retain hardware for reassembly.

2.5 Remove the Front Cover from the DSKY by lifting it away slowly while keeping the cover parallel to the front housing surfaces. Retain Front Cover for reassembly.

2.6 Remove the I/L Cover Assembly from the Front Housing Assembly by turning the six screws a quarter-turn at a time.

NOTE: Alternate between the screws so as to lift the indicator evenly, support the top portion by hand to insure even removal.

NOTE: Reference Figure 1 for steps 2.6 through 2.12.

2.7 Remove the I/L Cover from the I/L Assembly by disengaging the "E" Rings from the Jacking Screws and carefully separate the cover from the I/L and dispose of the I/L Assembly, jacking screws, and "E" Rings per paragraph IX of this RIB. Retain flat washers and Cover Assembly.

2.8 Remove from retrofit kit new I/L Assembly which is now identified as Indicator, Status/Caution, part no. 1005025, and clean this assembly with an optical cleaning kit. Insure that rubber gasket is clean.

CAUTION: Do not clean acrylic face of Status/Caution Indicator with Freon TF or allow any to come into contact with acrylic face.

2.9 Install the I/L Cover to the Status/Caution Indicator using retained flatwashers (1004546-4) and new hardware from retrofit kit as follows:

2.9.1 Install a flat washer (retained) to the head of each jacking screw (2004932-004) and insert the screws into the Status/Caution Indicator Cover.

2.9.2 Place two flat washers over each screw thread where it protrudes through the Status/Caution Indicator Cover (these washers act as shims between the cover and the indicator).

2.9.3 Carefully place the Cover over the Status/Caution Indicator so that the screws now protrude through both the cover and the indicator and the two washers on each screw act as shims.

2.9.4 Remove from retrofit kit six Retaining Rings ("E") (MS16633-4041) and place a flat washer over each screw protruding through the Status/Caution Indicator and Cover Assembly. Install a retaining ring to each screw over the flat washer thereby making the screws captive.

2.10 Apply a thin coating of silicone compound (1006879), supplied in kit, to the mating surfaces of the Status/Caution Indicator and the Front Housing Assembly of the DSKY. Do not get any on the gasket or in the tapped holes.

2.11 Fill female connectors on the Front Housing Assembly, which mate with the Status/Caution Indicator, with silicone compound (1008954), supplied in kit (note that this is a different compound than used in step 2.10).

2.12 Assemble the Status/Caution Indicator and Cover Assembly to the DSKY by positioning it in place and alternately tightening down the screws a quarter-of-a-turn at a time. Continue in this manner until a mounting torque of 8.5 to 9.5 inch-pounds is attained.

NOTE: Use criss-cross method.

2.13 Install the Front Cover Assembly "eggcrate" (retained with hardware from step 2.5) to the DSKY by placing it in position and alternately tightening down the screws a quarter-of-a-turn at a time until a mounting torque of 8.0 to 9.0 inch-pounds is achieved.

NOTE: Insure that clearances are correct throughout before torqueing down.

3. Install the DSKY to the Handling Fixture (if applicable) using hardware retained from step 2.1 as follows:

3.1 Assemble the two DSKY Mounting Brackets (2014009) to the DSKY. Insure that they are right side up and secure with eight pan head screws (MS51958-61), and eight flat washers (MS15795-808), and eight lock washers (MS35650-104), and then continue in reverse of steps 2.1.1, 2.1.2.

4. Retest Procedures:

Field site personnel will perform tests as necessary to insure that all legends on Status/Caution Indicator energize correctly after completion of this retrofit.

VIII. MODIFICATION DESIGNATION:

1. Remove from retrofit kit the new nameplate (1004260-20) and four screws (MS35216-1).

2. Using a stamping set, stamp "AGC DSKY", the applicable serial numbers, and the part numbers as follows:

2003994-041 and -051 become -061 and -071 respectively.
2003950-051 becomes -071
2003985-041 becomes -091

NOTE: Characters and digits are to be .08/.10 inches high per ND 1002019 and ND 1002023.

3. Remove existing nameplate and clean the area with Freon TF and cotton swabs. Dispose of removed nameplate per Paragraph IX of this RIB.

4. Install the new nameplate in the same location and insert the four screws with a few turns. Apply sealing compound (1008953-004) provided in kit, to the threads and torque screws down 2.0 to 2.5 inch-pounds. Clean away any excess compound that might have been squeezed out.

IX. DISPOSITION OF REMOVED PARTS:

All removed parts, excluding miscellaneous screws and washers, retaining rings, are to be returned to Raytheon, Waltham. Pack for shipment per ND 1002214.

X. REPORT OF ACCOMPLISHMENT:

Complete the following forms and forward to addressee:

1. AC Form 1 (page 10 of this RIB.)

2. Raytheon Form 53-9204.

Sheet 9 of 10
RIB No. 0104136
Date
TDRR No.
Revision

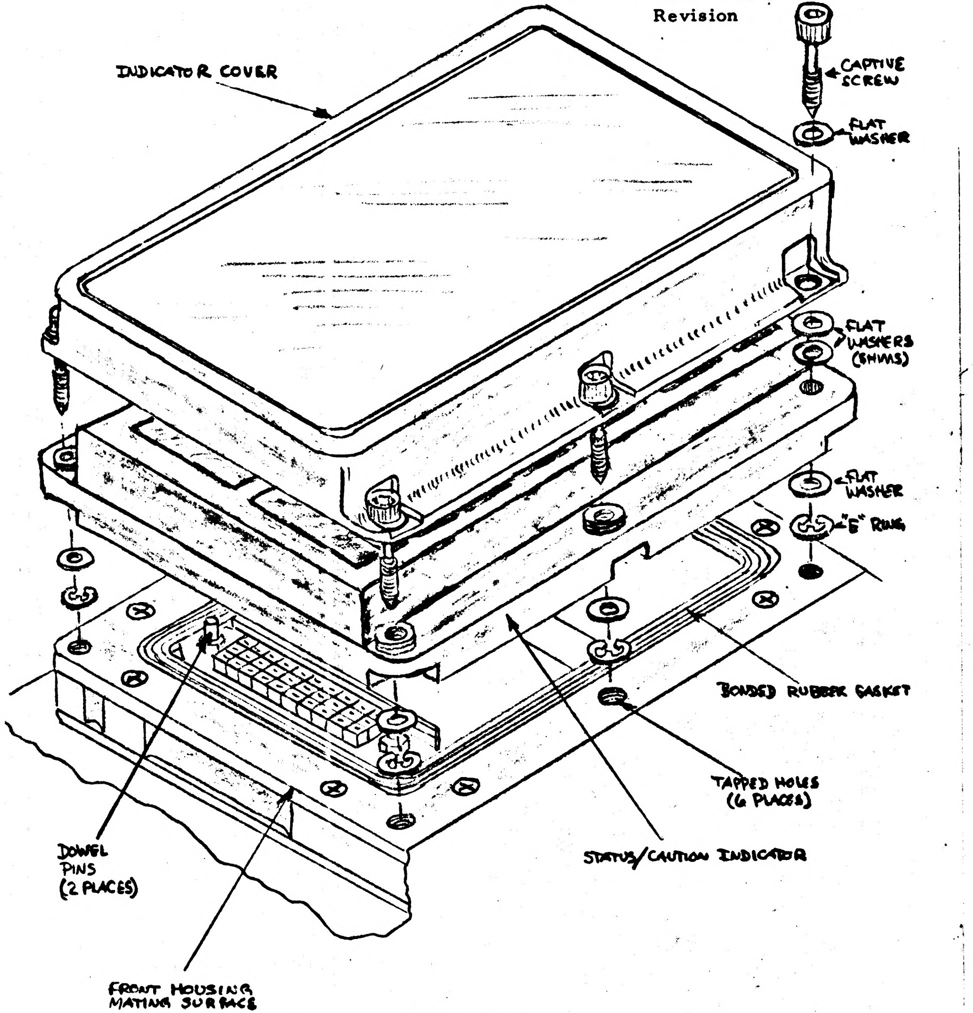
CAPTIVE SCREW
FLAT WASHER
INDICATOR COVER
FLAT WASHERS (SHIMS)
FLAT WASHER
"E" RING
BONDED RUBBER GASKET
TAPPED HOLES (6 PLACES)
DOWEL PINS (2 PLACES)
STATUS/CAUTION INDICATOR
FRONT HOUSING MATING SURFACE

FIGURE 1.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 10 of 10
¹Part No. RIB0104136
¹Date: ________
¹TDRR ________
¹Revision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

¹Applicable for Retrofit only

Sheet 1 of 5
RIB No. 0104137
Date 5 FEB 69
TDRR No. 37315
Revision —

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
LEM INSTALLATION KIT
AUTHORIZED BY ECP 743
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis D. Smith Jr Date 15 Jan. 1969

P.C. Engineering Approval ______ Date 1-28-69

DRB Approval W Stameris E C Hall Date 28 Jan 69

MIT Reliability Approval ______ Date ______

MIT/IL Approval ______ Date ______

NASA Approval ______ Date ______

Sheet 2 of 5
RIB No. 0104137
Date
TDRR No.
Revision

I. PURPOSE:

To update the LEM Installation Kit, part no. 6004000-021, to the -051 configuration by removal of the brackets and their associated hardware.

II. AUTHORITY:

This RIB is authorized by ECP ACSK-0743, CCA 497-0590

III. UNITS AFFECTED:

Name	Part No.	Ray S/N	New Part No.
Installation Kit, Computer Group, LEM	6004000-021	—	6004000-051

IV. PRIORITY CHANGES:

None.

V. RELATED CHANGES:

None.

VI. MATERIAL REQUIRED:

1. One retrofit kit, part number 8104253, containing the following:

Item	Qty	Nomenclature	Part No.
a.	1	Retrofit Instruction Bulletin	0104137

2. Material required but not supplied in kit:

None.

3. Tools required but not supplied in kit:

None.

Sheet 3 of 5
RIB No. 0104137
Date
TDRR No.
Revision

4. Documents required but not supplied in kit:

Item	Document	Document No.
a.	General Specifications, Marking	ND 1002019
b.	Packing and Shipping	ND 1002214
c.	Workmanship Standard	AC-STD-1 (3 Mar 64)

VII. PROCEDURE:

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any part unless so directed. No deviation should be made from any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial numbers of equipment affected by this retrofit are not changed by this retrofit.

2. Retrofit the LEM Installation Kit, part no. 6004000-021, using retrofit kit 8104253 as follows:

2.1 Remove from the LEM Installation Kit the following items:

2.1.1 Fourteen (14) Screw Retainer Brackets, part no. 2004149-004.

2.1.2 Twenty-eight (28) Mounting Screw Brackets, part no. 1001489-3.

Sheet 4 of 5
RIB No. 0104137
Date
TDRR No.
Revision

2.2 Dispose of items removed in step 2.1 per paragraph IX of this RIB.

3. Retest Procedures:

Not Applicable.

VIII. MODIFICATION DESIGNATION:

1. Reference ND 1002019 and reidentify tag (LEM Installation Kit is a "bag and tag" item) from 6004000-021 to 6004000-051.

XI. DISPOSITION OF REMOVED PARTS:

Removed items are to be returned to Raytheon, Waltham. Pack for shipment per ND 1002214.

X. REPORT OF ACCOMPLISHMENT:

1. Complete AC Form 1 (page 5 of this RIB) and return to addressee.

2. Complete Raytheon Form 53-9208 and return to addressee.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 5 of 5
' Part No. RIE 0104137
' Date: ________
' TDRR ________
' Revision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
					Kit			
				ECP No.	P/N	S/N		

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

Sheet 1 of 9
RIB No. 0104138
Date 5 FEB 69
TDRR No. 37322
Revision —

NASA
RETROFIT INSTRUCTION BULLETIN (RIB)
DSKY E/L AND COVER ASSEMBLY
AUTHORIZED BY ECP ACSK-0768
ORIGINATOR - RAYTHEON COMPANY

Revision Letter	TDRR No.	Pages Revised	APPROVALS		Date
			MIT	NASA	

Prepared by Hollis D Smith Date 23 January 1969

P. C. Engineering Approval L. Lacesse Date 1-28-69

DRB Approval EC Hall WStamerin Date 28 Jan 1969

MIT Reliability Approval__________ Date__________

MIT/IL Approval__________ Date__________

NASA Approval__________ Date__________

I. PURPOSE:

Retrofit instructions to replace the (LEM) AGC DSKY E/L Indicator and Cover Assembly with an E/L Indicator and Cover Assembly which has safety glass bonded over the entire surface of the Indicator glass. The additional bonded glass is provided to reduce the stress from thermal/vacuum environments.

II. AUTHORITY:

This retrofit is authorized by ECP 0768, CCA 497-0614

III. UNITS AFFECTED:

Name	Part No.	RAY S/N	New Part No.
AGC DSKY	2003994-061		2003994-081
AGC DSKY	2003994-071		2003994-091
AGC DSKY	2003994-041		2003994-111
AGC DSKY	2003994-051		2003994-121

IV. PRIORITY CHANGES:

1. RIB No. 0104135, RKA 8104251 ([illegible])
2. RIB No. 0104136 ,RKA 8104252

V. RELATED CHANGES:

None.

VI. MATERIAL REQUIRED:

1. One retrofit kit, part number 8104254, containing the following:

Item	Qty	Nomenclature	Part No.
a.	* 2 oz.	Sealing Compound (LOCKTITE)	1008953-003
b.	* 2 oz.	Silicone Compound (DC-4)	1008954
c.	* 5 oz.	Silicone Compound (DC-340)	1006879
d.	4	Screw, pan head, cross recessed	MS35216-1

* Denotes approx quantities.

Item	Qty	Nomenclature	Part No.
e.	1	Nameplate	1004260-20
f.	1	Retrofit Instruction Bulletin	0104138
g.	1	E/L and Cover Assembly	2003988-011, or 021

2. Material required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	A/R	Cotton Swabs	N/A
b.	A/R	Freon TF	N/A
c.	1	Foam rubber pad (approx. 1" thick and 12" x 12" approx.)	N/A

3. Tools required but not supplied in kit:

Item	Qty	Nomenclature	Part No.
a.	1	0-30 or 0-50 inch-pound torque Wrench	N/A
b.	1	Marking Press	"NBR-ALL"

4. Documents required but not supplied in kit:

Item	Document	Document No.
a.	Workmanship Standard	AC-STD-1 (3 March 64)
b.	AGC DSKY Assembly Drawing	2003994
c.	Front Housing Assembly Drawing	2003949
d.	General Specifications, Marking	ND 1002019

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4. Documents required but not supplied in kit (cont):

Item	Document	Document No.
e.	Serialization	ND 1002023
f.	Packing and Shipping	ND 1002214
g.	E/L & Cover Assy Dwg	2003988

VII. PROCEDURE:

1. General Instructions:

1.1 Read and understand complete procedure prior to attempting retrofit. Do not discard any part unless so directed. No deviation should be made from any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in paragraph VI, part 4, for applicable ND specifications.

1.5 Serial numbers of equipment affected by this retrofit are not changed by this retrofit.

2. Retrofit the AGC DSKY using retrofit kit 8104254 as follows:

2.1 Remove the AGC DSKY from the Handling Fixture, part no. 2014013 according to the following procedure:

NOTE: Omit steps 2.1 through 2.3 if DSKY is already installed in the space craft or subsystem.

2.1.1 Remove the eight flat head screws (MS51960-66), eight flat washers (MS15795-808), eight lock washers (MS 35650-104) which mount the Handling Fixture Panel (2014012) and remove the panel. Retain Panel and hardware for reassembly.

2.1.2 Remove the eight pan head screws (MS57958-62), eight lock washers (MS35337-81), and eight flat washers (MS157795-808) located on the sides of the DSKY Cage (2014008) and remove the cage. Retain cage and hardware for reassembly.

2.1.3 Remove the eight pan head screws (MS51958-61) and eight flat washers (MS15795-808) that mount the DSKY Mounting Brackets (2014009) to the DSKY and remove the brackets. Retain all items for reassembly.

2.2 Insure that the Protective Cap (1006425-14) is in place on the J9 connector of the DSKY.

2.3 Place the DSKY face up (indicator light side) on a foam rubber pad.

2.4 Remove the eight socket head screws (1001489-59) and the eight flat washers (NAS-620C6) that mount the Front Cover (2004739-001)to the DSKY. Retain hardware for reassembly.

2.5 Remove the Front Cover from the DSKY by lifting it away slowly insuring that it is lifted parallel to the front housing surfaces to avoid damage to the pushbuttons etc. Retain Cover for reassembly.

2.6 Jack the E/L and Cover Assembly from the Front Housing Assembly by turning the six jacking screws a quarter-turn at a time. Alternate between the screws (from side to side etc., criss-cross) so as to lift the indicator in parallel to its mounting surface.

NOTE: Support the top portion of the indicator by hand to maintain the parallelism.

2.7 Dispose of the removed E/L and Cover Assembly per paragraph IX of this RIB.

2.8 Clean the mating surfaces of the Front Housing Assembly with Freon TF and cotton swabs .

2.9 Remove from the retrofit kit, the new E/L and Cover Assembly, part no. 2003988-011,or 021 and clean it using Oprycal cleaning kit or equivalent.

CAUTION:

Do not clean glass face of E/L with Freon TF or allow any to come into contact with this surface.

2.10 Apply a thin coating of silicone compound (1006879), supplied in kit, to the mating surfaces of the Front Housing Assembly (Gasket Plate) being careful not to get any on the gasket or in the tapped holes.

2.11 Fill female connectors on the Front Housing Assembly, which mate with the E/L Assembly, with silicone compound (1008954), supplied in kit. Note that this is not the same silicone compound as used in step 2.10 (DC-4 used here, DC-340 used in step 2.10).

2.12 Carefully lower the new E/L and Cover Assembly into position on the dowel pins of the Front Housing Assembly approximately parallel to the mating surfaces.

2.13 Turn the six jacking screws (do not force) a quarter-turn at a time, alternating between each screw in a criss-cross manner.

CAUTION:

If any noticeable resistance is offered by the E/L and Cover Assembly during step 2.13, stop immediately and remove the Assembly. Inspect the screws, inserts, and contact pins prior to reinstalling.

2.14 Continue tightening the jacking screws a quarter-turn at a time (still alternating in a criss-cross manner) until a mounting torque of 8.5 to 9.5 inch-pounds has been attained. Note: Before reaching final torque, insure that there is an approx. uniform clearance between outer frame and bevel portion of glass.

2.15 Clean the area of the pushbutton switches and indicators to insure that they are free of dust, silicone compound, and any foreign matter. Use Freon TF and cotton swabs.

2.16 Assemble the Front Cover Assembly (retained from step 2.5) to the Front Housing with eight socket head screws and flat washers (retained from step 2.4) by first lowering the Front Cover carefully into place on the Front Housing and then installing the screws and washers.

CAUTION:

Ensure that dowel pins are properly aligned before proceding.

2.17 Torque the eight socket head screws 8 to 9 inch-pounds starting with the center screw and working around the perimeter of the cover until all screws are torqued down.

3. Install the DSKY to the Handling Fixture (if applicable) using hardware retained from 2.1 and reversing the procedure in that step.

4. Retest Procedures:

Field site personnel will perform such tests as necessary to insure that all figures and digits on the E/L Indicator energize correctly after completion of this retrofit.

VIII. MODIFICATION DESIGNATION:

1. Remove from retrofit kit the new nameplate (1004260-20) and four screws (MS35216-1).

2. Using a stamping set, stamp "AGC DSKY," the applicable serial numbers (reference step 1.5), and the part numbers as follows:

2003994-061 becomes 2003994-081
2003994-071 becomes 2003994-091
2003994-041 " " -111
2003994-051 " " -121

NOTE: Characters and digits are to be .08/.10 inches high per ND 1002019 and ND 1002023.

3. Remove existing nameplate and clean the area with Freon TF and cotton swabs. Dispose of removed nameplate per Paragraph IX of this RIB.

4. Install the new nameplate in the same location and insert the four screws with a few turns. Apply sealing compound (LOCKTITE), part no. 1008953-003, provided in kit, to the threads and then torque the screws down 2.0 to 2.5 inch-pounds. Clean away any excess compound that might have been squeezed out.

IX. DISPOSITION OF REMOVED PARTS:

1. Removed E/L and Cover Assembly, and its attached hardware is to be shipped to Raytheon, Waltham. Pack for shipment per ND 1002214.

2. Removed nameplate and its associated screws is to be scrapped.

X. REPORT OF ACCOMPLISHMENT:

Complete the following forms and forward to addressees:

1. AC Form 1 (revised), page 9 of this RIB.

2. Raytheon Form 53-9208 (Attachment A of this RIB).

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 9 of 9
ᑊPart No. RIB 0104138
ᑊDate: ____________
ᑊTDRR ____________
ᑊRevision ____________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ____________ Date: ____________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit			
					P/N	S/N		

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ᑊApplicable for Retrofit only

RIB NO. 0106001
Date 25 May 1965
TDRR No. 20035
Rev. —

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION
Azimuth Reference Fixture, Part Number 1017382-011

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA
20July65	A	20927	ALL (1-6)	WK.	Am

Prepared By Tom Newman — Date 6/3/65
I.C. Eng. Approval — Date
DRB Approval — Date
MIT/IL Approval — Date 6-8-65
NASA Approval — Date 6-8-65

REV. A.

RIB NO. 0106001
DATE 25 May 1965
TDRR NO. 20035
REV. A

I. PURPOSE

This RIB provides retrofit instructions for Azimuth Reference Fixture, NASA part number 1017382. The retrofit will increase reliability in the equipment by prevention of possible deterioriation in alignment after check out due to vibration and handling shock.

II. AUTHORITY

This retrofit is authorized by Contract & CCB Action

III. UNITS AFFECTED

NAME	PART NUMBER	RETROFIT SERIAL NUMBERS	NEW PART NO. OR MD MARK
Azimuth Ref. Fix.	1017382	1, 2, and 3	1017382-011

IV. PRIORITY CHANGES

NONE

V. RELATED CHANGES

RIB NO. - NONE

Revision of Drawings:

NASA DWG. NO.	NOMENCLATURE	REVISION CHANGE FROM	TO
1017382	Azimuth Reference Fixture	G	H
1019233	"V" Block	A	B
1019230	Housing Prism	A	B
1019384	Pin, Straight, Headless, Oversize	-	A
1019262	Identification Plate	-	A
1019761	Mount Assy. (Porro Prism)	E	F

RIB NO. 0106001
DATE 25 May 1965
TDRR NO. 20035
REV. A

NEW DRAWINGS:

NASA DWG. NO.	NOMENCLATURE
8106001	Master Retrofit Kit (KIC-GSE) Drawing List
1022930	Prism Sub-Assembly
8106002	Retrofit Kit Dwg. for Azimuth Reference Fixture 1017382-011

VI. MATERIAL REQUIRED

A. One retrofit kit P/N 8106002 consisting of the following:

ITEM	QUANTITY	NOMENCLATURE	PART NUMBER
1.	2	Pin, Straight Headless-Oversize	1019384-3
2.	1	Porro Prism Sub-Assembly	1022930-011
3.	1 Pack	Lens Tissue	N/A
4.	1 Roll	Electric Friction Tape	N/A
5.	4 oz.	Isopropyl Alcohol	N/A
6.	1	Stamp, metal 1/8" high, numeral one (1)	N/A
7.	1	Stamp, metal 1/8" high, numeral zero (0)	N/A
8.	1	Stamp, metal, dash (-)	N/A
9.	1	Retrofit Instruction Bulletin	0106001

B. Special Tools required but not supplied in kit:

RIB NO. 0106001
DATE 25 May 1965
TDRR NO. 20035
REV. A

ITEM	QUANTITY	NOMENCLATURE	PART NUMBER
1.	1.	Drill, hand, power 1/4" dia.	N/A
2.	1	Bit, drill .218 dia.	N/A
3.	1	Reamer, .2194 $^{+0005}_{-0000}$ dia.	N/A
4.	1	Wrench, Allen, 3/16 soc.	N/A
5.	1	Punch, drift, steel, 1/8" dia.	N/A
6.	1	Hammer, 16 oz.	N/A
7.	1	Vacuum Cleaner-Portable	N/A

VII. PROCEDURE

A. General

1. Check SIDL for latest revision of this RIB.
2. Read and understand complete procedure prior to attempting retrofit. No deviation should be made from procedure outlined herein.
3. All workmanship shall meet standards defined in "Workmanship Standard" AC-STD-1 dated 15 January 1965.

B. Perform the following step by step tasks to remove the Mounting Bracket, NASA P/N 1019228 (with components still assembled, unless otherwise noted below) from the mounting Plate, NASA P/N 1019229 of the Mount Assembly (Porro Prism) NASA P/N 1019761, located on the Azimuth Reference Fixture, NASA P/N 1017382.

1. Remove Dust Cover, NASA P/N 1019231 by removing three (3) Cap, Hex, Soc. Screws, NASA P/N 1017418-18 and three (3) Lockwashers P/N MS 35338-80.
2. Loosen the two (2) Plunger, Quick Release Screws, NASA P/N 1017419-3.
3. Rotate Prism Housing, NASA P/N 1019230 so that face of Porro Prism is facing up, and remove the three (3) Clamps, P/N 1019232 by removing six (6) Cap, Hex. Soc. Screws NASA P/N 1017418-8 and six (6) Lockwashers P/N MS 35338-80.

[illegible]

[illegible] NO. 0106001
DATE 25 May 1965
TDRR NO. 20035
REV. A

[illegible] Remove [illegible], NASA P/N 1019237 from Prism Housing, [illegible] and prepare Porro Prism for shipment.

[illegible] Replace [illegible] clamps, six (6) screws and washers removed in [illegible] "V" Block, NASA P/N 1019233 in Prism Housing, [illegible] by wrapping with lens tissue and friction tape [illegible].

[illegible] Using the drift pin, remove two (2) Dowel Pins, NASA P/N 1019384-1 from the underside of Mounting Plate, NASA P/N 1019229; then remove [illegible] (2) Cap, Hex. Soc. Screws, NASA P/N 1017418-35 and two (2) Lockwashers P/N MS 35338-82. Prepare this partial assembly for shipment.

C. Perform the following step by step tasks to install Porro Prism Sub-Assembly, [illegible]-011 on Mounting Plate, NASA P N 1019229, of Azimuth Reference [illegible] NASA P N [illegible]-011.

1. Perform visual inspection of kit.

2. Mount Porro Prism Sub-Assembly, NASA P/N 1022930-011 (less Porro Prism and "V" Block) contained in this kit, on Mounting Plate, NASA P/N 1019229; align the two screw holes and the two dowel holes by eye and secure subassembly with two (2) Cap, Hex., Soc. Screws, NASA P/N 1017418-35 as shown in Mount Assembly, NASA P/N 1019761-011.

NOTE: Do not use oil for the next operation.

3. Transfer drill and ream two holes thru the Mounting Bracket, NASA P N [illegible] and the Mounting Plate, NASA P/N 1019229, with drill and reamer provided in kit.

4. Vacuum clean all chips. Press fit two (2) Dowel Pins NASA P/N [illegible]-3 into Mounting Plate and Mounting Bracket to dimension shown in Dwg. No. 1019761-011.

RIB NO. 0106001
Date 25 May 1965
TDRR No. 20035
Rev. —

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION
Azimuth Reference Fixture, Part Number 1017382-011

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

Prepared By Tom Newman Date 6/3/65
I.C. Eng. Approval ____ Date ____
DRB Approval ____ Date ____
MIT/IL Approval Schmidt 6-4-65 6-8-65 Date 6-8-65
NASA Approval A. C. Mc Date 6-8/65

RIB No. 01060001
Date 25 May 1965
TDRR NO. 20035
Rev. —

I. PURPOSE

This RIB provides retrofit instructions for Azimuth Reference Fixture, NASA part number 1017382-011. The retrofit will increase reliability in the equipment by prevention of possible deterioration in alignment after check out due to vibration and handling shock.

II. AUTHORITY

This retrofit is authorized by Contract & CCB Action

III. UNITS AFFECTED

NAME	PART NUMBER	RETROFIT SERIAL NUMBERS	NEW PART NO. OR MD MARK
Azimuth Ref. Fix.	1017382	1,2, and 3	1017382-011

IV. PRIORITY CHANGES

NONE

V. RELATED CHANGES

RIB NO. - NONE

Revision of Drawings:

NASA DWG. NO.	NOMENCLATURE	REVISION CHANGE FROM	TO
1017382	Azimuth Reference Fixture	G	H
1019233	"V" Block	A	B
1019230	Housing Prism	A	B
1019384	Pin, Straight, Headless, Oversize	-	A
1019262	Identification Plate	-	A
1019761	Mount Assy (Porro Prism)	F	G

RIB NO. 0106001
Date 25 May 1965
TDRR NO. 20035
Rev. —

NEW DRAWINGS:

NASA DWG. NO.	NOMENCLATURE
8106001	Master Retrofit Kit (KIC-GSE) Drawing List
1022930	Prism Sub-Assembly
8106002	Retrofit Kit Dwg. for Azimuth Reference Fixture 1017382-011

VI. MATERIAL REQUIRED

A. One retrofit kin P/N 1022931 consisting of the following:

ITEM	QUANTITY	NOMENCLATURE	PART NUMBER
1.	2	Pin, Straight Headless-Oversize	1019384-3
2.	1	Porro Prism Sub-Assembly	1022930-011
3.	1 Pack	Lens Tissue	N/A
4.	1 Roll	Electric Friction Tape	N/A
5.	4 oz.	Isopropyl Alcohol	N/A
6.	1	Stamp, metal 1/8" high, numeral one (1)	N/A
7.	1	Stamp, metal 1/8" high, numeral zero (0)	N/A
8.	1	Stamp, metal, dash (-)	N/A
9.	1	Retrofit Instruction Bulletin	0106001

B. Special Tools required but not supplied in kit:

RIB NO. 0106001
Date 25 May 1965
TDRR NO. 20035
Rev. —

ITEM	QUANTITY	NOMENCLATURE	PART NUMBER
1.	1	Drill, hand, power 1/4" dia.	N/A
2.	1	Bit, drill .218 dia.	N/A
3.	1	Reamer .2194 $^{+0005}_{-0000}$ dia.	N/A
4.	1	Wrench, Allen, 3/16 soc.	N/A
5.	1	Punch, drift, steel, 1/8" dia.	N/A
6.	1	Hammer, 16 oz.	N/A
7.	1	Vacuum Cleaner-Portable	N/A

VII. PROCEDURE

A. General

1. Check SIDL for latest revision of this RIB.
2. Read and understand complete procedure prior to attempting retrofit. No deviation should be made from procedure outlined herein.
3. All workmanship shall meet standards defined in "Workmanship Standard" AC-STD-1 dated 15 January 1965.

B. Perform the following step by step tasks to remove the Mounting Bracket, NASA P/N 1019228 (with components still assembled, unless otherwise noted below) from the mounting Plate, NASA P/N 1019229 of the Mount Assembly (Porro Prism) NASA P/N 1019761, located on the Azimuth Reference Fixture, NASA P/N 1017382.

1. Remove Dust Cover, NASA P/N 1019231 by removing three (3) Cap, Hex, Soc. Screws, NASA P/N 1017418-18 and three (3) Lockwashers P/N MS 35338-80.
2. Loosen the two (2) Plunger, Quick Release Screws, NASA P/N 1017419-3.
3. Rotate Prism Housing, NASA P/N 1019230 so that face of Porro Prism is facing up, and remove the three (3) Clamps, P/N 1019232 by removing six (6) Cap, Hex. Soc. Screws NASA P/N 1017418-18 and six (6) Lockwashers P/N MS 35338-80.

4. Remove Porro Prisms, NASA P/N 1019227 from Prism Housing, NASA P/N 1019230 and prepare Porro Prism for shipment.

5. Replace three (3) clamps, six (6) screws and washers removed in Step 3, and secure "V" Block, NASA P/N 1019233 in Prism Housing, NASA P/N 1019230, by wrapping with lens tissue and friction tape provided in kit.

6. Using the drift pin, remove two (2) Dowel Pins, NASA P/N 1019384-1 from the underside of Mounting Plate, NASA P/N 1019229; then remove two (2) Cap, Hex. Soc. Screws, NASA P/N 1017418-35 and two (2) Lockwashers P/N MS 35338-82. Prepare this partial assembly for shipment.

C. Perform the following step by step tasks to install Porro Prism Sub-Assembly, NASA P/N 1022930-011 on Mounting Plate, NASA P/N 1019229, of Azimuth Reference Fixture, NASA P/N 1017382-011.

1. Perform visual inspection of kit.

2. Mount Porro Prism Sub-Assembly, NASA P/N 1022930-011 (less Porro Prism and "V" Block) contained in this kit, on Mounting Plate, NASA P/N 1019229; align the two screw holes and the two dowel holes by eye and secure sub-assembly with two (2) Cap, Hex., Soc. Screws, NASA P/N 1017418-35 as shown in Mount Assembly, NASA P/N 1019761-011.

NOTE: Do not use oil for the next operation.

3. Transfer drill and ream two holes thru the Mounting Bracket, NASA P/N 1019228 and the Mounting Plate, NASA P/N 1019229, with drill and reamer provided in kit.

4. Vacuum clean all chips. Press fit two (2) Dowel Pins NASA P/N 1019384-3 into Mounting Plate and Mounting Bracket to dimension shown in Dwg. No. 1019761-011.

5. Remove three (3) Clamps, NASA P/N 1019232 from Prism Housing, NASA P/N 1019230-011 by removing six (6) Cap, Hex. Soc. Screws, NASA P/N 1017418-18 and six (6) Lockwashers P/N MS 35338-80

6. Carefully insert "V" Block, NASA P/N 1019233-011 in groove of Prism Housing, NASA P/N 1019230-011, install Porro Prism supplied with the kit and secure in place by replacing clamps, screws and washers removed in Step C-5 Above.

7. Tighten two (2) Plunger, Quick Release Screws, NASA P/N 1017419-3 so that the plunger spring load is bearing against "V" Block.

8. Clean Porro Prism with isopropyl alcohol and lens tissues.

9. Complete certification and alignment in accordance with FTM 1017382.

D. Perform the following procedure to retrofit Identification Plate, NASA P/N 1019262-011 on Azimuth Reference Fixture, NASA P/N 1017382 to 1017382-011

1. Metal Stamp the characters -011 after part number 1017382 on Identification Plate NASA P/N 1019262

VIII. MODIFICATION DESIGNATION

P/N on Name Plate changes from 1017382 to 1017382-011

IX. DISPOSITION OF PARTS REMOVED

Package and return to KIC Assembly Parts to rework and install on another serial number.

RIB NO. 0106002
DATE June 24, 1965
TDRR NO. 20537
REV. —

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

ALIGNMENT CERTIFICATION FIXTURE NASA Part Number 1017387-

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY Leon [illegible] DATE 6/26/65
I.C. ENG. APPROVAL DATE
DRB APPROVAL E A Olson DATE 28 June 65
MIT/IL APPROVAL [illegible] DATE 6/26/65 - 6-28-65
NASA APPROVAL G. C. [illegible] DATE 6/28/65

RIB NO. 0106002
DATE June 24, 1965
TDRR NO. 20537
REV.

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) provides instructions for the modification of the Alignment Certification Fixture, NASA P/N 1017387. This modification deletes the horizontal test position due to the errors induced due to structural sag in that axis and permits all certification to be accomplished in the vertical (usage) position.

II. AUTHORITY

This change is authorized by contract and CCB action.

III. UNIT AFFECTED

NAME	PART NUMBER	RETROFIT SERIAL NUMBERS	NEW PART NO. OR MD MARK
Alignment Certification Fixture	1017387	S/N 1 thru S/N 5	1017387-011

IV. PRIORITY CHANGES

"URGENT ON ALL"

V. RELATED CHANGE

RIB NO. NONE

RIB NO. 0106002
DATE June 24, 1965
TDRR NO. 20537
REV.

REVISION OF DRAWINGS/DOCUMENTS:

NASA DWG. NO.	NOMENCLATURE	REVISION CHANGE FROM	TO
1017387	Alignment Certification Fixture	D	E
1017386	Base, Sub-Assembly	B	C
1019012	Base, Machining	C	D
8106001	Master Retrofit Kit List Dwg. (KIC-GSE)	-	A
1019164	Plate Identification	A	B
JDC 02839	Autocollimator and Telescope Zero	-	A
JDC 02840	Test-Vertical Position with Theodolite	A	B
1016951	Alignment Mirror Assembly	E	F
1019009	CERTIFICATION BLOCK (MACH.)	C	D

NEW DRAWINGS/DOCUMENTS:

NASA DWG. NO.	NOMENCLATURE
8106003	Retrofit Kit for Alignment Certification Fixture
1022831	Theodolite Stand Ass'y.
1022833	Stand Assembly
1022834	Leveling Stud Ass'y.
1022237	Stand, Theodolite (Cast)
1022238	Stand, Theodolite (Mach)
1022239	Button
1022240	Stud
1022241	Knob
1022953	Azimuth Monitor Mirror Ass'y.
1022501	Bushing

RIB NO. 0106002
DATE June 24, 1965
TDRR NO. 20537
REV.

NEW DRAWINGS/DOCUMENTS:

NASA DWG. NO.	NOMENCLATURE
1022502	Washer
1022503	Eccentric
1022504	Pivot Block
1022505	Mirror Mount, Azimuth Monitor
1022506	Pad Support
1022507	Pad

VI. MATERIAL REQUIRED

A. One Retrofit Kit P/N 8106003 consisting of the following:

ITEM	QUANTITY	NOMENCLATURE	PART NUMBER
1.	1	Alignment Certification Fixture	1017387-011
2.	1	Theodolite Stand Assy.	1022831-011
3.	1	Retrofit Instruction Bulletin (RIB)	0106002
4.	1	Autocollimator and Telescope Zero	JDC 02839
5.	1	Test-Vertical Position with Theodolite	JDC 02840
6.	1	Azimuth Monitor Mirror Assy	1022953-011

VII. PROCEDURE

A. General

1. Check SIDL for latest revision of this RIB.
2. Read and understand complete procedure prior to attempting retrofit. No deviation should be made from procedure outlined herein.
3. All workmanship shall meet standards defined in Workmanship Standard AC-STD-1 dated 15 January 1965.
4. Perform visual inspection of all parts in kit.

B. Perform the following step by step tasks to accomplish retrofit of Alignment Certification Fixture P/N 1017387-011 utilizing Kit P/N 8106003.

1. Remove Alignment Certification Fixture P/N 1017387 from its installed position. Package and pack in accordance with JDC 03191 for shipment to KIC.

VII. PROCEDURE

B. (Continued)

2. Unpack modified Alignment Certification Fixture P/N 1017387-011, and place upon suitable stable surface.
3. Unpack Azimuth Monitor Mirror Assembly P/N 1022953-011 and mount upon Alignment Certification Fixture, P/N 1017387-011, utilizing eccentric stud, P/N 1022503 and furnished hardware (2 each clamp screws; 3 each bolts; 5 each washers).
4. Unpack Theodolite Stand Assembly P/N 1022831-011 and place adjacent to Alignment Certification Fixture as indicated in JDC 02840.
5. Verify proper operation of modified Alignment Certification Fixture by performing certification of AMA P/N 1016951 in accordance with JDC's 02839 and 02840.

Note: Theodolite Stand Assembly NASA P/N 1022831-011 is required for performance of JDC 02840.

VIII. MODIFICATION DESIGNATION

P/N on Nameplate changes from 1017387 to 1017387-011.

IX. DISPOSITION OF PARTS REMOVED

Return to KIC for rework.

RIB NO. 0106005
DATE June 15, 1965
TDRR NO. 20913-
REV. ---

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

G&N INSTALLATION QUALIFICATION FIXTURE,
Part Number 1017383-

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY Leon [illegible] DATE 7/6/65
I.C. ENG. APPROVAL DATE
DRB APPROVAL Schmidt, per TWR DATE 7/6/65
MIT/IL APPROVAL [illegible] DATE 7/6/65
NASA APPROVAL [illegible] DATE 7/14/65
CCB WKayton, MIT/IL 14 July 65.

RIB NO. 0106005
DATE June 15, 1965
TDRR NO. 20913-
REV. ---

I. PURPOSE

This RIB provides retrofit instructions for G and N Installation Qualification Fixture, NASA part number 1017383-. The retrofit will increase reliability in the equipment by prevention of possible deterioration in alignment after check out due to vibration and handling shock.

II. AUTHORITY

This retrofit is authorized by Contract and CCB action.

III. UNITS AFFECTED

NAME	PART NUMBER	RETROFIT SERIAL NUMBERS	NEW PART NO. or MD MARK
G&N Install. Qual. Fix.	1017383	S/N 1, 2, & 3	1017383-011

IV. PRIORITY CHANGES

"G: NONE TO ALL".

V. RELATED CHANGES

RIB No. - NONE

Revision of Drawings:

NASA DWG. NO.	NOMENCLATURE	REVISION CHANGE	
		FROM	TO
1017383	G&N Installation Qualification Fixture	H	J
1019261	Plate, Identification	-	A
8106001	Master Retrofit Kit List (KIC-GSE)	A	B

RIB NO. 0106005
DATE June 15, 1965
TDRR NO. 20913
REV. ---

New Drawings:

NASA DWG. NO.	NOMENCLATURE
8106006	Retrofit Kit Dwg. for G&N Installation Qualification Fixture 1017383-

VI. MATERIAL REQUIRED

A. One retrofit kit P/N 8106006 consisting of the following:

ITEM	QUAN.	NOMENCLATURE	PART NUMBER
1.	2	Pin, Straight Headless-Oversize	1019384-3
2.	1	Porro Prism Sub-Assembly	1022930-011
3.	1 Pack	Lens Tissue	N/A
4.	1 Roll	Electric Friction Tape	N/A
5.	4 oz.	Isopropyl Alcohol	N/A
6.	1	Stamp, metal 1/8" high, numeral one (1)	N/A
7.	1	Stamp, metal 1/8" high, numeral zero (0)	N/A
8.	1	Stamp, metal, dash (-)	N/A
9.	1	Retrofit Instruction Bulletin	0106005

B. Special Tools, required but not supplied in kit:

ITEM	QUAN.	NOMENCLATURE	PART NUMBER
1.	1	Drill, hand, power 1/4" dia.	N/A
2.	1	Bit, drill .218 dia.	N/A
3.	1	Reamer $.2194^{+.0005}_{-.0000}$ dia.	N/A
4.	1	Wrench, Allen, 3/16 soc.	N/A
5.	1	Punch, drift, steel, 1/8" dia.	N/A

RIB NO. 0106005
DATE June 15, 1965
TDRR NO. 20913
REV. ---

ITEM	QUAN.	NOMENCLATURE	PART NUMBER
6.	1	Hammer, 16 oz.	N/A
7.	1	Vacuum Cleaner-Portable	N/A

VII. PROCEDURE

A. General

1. Check SIDL for latest revision of this RIB.
2. Read and understand complete procedure prior to attempting retrofit. No deviation should be made from procedure outlined herein.
3. All workmanship shall meet standards defined in "Workmanship Standard" AC-STD-1 dated 15 January 1965.

B. Perform the following step by step tasks to remove the Mounting Bracket, NASA P/N 1019228 (with components still assembled, unless otherwise noted below) from the mounting Plate, NASA P/N 1019229 of the Mount Assembly (Porro Prism) NASA P/N 1019761, located on the G&N Installation Qualification Fixture, NASA P/N 1017383.

1. Remove Dust Cover, NASA P/N 1019231 by removing three (3) Cap, Hex, Soc. Screws, NASA P/N 1017418-18 and three (3) Lockwashers P/N MS 35338-80.
2. Loosen the two (2) Plunger, Quick Release Screws, NASA P/N 1017419-3.

RIB NO. 0106005
DATE June 15, 1965
TDRR NO. 20913
REV. ---

3. Rotate Prism Housing, NASA P/N 1019230 so that face of Porro Prism is facing up, and remove the three (3) Clamps, P/N 1019232 by removing six (6) Cap, Hex. Soc. Screws NASA P/N 1017418-18 and six (6) Lockwashers P/N MS 35338-80.
4. Remove Porro Prisms, NASA P/N 1019227 from Prism Housing, NASA P/N 1019230 and prepare Porro Prism for shipment.
5. Replace three (3) clamps, six (6) screws and washers removed in Step 3, and secure "V" Block, NASA P/N 1019233 in Prism Housing, NASA P/N 1019230, by wrapping with lens tissue and friction tape provided in kit.
6. Using the drift pin, remove two (2) Dowel Pins, NASA P/N 1019384-1 from the underside of Mounting Plate, NASA P/N 1019229; then remove two (2) Cap, Hex. Soc. Screws, NASA P/N 1017418-35 and two (2) Lockwashers P/N MS 35338-82. Prepare this partial assembly for shipment.

C. Perform the following step by step tasks to install Porro Prism Sub-Assembly, NASA P/N 1022930-011 on Mounting Plate, NASA P/N 1019229, of G&N Installation Qualification Fixture, NASA P/N 1017383-011.
   1. Perform visual inspection of kit.

RIB NO. 0106005
DATE June 15, 1965
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REV. ---

2. Mount Porro Prism Sub-Assembly, NASA P/N 1022930-011 (less Porro Prism and "V" Block) contained in this kit, on Mounting Plate, NASA P/N 1019229; align the two screw holes and the two dowel holes by eye and secure sub-assembly with two (2) Cap, Hex., Soc. Screws, NASA P/N 1017418-35 as shown in Mount Assembly, NASA P/N 1019761-011.

   NOTE: Do not use oil for the next operation.

3. Transfer drill and ream two holes thru the Mounting Bracket, NASA P/N 1019228 and the Mounting Plate, NASA P/N 1019229, with drill and reamer provided in kit.
4. Vacuum clean all chips. Press fit two (2) Dowel Pins NASA P/N 1019384-3 into Mounting Plate and Mounting Bracket to dimension shown in Dwg. No. 1019761-011.
5. Remove three (3) Clamps, NASA P/N 1019232 from Prism Housing, NASA P/N 1019230-011 by removing six (6) Cap, Hex. Soc. Screws, NASA P/N 1017418-18 and six (6) Lockwashers P/N MS 35338-80.
6. Carefully insert "V" Block, NASA P/N 1019233-011 in groove of Prism Housing, NASA P/N 1019230-011, install Porro Prism supplied with the kit and secure in place by replacing clamps, screws and washers removed in Step C-5 above.

RIB NO. 0106005
DATE June 15, 1965
TDRR NO. 20913
REV. ---

7. Tighten two (2) Plunger, Quick Release Screws, NASA P/N 1017419-3 so that the plunger spring load is bearing against "V" Block.
8. Clean Porro Prism with isopropyl alcohol and lens tissues.
9. Complete certification and alignment in accordance with FTM 1017383.

D. Perform the following procedure to retrofit Identification Plate, NASA P/N 1019261-011 on G&N Installation Qualification Fixture, NASA P/N 1017383 to 1017383-011.
   1. Metal Stamp the characters -011 after part number 1017383 on Identification Plate NASA P/N 1019261.

VIII. MODIFICATION DESIGNATION

P/N on Name Plate changes from 1017383 to 1017383-011.

IX. DISPOSITION OF PARTS REMOVED

Package and return to KIC Assembly Parts to rework and install on another serial number.

RIB NO. 0106021
DATE February 4, 1966
TDRR NO. 26000
REV. –
Sheet 1 of 8

NASA RETROFIT INSTRUCTION BULLETIN (RIB) FOR ECP 293
KOLLSMAN INSTRUMENT CORPORATION

Optics-Navigation Base Shipping
Container P/N 1019720

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY ______ DATE 2-4-66
I.C. ENG. APPROVAL ______ DATE 2-4-66
DRB APPROVAL ______ DATE 7 Feb 66
MIT/IL APPROVAL ______ DATE 8 Feb 66
NASA APPROVAL A. C. METZGER DATE ______

RIB NO. 0106021
DATE: February 4, 1966
TDRR NO. 26000
REV. –
Sheet 2 of 8

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) provides instructions for modifying the Optics-Navigation Base Shipping Container, NASA P/N 1019720. The changes consist of the following:

a. Stripping and refinishing various parts of the Shipping Container in order to obtain greater resistance to corrosion (some parts to be replaced).

b. Cutting and enameling a groove in the flanges of the Inner Container to assure that the Upper Container is assembled to the Lower Container in the proper position.

c. Machining the bores of the Bellows Retainer Plate to an increased diameter to allow for the addition of protective covers on the SCT and SXT.

d. Changing the Warning designation to a Caution designation to provide a better description of pressure release inside of the Inner Container required before removing the Upper Container from the Lower Container.

e. Providing storage space in the Inner Container for two (2) Guide Plates that are to be used to cover the openings in the OUA when the Eyepiece Assemblies are removed from the OUA.

II. AUTHORITY

This retrofit is authorized by ECP 293

III. UNIT AFFECTED

NAME	PART NUMBER	NEW PART NUMBER	S/N	KIT P/N
Optics-Navigation Base Shipping Container	1019720	1019720-011	1-8	8106034 ~~Rev. A~~

IV. PRIORITY CHANGES

Retrofit concurrently with RIB No. 0106019/ECP 075 and RIB No. 0106020/ECP 086.

RIB NO. 0106021
DATE: February 4, 1966
TDRR NO. 26000
REV. –
Sheet 3 of 8

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

A. One (1) Retrofit Kit P/N 8106034 ~~Rev. A~~

B. Special tools or equipment required but not supplied in kit:

1. Paint, Cashmere Blue per dwg no. 1016194.
2. Jig Borer.
3. White Enamel per TT-E-489, Color No. 17875 per Fed Std 595.
4. Adhesive per MIL-A-5092 Butadiene acrylonitrile (Buna N) rubber base, fuel resistant.

VII. PROCEDURE

A. General

1. Assemble all drawings listed or referenced before initiating retrofit. No deviation shall be made from the procedure specified in this RIB.

2. AC-STD-1, "General Workmanship", shall be applicable where such a requirement has not been placed by a drawing, ND, or equivalent KIC specification.

REVISED PARTS

PART NO.	NOMENCLATURE	REVISED FROM	TO
* 1019720	Optics-Navigation Base Shipping Container	-000	-011
1019685	Hinge Cover	-000	-001
* 1019665	Handling Container Assy. (Inner Container)	-000	-011

RIB NO. 0106021
DATE: February 4, 1966
TDRR NO. 26000
REV. -
Sheet 4 of 8

REVISED PARTS (Cont.)

PART NO.	NOMENCLATURE	REVISED FROM	TO
1019673	Bellows Retainer Plate	-000	-001
1019689	Captive Screws	-000	-001
* 1019694	Identification Plate	-000	-001
* 1019672	Frame Support Assy	-000	-011
* 1019693	Identification Plate	-000	-001
* 1019687	Hinge and Cover Assy	-000	-011
1019667	Handling Container (Upper Half)	-000	-011
1019677	Pin, Self-Locking Quick Release Assy.	-000	-011
1001672	Cable	-1	-3
1001683	Pin, Self-Locking Quick Release	-1	-2
1019663	Indicator, Mounting Plug	-000	-001
1001681	Nut-Clinch	-1	-5
1001681	Nut-Clinch	-2	-6
1001681	Nut-Clinch	-3	-7
1001681	Nut-Clinch	-4	-8

* Also listed in RIB No. 0106019 and /or 0106020

B. Rework Procedure

1. See RIB No. 0106020, Paragraph VII.B, steps 1 through 3. After completion of steps 1 through 3, perform step 2 of RIB No. 0106021.

   NOTE: Steps 2 through 7 of RIB No. 0106021 may be performed concurrently with steps 2 through 6 of RIB No. 0106020.

2. See dwg. 1019665, sheet 2, Section B-B. Disassemble Bellows Retainer Plate, item no. 5, from Lower Container, item no. 1, by removing four (4) each Screws, Flat Washers, and Lock Washers, item nos. 22, 66, and 23, respectively. Place Bellows Retainer Plate in plastic bag.

3. See dwg. 1019665, sheet 2, Details D-D and E-E. Remove thirty (30) Captive Screws, item no. 14, from Upper Container, item no. 2. Place parts in plastic bags.

4. See dwg. 1019665, sheet 1, right side view. Remove Humidity Indicator Plug, item no. 10 from Upper Container, item no. 2. Place part in plastic bag.

5. See dwg. 1019667, sheet 1, front view. Drill twelve (12) Clinch Nuts, item no. 11, to remove them from Upper Container. Use portable drill.

6. See dwg. 1019667, sheet 2, Partial Section A-A. Drill six (6) Clinch Nuts, item no. 12, to remove them from Upper Container. Use portable drill.

7. See dwg. 1019672. Remove four (4) Quick Release Self Locking Pins, item no. 3, and four (4) Nuts, item no. 8, from Support Frame, item no. 1. Place parts removed in plastic bags.

8. See RIB No. 0106020, Paragraph VII. B, steps 7 and 8. See dwg. 1019687, sheet 1. Remove Clamp and Screw, item nos. 5 and 6 from Cover. Drill eleven (11) Clinch Nuts, item no. 3, and one (1) Clinch Nut, item no. 4, to remove them from Cover. Place Clamp and Screw, items 5 and 6 in plastic bag.

9. See RIB No. 0106020, Paragraph VII. B, steps 7 and 8. See dwg. 1019685, sheet 2. Drill four (4) holes marked "A" (7/32 thru).

NOTE: These holes are in addition to one "A" hole already in cover.

Re-identify part, per Note 3 of dwg, as P/N 1019685-001.

10. See dwg. 1019665, sheet 3. File two (2) grooves in flange of Inner Container to 6.750 ±.125, .125/.156, and .062/.094. dimensions.

11. Remove burrs from filed grooves in accordance with ND 1002079. Clean with Freon TF.

12. Rework Bellows Retainer Plate, P/N 1019673 in accordance with dwg. 1019673-001. Machine bores "A" and "B", per Notes 4 and 5 of drawing. Clean with Freon TF. Repaint, as required, per Note 2 of drawing. Re-identify part, per Note 3 of drawing, as P/N 1019673-001. Place part in plastic bag.

---

13. See dwg. 1019667, sheet 1. Press and swage twelve (12) Clinch Nuts, item no. 11 (obtain Clinch Nuts from Retrofit Kit), to assemble them to the Support, item no. 6.

14. See dwg. 1019667, sheet 2, Partial Sections A-A and D-D. Press and swage six (6) Clinch Nuts, item no. 12 (obtain Clinch Nuts from Retrofit Kit) to assemble them to the Support.

15. See RIB No. 0106020, Paragraph VII. B, steps 7 and 8. See drawing 1019687, sheet 2. Press and swage eleven (11) Clinch Nuts, item No. 3, and one (1) Clinch Nut, item No. 4 (obtain Clinch Nuts from Retrofit Kit) to assemble them to Cover, item No. 1.

16. Paint assembly (step 15), as required per Note 3 of drawing. Re-identify assembly, per note 4 of drawing, as P/N 1019687-011.

17. See drawing 1019665, Sheet 4. Assemble thirty (30) Captive Screws, item #71 (reworked per drawing 1019689-001) to Upper Container, item No. 2.

18. See drawing 1019665, Sheet 3. Assemble Humidity Indicator, Item No. 10 (reworked per drawing 1019663-001) to Upper Container, item No. 2.

19. See drawing 1019665, sheet 1. Remove Identification Plate, item No. 45.

20. See drawing 1019665, sheet 3. Cement Identification Plate, item No. 70, (obtain Identification Plate from Retrofit Kit) to Upper Container, per Note 3 of drawing.

NOTE: Serialize per Note 4 of drawing.
Inner Container to be reidentified as P/N 1019665-011.

21. See RIB No. 0106020, Paragraph VII. B., steps 10 through 12. After completion of the above steps (10 through 12), assemble, in accordance with drawing 1019665, sheet 4, Plate Guides, item Nos. 80 and 87 to the Hinge and Cover Assembly, with four (4) each Screws, Nuts, and Washers, item Nos. 81, 82 and 83, respectively (obtain Plate Guides, Screws, Nuts, and Washers from Retrofit Kit). Assemble one (1) each Clamp and Screw, item Nos. 85 and 86, respectively, to Hinge and Cover Assembly (See Step 8.)

---

22. Perform step 13 of Paragraph VII. B. RIB No. 0106020.

23. Assemble Bellows Retainer Plate, item No. 72 of drawing 1019665, sheet 4, to Lower Container, item No. 1.

24. See drawing 1019665, sheet 4. Assemble Upper Container, item No. 2, to Lower Container, Item No. 1, with thirty (30) Captive Screws, Item No. 71.

25. See drawing 1019667, sheet 3. Stencil Upper Container " CAUTION" designation per ND 1002019. Reidentify Upper Container per Note 8 of drawing, as P/N 1019667-011.

26. See drawing 1019665, sheet 3. Fill grooves in Inner Container, per Note 5 of drawing.

NOTE: Grooves were cut in step 10.

27. See drawing 1019672. Assemble four (4) Screws, item No. 6 to Frame Support Assembly, with four (4) each Washers and Nuts, items Nos. 7 and 10, respectively. Obtain Nuts from Retrofit Kit.

28. See drawing 1019677. Assemble four (4) Cables item no. 4 to four (4) Quick Release Locking Pins, item no. 3.

29. See drawing 1019672. Assemble four (4) Quick Release Self Locking Pin Assemblies, item No. 3 (step 28) for Frame Support Assembly with four (4) Screws, item No. 5. Reidentify assembly, per note 2 of drawing, as P/N 1019672-011.

30. Perform steps 9 through 13, Paragraph VII. B. of RIB 0106019.

31. See drawing 1019720. Remove Identification Plate, item No. 10, and replace with Identification Plate, item No. 14.

NOTE: Shipping Container is to be reidentified as P/N 1019720-011.

32. Perform test per RIB No. 0106019, Paragraph VII. C.

VIII. MODIFICATION DESIGNATION

The Optics-Navigation Base Shipping Container is reidentified as P/N 1019720-011.

IX. DISPOSITION OF PARTS REMOVED

Part No.	Nomenclature	Disposition
1019693	Identification Plate	Package and forward to bonded storage
1019694	Identification Plate	Package and forward to bonded storage
1001672-1	Cable (4)	Package and forward to bonded storage
1001681-3	Clinch Nut (6)	Scrap
1001681-2	Clinch Nut (12)	Scrap
1001681-4	Clinch Nut (1)	Scrap
1001681-1	Clinch Nut (11)	Scrap

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NASA RETROFIT INSTRUCTION BULLETIN (RIB) FOR ECP 075
KOLLSMAN INSTRUMENT CORPORATION

LEM - Alignment Optical Telescope Shipping Container
P/N 6014000-000

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY E. Schroeder DATE 2/10/66
I.C. ENG. APPROVAL DATE 2/11/66
DRB APPROVAL DATE 2 March 66
MIT/IL APPROVAL DATE 2 March 66
NASA APPROVAL A.C. METZGER DATE

RIB NO. 0106023
DATE: February 8, 1966
TDRR NO. 26838
REV. -

Sheet 2 of 4

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) provides instructions for modifying the LEM-Alignment Optical Telescope Shipping Container, NASA P/N 6014000. This change incorporates the addition of a Shock Recorder to each shipping container. The recorder is required for measuring and recording the shock loads to which the shipping container is subjected during transit.

II. AUTHORITY

This retrofit is authorized by ECP 075.

III. UNIT AFFECTED

Name	Part No.	New Part No.	S/N	KIT P/N
LEM-Alignment Optical Telescope Shipping Container	6014000-000	6014000-011	1 ~~and 2~~	8106037

IV. PRIORITY CHANGES

None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

a. One (1) Retrofit Kit P/N 8106037

b. Special tools or equipment required but not supplied in kits:

1. Spintite Nut Driver, 5/16 in.
2. Screw driver slotted, 1/4" width
3. Ham~~er~~mer, plastic head, 2 in. dia.

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4. Plastic sheet, approximately 6 in. x 6 in. x 1/8 in. thick

VII PROCEDURE

A. General

1. Assemble all drawings listed or referenced before initiating retrofit. No deviation shall be made from the procedure specified in this RIB.
2. AC-STD-1 "General Workmanship" shall be applicable where such a requirement has not been placed by a drawing, ND, or equivalent KIC specification.

REVISED PARTS

Part No.	Nomenclature	Revised From	Revised To
6014000	LEM Alignment Optical Telescope Shipping Container	-000	-011
1004260-307	Nameplate	-000	-011

B. Rework Procedure

1. See drawing 6014000-011 sheets 1 and 4 for item number reference. Remove Bracket Assembly P/N 6014055-011 (item 24), Shock Recorder P/N 1897338-003 (item 22), and Nuts, Self-Locking, P/N 1016151-006 (item 23) from Retrofit Kit.
2. Using a screwdriver and Spintite Nut Driver, assemble the Shock Recorder to the Bracket Assembly. See drawing 6014000-011, sheet 4 for reference.
3. See drawing 6014000-011 sheets 1 and 4 for item number reference. Remove Screws - Hex Head P/N 1015836-332 (item 25) and Washers Flat P/N AN 960-C10L (item 26) from Retrofit Kit.
4. Using the Spintite Nut Driver, fasten Bracket Assembly (with Shock Recorder now mounted) to the AOT Mounting Plate P/N 6014000-3 (item 3). See drawing 6014000-011, sheets 1 and 4 for reference.

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5. Test operation of the Shock Recorder in the following manner:
   - a. Using the plastic head hammer, strike the AOT Mounting Plate at one end with a sharp hammer blow. Observe the functioning of the Shock Recorder.
   - b. Repeat Step (a) with a sharp hammer blow at one side of the AOT Mounting Plate.
   - c. Repeat Step (a) with a sharp hammer blow at top of the AOT Mounting Plate.

   CAUTION: Protect finish of the AOT Mounting Plate by placing plastic sheet on area of hammer impact, steps a, b and c.
6. See drawing 6014000-000, sheet 3. Remove Identification Plate item 15 and replace with Identification Plate from Retrofit Kit, P/N 1004260-307.

C. Shipping Container Post-Retrofit Test

Perform visual and mechanical inspection in accordance with JDC's 03504 and JDC 03505.

VIII. MODIFICATION DESIGNATION

Reidentify the modified LEM-Alignment Optical Telescope Shipping Container as P/N 6014000-011.

IX. DISPOSITION OF PARTS REMOVED

NA

RIB NO. 0106033
DATE 8/23/66
TDRR NO. 30853
REV. -

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION
FOR ECP 353F

LEM ALIGNMENT OPTICAL TELESCOPE 602, S/N 8

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY ________ DATE 6/10/66
I.C. ENG. APPROVAL ________ DATE 6/13/66
DRB APPROVAL ________ DATE 19 Aug 66
MIT/IL APPROVAL ________ DATE 8-19-66
NASA APPROVAL ________ DATE ________

I. PURPOSE

The purpose of this Retrofit Instruction Bulletin (RIB) is to replace the molded strain isolation pressure seal manufactured of vulcanized fluorosilicone rubber with a molded strain isolation pressure seal manufactured of thermoplastic urethane rubber. The new seal material is being changed to meet new strength and durability requirements. Its reliability is expected to be significantly greater.

II. AUTHORITY

This retrofit is authorized by ECP 353F, CCA 497-0237-R1.

III. UNITS AFFECTED

LEM Alignment Optical Telescope (AOT) 602, serial number 8, part number 6011000-011. The new part number upon completion of the RIB will be 6011000- 012.

IV. PRIORITY CHANGES

None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

A. One (1) retrofit kit, P/N 8106046.

B. Special tools

Allen Wrench, No. 6
Micrometer, 1-inch
Camel hair paint brush
2 oz. can of paint per drawing 1012543-003

VII. PROCEDURE

A. General

1. Check SIDL for latest revision of RIB.
2. Assemble and read all drawings listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
3. AC-STD-1, General Workmanship, shall be applicable where such a requirement has not been replaced by a drawing, ND, or equivalent KIC Specification.

B. Revised Parts

PART NO.	NOMENCLATURE	NEW P/N
6011096	Strain Isolation Pressure Seal	6011143

C. Disassembly Procedures

Remove Isolation Strain Pressure Seal, P/N 6011096, in accordance with drawing 6011000-011

PART NO.	PARTS DISPOSITION NOMENCLATURE	DISPOSITION
6011096	Strain Isolation Pressure Seal	See Para. IX

D. Assembly Procedures

Assemble Strain Isolation Pressure Seal, P/N 6011143, in accordance with drawing 6011000-012. After completion of assembly, touch up with paint in accordance with drawing 6011000-012.

VIII. MODIFICATION DESIGN

Reidentify the LEM Alignment Optical Telescope (AOT) as P/N 6011000-012 in accordance with ND 1002019. Metal stamp the characters on the new identification plate P/N 1004260-350 and assemble in accordance with 6011000-012.

IX. DISPOSITION OF PARTS REMOVED

All parts removed and replaced shall be packaged in accordance with ND 1002214.
Store packaged parts in the NASA approved bond room to await disposition.

X. REPORT OF ACCOMPLISHMENT

Complete ACC Form No. 1, Retrofit or Repair Compliance Report, dated 2/23/66, and forward through channels as instructed by the form.

RIB NO. 0106037
DATE 11-17-66
TDRR NO. 31934
REV. -

Sheet 1 of 5

NASA RETROFIT INSTRUCTION BULLETIN (RIB) FOR ECP 458
KOLLSMAN INSTRUMENT CORPORATION

PORTABLE LIGHT ASSEMBLY, P/N 1019837-011
SERIAL NUMBERS 5 THROUGH 9

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY E. Goshak DATE 21 Sept. 1966
I.C. ENG. APPROVAL DATE 21 Sept. 1966
DRB APPROVAL DATE 10/17/66
MIT/IL APPROVAL DATE
NASA APPROVAL DATE 11/7/66

RIB NO. 0106037
DATE 11-17-66
TDRR NO. 31934
REV.

Sheet 2 of 5

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Portable Light Assemblies, PN 1019837-011, serial numbers 5 through 9. The Adapter, SXT Eyepiece, PN 1022659, is required to provide the means for attaching the Illuminator to the SXT Mirror Housing and Air Focusing Shim Assembly, PN 2012699.

II. AUTHORITY

This retrofit is authorized by ECP 458 (CCA-497-359)

III. UNITS AFFECTED

Name	Part Number	Kit P/N	S/N	New Part Number
Portable Light Assembly	1019837-011	8106049	5 thru 9	1019837-021

IV. PRIORITY CHANGES

None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

a. One (1) Retrofit Kit, PN 8106049

b. Special tools or equipment required but not supplied in the retrofit kit:

Optics Cleaner Kit, PN 1019984-011

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DATE 11-17-66
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c. Drawings and documents required

1) 8106049
2) 1019837
3) JDC 02820
4) MILP-19834

VII. PROCEDURE

A. General

1. Read and assemble all drawings listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.

2. AC-STD-1, General Workmanship shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure

1. Disconnect the Electrical Power Supply Cord on the base of the Illuminator, PN 1001674, from the 115 volts, 60 cps power source.

2. Remove the Identification Plate, PN 1019307-001, in accordance with drawing 1019837-011, and dispose of the part in accordance with paragraph 1X of this RIB.

3. Clean the exposed surface of the glass diffuser on the light source of the Illuminator, PN 1001674, in accordance with JDC 02820.

NOTE: The required items of the optics cleaner kit, PN 1019984-011, or equivalent shall be used for the cleaning operation of paragraph VII.B.5.

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DATE 11-17-66
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REV.

Sheet 4 of 5

4. Assemble the SXT Eyepiece Adapter, PN 1022659 (from retrofit kit), to the mount assembly, PN 1019783, in accordance with drawing 1019837-021.

5. Assemble the Identification Plate, PN 1018307-002 (from retrofit kit), in accordance with drawing 1019837-021.

NOTE: Apply the Identification Plate to the Illuminator, PN 1001674, in accordance with MIL-P-19834.

6. Visually inspect the Portable Light Assembly for proper assembly of its various components.

7. Connect the Electrical Power Supply Cord of the base of the Illuminator, PN 1001674, to a 115 volts, 60 cps power source.

8. Turn the knob of the light intensity control on the base of the Illuminator, PN 1001674, from OFF to positions 1, 2, and 3. Verify that lamp lights and that light intensity varies.

9. Turn the knob (paragraph VII.B.11) to OFF. Disconnect the Electrical Power Supply Cord (paragraph VII.B.10).

VIII. MODIFICATION DESIGNATION

The retrofitted Portable Light Assemblies are reidentified as PN 1019837-021, SN's KIC 5 through KIC 9. The modification designations are accomplished in paragraph VII.B.7 by assembling an Identification Plate, PN 1019307-002 (from retrofit kits) to each Portable Light Assembly. Each Identification Plate is engraved with the required part number, serial number, and contract numbers.

IX. DISPOSITION OF PARTS REMOVED

1. Identification Plate, PN 1019307-001
    - removed in paragraph VII.B.4
    - one per Portable Light Assembly
    - Scrap

X. REPORT OF ACCOMPLISHMENT

Complete ACC Form No. 1 and 1A, Retrofit Compliance Report, dated 2-23-66, and distribute as specified on the form.

RIB NO. 0106038
DATE
TDRR NO. 31935
REV. -

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NASA RETROFIT INSTRUCTION BULLETIN (RIB) For ECP 458
KOLLSMAN INSTRUMENT CORPORATION

Portable Light Assembly, PN 1019837-000
Serial Numbers 1 through 4

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY ______ DATE 9/29/66
I.C. ENG. APPROVAL ______ DATE 9-29-66
DRB APPROVAL ______ DATE 10/17/66 21 Oct 66
MIT/IL APPROVAL ______ DATE ______
NASA APPROVAL ______ DATE 11/7/66

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Portable Light Assemblies, PN 1019837-000, serial numbers 1 through 4. The Adapter, SXT Eyepiece, PN 1022659, is added to the Portable Light Assembly to provide the means for attaching the Illuminator to the SXT Mirror Housing and Air Focusing Shim Assembly, PN 2012699.

II. AUTHORITY

This retrofit is authorized by ECP 458 (CCA - 497-359)

III. UNITS AFFECTED

Name	Part No.	Kit PN	SN	New PN
Portable Light Assembly	1019837-000	8106050	1 thru 4	1019837-031

IV. PRIORITY CHANGES - None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

A. One retrofit kit, PN 8106050

B. Special tools or equipment required but not supplied in the retrofit kit:

Optics cleaner kit, PN 1019984-011

C. Drawings and documents

1) 8106050
2) 1019837
3) JDC 02820
4) MIL-P-19834

VII. PROCEDURE

A. General

1. Read and assemble all drawings listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC-STD-1, General Workmanship shall be applicable unless otherwise specified by a NASA Document ND.

B. Rework Procedure

1. Disconnect the Electrical Power Supply Cord on the base of the Illuminator, PN 1001674, from the 115 volts, 60 cps power source.
2. Remove the Identification Plate, PN 1019307, in accordance with drawing 1019837-000 and dispose of the part in accordance with paragraph IX of this RIB.
3. Clean the exposed surface of the glass diffuser on the light source of the Illuminator, PN 1001674, in accordance with JDC 02820.

   NOTE: The required items of the optics cleaner kit, PN 1019984-011, or equivalent shall be used for the cleaning operation of paragraph VII.B.3.

4. Assemble the SXT Eyepiece Adapter, PN 1022659 (from retrofit kit), to mount assembly, PN 1019783, in accordance with drawing 1019837-031.
5. Assemble the Identification Plate, PN 1019307-003 (from retrofit kit), in accordance with drawing 1019837-001.

   NOTE: Apply the Identification Plate to the Illuminator, PN 1001674, in accordance with MIL-P-19834.

---

6. Visually inspect the Portable Light Assembly for proper assembly of its various components.
7. Connect the Electrical Power Supply Cord of the base of the Illuminator, PN 1001674, to a 115 volts, 60 cps power source.
8. Turn the knob of the light intensity control on the base of the Illuminator, PN 1001674, from OFF to positions 1, 2, and 3. Verify that lamp lights and that light intensity varies.
9. Turn the knob (paragraph VII.B.8) to OFF. Disconnect the Electrical Power Supply Cord (paragraph VII.B.7).

VIII. MODIFICATION DESIGNATION

The retrofitted Portable Light Assemblies are reidentified as PN 1019837-031, SN's KIC 1 through KIC 4. The modification designations are accomplished in paragraph VII.B.5 by assembling an Identification Plate, PN 1019307-003, which is engraved with the required part number, serial number, and contract number.

IX. DISPOSITION OF PARTS REMOVED

1. Identification Plate, PN 1019307
   - removed in paragraph VII.B.2
   - one per Portable Light Assembly
   - scrap

X. REPORT OF ACCOMPLISHMENT

Complete ACC form No. ~~1~~ 1A Retrofit or Compliance Report, dated 2-23-66, and distribute as specified on the form.

11/29/7 M

RIB NO. 0106048
DATE 1 Oct 67
TDRR NO. 3519?
REV. —
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NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

ALIGNMENT OPTICAL TELESCOPE-*
Serial Numbers-*
*See paragraph III for Part and Serial Numbers

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL MIT	APPROVAL NASA
12-28-67	A	35351	4,5,6,7	M.M.	R.J.J.

PREPARED BY R. Lawrence DATE 10/20/67
I.C. ENG. APPROVAL DATE 10/20/67
DRB APPROVAL W S Yamerie DATE 30 Nov 67
MIT/IL APPROVAL E. Thomp ERD DATE 11/30/67
NASA APPROVAL DATE 11/30/67

PART NUMBER
SERIAL NUMBER
RETROFIT KIT PN 8106073
RETROFIT KIT SN

NOV 22 1967

RIB NO. 0106048
DATE
TDRR NO.
REV.
Page 2 of 7

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Alignment Optical Telescopes (AOT) listed in paragraph III. A Lamp Assembly Protective Cover, 6011230, and Protective Heater Cover, 6011231 is added to the Alignment Optical Telescope (AOT). The addition of the protective covers to the AOT will prevent damage to heater blanket and add a flame resistant barrier over the reticle lamp assembly.

II. AUTHORITY

This retrofit is authorized by ECP-633.

III. UNITS AFFECTED

Name	LEM	SN	Pre-Retrofit PN	Post-Retrofit PN	Retrofit Kit PN
AOT	612	018	6011000-071	6011000-072	8106073

IV. PRIORITY CHANGES

None.

V. RELATED CHANGES

None.

VI. MATERIAL REQUIRED

A. One retrofit kit, PN 8106073
B. Special tools or equipment required but not supplied in the retrofit kit:
1. Freon TF, E.I. DuPont DeNemour Company or equivalent
2. Plastic gloves
3. Balance scale, ± 1% accuracy for full range of scale
4. Mixing containers for paint-glass, aluminum, or corrosion-resisting steel
5. Mixing spatulas-glass, aluminum, or corrosion-resisting steel
6. Paint brush, camel hair
7. Rubber stamp, numbers .187 inches high.

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C. Drawings and documents required:

1. Drawing 6011000	4. Drawing 6011239
2. Drawing 6011230	5. ND 1002019
3. Drawing 6011231	6. ND1002345

VII. PROCEDURE

A. General
1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure
1. Using freon clean area of nameplate in area of configuration dash number.
2. Prepare a quantity of paint sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-010 and 1 (one) gram catalyst, 1012546. Using camel hair brush paint over configuration dash number. Allow ink to air dry one half hour minimum. Proceed with following steps while ink dries.

CAUTION: The ink and catalyst listed above shall have a shelf life of 12 months minimum for ink or 6 months minimum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

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DATE 12-28-67
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REV. A
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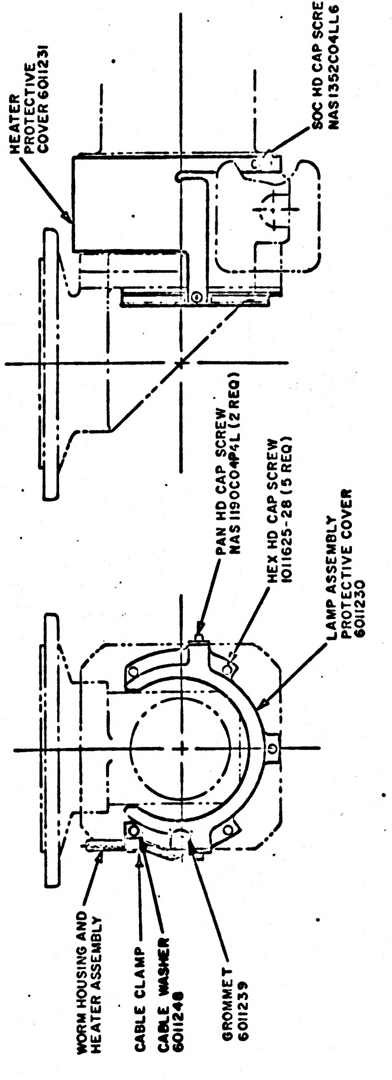
HEATER PROTECTIVE COVER 6011231
SOC HD CAP SCREW NAS1352C04LL6
PAN HD CAP SCREW NAS1190C04P4L (2 REQ)
HEX HD CAP SCREW 1011625-28 (5 REQ)
LAMP ASSEMBLY PROTECTIVE COVER 6011230
WORM HOUSING AND HEATER ASSEMBLY
CABLE CLAMP
CABLE WASHER 6011248
GROMMET 6011239

Installation AOT Protective Covers

Figure 1

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3. Remove the five hex head cap screws securing the plate and lamp assembly to mirror housing and window assembly (see figure 1). Place hex head cap screws in box for later installation.

3a. Obtain from retrofit kit, cable washer, PN 6011248. Remove existing cable washer (PN 1011918-1) and install new cable washer in its place. (see Figure 1) Dispose of old cable washer in accordance with paragraph IX.

4. Obtain from retrofit kit lamp assembly protective cover, 6011230. Install protective cover over plate and lamp assembly. Align protective cover holes with holes in plate and lamp assembly. Install the five hex head cap screws 1011625-28, removed in paragraph B.3. Torque the hex head cap screws to 6.4 ± 0.5 inch-pounds.

5. Obtain from retrofit kit heater protective cover, 6011231 and grommet, 6011239. Loosen clamping screw and slide protective cover over AOT worm housing and heater assembly. Install grommet over heater wires. Align the two aft holes of the protective cover with lamp assembly protective cover. (See figure 1)

6. Obtain from retrofit kit two pan hd. cap screws (self-locking) NAS 1190CO4P4L. Install screws in holes on each side of heater protective cover. Torque the pan. hd. screws to 6.4 ± 0.5 inch-pound.

7. Torque the soc. hd. cap located on ring of heater protective cover to 6.4 ± 0.5 inch-pounds.

C. Identification Plate Marking

1. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix paint in the ratio of 8.5 grams ink, 1012545-001 and one (1) gram catalyst 1012546-001. Using rubber stamp, stamp the configuration dash number over the area where white ink was applied to nameplate. Allow to air dry one half hour minimum.

2. Visually inspect AOT for proper performance of retrofit.

VIII MODIFICATION DESIGNATION

The retrofitted AOT's are reidentified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraphs VII by marking Identification Plate, PN 1004260-350. With new configuration dash number.

IX. DISPOSITION OF PART REMOVED

1. Cable Washer, 1011918-1
   -remove in paragraph VII B.3a
   -one per AOT
   -see Note 1

   NOTE: All parts removed and replaced shall be packaged in accordance with Federal Specification, PPP-B-601. Store packaged parts in a NASA approved bond room to await disposition as directed

X. REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

XI. QUALITY ASSURANCE

The work accomplished by this RIB shall be inspected during and upon completion by a quality assurance representative to assure that the workmanship is commensurate with factory quality standards as a minimum.

ACC Form 1 (Revised)
10/10/66

RIB 0106048
Sheet 7 of 7
ᛌPart No. 6011000
ᛌDate: 12-28-67
ᛌTDRR 35351
ᛌRevision A

Document Control No. ______

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ______ Date: ______ G & N # 612

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

Indent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Alignment							
	Optical				8106073		6011000-072	
	Telescope	6011000-071						

PART II: A/B PARTS ADDED OR REMOVED

Indent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	1	Cover, Protective,					
			Lamp Assy	6011230				
1	A	1	Cover, Protective,					
			Heater	6011231				
1	A	2	Screw	NAS1190				
				C04P4L				
1	A	1	Grommet	6011239				
1	R	1	Washer, Cable	1011918-1				
1	A	1	Washer, Cable	6011248				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ᛌApplicable for Retrofit only

NOV 2 2 1967

11/29/7 M

RIB NO. 0106048
DATE 1 Dec 67
TDRR NO. 35198
REV. —
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NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

ALIGNMENT OPTICAL TELESCOPE-*
Serial Numbers-*
*See paragraph III for Part and Serial Numbers

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY DATE 10/20/67
I.C. ENG. APPROVAL DATE 10/20/67
DRB APPROVAL DATE 20 Nov 67
MIT/IL APPROVAL DATE 11/30/67
NASA APPROVAL DATE 11/30/67

PART NUMBER
SERIAL NUMBER
RETROFIT KIT PN 8106073
RETROFIT KIT SN

NOV 22 1967

RIB NO. 0106048
DATE
TDRR NO.
REV.
Page 2 of 9

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the alignment Optical Telescopes (AOT) listed in paragraph III. A Lamp Assembly Protective Cover, 6011230, and Protective Heater Cover, 6011231 is added to the Alignment Optical Telescope (AOT). The addition of the protective covers to the AOT will prevent damage to heater blanket and add a flame resistant barrier over the reticle lamp assembly.

II. AUTHORITY

This retrofit is authorized by ECP-633.

III. UNITS AFFECTED

Name	LEM	SN	Pre-Retrofit PN	~~Post~~ Retrofit PN	Retrofit Kit PN
AOT	612	018	6011000-071	6011000-072	8106073

IV. PRIORITY CHANGES

None.

V. RELATED CHANGES

None.

VI. MATERIAL REQUIRED

A. One retrofit kit, PN 8106073

B. Special tools or equipment required but not supplied in the retrofit kit:
1. Freon TF, E.I. DuPont DeNemour Company or equivalent
2. Plastic gloves
3. Balance scale, ± 1% accuracy for full range of scale
4. Mixing containers for paint-glass, aluminum, or corrosion-resisting steel
5. Mixing spatulas-glass, aluminum, or corrosion-resisting steel
6. Paint brush, camel hair
7. Rubber stamp, numbers .187 inches high.

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C. Drawings and documents required:

1. Drawing 6011000	4. Drawing 6011239
2. Drawing 6011230	5. ND 1002019
3. Drawing 6011231	6. ND1002345

VII. PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure

1. Using freon clean area of nameplate in area of configuration dash number.
2. Prepare a quantity of paint sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-010 and 1 (one) gram catalyst, 1012546. Using camel hair brush paint over configuration dash number. Allow ink to air dry one half hour minimum. Proceed with following steps while ink dries.

CAUTION: The ink and catalyst listed above shall have a shelf life of 12 months minimum for ink or 6 months minimum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

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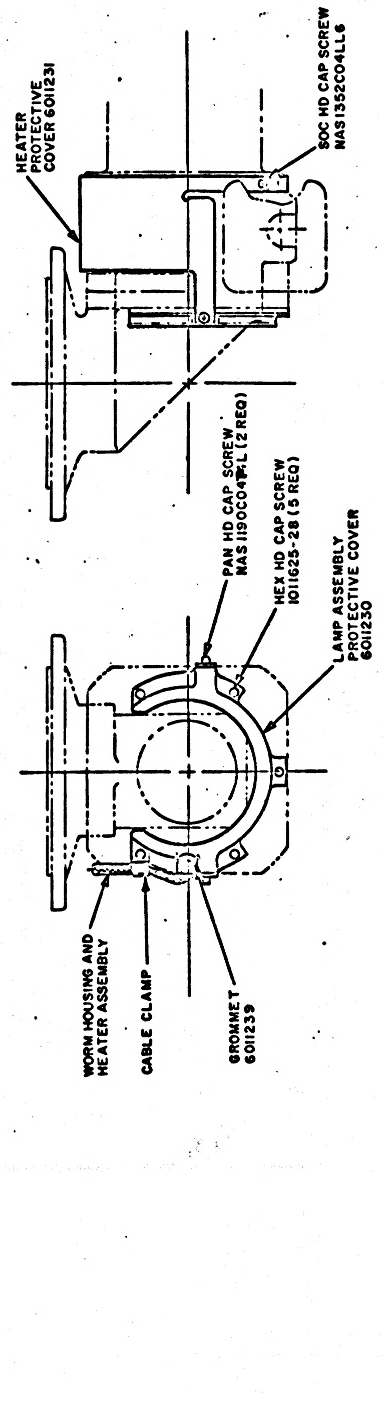
HEATER PROTECTIVE COVER 6011231
SOC HD CAP SCREW NAS1352C04LL6
PAN HD CAP SCREW NAS1190C04PL (2 REQ)
HEX HD CAP SCREW 1011625-28 (5 REQ)
LAMP ASSEMBLY PROTECTIVE COVER 6011230
WORM HOUSING AND HEATER ASSEMBLY
CABLE CLAMP
GROMMET 6011239

Installation AOT Protective Covers
Figure 1

NOV 22 1967

3. Remove the five hex head cap screws securing the plate and lamp assembly to mirror housing and window assembly (see figure 1), Place hex head cap screws in box for later installation.
4. Obtain from retrofit kit lamp assembly protective cover, 6011230. Install protective cover over plate and lamp assembly. Align protective cover holes with holes in plate and lamp assembly. Install the five hex head cap screws 1011625-28, removed in paragraph B.3. Torque the hex head cap screws to 6.4 ± 0.5 inch-pounds.
5. Obtain from retrofit kit heater protective cover, 6011231 and grommet, 6011239. Loosen clamping screw and slide protective cover over AOT worm housing and heater assembly. Install grommet over heater wires. Align the two aft holes of the protective cover with lamp assembly protective cover. (See figure 1)
6. Obtain from retrofit kit two pan hd. cap screws (self-locking) NAS 1190C04P4L. Install screws in holes on each side of heater protective cover. Torque the pan. hd. screws to 6.4 ± 0.5 inch-pound.
7. Torque the soc. hd. cap located on ring of heater protective cover to 6.4 ± 0.5 inch-pounds.

C. Identification Plate Marking

1. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix paint in the ratio of 8.5 grams ink, 1012545-001 and one (1) gram catalyst 1012546-006. Using rubber stamp, stamp the configuration dash number over the area where white ink was applied to nameplate. Allow to air dry one half hour minimum.
2. Visually inspect AOT for proper performance of retrofit.

VIII. MODIFICATION DESIGNATION

The retrofited AOT's are reidentified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraphs VII by marking Identification Plate, PN 1004260-350. With new configuration dash number.

IX. DISPOSITION OF PART REMOVED

None.

X. REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

XI. QUALITY ASSURANCE

The work accomplished by this RIB shall be inspected during and upon completion by a quality assurance representative to assure that the workmanship is commensurate with factory quality standards as a minimum.

ACC Form 1 (Revised)
10/10/66

RIB 0106048
Sheet 7 of 8
' Part No.
' Date:
' TDRR
' Revision

Document Control No.

RETROFIT OR REPAIR COMPLIANCE REPORT

G & N # 612

Reporting Facility: Date:

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Alignment							
	Optical				8106073		6011000-072	
	Telescope	6011000-071						

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	1	Cover, Protective,					
			Lamp Assy	6011230				
1	A	1	Cover, Protective,					
			Heater	6011231				
1	A	2	Screw	NAS1190				
				C04P4L				
1	A	1	Grommet	6011239				

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

*Parts
A - Added
R - Removed

'Applicable for Retrofit only

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11/29/7 /m

RIB NO. 0106049
DATE 1 Dec 67
TDRR NO. 35193
REV. —
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NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION
ALIGNMENT OPTICAL TELESCOPE-*
Serial Numbers-*
*See paragraph III for Part and Serial Numbers

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY R. Lawrence DATE 11-21-67
I.C. ENG. APPROVAL DATE 11-21-67
DRB APPROVAL DATE 20 Nov 67
MIT/IL APPROVAL ECW DATE 11-30-67
NASA APPROVAL A. C DATE 11/30/67

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RIB NO. 0106049
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I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Alignment Optical Telescope's (AOT's) listed in paragraph III. The retrofit consists of adding a Lamp Assembly Protective Cover, 6011230, and Protective Heater Cover, 6011231 is added to the AOT in place of thermal blankets. The retrofit also consists of adding a Pressure Seal, Flameguard Bellows Assembly, 6011869, around the AOT pressure seal. The bellows shall not be installed until such time as the AOT is being installed on the LM vehicle.

II. AUTHORITY

This retrofit is authorized by ECP-633.

III. UNITS AFFECTED

Name	LEM	SN	Pre-Retrofit PN	Post-Retrofit PN	Retrofit Kit PN
AOT	610	016	6011000-071	6011000-081	8106069
AOT	611	017	6011000-071	6011000-081	8106069

IV. PRIORITY CHANGES

None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

A. One retrofit kit, PN 8106069

B. Special tools or equipment required but not supplied in the retrofit kit:

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1. Freon TF, E. I. Dupont DeNemour Company or equivalent
2. Plastic gloves
3. Balance scale, ± 1% accuracy for full range of scale
4. Mixing spatulas-glass, aluminum, or corrosion-resisting steel
5. Paint brush, camel hair
6. Torque wrench, 0-20 inch-pounds
7. Rubber stamp, numbers .187 inches high
8. Mixing containers for paint-glass, aluminum or corrosion-resisting steel

C. Drawings and documents required:

1. Drawing 6011000	5. Drawing 6011230
2. Drawing 6011869	6. Drawing 6011231
3. Drawing 6011227	7. ND 1002019
4. Drawing 1008937	8. ND 1002345

VII. PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure (AOT Bellows Assembly)

1. Using freon, clean area of nameplate in area of configuration dash number.
2. Prepare a quantity of ink sufficient for painting over the configuration dash number, by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-010 and 1 (one) gram catalyst 1012546-006. Using camel hair brush paint over configuration dash number. Allow ink to air dry one half hour minimum. Proceed with following steps while ink dries.

CAUTION: The ink and catalyst listed above shall have a shelf life of 12 months minimum for ink or 6 months minimum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

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3. Remove all AOT mounting screws for AOT pressure seal mounting flange except screws marked with "A". Observe relation of index mark to screws removed. (See figure 1.) Place screws in plastic box for later installation of bellows.
4. Obtain from retrofit kit, bellows assembly, 6011869. Slide bellow assembly over AOT outer tube seal flange from prism end.
5. Slide bellows assembly down over pressure seal and align index line on bellows assembly with existing index line on pressure seal. (See figure 1)
6. Obtain from retrofit kit split ring, 6011227 (-1 and -2), and six soc. hd. cap screws NAS 1352C02 LL3. Install split ring on lower portion of bellows assembly using the six soc. hd. cap screws. Torque screws to 1.8 ± 0.1 inch-pounds.
7. Install and secure AOT to spacecraft. Secure upper seal flange in accordance with "Grumman Aircraft Company's" prescribed installation procedure LID 280-10004 and ICD LIS 420-10004.
8. Wrap two (2) continuous layers of aluminum tape, 1008937-003, from retrofit kit around the upper exposed periphery of the pressure seal flange and adjacent spacecraft interfaced in accordance with GAEC ICD LID 420-10004.
9. Mount bellows assembly to AOT using the eight screws removed in step B.3. Torque all (12) twelve screws to 13.5 ± 0.5 inch-pounds using the tightening sequences as shown on drawing 6011000.

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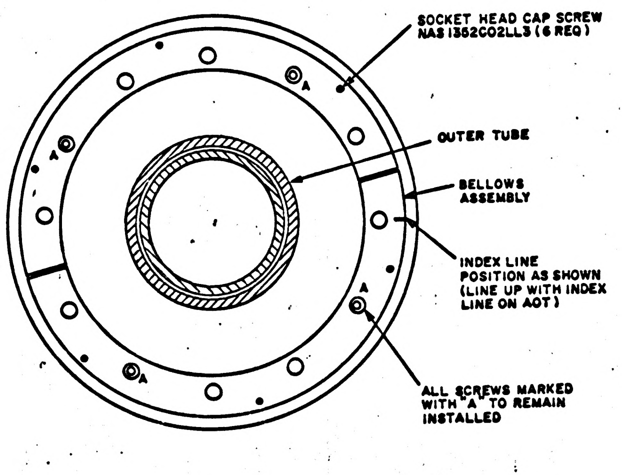
SOCKET HEAD CAP SCREW NAS1352C02LL3 (6 REQ)
OUTER TUBE
BELLOWS ASSEMBLY
INDEX LINE POSITION AS SHOWN (LINE UP WITH INDEX LINE ON AOT)
ALL SCREWS MARKED WITH "A" TO REMAIN INSTALLED
4606

Installation of AOT Bellows Assembly

Figure 1.

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C. Rework Procedure (Protective Covers)

1. Remove the five hex head cap screws securing the plate and lamp assembly to mirror housing and window assembly (see figure 1). Place hex head cap screws in box for later installation.
2. Obtain from retrofit kit lamp assembly protective cover, 6011230. Install protective cover over plate and lamp assembly. Align protective cover holes with holes in plate and lamp assembly. Install the five hex head cap screws 1011625-28, removed in paragraph C.1. Torque the hex head cap screws to 6.4 ± 0.5 inch-pounds.
3. Obtain from retrofit kit heater protective cover, 6011231. Loosen clamping screw and slide protective cover over AOT worm housing and heater assembly. Align the two aft holes of the protective cover with lamp assembly protective cover. (See figure 2)
4. Obtain from retrofit kit two pan hd. cap screws (self-locking) NAS 1190C04P4L. Install screws in holes on each side of heater protective cover. Torque the pan. hd. screws to 6.4 ± 0.5 inch-pound.
5. Torque the soc. hd. cap located on ring of heater protective cover to 6.4 ± 0.5 inch-pounds.

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DATE
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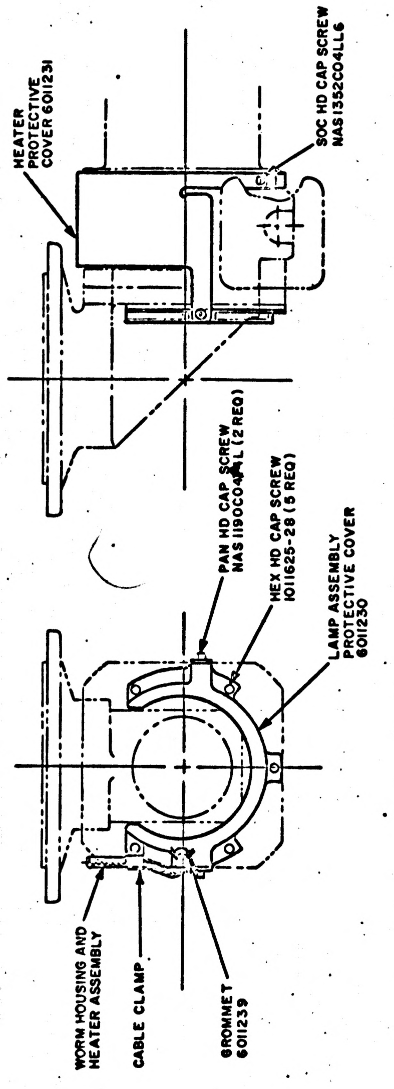
HEATER PROTECTIVE COVER 6011231
SOC HD CAP SCREW NAS1352C04LL6
PAN HD CAP SCREW NAS1190C04P4L (2 REQ)
HEX HD CAP SCREW 1011625-28 (5 REQ)
LAMP ASSEMBLY PROTECTIVE COVER 6011230
WORM HOUSING AND HEATER ASSEMBLY
CABLE CLAMP
GROMMET 6011239
4661

Installation AOT Protective Covers

Figure 2

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D. Identification Plate Marking

1. Prepare a quanity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix paint in the ratio of 8.5 grams ink, 1012545-001. and one (1) gram catalyst 1012546. Using rubber stamp, stamp, the configuration dash number over the area where white ink was applied to nameplate. Allow to air dry one half hour minimum.
2. Visually inspect AOT for proper performance of retrofit.

VIII. MODIFICATION DESIGNATION

The retrofitted AOT's are reidentified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraphs VII by marking Identification Plate, PN 1004260-350 with new configuration dash number.

IX. DISPOSITION OF PART REMOVED - None

X. REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised), Retrofit or Repair Compliance Report, dated 10/10/66 in accordance with ND 1002345

XI. QUALITY ASSURANCE

The work accomplished by this RIB shall be inspected during and upon completion by a quality assurance representative to assure that the workmanship is commensurate with factory quality standards as a minimum.

ACC Form 1 (Revised)
10/10/66

RIB 0106049
Sheet 9 of 10
ᶦPart No.
ᶦDate:
ᶦTDRR
ᶦRevision

Document Control No. ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # 610

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Alignment							
	Optical Tele-							
	scope	6011000-071			8106069		6011000-081	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	ᶦS/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	AR	Aluminum Tape	1008937-003				
1	A	1	Bellows Assy, Pressure					
			Seal	6011869				
1	A	1	Ring, Split	6011227-1				
1	A	6	Screw, Cap Soc Hd	NAS 1352-				
				CO2LL3				
~~1~~	~~R~~	~~1~~	~~Identification Plate~~	[illegible]				
~~1~~	~~A~~	~~1~~	~~Identification Plate~~	[illegible]				
1	A	1	Cover, Protective,					
			Lamp Assy	6011230				
1	A	1	Cover, Protective,					
			Heater	6011231				
1	A	1	Screw	NAS1190				
				CO 4P4L				
1	A	1	Grommet	6011239				
1	A	1	Ring, Split	6011227-2				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ᶦApplicable for Retrofit only

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10/10/66

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Sheet 10 of 10
ᶦPart No.
ᶦDate:
ᶦTDRR
ᶦRevision

Document Control No. ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # 610

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Alignment							
	Optical Tele-							
	scope	6011000-071			8106069		6011000-081	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	AR	Aluminum Tape	1008937-003				
1	A	1	Bellows Assy, Pressure					
			Seal	6011869				
1	A	1	Ring, Split	6011227-1				
1	A	6	Screw, Cap Soc Hd	NAS 1352-				
				CO2LL3				
~~1~~	~~R~~	~~1~~	~~Identification Plate~~	[illegible]				
~~1~~	~~A~~	~~1~~	~~Identification Plate~~	[illegible]				
1	A	1	Cover, Protective,					
			Lamp Assy	6011230				
1	A	1	Cover, Protective,					
			Heater	6011231				
1	A	1	Screw	NAS1190				
				CO4P4L				
1	A	1	Grommet	6011239				
1	A	1	Ring, Split	6011227-2				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ᶦApplicable for Retrofit only

NOV 22 1967

RIB NO 0106050
DATE 15 Apr 68
TDRR NO. 36088
REV. A
Page 1 of 15

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

ALIGNMENT OPTICAL TELESCOPE-*
Serial Numbers-*
*See paragraph III for Part and Serial Numbers

(A)

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA
6-24-68	A	36425	1, 2, 3, 6, 11, 14, 15	E.H.	NR

PREPARED BY K. Lawrence DATE 2-6-68
I.C. ENG APPROVAL DATE 2-20-68
DRB APPROVAL DATE 22 Mar 68
MIT/IL APPROVAL DATE 3-21-68
NASA APPROVAL DATE 3/2?/68

PART NUMBER
SERIAL NUMBER
RETROFIT KITS PN 8106076 & PN 8106086
RETROFIT KIT SN

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Alignment Optical Telescopes (AOT) listed in paragraph III. The retrofit consists of removing Prism Shield, 6011163 and Prism Shield Spacer, 6011058 from the AOT and adding Sunshade and Radar Shield Assembly, 6011876 in place of Prism Shield and adding new Detent Calibration Plate, 6011252. The function of the Sunshade is to eliminate the effects of light scattering of the LM vehicle so star sightings can be made using the AOT. The function of the new detent calibration plate is to show calculated elevation and azimuth angle data for six (6) detent positions instead of three (3). This retrofit is to be accomplished after AOT is installed in LM vehicle.

II. AUTHORITY

This retrofit is authorized by ECP- 657 / CCA 497-0514

III. UNITS AFFECTED

Name	G&N	SN	Pre-Retrofit PN	Post-Retrofit PN	Retrofit Kit PN
AOT	606	012	6011000-081	6011000-091	8106076 & 8106086
AOT	607	013	6011000-081	6011000-091	↓
AOT	608	014	6011000-081	6011000-091	↓
AOT	609	015	6011000-081	6011000-091	↓
AOT	610	016	6011000-081	6011000-091	↓
AOT	611	017	6011000-081	6011000-091	↓
AOT	612	018	6011000-072	6011000-073	↓
AOT	613	019	6011000-081	6011000-091	↓
AOT	614	020	6011000-081	6011000-091	↓
AOT	615	021	6011000-081	6011000-091	↓
AOT	616	022	6011000-081	6011000-091	↓
AOT	617	023	6011000-081	6011000-091	8106076 & 8106086

IV. PRIORITY CHANGES

None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

A. One retrofit kit, PN 8106076 & PN 8106086

B. Special tools or equipment required but not supplied in the retrofit kit.

1. Freon TF, E.I. DuPont DeNemour Company or equivalent
2. Balance scale, ±1% accuracy for full range of scale
3. Mixing containers for paint-glass, aluminum, or corrosion-resisting steel
4. Mixing spatulas-glass, aluminum, or corrosion-resisting steel
5. Paint brush, camel hair
6. Rubber stamp, numbers .125 inches high approx.
7. Razor blade
8. Tool kit consisting of the following items as a minimum,
    a. Torque screw driver 0-5 inch pounds minimum
    b. Allen head set with attachments to screw driver
    c. Feeler gauge in tenths and hundredths
9. AOT Sunshade Alignment Fixture, 6014064
10. Emery paper, zero grade.
11. Lint free cloth
12. Methyl Alcohol
13. Dust Cover Protective, Sunshade, 6014324
14. Paint roller, hard surface

C. Drawings and documents required:

1. Drawing 6011000
2. Drawing 6011876
3. ND 1002019
4. ND 1002219

VII. PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure

1. Remove AOT Protective Dust Cover 6014322. Using freon, clean area of AOT nameplate in area of configuration dash number.
2. Prepare a quantity of paint sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-010 and 1 (one) gram catalyst, 1012546-001. Using camel hair brush paint over configuration dash number. Allow ink to air dry one half hour minimum. Proceed with following steps while ink dries.

    CAUTION: The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

3. Obtain new detent calibration plate, 6011252, from retrofit kit. Verify that the AZ and ELEV. values for F, L, R are the exact values as on old detent calibration plate on AOT.
4. Using tape, lint-free cloth, plastic gloves, and Freon TF per paragraph VI.B, mask and wipe the area of AOT, to which detent calibration plate, PN 6011252, will be cemented, in accordance with ND 1002219.

CAUTION: It shall be determined that the shelf life of 6 months has hot been exceeded before mixing the Base Resin "B" PN 1011541-1 and the Hardener Accelerator "A" PN 1011541-2.

5. Prepare a quantity of adhesive sufficient for cementing the detent plate, by thoroughly mixing in the ratio 100 parts, of Base Resin "B" and 140 parts Hardener Accelerator "A".

CAUTION: The mixing and application of cement shall be completed before the 2 hour pot life.

6. Using emery paper scuff up the back of detent plate prior to applying adhesive. Apply the adhesive, uniformly to the surfaces of the AOT and detent plate. Assemble the detent plate to the AOT (figure 1) and gently press them together to achieve an uninterrupted glue line. Remove excess adhesive with methyl alcohol.

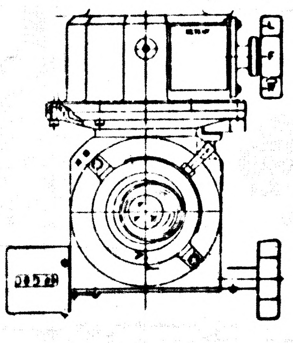

Figure 1. Detent Calibration Plate Location on AOT

7. Cure the bonded parts at room temperature for a minimum of 24 hours.

C. Identification Plate Marking

1. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix paint in the ratio of 8.5 grams ink, 1012545-001 and one (1) gram catalyst 1012546-001. Using rubber stamp, stamp the configuration dash number over the area where white ink was applied to nameplate. Allow to air dry one half hour minimum.

D. Sunshade Rework Procedure (RFK 8106076)

1. Using a screwdriver with allen head attachment remove the two (2) soc head cap screws securing the prism shield to the outer tube. Remove prism shield, 6011163 and prism shield spacer, 6011058, from AOT. Dispose of old prism shield, radar shield, soc head cap screws and spacer in accordance with paragraph IX.

2. Using a screwdriver with an allen head attachment remove the two (2). soc head cap screws marked with an "X" from the prism housing (See figure 2). Dispose of the two soc head cap screws in accordance with paragraph IX.

3. Obtain from retrofit kit sunshade and radar shield assembly, 6011876. Install sunshade over prism housing as shown in figure 3.

4. Obtain from retrofit kit two soc head cap screws, NAS 1352CO4LL8. Install soc head cap screws in sunshade as shown in figure 3. Do not torque screws at this operation.

5. Obtain from retrofit kit two clamps 6011248, two shims, 6011251, four washers, AN 960PD3L, and four screws NAS 1352CO2LL3.

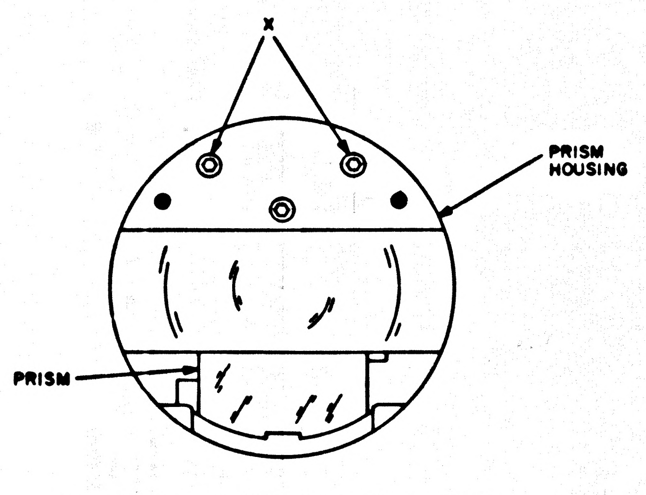

Figure 2. Location of Two Soc Head Cap Screws on Prism Housing (Top View)

NOTE: Shims, 6011251, shall only be used if clearances between clamps, 6011248, and bosses of sunshade, 6011876, exceed .010 inches on each side. (Use feeler gauge)

6. Install the two clamps, two shims if required to the sunshade using four screws NAS 1352CO2LL3 and four washers AN960PD3L as shown in figure 3. Do not torque screws at this operation.

7. Obtain from retrofit kit two screws NAS 1352CO2LL4. Install screws through sunshade holes as shown in figure 3. Do not torque screws at this operation.

8. Install sunshade alignment fixture over exposed end of sunshade. Secure fixture to sunshade using two retaining screws.

9. Prior to torquing all the mounting screws a visual observation shall be made through the AOT eyepiece as follows:
   a. Rotate AOT focus control for optimum focus on AOT reticle.
   b. Rotate the reticle control knob so AOT counter reads 0.00 degrees.
   c. Observe scribe line on sunshade alignment fixture. Rotate sunshade until scribe line is superimposed on center of AOT reticle.

10. When sunshade is centered torque the mounting screws in the following sequence:
    a. Torque two screws, NAS1352CO4LL8 shown in figure 3 to 4.8 + .20 - .10 inch-pounds

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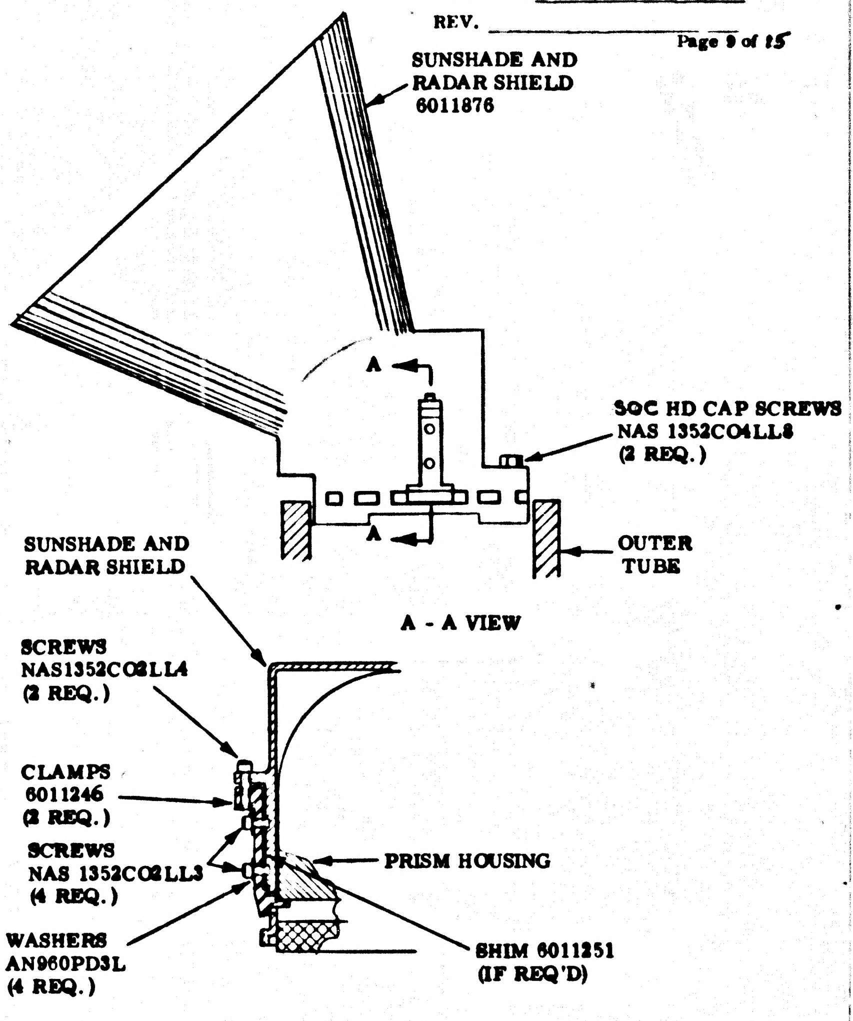
SUNSHADE AND RADAR SHIELD 6011876
A
A
SOC HD CAP SCREWS NAS 1352C04LL8 (2 REQ.)
OUTER TUBE
A - A VIEW
SUNSHADE AND RADAR SHIELD
SCREWS NAS1352C02LL4 (2 REQ.)
CLAMPS 6011246 (2 REQ.)
SCREWS NAS 1352C02LL3 (4 REQ.)
WASHERS AN960PD3L (4 REQ.)
PRISM HOUSING
SHIM 6011251 (IF REQ'D)

Figure 3. Installation of Sunshade on AOT

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b. Torque two screws, NAS1352C02LL4 shown in figure 3 to 1.5 + .20 - .10 inch-pounds.

c. Torque four screws, NAS1352C02LL3 shown in figure 3 to 2.3 + .20 - .10 inch-pounds

11. Verify sunshade has remained centered on AOT reticle.
12. Remove AOT sunshade alignment fixture from sunshade.
13. Install sunshade protective cover, 6014324 on sunshade.
14. Visually inspect AOT for proper performance of retrofit.
15. Replace AOT Protective Dust Cover

E. Reidentification of Prime Parts to GSE Parts

1. Verify that radar shield, 6011165 has been removed from prism shield, 6011163.

~~2. Prepare a quanity of ink sufficient for painting over the part number on prism shield, 6011163, and prism shield spacer, 6011058 by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-001 (black) and one (1) gram catalyst, 1012546-001. Using a camel hair brush, paint over the part number on prism shield and prism shield spacer. Allow ink to air dry one half hour minimum. CAUTION: The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tight closed container at room temperature. Pot life (catalyzed) 4 hours.~~

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~~3. Prepare a quantity of ink sufficient for rubber stamping the part number 6014328 on prism shield and 6014327 on prism shield spacer. Thoroughly mix ink in the ratio of 8.5 grams ink, 1012545-010 and one (1) gram catalyst 1012546-001. Using rubber stamp, stamp the new part number over the area where black ink was applied to prism shield and prism shield spacer. Allow to air dry one half hour minimum.~~

2. ~~4.~~ Bag and tag two soc. hd. cap screws, 6011083. ~~Reidentify bag to part number, 6014326.~~

3. ~~5.~~ Obtain from RFK 8106086 LEM-AOT Transparent Prism and Head Protective Cover, 6014035-011.

4. Assemble the GSE parts in steps 2,3, ~~PN 6011163~~ and PN 6011058 Bag and tag the parts as the AOT prism Protective Cover, PN6014329-011, per ND 1002019.

5. Visually inspect the GSE parts, for proper performance of retrofit and then place parts in NASA bond room.

Note: AOT Prism Protective Cover, PN6014329, shall be installed when shipping AOT and whenever sunshade is removed from AOT.

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VIII MODIFICATION DESIGNATION

The retrofitted AOT's are reidentified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraphs VII by marking Identification Plate, PN 1004260-350 with new configuration dash number.

IX. DISPOSITION OF PART REMOVED

1. Prism Shield, 6011163
   - removed in paragraph VII D.1
   - one per AOT
   - Part becomes GSE.
2. Prism Shield Spacer, 6011058
   - removed in paragraph VII D.1
   - one per AOT
   - Part becomes GSE.
3. Radar Shield, 6011165
   - removed in paragraph VII. D.1
   - one per AOT
   - see note 1
4. Soc. Hd. Cap Screw, 6011083
   - removed in paragraph VII d.1
   - two per AOT
   - part becomes GSE.

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5. Soc. Hd. Cap Screw, 1011625-30
   - removed in paragraph VII.
   - two per AOT
   - see note 1

NOTE 1: All parts removed and replaced shall be packaged in accordance with ND1002214. Store packaged parts in a NASA approved bond room to await disposition as directed.

X. REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

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10/10/66

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[1]Part No.
[1]Date: 6-24-68
[1]TDRR 36425
[1]Revision A

Document Control No.

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: Date: G & N # [illegible]

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Align Optical							
	Telescope	6011000-091			8106076		6011000-091	
2	Telescope Upper							
	Section Assy	6011801-031			8106076		6011801-041	
3	AOT Protective				8106086		6014329-011	
	Cover	—						

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
2	R	1	Prism, Shield	6011163				
2	R	1	Prism Shield Spacer	6011058				
1	R	1	Radar Shield	6011165				
2	R	2	Soc. Hd. Cap Screw	6011083				
	R	2	Soc. Hd. Cap Screw	1011625-30				
1	A	1	Sunshade & Radar					
			Shield Assy	6011876				
1	A	2	Hex Hd. Cap Screw	NAS1352-				
				CO4LL8				
1	A	2	Clamps	6011246				
1	A	2	Shims	6011251				
1	A	4	Washers	AN960PD3L				
1	A	4	Screws	NAS1352 -				
				CO2LL3				
1	A	2	Screws	NAS1352				
				CO2LL4				
1	A	1	Detent Cal. Plate	6011252				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

[1]Applicable for Retrofit only

ACC Form 1 (Revised)
10/10/66

RIB 0106050

Sheet 15 of 15
[1]Part No.
[1]Date: 6-24-68
[1]TDRR 36425
[1]Revision A

Document Control No.

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: Date: G & N # [illegible]

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Align Optical							
	Telescope	6011000-072			8106076		6011000-073	
2	Telescope Upper							
	Section Assy	6011801-031			8106076		6011801-041	
3.	AOT Protective							
	Cover	—			8106086		6014329-011	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
2	R	1	Prism, Shield	6011163				
2	R	1	Prism Shield Spacer	6011058				
1	R	1	Radar Shield	6011165				
2	R	2	Soc. Hd. Cap Screw	6011083				
	R	2	Soc. Hd. Cap Screw	1011625-30				
1	A	1	Sunshade & Radar					
			Shield Assy	6011876				
1	A	2	Hex Hd. Cap Screw	NAS1352-				
				CO4LL8				
1	A	2	Clamps	6011246				
1	A	2	Shims	6011251				
1	A	4	Washers	AN960PD3L				
1	A	4	Screws	NAS1352 -				
				CO2LL3				
1	A	2	Screws	NAS1352				
				CO2LL4				
1	A	1	Detent Cal. Plate	6011252				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

[1]Applicable for Retrofit only

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NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

ALIGNMENT OPTICAL TELESCOPE-*
Serial Numbers-*
*See paragraph III for Part and Serial Numbers

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY R. Lawrence DATE 2-6-68
I.C. ENG. APPROVAL DATE 2-20-68
DRB APPROVAL W Stameris DATE 22 Mar 68
MIT/IL APPROVAL DATE 3-21-68
NASA APPROVAL DATE 3/25/68

PART NUMBER
SERIAL NUMBER
RETROFIT KIT PN 8106076
RETROFIT KIT SN

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Alignment Optical Telescopes (AOT) listed in paragraph III. The retrofit consists of removing Prism Shield, 6011163 and Prism Shield Spacer, 6011058 from the AOT and adding Sunshade and Radar Shield Assembly, 6011876 in place of Prism Shield and adding new Detent Calibration Plate, 6011252. The function of the Sunshade is to eliminate the effects of light scattering of the LM vehicle so star sightings can be made using the AOT. The function of the new detent calibration plate is to show calculated elevation and azimuth angle data for six (6) detent positions instead of three (3). This retrofit is to be accomplished after AOT is installed in LM vehicle.

II. AUTHORITY

This retrofit is authorized by ECP- 657 / CCA 497-0514

III. UNITS AFFECTED

Name	G&N	SN	Pre-Retrofit PN	Post-Retrofit PN	Retrofit Kit PN
AOT	606	012	6011000-081	6011000-091	8106076
AOT	607	013	6011000-081	6011000-091	↓
AOT	608	014	6011000-081	6011000-091	↓
AOT	609	015	6011000-081	6011000-091	↓
AOT	610	016	6011000-081	6011000-091	↓
AOT	611	017	6011000-081	6011000-091	↓
AOT	612	018	6011000-072	6011000-073	↓
AOT	613	019	6011000-081	6011000-091	↓
AOT	614	020	6011000-081	6011000-091	↓
AOT	615	021	6011000-081	6011000-091	↓
AOT	616	022	6011000-081	6011000-091	↓
AOT	617	023	6011000-081	6011000-091	8106076

IV. PRIORITY CHANGES

None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

A. One retrofit kit, PN 8106076

B. Special tools or equipment required but not supplied in the retrofit kit.

1. Freon TF, E.I. DuPont DeNemour Company or equivalent
2. Balance scale, ±1% accuracy for full range of scale
3. Mixing containers for paint-glass, aluminum, or corrosion-resisting steel
4. Mixing spatulas-glass, aluminum, or corrosion-resisting steel
5. Paint brush, camel hair
6. Rubber stamp, numbers .125 inches high approx.
7. Razor blade
8. Tool kit consisting of the following items as a minimum,
    a. Torque screw driver 0-5 inch pounds minimum
    b. Allen head set with attachments to screw driver
    c. Feeler gauge in tenths and hundredths
9. AOT Sunshade Alignment Fixture, 6014064
10. Emery paper, zero grade.
11. Lint free cloth
12. Methyl Alcohol
13. Dust Cover Protective, Sunshade, 6014324
14. Paint roller, hard surface

C. Drawings and documents required:

1. Drawing 6011000
2. Drawing 6011876
3. ND 1002019
4. ND 1002219

VII. PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure

1. Remove AOT Protective Dust Cover 6014322. Using freon, clean area of AOT nameplate in area of configuration dash number.
2. Prepare a quantity of paint sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-010 and 1 (one) gram catalyst, 1012546-001. Using camel hair brush paint over configuration dash number. Allow ink to air dry one half hour minimum. Proceed with following steps while ink dries.

    CAUTION: The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

3. Obtain new detent calibration plate, 6011252, from retrofit kit. Verify that the AZ and ELEV. values for F, L, R are the exact values as on old detent calibration plate on AOT.
4. Using tape, lint-free cloth, plastic gloves, and Freon TF per paragraph VI.B, mask and wipe the area of AOT, to which detent calibration plate, PN 6011252, will be cemented, in accordance with ND 1002219.

CAUTION: It shall be determined that the shelf life of 6 months has not been exceeded before mixing the Base Resin "B" PN 1011541-1 and the Hardener Accelerator "A" PN 1011541-2.

5. Prepare a quantity of adhesive sufficient for cementing the detent plate, by thoroughly mixing in the ratio 100 parts, of Base Resin "B" and 140 parts Hardener Accelerator "A".

CAUTION: The mixing and application of cement shall be completed before the 2 hour pot life.

6. Using emery paper scuff up the back of detent plate prior to applying adhesive. Apply the adhesive, uniformly to the surfaces of the AOT and detent plate. Assemble the detent plate to the AOT (figure 1) and gently press them together to achieve an uninterrupted glue line. Remove excess adhesive with methyl alcohol.

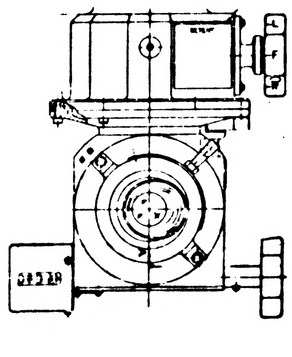

Figure 1. Detent Calibration Plate Location on AOT

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7. Cure the bonded parts at room temperature for a minimum of 24 hours.

C. Identification Plate Marking

1. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix paint in the ratio of 8.5 grams ink, 1012545-001 and one (1) gram catalyst 1012546-001. Using rubber stamp, stamp the configuration dash number over the area where white ink was applied to nameplate. Allow to air dry one half hour minimum.

D. Sunshade Rework Procedure

1. Using a screwdriver with allen head attachment remove the two (2) soc head cap screws securing the prism shield to the outer tube. Remove prism shield, 6011163 and prism shield spacer, 6011058, from AOT. Dispose of old prism shield, radar shield, soc head cap screws and spacer in accordance with paragraph IX.

2. Using a screwdriver with an allen head attachment remove the two (2) soc head cap screws marked with an "X" from the prism housing (See figure 2). Dispose of the two soc head cap screws in accordance with paragraph IX.

3. Obtain from retrofit kit sunshade and radar shield assembly, 6011876. Install sunshade over prism housing as shown in figure 3.

4. Obtain from retrofit kit two soc head cap screws, NAS 1352C04LL8. Install soc head cap screws in sunshade as shown in figure 3. Do not torque screws at this operation.

5. Obtain from retrofit kit two clamps 6011246, two shims, 6011251, four washers, AN 960PD3L, and four screws NAS 1352C02LL3.

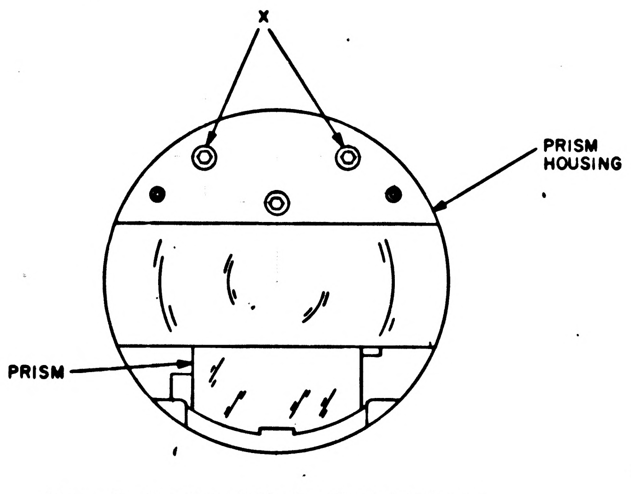

Figure 2. Location of Two Soc Head Cap Screws on Prism Housing (Top View)

NOTE: Shims, 6011251, shall only be used if clearances between clamps, 6011248, and bosses of sunshade, 6011876, exceed .010 inches on each side. (Use feeler gauge)

6. Install the two clamps, two shims if required to the sunshade using four screws NAS 1352C02LL3 and four washers AN960PD3L as shown in figure 3. Do not torque screws at this operation.

7. Obtain from retrofit kit two screws NAS 1352C02LL4. Install screws through sunshade holes as shown in figure 3. Do not torque screws at this operation.

8. Install sunshade alignment fixture over exposed end of sunshade. Secure fixture to sunshade using two retaining screws.

9. Prior to torquing all the mounting screws a visual observation shall be made through the AOT eyepiece as follows:
   a. Rotate AOT focus control for optimum focus on AOT reticle.
   b. Rotate the reticle control knob so AOT counter reads 0.00 degrees.
   c. Observe scribe line on sunshade alignment fixture. Rotate sunshade until scribe line is superimposed on center of AOT reticle.

10. When sunshade is centered torque the mounting screws in the following sequence:
   a. Torque two screws, NAS1352C04LL8 shown in figure 3 to 4.8 + .20 - .10 inch-pounds

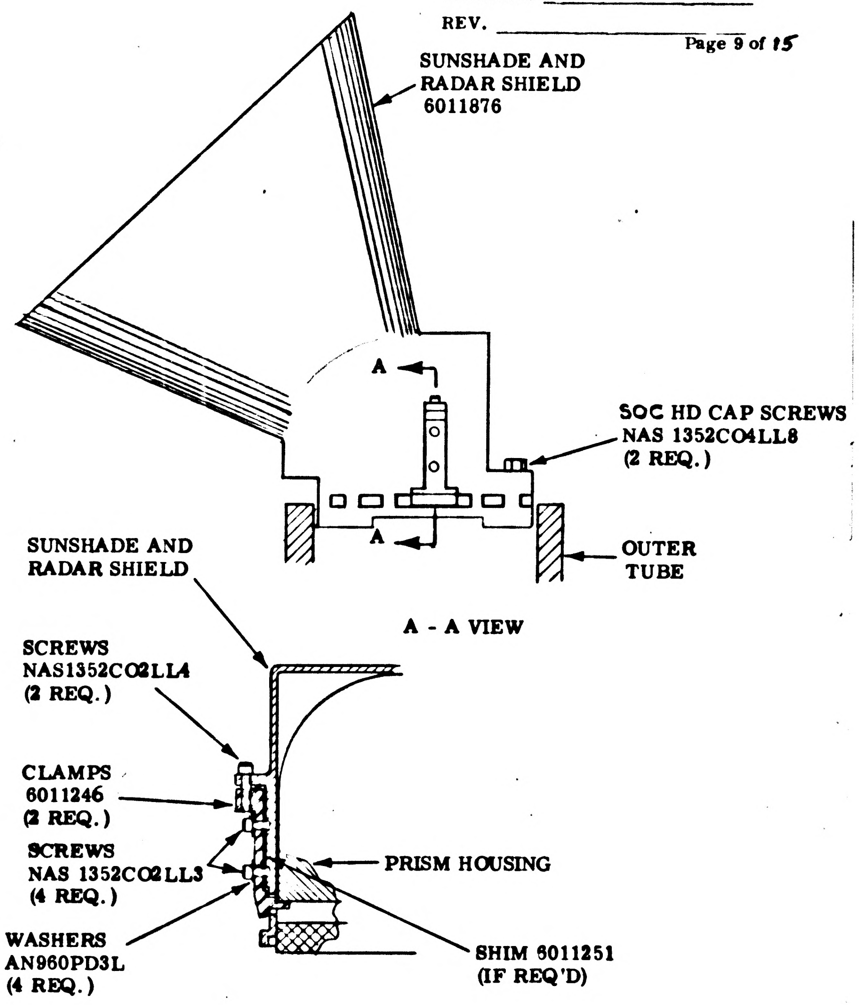

Figure 3. Installation of Sunshade on AOT

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b. Torque two screws, NAS1352C02LL4 shown in figure 3 to 1.5 + .20 - .10 inch-pounds.

c. Torque four screws, NAS1352C02LL3 shown in figure 3 to 2.3 + .20 - .10 inch-pounds

11. Verify sunshade has remained centered on AOT reticle.
12. Remove AOT sunshade alignment fixture from sunshade.
13. Install sunshade protective cover, 6014324 on sunshade.
14. Visually inspect AOT for proper performance of retrofit.
15. Replace AOT Protective Dust Cover

E. Reidentification of Prime Parts to GSE Parts

1. Verify that radar shield, 6011165 has been removed from prism shield, 6011163.

~~2. Prepare a quanity of ink sufficient for painting over the part number on prism shield, 6011163, and prism shield spacer, 6011058 by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-001 (black) and one (1) gram catalyst, 1012546-001. Using a camel hair brush, paint over the part number on prism shield and prism shield spacer. Allow ink to air dry one half hour minimum. CAUTION: The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tight closed container at room temperature. Pot life (catalyzed) 4 hours.~~

~~3. Prepare a quantity of ink sufficient for rubber stamping the part number 6014326 on prism shield and 6014327 on prism shield spacer. Thoroughly mix ink in the ratio of 8.5 grams ink, 1012545-010 and one (1) gram catalyst 1012546-001. Using rubber stamp, stamp the new part number over the area where black ink was applied to prism shield and prism shield spacer. Allow to air dry one half hour minimum.~~

2. Bag and tag two soc. hd. cap screws, 6011083. ~~Reidentify bag to part number, 6014326.~~

3. Obtain from NASA bond room LEM-AOT Transparent Prism and Head Protective Cover, 6014035-011.

4. Assemble the GSE parts in steps 2,3, PN 6011163 and PN 6011058 Bag and tag the parts as the AOT prism Protective Cover, PN6014329, per FED-STD-PPP-B-601.

5. Visually inspect the GSE parts, for proper performance of retrofit and then place parts in NASA bond room.

Note: AOT Prism Protective Cover, PN6014329, shall be installed when shipping AOT and whenever sunshade is removed from AOT.

VIII MODIFICATION DESIGNATION

The retrofitted AOT's are reidentified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraphs VII by marking Identification Plate, PN 1004260-350 with new configuration dash number.

IX. DISPOSITION OF PART REMOVED

1. Prism Shield, 6011163
   - removed in paragraph VII D.1
   - one per AOT
   - Part becomes GSE.
2. Prism Shield Spacer, 6011058
   - removed in paragraph VII D.1
   - one per AOT
   - Part becomes GSE.
3. Radar Shield, 6011165
   - removed in paragraph VII. D.1
   - one per AOT
   - see note 1
4. Soc. Hd. Cap Screw, 6011083
   - removed in paragraph VII d.1
   - two per AOT
   - part becomes GSE.

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5. Soc. Hd. Cap Screw, 1011625-30
   - removed in paragraph VII.
   - two per AOT
   - see note 1

NOTE 1: All parts removed and replaced shall be packaged in accordance with ND 1002214. Store packaged parts in a NASA approved bond room to await disposition as directed.

X. REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

ACC Form 1 (Revised)
10/10/66

RIB 0106050

Sheet 14 of 15
'Part No.
'Date:
'TDRR
'Revision

Document Control No.

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: Date: G & N #

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In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Align Optical							
	Telescope	6011000-081			8106076		6011000-091	
2	Telescope Upper							
	Section Assy	6011801-031			8106076		6011801-041	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
2	R	1	Prism, Shield	6011163				
2	R	1	Prism Shield Spacer	6011058				
1	R	1	Radar Shield	6011165				
2	R	2	Soc. Hd. Cap Screw	6011083				
	R	2	Soc. Hd. Cap Screw	1011625-30				
1	A	1	Sunshade & Radar					
			Shield Assy	6011876				
1	A	2	Hex Hd. Cap Screw	NAS1352-				
				CO4LL8				
1	A	2	Clamps	6011246				
1	A	2	Shims	6011251				
1	A	4	Washers	AN960PD3L				
1	A	4	Screws	NAS1352 -				
				CO2LL3				
1	A	2	Screws	NAS1352				
				CO2LL4				
1	A	1	Detent Cal. Plate	6011252				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

ACC Form 1 (Revised)
10/10/66

RIB 0106050

Sheet 15 of 15
'Part No.
'Date:
'TDRR
'Revision

Document Control No.

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: Date: G & N # ~~012~~

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	Align Optical							
	Telescope	6011000-072			8106076		6011000-073	
2	Telescope Upper							
	Section Assy	6011801-031			8106076		6011801-041	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
2	R	1	Prism, Shield	6011163				
2	R	1	Prism Shield Spacer	6011058				
1	R	1	Radar Shield	6011165				
2	R	2	Soc. Hd. Cap Screw	6011083				
	R	2	Soc. Hd. Cap Screw	1011625-30				
1	A	1	Sunshade & Radar					
			Shield Assy	6011876				
1	A	2	Hex Hd. Cap Screw	NAS1352-				
				CO4LL8				
1	A	2	Clamps	6011246				
1	A	2	Shims	6011251				
1	A	4	Washers	AN960PD3L				
1	A	4	Screws	NAS1352 -				
				CO2LL3				
1	A	2	Screws	NAS1352				
				CO2LL4				
1	A	1	Detent Cal. Plate	6011252				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

RIB NO. 0106056
DATE 20 FEB 69
TDRR NO. 37356
REV. 1

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

VARIABLE DEVIATION WEDGE - 1017376-011
Serial Number 1 through 9

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY W. Lawrence DATE 12-18-68
I.C. ENG. APPROVAL DATE 1-20-69
DRB APPROVAL DATE 2/1/69
MIT/IL APPROVAL W. Stamerin DATE 4 Feb 69
NASA APPROVAL DATE 2/4/69

PART NUMBER
SERIAL NUMBER
RETROFIT KIT P/N 8106091 11
RETROFIT KIT S/N

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Variable Deviation Wedge listed in paragraph III. The modification consists of applying a plus or minus correction sign to determine correction factor for direction of wedge deviation.

II. AUTHORITY

This retrofit is authorized by ECP 749 and CCA

III. UNITS AFFECTED

Name	Units	Pre-Retrofit PN	Post-Retrofit PN	Retrofit Kit PN
Variable Deviation Wedge	1-9	1017376-000	1017376-011	8106091

IV. PRIORITY CHANGES

None

V. RELATED CHANGES

None

VI. MATERIAL REQUIRED

A. One retrofit kit, 8106091.

B. Special tools or equipment required but not supplied in retrofit kit.

1. Epoxy adhesive, EC826 per MIL-A-5092, Type III
2. Epoxy ink, 1012545-001. (Black) 1012545-001
3. Catalyst 1012546-001.
4. Razor blade
5. Lint-free cloth
6. Balance scale, ±1% accuracy for full range of scale
7. Mixing containers for ink-glass, aluminum, or corrosion-resisting steel
8. Freon TF, E.I. DuPont De Nemour Company or equiv.
9. Surface plate, 5 x 4 feet nominal
10. Theodolite, DKM-3, 1017444 or equiv.
11. Front surface mirror, 3 inch diameter min. 1/2 wave or better
12. Camel hair brush
13. Masking tape.
14. Hard rubber roller

C. Drawings and documents required.

1. Drawing 1017376
2. MIL-A-5092
3. ND1002345

VII. PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initating retrofit. No deviation shall be made from the procedure outlined herein.

2. AC-STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure

Test to Determine Correction Factor for Direction of Wedge Deviation.

1. Setup theodolite and front surface mirror on surface plate to obtain autocollimation.

2. Set variable deviation wedge micrometer to zero degrees. Place wedge between theodolite & front surface mirror so the wedge aperture is approximately centered about the collimated light beam.

3. Rotate the wedge slightly in azimuth until autocollimated image indicates minimum deviation.

4. Set wedge micrometer to 350 degrees. Adjust theodolite to superimpose image. Note direction of theodolite azimuth scale reading to point of superimposition.

B. Rework Procedure (Cont.)

5. If theodolite azimuth scale reading increases (wedge scale reading decreasing) the wedge reading for decreasing scale reading (from 360°) will indicate a negative (-) angle in seconds.
6. If theodolite azimuth scale reading decreases, (wedge scale reading increasing) the wedge reading for decreasing scale reading (from 360°) indicates a positive (+) angle in seconds.

NOTE: The wedge reading for increasing scale reading (from 360°) will have opposite angle indications from that in steps 5 and 6.

7. Record correction sign here, positive or negative.

Installation of Identification and Instruction Plate

8. If sign is negative (-), instruction plate, 1022677, from retrofit kit, already has a negative marked on it and no further marking is required and proceed to step 10. Step 10.

If sign is positive (+) proceed to step 9 to cross the negative sign on instruction plate to make it positive (+).

CAUTION

The ink and catalyst listed below shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

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9. Prepare a quantity of ink sufficient for crossing the negative (-) sign on instruction plate, by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-001 (black) and one (1) grain catalyst, 1012546-001. Using a camel hair brush, paint a line crossing the negative (-) sign. Allow the ink to air dry one half hour minimum.
10. Using masking tape, mask the perimeter of the identification plate and instruction plate. See Figure 1.
11. Using freon and lint free cloth, wipe the area of the identification plate and area where instruction plate is to be installed.
12. Obtain from retrofit kit identification plate, 1019175-001 and instruction plate, 1022677.
13. Apply epoxy adhesive, EC826, to both surfaces to be bonded. Allow to air dry three (3) to five (5) minutes or until tacky.
14. Orient both plates as shown in Figure 1 and using a hard roller, roll out all air and bumps to form a good bond between variable deviation wedge and plates.
15. Remove masking tape from around identification plate and instruction plate. Using lint free cloth or razor blade remove any excess adhesive.
16. Cure the bonded parts at room temperature for a minimum of four hours.

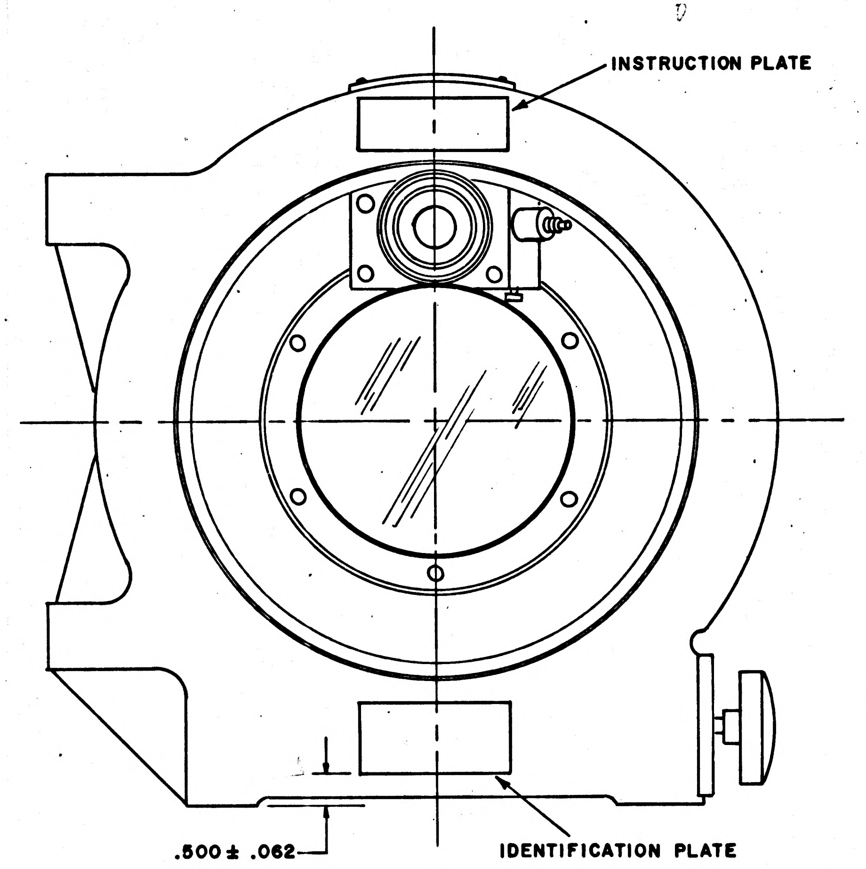

Figure 1

Figure 1. Instruction and Identification Plate Location on Variable Deviation Wedge

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17. Visually inspect the variable deviation wedge for proper performance of retrofit.

VIII. MODIFICATION DESIGNATION

The retrofitted variable deviation wedge's are reidentified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraph VII by cementing identification plate, PN 1019175-001 to each variable deviation wedge.

IX. DISPOSITION OF PARTS REMOVED

None

X. REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66 in accordance with ND 1002345.

ACC Form 1 (Revised)
10/10/66

RIB 0106056
Sheet 9 of 9
ᑊPart No. ________
ᑊDate: ________
ᑊTDRR ________
ᑊRevision ________

Document Control No. ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
					Kit			
				ECP No.	P/N	S/N		
1	Variable							
	Deviation							
	Wedge	1017376-000			8106091		1017376-011	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	1	Identification Plate	1019175-001				
1	A	1	Instruction Plate	1022677				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ᑊApplicable for Retrofit only

RIB NO. 0106058
DATE 5-26-69
TDRR NO. 37633
REV. —

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION
SCT STANDARD (ADJUSTABLE) EYEPIECE ASSEMBLY
P/N 2012793-000

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY J. Curtin DATE 5.26.69
I.C. ENG. APPROVAL DATE 5-29-69
DRB APPROVAL DATE
CCB [redacted] APPROVAL DATE 6/4/69
NASA APPROVAL DATE 6-3-69

PART NUMBER
SERIAL NUMBER
RETROFIT KIT P/N 8106094
RETROFIT KIT S/N

RIB NO. 0106058
DATE 5-26-69
TDRR NO.
REV.

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the SCT Standard (Adjustable) Eyepiece Assembly listed in paragraph III. The retrofit consists of adding a locking ring, 2012825, to the SCT eyepiece to reduce the possibility of SCT Eyeguard Assembly backing off during weightlessness.

II. AUTHORITY

This retrofit is authorized by ECP 795, CCA 497-0632

III. UNITS AFFECTED

Name	Unit Affected	Pre-Retrofit P/N	Post-Retrofit P/N	Retrofit Kit P/N
SCT Standard (Adjustable) Eyepiece Assembly	~~017, 018, 2002~~ ~~2004, 2005, 2006~~ ~~2007, 2008, 2009~~ ~~2014, 2015, 2016~~ ~~2018, 2020, 2022~~ ~~2023~~	2012793 -000	2012793 -011	8106094

IV. PRIORITY CHANGES

None.

V. RELATED CHANGES

None.

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8106094

B. Special tools or equipment required but not supplied in the retrofit kit.

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DATE 5-26-69
TDRR NO.
REV.

1. Freon TF E.I. Dupont DeNemour Company or equivalent.
2. Optics Cleaner Kit, 1019984-021
3. Mixing containers for ink.
4. Paint brush, camel hair.
5. Rubber stamp, number 1/8 inch high approx.
6. Lint free cloth.
7. Lubricant, Dry Power per (MIL-M-7866)
8. Ink (1012545-001) black.
9. Catalyst (1012546-001)
10. Ink (1012545-010) white

C. Drawings and Documents Required

1. Drawing 8106094
2. Drawing 2012793
3. MIL-M-7866
4. ND 1002345
5. ND 1002019

VII. PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.

RIB NO. 0106058
DATE 5-26-69
TDRR NO.
REV.

2. AC-STD-1, General Workmanship, shall be applicable where such a requirement has not been replaced by a drawing or ND.

B. Rework Procedure

CAUTION

Care shall be exercised when cleaning with Freon TF to avoid spattering on the rubber eyeguard of the SCT Standard Eyepiece.

1. Remove the SCT Eyeguard Assembly P/N 2011965 from the SCT Standard Eyepiece Assembly.

CAUTION

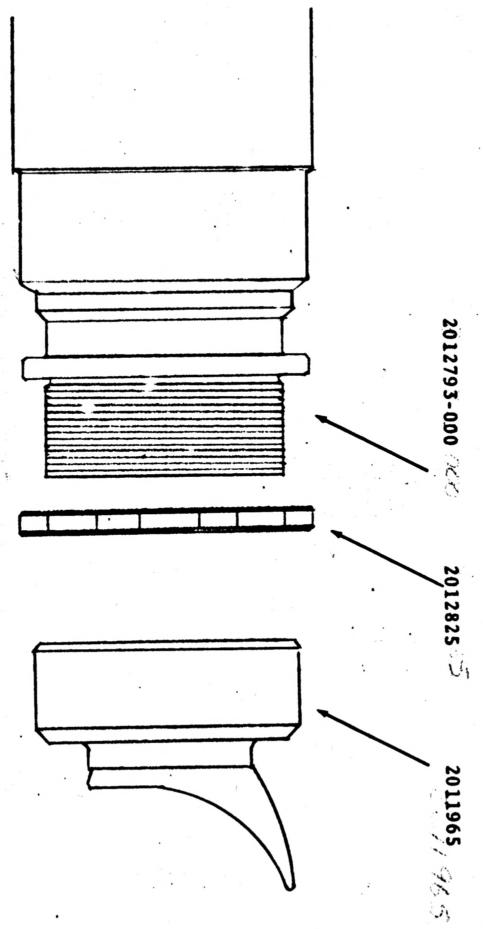
Care shall be exercised when handling the SCT Eyeguard Assembly to prevent rubber eyeguard from becoming uncemented during ~~disassembly~~.

2. Prepare a swab(lens paper wrapped on shaped rod, both obtained from Optics Cleaner Kit P/N 1019984). Moistened in Freon TF.

3. Clean threads of SCT Standard Eyepiece Assembly with Freon TF.

4. Apply Dry Lubricant Powder (MIL-M-7866) to threads of SCT Eyepiece Assembly with a lint free cloth or chamois. Remove all loose particles.

RIB NO. 0106058
DATE 5-26-69
TDRR NO.
REV.



INSTALLATION OF LOCKING RING
Figure 1

Installation Locking Ring
FIG 1

RIB NO. 0106058
DATE 5-26-69
TDRR NO.
REV.

5. Install locking ring P/N 2012825 (obtained from Retrofit Kit 8106094). Position it three quarters of the threaded distance from eye end of Eyepiece. (Ref. Figure 1).

6. Replace the SCT Eyeguard Assembly (P/N 2011965) on the SCT Eyepiece, until it shoulders against locking ring.

7. Hold SCT Eyeguard Assembly in one hand and bring installed Locking Ring (2012825) firmly against eyeguard assembly.

8. Using Freon TF, clean off area where P/N is marked.

9. Prepare a quantity of ink sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-001 (black) and one (1) gram catalyst, 1012546-001. Using camel hair bruxh, paint over configuration dash number. Allow ink to air dry one half hour minimum.

CAUTION

The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

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DATE 5-26-69
TDRR NO.
REV.

10. 10. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix ink in the ratio of 8.5 grams ink, 1012545-010 (white) and one (1) gram catalyst 1012546-001. Using rubber stamp, stamp the configuration dash number over the area where black ink was applied. Allow to air dry one half hour minimum.

11. Visually inspect the SCT Standard (Adjustable) Eyepiece for proper performance of retrofit.

VIII MODIFICATION DESIGNATION

The retrofitted SCT Eyepieces are re0identified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraph VII by marking the SCT Eyepiece with the new configuration dash number.

IX DISPOSITION OF PARTS REMOVED.

None. [illegible]

X REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet 1 of 1
'Part No. 0106058
'Date: 5-26-69
'TDRR ________
'Revision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N# ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

Indent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	SCT STANDARD	2012793-000			8106094		2012793-011	
	(ADJUSTABLE)							
	EYEPIECE							
2	'Lens Housing	2012713000			8106094		2012713-011	
	Assembly of							
	(SCT Eyepiece)							

PART II: A/B PARTS ADDED OR REMOVED

Indent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	1	Ring, Locking	2012825				

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

*Parts
A - Added
R - Removed

'Applicable for Retrofit only

RIB NO. 0106059
DATE 5-27-69
TDRR NO. 37634
REV.

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION
SEXTANT EYEPIECE ASSEMBLY
P/N 2012700-011

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY J. Curtin DATE 5-27-69
I.C. ENG. APPROVAL DATE 5-29-69
DRB APPROVAL DATE
MIT/IL APPROVAL E. Thomp DATE 6-2-69
NASA APPROVAL DATE 6-3-69

PART NUMBER
SERIAL NUMBER
RETROFIT KIT P/N 8106095
RETROFIT KIT S/N
Retrofit Kit S/N

RIB NO. 0106059
DATE 5-27-69
TDRR NO.
REV.

I. PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the Sextant Eyepiece Assembly listed in paragraph III. The retrofit consists of adding a locking ring, 2012826, to the SXT Eyepiece to reduce the possibility of SXT Eyeguard Assembly from backing off during weightlessness.

II. AUTHORITY

This retrofit ia authorized by ECP 795, CCA 497-0632.

III. UNITS AFFECTED

Name	Units Affected S/N	Pre-Retrofit P/N	Post Retrofit P/N	Retrofit Kit P/N
Sextant Eyepiece Assembly	~~2004, 2006, 2007~~ ~~2008, 2009, 2010~~ ~~2012, 2013, 2014~~ ~~2015, 2016, 2018~~ ~~2019, 2020, 2022~~ ~~2028~~	2012700-011	2012700-021	8106095

IV. PRIORITY CHANGES

None.

V. RELATED CHANGES

None.

VI. MATERIALS REQUIRED

A. One retrofit kit, P/N 8106095

B. Special tools or equipment required but not supplied in the retrofit kit.

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DATE 5-27-69
TDRR NO.
REV.

1. Freon TF E.I. Dupont DeNemour Company or equivalent.
2. Optics Cleaner Kit, 1019984-021
3. Mixing containers for ink.
4. Paint brush, camel hair.
5. Rubber stamp, number 1/8 inch high approx.
6. Lint free cloth.
7. Lubricant, Dry Power per (MIL-M_7866)
8. Ink (1012545-001) black.
9. Catalyst (1012546-001)
10. Ink (1012545-010) white

C. Drawings and Documents Required

1. Drawing 8106095
2. Drawing 2012700-011
3. MIL-M-7866
4. ND 1002345
5. ND 1002019

VII. PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.

RIB NO. 0106059
DATE 5-27-69
TDRR NO.
REV.

2. AC-STD-1, General Workmanship, shall be applicable where such a requirement has not been replaced by a drawing or N.D.

B. Rework Procedure

CAUTION

Care shall be exercised when cleaning with Freon TF to avoid spattering on the rubber eyeguard of the SXT Eyeguard Assembly.

1. Remove the SXT Eyeguard Assembly P/N 2012609-000 from the Sextant Eyepiece Assembly.

CAUTION

Care shall be exercised when handling the SXT Eyeguard Assembly to prevent rubber eyeguard from becoming uncemented during disassembly.

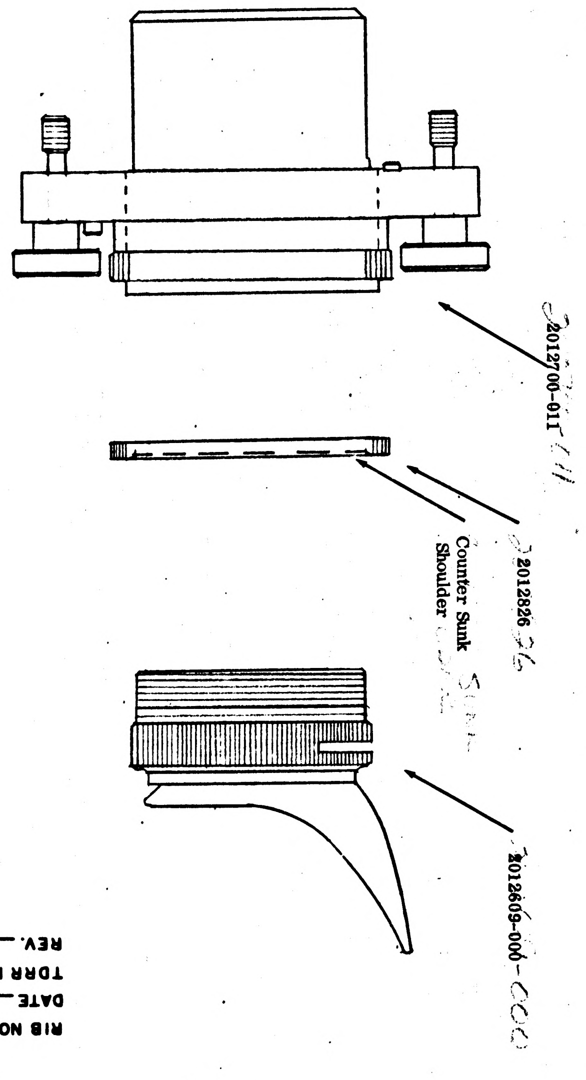
2. Prepare a swab (lens paper wrapped on shaped rod, both obtained from Optics Cleaner Kit P/N 1019984). Moistened in Freon TF.

3. Clean threads of SXT Eyeguard Assembly with Freon TF.

4. Apply Dry Lubricant Powder (MIL-M-7866) to threads of SXT Eyeguard Assembly with a lint free cloth or chamois. Remove all loose particles.

5. Install locking ring P/N 2012826 (obtained from Retrofit Kit 8106095). Position the ring with counter sunk shoulder towards eye end of SXT Eyeguard Assembly. (Ref. Fig. 1)

6. Run locking ring on threaded area of SXT Eyeguard Assembly until it mates with shoulder of 2012609 assembly.



Installation of SXT Locking Ring Fig 1

Figure 1. Installation of SXT Locking Ring

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7. Replace the SXT Eyeguard Assembly (P/N 2012609-000) on the SXT Eyepiece, until locking ring shoulders against mating component of 2012700-011 assembly.

8. Hold SXT Eyeguard Assembly in one hand and bring installed Locking Ring (2012826) firmly against eyepiece assembly.

9. Using Freon TF, clean off area where P/N (2012700-011) is marked.

10. Prepare a quantity of ink sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-001 (black) and one (1) gram catalyst, 1012546-001. Using camel hair brush, paint over configuration dash number. Allow ink to air dry one half hour minimum.

CAUTION

The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.

11. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix ink in the ratio of 8.5 grams ink, 1012545-010 (white) and one (1) gram catalyst 1012546-001. Using rubber stamp, stamp the configuration dash number over the area where black ink was applied. Allow to air dry one half hour minimum.

12. Visually inspect the Sextant Eyepiece for proper performance of retrofit.

VIII. MODIFICATION DESIGNATION

The retrofitted SXT Eyepieces are reidentified with new part numbers in accordance with paragraph III. The modification designation is accomplished in paragraph VII by marking the SXT Eyepiece with the new configuration dash number.

IX. DISPOSITION OF PARTS REMOVED

None.

X. REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

Sheet ___ of ___
¹Part No. 0106059 57
¹Date: 5-27-69
¹TDRR ________
¹Revision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit			
					P/N	S/N		
1	Sextant Eyepiece Assembly	2012700-011			8106095		2012700-021	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	1	Ring, Locking	2012826				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

¹Applicable for Retrofit only

RIB NO. 0106060
DATE 16 MAR 70
TDRR NO. 38064
REV. —

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

SXT MIRROR HOUSING ASSEMBLY - P/N 2012791-011

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA
6-29-70	A	38175	3.4.7	N/A	M.H.

PREPARED BY R. Lawrence DATE 1-29-70
I.C. ENG. APPROVAL DATE 2-2-70
DRB APPROVAL DATE 2/12/70
MIT/IL APPROVAL DATE 2-11-70
NASA APPROVAL DATE 2-11-70

Part Number
Serial Number
Retrofit Kit P/N 8106096
Retrofit Kit S/N

RIB NO. 0106060
DATE
TDRR NO.
REV.

I PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the SXT Mirror Housing Assembly listed in paragraph III. The retrofit consists of adding a field stop, 2012830 to the SXT Mirror Housing. The function of this field stop is to eliminate the halo formed around the SXT reticle.

II AUTHORITY

This retrofit is authorized by NAS 9-10356 (ECP ACSK-1007)

III UNITS AFFECTED

Name	Unit Affected	Pre-Retrofit P/N	Post-Retrofit P/N	Retrofit Kit P/N
SXT Mirror Hsg Assy.	Qty. 13 units	2012791-011	2012791-021	8106096

IV PRIORITY CHANGES

None

V RELATED CHANGES

None

VI MATERIAL REQUIRED

A. One retrofit kit, P/N 8106096

Item	P/N	Nomenclature
1	2012830	Field Stop, Eyepiece
2	1011541	Adhesive, Epoxy
3	1012545-010(white)	Epoxy Ink
4	1012545-001(black)	Epoxy Ink
5	1012546-001	Catalyst

B. Special tools or equipment required but not supplied in the retrofit kit.

1. Optics Cleaner Kit, 1019984
2. Balance scale, ± 1% accuracy for full range of scale
3. Mixing spatulas-glass, aluminum, or corrosion-resisting steel
4. Paint-brush, camel hair
5. Rubber stamp, numbers 1/8 inch high approx.

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REV. A

6. Paint roller, hard surface
7. Holding Fixture, Field Stop Eyepiece, 01386910118
8. Depth Gage

C. Drawings and Documents Required

1. Drawing 8106096
2. Drawing 2012791
3. ND1002019
4. ND1002219

VII PROCEDURE

A. General

1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC-STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure

Caution: Care shall be exercised when cleaning with Freon TF or MEK to avoid spattering on the optics inside the SXT Mirror Housing. Care shall be exercised during the application and curing of the adhesive to prevent the adhesive from bleeding or flowing.

1. Prior to bonding the field stop to the SXT mirror housing. Clean the inside surfaces of the mirror housing with Freon TF or MEK using swab (lens paper wrapped on shaped rod) obtained from Optics Cleaner Kit. Remove all traces of oil, grease, dirt or other contamination which might adversely effect adhesion in the area to be bonded.
2. Clean the field stop, 2012830, obtained from the retrofit with Freon TF or MEK.

   Caution: The shelf life of six (6) months shall be observed before mixing the Base Resin "B", P/N 1011541-1, and the Hardner Accelerator "A" P/N 1011541-2.

3. Prepare a quantity of adhesive sufficient for cementing the field stop, by thoroughly mixing in the ratio, 100 parts of Base Resin "B" and 140 parts Hardner Accelerator "A".

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DATE 6-29-70
TDRR NO. 38175
REV. A

Caution: Pot life of two hours for the adhesive shall be observed during the cementing operation.

4. Apply a thin film of adhesive to the inside of the mirror housing as shown in figure 1.
5. Mount field stop, 2012830 on Field Stop Holding Fixture by turning clamps on holding fixture towards center of fixture. (Directional arrows on thumb screws facing towards center of fixture)*. Once field stop is in place, turn clamps outward 180 degrees (directional arrows pointing out). Tighten lower thumb nuts to secure field stop.

   *Refer to Figure 1 for chamfer orientation of field stop on fixture.

6. Assemble fixture into SXT mirror housing as shown in figure 2. Fasten fixture to SXT mirror housing with two (2) hex head cap screws. Check axial location of field stop with depth gage 1.276 ±.020 inch, as shown in Figure 1.
7. Apply a bead of adhesive as required on the outer perimeter of the field stop and wall of the SXT mirror housing (refer to figure 1) if the area can be reached with the fixture in place.
8. Cure the SXT mirror housing for 24 hours minimum at room temperature (25° ± 5°C). (Fixture mounting flange facing downward)
9. After adhesive has cured. Remove fixture by loosening lower thumb nuts and turning upper thumb screws half turn (180°) so that directional is facing toward center of fixture. When clamps are in this position, tighten lower thumb nuts. Remove two (2) hex head cap screws holding fixture down and gently remove fixture.
10. After fixture has been removed, add additional adhesive to outer perimeter of field stop to areas that did not receive adhesive while fixture was in place.

    Caution: Do not apply adhesive to area noted in figure 1. (.500 ± .062 inch dimension shown on end view of mirror housing)

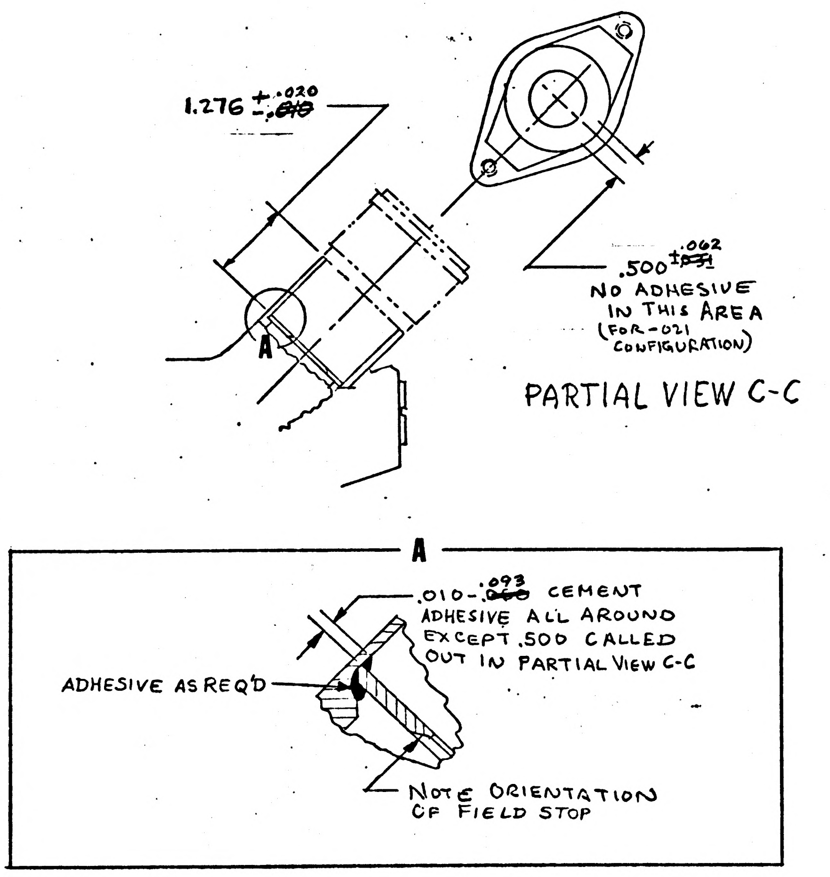
1.276 +.020 -
.500 ±.062
NO ADHESIVE IN THIS AREA (FOR -021 CONFIGURATION)
A
PARTIAL VIEW C-C
A
.010-.093 CEMENT ADHESIVE ALL AROUND EXCEPT .500 CALLED OUT IN PARTIAL VIEW C-C
ADHESIVE AS REQ'D
NOTE ORIENTATION OF FIELD STOP

Figure 1 Cementing of Field Stop in SXT Mirror Housing

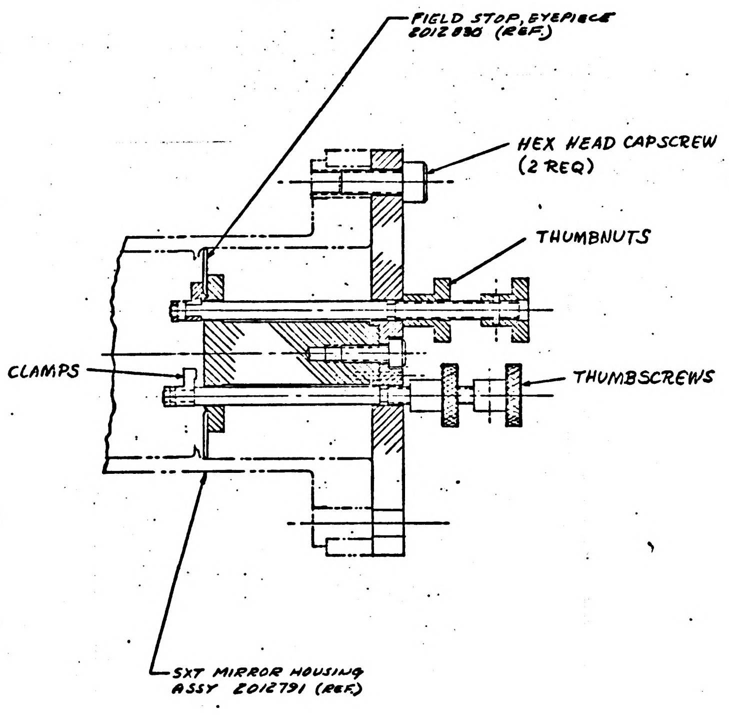
FIELD STOP, EYEPIECE 2012830 (REF)
HEX HEAD CAPSCREW (2 REQ)
THUMBNUTS
CLAMPS
THUMBSCREWS
SXT MIRROR HOUSING ASSY 2012791 (REF)

Figure 2 Installation of Field Stop Holding Fixture in SXT Mirror Housing Assembly

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C. Identification Marking

1. Using Freon TF or MEK clean off the area where P/N is marked.
2. Prepare a quantity of ink sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-001(black) and one (1) gram catalyst, 1012546-001. Using camel hair brush, paint over configuration dash number. Allow ink to air dry for one half hour minimum.

   Caution: The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.
3. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix ink in the ratio of 8.5 grams ink, 1012545-010 (white) and one (1) gram catalyst, 1012546-001. Using rubber stamp, stamp the configuration dash number over the area where black ink was applied. Allow to air dry one half hour minumum.
4. Visually inspect the SXT mirror housing for proper performance of retrofit. Install SXT Standard Eyepiece, 2012700, and check for no interference. A thin film of adhesive may bleed beyond the adhesive bead at the field stop, however, this is acceptable if it does not interfere with the proper performance of the eyepiece.

VIII MODIFICATION DESIGNATION

The retrofitted SXT mirror housings are re-identified with part numbers in accordance with paragraph III. The modification designation is accomplished in paragraph VII by marking the SXT mirror housing with the new configuration dash number.

IX DISPOSITION OF PARTS REMOVED

None

X REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

RIB 0106060
Sheet 8 of 8
ᑊPart No. ________
ᑊDate: ________
ᑊTDRR ________
ᑊRevision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	SXT Mirror							
	Hsg Assy	2012791-011			8106096		2012791-021	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	1	Field Stop, Eyepiece	2012830				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

ᑊApplicable for Retrofit only

RIB NO. 0106060
DATE 16 MAR 70
TDRR NO. 38064
REV. —

NASA RETROFIT INSTRUCTION BULLETIN (RIB)
KOLLSMAN INSTRUMENT CORPORATION

SXT MIRROR HOUSING ASSEMBLY - P/N 2012791-011

DATE	REV. LET.	TDRR NO.	PAGES REVISED	APPROVAL	
				MIT	NASA

PREPARED BY O. K. Lawrence DATE 1-29-70
I.C. ENG. APPROVAL Ble Chin DATE 2-2-70
DRB APPROVAL W Stamenis DATE 2/12/70
MIT/IL APPROVAL E. Thomp DATE 2-11-70
NASA APPROVAL DATE 2-11-70

Part Number
Serial Number
Retrofit Kit P/N 8106096
Retrofit Kit S/N

I PURPOSE

This Retrofit Instruction Bulletin (RIB) contains instructions for modifying the SXT Mirror Housing Assembly listed in paragraph III. The retrofit consists of adding a field stop, 2012830 to the SXT Mirror Housing. The function of this field stop is to eliminate the halo formed around the SXT reticle.

II AUTHORITY

This retrofit is authorized by NAS 9-10356 (ECP ACSK-1007)

III UNITS AFFECTED

Name	Unit Affected	Pre-Retrofit P/N	Post-Retrofit P/N	Retrofit Kit P/N
SXT Mirror Hsg Assy.	Qty. 13 units	2012791-011	2012791-021	8106096

IV PRIORITY CHANGES

None

V RELATED CHANGES

None

VI MATERIAL REQUIRED

A. One retrofit kit, P/N 8106096.

Item	P/N	Nomenclature
1	2012830	Field Stop, Eyepiece
2	1011541	Adhesive, Epoxy
3	1012545-010(white)	Epoxy Ink
4	1012545-001(black)	Epoxy Ink
5	1012546-001	Catalyst

B. Special tools or equipment required but not supplied in the retrofit kit.
1. Optics Cleaner Kit, 1019984
2. Balance scale, ± 1% accuracy for full range of scale
3. Mixing spatulas-glass, aluminum, or corrosion-resisting steel
4. Paint-brush, camel hair
5. Rubber stamp, numbers 1/8 inch high approx.

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6. Paint roller, hard surface
7. Holding Fixture, Field Stop Eyepiece, 01386910118
8. Depth Gage

C. Drawings and Documents Required
1. Drawing 8106096
2. Drawing 2012791
3. ND1002019
4. ND1002219

VII PROCEDURE

A. General
1. Assemble and read all drawings and documents listed or referenced before initiating retrofit. No deviation shall be made from the procedure outlined herein.
2. AC-STD-1, General Workmanship, shall be applicable where such a requirement has not been placed by a drawing or ND.

B. Rework Procedure

Caution: Care shall be exercised when cleaning with FREON TF OR MEK ~~acetone~~ to avoid spattering on the optics inside the SXT Mirror Housing.

1. Prior to bonding the field stop to the SXT mirror housing. Clean the inside surfaces of the mirror housing with FREON TF OR MEK ~~acetone~~ using swab (lens paper wrapped on shaped rod) obtained from Optics Cleaner Kit. Remove all traces of oil, grease, dirt or other contamination which might adversely effect adhesion in the area to be bonded.
2. Clean the field stop, 2012830, obtained from the retrofit with ~~acetone~~ FREON TF OR MEK.

Caution: The shelf life of six (6) months shall be observed before mixing the Base Resin "B", P/N 1011541-1, and the Hardner Accelerator "A" P/N 1011541-2.

3. Prepare a quantity of adhesive sufficient for cementing the field stop, by thoroughly mixing in the ratio, 100 parts of Base Resin "B" and 140 parts Hardner Accelerator "A".

Caution: Pot life of two hours for the adhesive shall be observed during the cementing operation.

4. Apply a thin film of adhesive to the inside of the mirror housing as shown in figure 1.
5. Mount field stop, 2012830 on Field Stop Holding Fixture ~~[illegible]~~, by turning clamps on holding fixture towards center of fixture. (Directional arrows on thumb screws facing towards center of fixture)* Once field stop is in place, turn clamps outward 180 degrees (Directional arrows pointing out). Tighten lower thumb nuts to secure field stop.

   *Refer to Figure 1 for chamfer orientation of field stop on fixture.

6. Assemble fixture into SXT mirror housing as shown in figure 2. Fasten fixture to SXT mirror housing with two (2) hex head cap screws. Check axial location of field stop with depth gage 1.276 ±.~~010~~ .020 inch, as shown in Figure 1.
7. Apply a bead of adhesive on the outer perimeter of the field stop and wall of the SXT mirror housing (Refer to figure 1) to area which can be reached with fixture in place.
8. Cure the SXT mirror housing for 24 hours minimum at room temperature (25° ± 5°C). (Fixture mounting flange facing downward)
9. After adhesive has cured. Remove fixture by loosening lower thumb nuts and turning upper thumb screws half turn (180°) so that directional is facing toward center of fixture. When clamps are in this position, tighten lower thumb nuts. Remove two (2) hex head cap screws holding fixture down and gently remove fixture.
10. After fixture has been removed, add additional adhesive to outer perimeter of field stop to areas that did not receive adhesive while fixture was in place.

Caution: Do not apply adhesive to area noted in figure 1. (.500 ± .002 inch dimension shown on end view of mirror housing)

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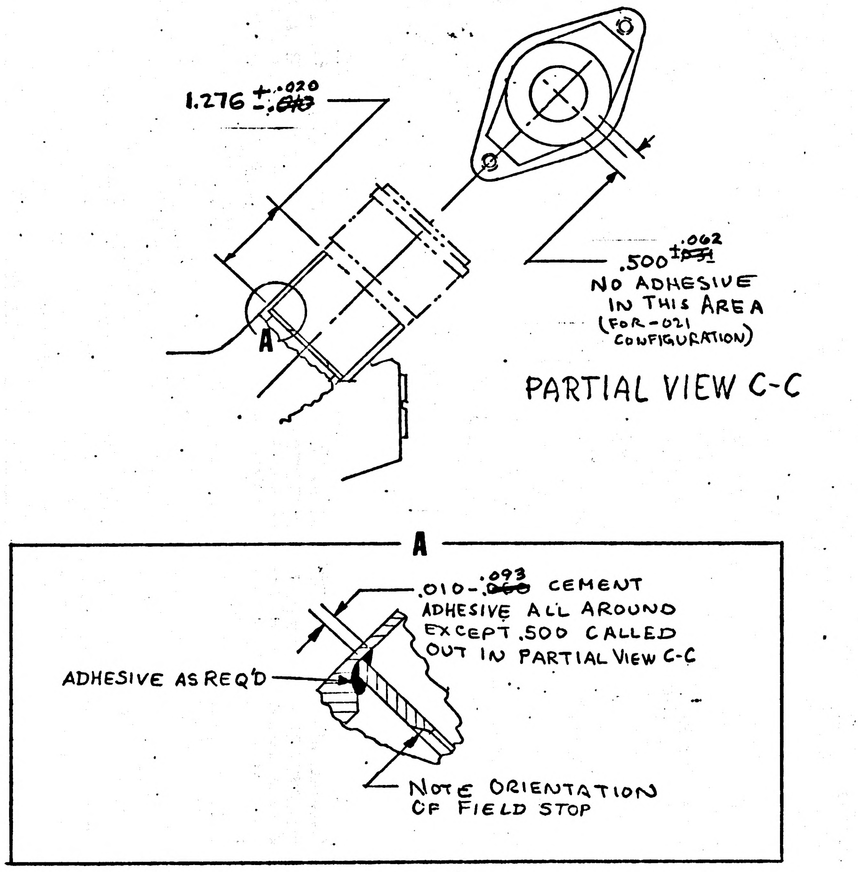

1.276 +.020 -.~~013~~
.500 ±.062
NO ADHESIVE IN THIS AREA (FOR-021 CONFIGURATION)
PARTIAL VIEW C-C
A
A
.010-.093 ~~.060~~ CEMENT ADHESIVE ALL AROUND EXCEPT .500 CALLED OUT IN PARTIAL VIEW C-C
ADHESIVE AS REQ'D
NOTE ORIENTATION OF FIELD STOP

Figure 1 Cementing of Field Stop in SXT Mirror Housing

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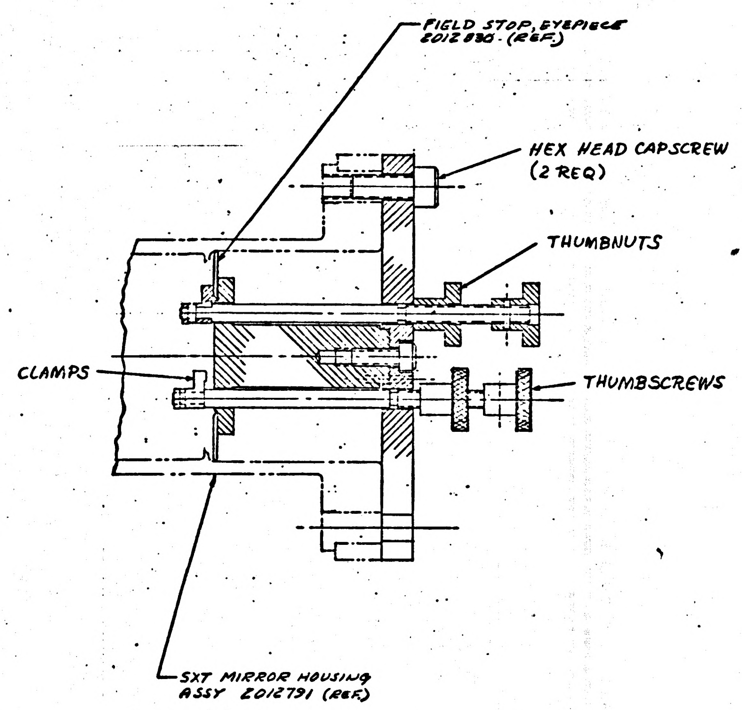

FIELD STOP, EYEPIECE 2012830 (REF)
HEX HEAD CAPSCREW (2 REQ)
THUMBNUTS
CLAMPS
THUMBSCREWS
SXT MIRROR HOUSING ASSY 2012791 (REF)

Figure 2 Installation of Field Stop Holding Fixture in SXT Mirror Housing Assembly

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RIB NO. 0106060
DATE
TDRR NO.
REV.
Page 7 of 8

C. Identification Marking

1. Using ~~acetone~~ FREON TF OR MEK clean off the area where P/N is marked.
2. Prepare a quantity of ink sufficient for painting over the configuration dash number by thoroughly mixing in the ratio of 8.5 grams ink, 1012545-001 (black) and one (1) gram catalyst, 1012546-001. Using camel hair brush, paint over configuration dash number. Allow ink to air dry for one half hour minimum.

   Caution: The ink and catalyst listed above shall have a shelf life of 12 months maximum for ink or 6 months maximum for catalyst when stored in a clean tightly closed container at room temperature. Pot life (catalyzed) 4 hours.
3. Prepare a quantity of ink sufficient for rubber stamping the configuration dash number listed in paragraph III. Thoroughly mix ink in the ratio of 8.5 grams ink, 1012545-010 (white) and one (1) gram catalyst, 1012546-001. Using rubber stamp, stamp the configuration dash number over the area where black ink was applied. Allow to air dry one half hour minumum.
4. Visually inspect the SXT mirror housing for proper performance of retrofit. Install SXT Standard Eyepiece, 2012700, and check for no interference.

VIII MODIFICATION DESIGNATION

The retrofitted SXT mirror housings are re-identified with part numbers in accordance with paragraph III. The modification designation is accomplished in paragraph VII by marking the SXT mirror housing with the new configuration dash number.

IX DISPOSITION OF PARTS REMOVED

None

X REPORT OF ACCOMPLISHMENT

Complete ACC form 1 (Revised) Retrofit or Repair Compliance Report, dated 10/10/66, in accordance with ND 1002345.

ACC Form 1 (Revised)
10/10/66

Document Control No. ________

RIB 0106060
Sheet 8 of 8
' Part No. ________
' Date: ________
' TDRR ________
' Revision ________

RETROFIT OR REPAIR COMPLIANCE REPORT

Reporting Facility: ________ Date: ________ G & N # ________

The following information must be submitted to Apollo Integrated Logistics Support, Dept. 38-05, AC Electronics, Milwaukee, upon the completion of any retrofit performed on Apollo GFP equipment or repair of Apollo Airborne GFP.

In Part I below, list all Apollo airborne GFP components that are repaired and all A/B and GSE MD symbols or P/N changes affecting subassembly and higher levels of equipment. List highest-to-lowest level of assembly order. All parts/assemblies added to or removed from airborne equipment shall be listed in Part II using the Part I Indent No. of the assembly affected as a cross reference.

PART I: A/B GSE BLACK BOXES/REPARABLE SUB-ASSEMBLIES AFFECTED

In-dent	Equipment Name	Equip. P/N Prior to Repair/Retro	Equip. S/N	Retrofit Installed			Equip. P/N or MD Sym. After Retro	Additional Information
				ECP No.	Kit P/N	Kit S/N		
1	SXT Mirror							
	Hsg Assy	2012791-011			8106096		2012791-021	

PART II: A/B PARTS ADDED OR REMOVED

In-dent	Part A/R*	Qty.	Part Name	P/N	S/N	Lot No.	Ref/Circuit Designator	Additional Information
1	A	1	Field Stop, Eyepiece	2012830				

*Parts
A - Added
R - Removed

	MODS Installed	Q.A. Verification
DATE		
SIGNED		

'Applicable for Retrofit only

APOLLO G&N SYSTEMS INDEX
ND 1000008 AA
Original Issue Date: 11/13/64
Release Authority: TDRR 14303
Class A Release

APOLLO GUIDANCE & NAVIGATION

SYSTEMS INDEX

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
3-22-66	K	27349	Revised & Retyped Pgs. 1,2, & 3	WR	A. C. METZGER
5/18/66	L	29017	Revisec Pgs 1 & 3	MGM	A. C. METZGER
8/4/66	M	30379	3 RDG/AC	EA	--
8/11/66	N	30590	3 RDG/AC	EA	--
9/8/66	P	31019	2 RDG/AC	EA	--
11/16/66	R	31924	3 RDG/AC	EA	--
12/8/66	S	32291	3 RDG/AC	EA	--
2/28/67	T	33463	3 RDG/AC	EA	--
4/14/67	U	33616	3 RDG/AC	MGM EA	--
6/30/67	V	34042	3 RDG/AC	EA	--
7-17-67	W	34165	3 RDG/AC	SB	--
10/17/67	Y	34861	2 RDG/AC	EA	--
2/15/68	Z	35652	3 [illegible]/AC	EA	--
5/14/68	AA	36215	3 [illegible]/AC	MGM EA	--

APPROVALS	A. C. METZGER NASA/MSC	WWrigley 22 March 66. MIT/IL	AC

This systems index consists of page 1. to 3. inclusive.

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ND 1000008 AB
Original Issue Date: 11/13/64
Release Authority: TDRR 14303
Class A Release

APOLLO GUIDANCE & NAVIGATION

SYSTEMS INDEX

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					AC	NASA
	3-22-66	K	27349	Revised & Retyped Pgs. 1,2, & 3	WK	A. C. METZGER
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M	8/11/66	N	30590	3 RDG/AC	EA	---
M	9/8/66	P	31019	2 RDG/AC	EA	--
M	11/10/66	R	31924	3 RDG/AC	EA	--
M	12/8/66	S	32291	3 RDG/AC	EA	--
M	3/30/67	T	33463	3 RDG/AC	EA	--
M	4/14/67	U	33616	3 RDG/AC	MGM EA	--
M	6/30/67	V	34042	3 RDG/AC	EA	--
M	7-17-67	W	34165	3 RDG/AC	SB	--
M	10/17/67	Y	34861	2 RDG/AC	EA	--
M	2/15/68	Z	35652	3 /AC	EA	--
MV	5/14/68	AA	36215	3 /AC	MGM EA	--
	6/11/68	AB	36330	3 /AC	EA	--

APPROVALS	A. C. METZGER NASA/MSC	22 March 66 MIT/IL	AC

This systems index consists of page 1. to 3. inclusive.

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8.	COMPUTER PROGRAM ASSEMBLY	
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	B. Artemis	1021100
	C. Moonglow	1021101
	D. Sunrise	1021102
	E. Sunrise	1021103
	F. Ares	1021104
	G. B*RLS 202	1021105
	H. RLS 202	1021106
	I. Retred 44	2021100
	J. Aurora	2021101
	K. Venus	2021102
	L. Retred 50	2021103
	M. Sundial	2021104
	N. Newspeak	2021105
	O. AS-204	1021107
	P. Solarium	1021108
	Q. Sunburst	2021106
	R. La Mesh	2021107
	S. Sundisk	2021108
	T. Sundance	2021110
9.	CONTRACT TECHNICAL SPECIFICATION APOLLO G&N EQUIPMENT	
	A. APOLLO Command Module & Associated Equipment - Block I	PS1000000
	B. APOLLO Command Module & Associated Equipment - Block II	PS2000000
	C. Airborne Primary Guidance, Navigation and Control Subsystem - LEM	PS6000000
10.	A/B G&N EQUIPMENT QUALIFICATION SPECIFICATIONS	
	A. Block I and Block I, 100 Series -	ND1002037
	B. Block II and LEM -	ND1002337
11.	G&N RETEST SPECIFICATION INDEXES	
	A. Command Module - Block I	ND1002362
	B. Command Module - Block II	ND1002363
	C. LEM	ND1002364
12.	FLIGHT PROGRAM ASSEMBLY	
	A. Block II	2021469
13.	DESIGN SPECIFICATION - G&N PLACARDS	ND1002374

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ND 1000008 AB AC
Original Issue Date: 11/13/64
Release Authority: TDRR 14303
Class A Release

APOLLO GUIDANCE & NAVIGATION

SYSTEMS INDEX

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
3-22-66	K	27349	Revised & Retyped Pgs. 1,2, & 3	WK	A. C. METZGER
5/18/66	L	29017	Revisec Pgs 1 & 3	[illegible]	A. C. METZGER
Ⓜ 8/4/66	M	30379	3 RDG/AC	EA	--
Ⓜ 8/11/66	N	30590	3 RDG/AC	EA	--
Ⓜ 9/8/66	P	31019	2 RDG/AC	EA	--
Ⓜ 11/10/66	R	31924	3 RDG/AC	EA	--
Ⓜ 12/8/66	S	32291	3 RDG/AC	EA	--
Ⓜ 3/20/67	T	33462	3 RDG/AC	EA	--
Ⓜ 4/14/67	U	33616	3 RDG/AC	MGM EA	--
Ⓜ 6/30/67	V	34042	3 RDG/AC	EA	--
Ⓜ 7-17-67	W	34165	3 RDG/AC	SB	--
Ⓜ 10/17/67	Y	34861	2 RDG/AC	EA	--
Ⓜ 2/15/68	Z	35652	3 [illegible]/AC	EA	--
Ⓜ 5/14/68	AA	36215	3 [illegible]/AC	MGM EA	--
Ⓜ 6/11/68	AB	36330	3 [illegible]/AC	EA	--
8/23/68	AC	36809	3 [illegible]/AC	MGM EA	--

APPROVALS	A. C. METZGER NASA/MSC	WKupfer 22 March 66 MIT/IL	AC

This systems index consists of page 1. to 3. inclusive.

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	C. Moonglow	1021101
	D. Sunrise	1021102
	E. Sunrise	1021103
	F. Ares	1021104
	G. B*RLS 202	1021105
	H. RLS 202	1021106
	I. Retred 44	2021100
	J. Aurora	2021101
	K. Venus	2021102
	L. Retred 50	2021103
	M. Sundial	2021104
	N. Newspeak	2021105
	O. AS-204	1021107
	P. Solarium	1021108
	Q. Sunburst	2021106
	R. La Mesh	2021107
	S. Sundisk	2021108
	T. Sundance	2021110
	U. Colossus	2021111
9.	CONTRACT TECHNICAL SPECIFICATION APOLLO G&N EQUIPMENT	
	A. APOLLO Command Module & Associated Equipment - Block I	PS1000000
	B. APOLLO Command Module & Associated Equipment - Block II	PS2000000
	C. Airborne Primary Guidance, Navigation and Control Subsystem - LEM	PS6000000
10.	A/B G&N EQUIPMENT QUALIFICATION SPECIFICATIONS	
	A. Block I and Block I, 100 Series -	ND1002037
	B. Block II and LEM -	ND1002337
11.	G&N RETEST SPECIFICATION INDEXES	
	A. Command Module - Block I	ND1002362
	B. Command Module - Block II	ND1002363
	C. LEM	ND1002364
12.	FLIGHT PROGRAM ASSEMBLY	
	A. Block II	2021469
13.	DESIGN SPECIFICATION - G&N PLACARDS	ND1002374

APOLLO G&N SYSTEMS INDEX
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12/27/65	G	24937	1 & 2	WK.	A. C. METZGER

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	C. LEM	6019999
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4.	G&N MASTER RETROFIT KIT LIST	
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	B. Computer (Raytheon)	8104001
	C. Misc. C. E. I. (Raytheon)	8104100
	D. (Kollsman)	8106025
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4.	G&N MASTER RETROFIT KIT LIST	
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	B. Computer (Raytheon)	8104001
	C. Misc. C. E. I. (Raytheon)	8104100
	D. (Kollsman)	8106025
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	F. LEM (Kollsman)	8106048
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Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
3-22-66	K	27349	Revised & Retyped Pgs. 1,2, & 3		A. C. METZGER
5/18/66	L	29017	Revised Pgs 1 & 3		A. C. METZGER
Ⓜ 8/4/66	M	30379	3 RDG/AC	EA	--
Ⓜ 8/11/66	N	30590	3 RDG/AC	EA	—
Ⓜ 9/8/66	P	31019	2 RDG/AC	EA	—
Ⓜ 11/10/66	R	31924	3 RDG/AC	EA	—
Ⓜ 12/8/66	S	32291	3 RDG/AC	EA	—
Ⓜ 3/30/67	T	33463	3 RDG/AC	EA	—
Ⓜ 4/14/67	U	33616	3 RDG/AC	MGM EA	—
Ⓜ 6/30/67	V	34042	3 RDG/AC	EA	--
7-17-67	W	34165	3 RDG/AC	SB	—

APPROVALS	A. C. METZGER NASA/MSC	22 March 66 MIT/IL	AC

This systems index consists of page 1. to 3. inclusive.

APOLLO GUIDANCE & NAVIGATION SYSTEMS INDEX

Item	Title	Number
8.	COMPUTER PROGRAM ASSEMBLY	
	A. Eclipse	1003203
	B. Artemis	1021100
	C. Moonglow	1021101
	D. Sunrise	1021102
	E. Sunrise	1021103
	F. Ares	1021104
	G. B*RLS 202	1021105
	H. RLS 202	1021106
	I. Retred 44	2021100
	J. Aurora	2021101
	K. Venus	2021102
	L. Retred 50	2021103
	M. Sundial	2021104
	N. Newspeak	2021105
	O. AS-204	1021107
	P. AS-501	1021108
	Q. Sunburst	2021106
	R. La Mesh	2021107
9.	CONTRACT TECHNICAL SPECIFICATION APOLLO G&N EQUIPMENT	
	A. APOLLO Command Module & Associated Equipment - Block I	PS1000000
	B. APOLLO Command Module & Associated Equipment - Block II	PS2000000
	C. Airborne Primary Guidance, Navigation and Control Subsystem - LEM	PS6000000
10. A/B	G&N EQUIPMENT QUALIFICATION SPECIFICATIONS	
	A. Block I and Block I, 100 Series -	ND1002037
	B. Block II and LEM -	ND1002337
11.	G&N RETEST SPECIFICATION INDEXES	
	A. Command Module - Block I	ND1002362
	B. Command Module - Block II	ND1002363
	C. LEM	ND1002364

APOLLO G&N SYSTEMS INDEX
ND 1000008 VY
Original Issue Date: 11/13/64
Release Authority: TDRR 14303
Class A Release

APOLLO GUIDANCE & NAVIGATION

SYSTEMS INDEX

Record of Revisions

	Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
					AC	NASA
	3-22-66	K	27349	Revised & Retyped Pgs. 1,2, & 3	W/K	A. C. METZGER
	5/18/66	L	29017	Revisec Pgs 1 & 3		A. C. METZGER
M	8/4/66	M	30379	3 RDG/AC	EA	--
M	8/11/66	N	30590	3 RDG/AC	EA	---
M	9/8/66	P	31019	2 RDG/AC	EA	—
M	11/10/66	R	31924	3 RDG/AC	EA	—
M	12/8/66	S	32291	3 RDG/AC	EA	—
M	3/30/67	T	33463	3 RDG/AC	EA	—
M	4/14/67	U	33616	3 RDG/AC	MGM EA	—
M	6/30/67	V	34042	3 RDG/AC	EA	--
M	7-17-67	W	34165	3 RDG/AC	SB	—
	10/17/67	Y	34861	2 RDG/AC	EA	--

APPROVALS	A. C. METZGER NASA/MSC	22 March 66 MIT/IL	AC

This systems index consists of page 1. to 3. inclusive.

APOLLO GUIDANCE & NAVIGATION SYSTEMS INDEX

Item		Title	Number
1.	G&N SPACECRAFT EQUIPMENT		
	A.	Command Module - Block I	1015000
	B.	Command Module - Block II	2015000
	C.	LEM	6015000
2.	G&N SUPPORTING DOCUMENT LIST		
	A.	Command Module - Block I	1019999
	B.	Command Module - Block II	2019999
	C.	LEM	6019999
3.	INSTALLATION LIST APOLLO GUIDANCE EQUIPMENT		
	A.	Block I	1014999
	B.	Block II	2014999
	C.	LEM	6014999
4.	G&N MASTER RETROFIT KIT LIST		
	A.	Command Module (A C Electronics)	1021200
	B.	Computer (Raytheon)	8104001
	C.	Misc. C. E. I. (Raytheon)	8104100
	D.	OUA (Kollsman)	8106025
	E.	(M.I.T.)	8100001
	F.	AOT (Kollsman)	8106048
5.	ICD REFERENCE DRAWINGS		
	A.	Block I	1021717
	B.	Block II	
	C.	LEM	6014500
	D.	LEM	6014501
6.	G&N GROUND SUPPORT EQUIPMENT		1900030
7.	GSE MASTER RETROFIT KIT LIST		
	A.	(A C Electronics)	1021201
	B.	(Raytheon)	8104002
	C.	(Kollsman)	8106001

Revision II
This system index is for reference only.

APOLLO G&N SYSTEMS INDEX
ND 1000008 Z
Original Issue Date: 11/13/64
Release Authority: TDRR 14303
Class A Release

APOLLO GUIDANCE & NAVIGATION

SYSTEMS INDEX

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals AC	Approvals NASA
3-22-66	K	27349	Revised & Retyped Pgs. 1,2, & 3	W/C	A. C. METZGER
5/18/66	L	29017	Revisec Pgs 1 & 3		A. C. METZGER
8/4/66	M	30379	3 RDG/AC	EA	—
8/11/66	N	30590	3 RDG/AC	EA	—
9/8/66	P	31019	2 RDG/AC	EA	—
11/10/66	R	31924	3 RDG/AC	EA	—
12/8/66	S	32291	3 RDG/AC	EA	—
3/30/67	T	33463	3 RDG/AC	EA	—
4/14/67	U	33616	3 RDG/AC	MGM EA	—
6/30/67	V	34042	3 RDG/AC	EA	—
7-17-67	W	34165	3 RDG/AC	SB	—
10/17/67	Y	34861	2 RDG/AC	EA	—
2/15/68	Z	35652	3 RDG/AC	EA	—

APPROVALS	A. C. METZGER NASA/MSC	22 March 66 MIT/IL	AC

This systems index consists of page 1. to 3. inclusive.

APOLLO GUIDANCE & NAVIGATION SYSTEMS INDEX

Item	Title		Number
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	B.	Artemis	1021100
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	D.	Sunrise	1021102
	E.	Sunrise	1021103
	F.	Ares	1021104
	G.	B*RLS 202	1021105
	H.	RLS 202	1021106
	I.	Retred 44	2021100
	J.	Aurora	2021101
	K.	Venus	2021102
	L.	Retred 50	2021103
	M.	Sundial	2021104
	N.	Newspeak	2021105
	O.	AS-204	1021107
	P.	Solarium	1021108
	Q.	Sunburst	2021106
	R.	La Mesh	2021107
	S.	Sundisk	2021108
9.	CONTRACT TECHNICAL SPECIFICATION APOLLO G&N EQUIPMENT		
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	B.	APOLLO Command Module & Associated Equipment - Block II	PS2000000
	C.	Airborne Primary Guidance, Navigation and Control Subsystem - LEM	PS6000000
10. A/B	G&N EQUIPMENT QUALIFICATION SPECIFICATIONS		
	A.	Block I and Block I, 100 Series -	ND1002037
	B.	Block II and LEM -	ND1002337
11.	G&N RETEST SPECIFICATION INDEXES		
	A.	Command Module - Block I	ND1002362
	B.	Command Module - Block II	ND1002363
	C.	LEM	ND1002364

Release Authority: TDRR 14305
Class A Release

APOLLO GUIDANCE & NAVIGATION

SYSTEMS INDEX

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This systems index consists of page 1. to 2. inclusive.

APPROVALS	W J Rhine 11-17-64 NASA/MSC	17Nov64 MIT/IL	ACSP

INCHES
0 1 2

APOLLO GUIDANCE & NAVIGATION SYSTEMS INDEX

Item	Number
G&N Spacecraft Equipment Command Module Block I Series 0	1015000 Sh-1
G&N Spacecraft Equipment Command Module Block I Series 50	1015000 Sh-2
G&N Spacecraft Equipment Command Module Block I Series 100	1015000 Sh-3
G&N Spacecraft Equipment Command Module Block II	2015000
G&N Spacecraft Equipment LEM	
GSE	1900030
G&N Master Retrofit Kit List,G&N, Command Module Block I	1021200
G&N Master Retrofit Kit List,G&N, Command Module Block II	
GSE Master Retrofit Kit List	1021201
ICD List Block I	
ICD List Block II	
GSE/G&N Compatibility List	
G&N Subsystem Compatibility List	
Supporting Document List Block I	1019999
Supporting Document List Block II	
G&N Command Module Miscellaneous End Items Block I	1019998
G&N Command Module Miscellaneous End Items Block II	
GSE, Other End Items	
Ropes	
G&N Master Retrofit Kit List,Computer Subsystem Block I	8104001
GSE Master Retrofit Kit List, (Raytheon)	8104002

This systems index is for reference only.

1000001 (M)

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL
A	TDR 00080	30Oct62	qB

PART NO.	DESCRIPTION	REQD.
1000002	Outer Axis Assy	1
1000085	CASE, CENTER, MACHINED ASSEMBLY	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION
10/17/62
MIT Approved

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000001

SHEET 1 OF 1

1000001 (M)

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00080	30Oct62	ajb	
B	TDR 000 94	8 NOV 62	ajb	WK

PART NO.	DESCRIPTION	REQD.
1000002	Outer Axis Assy	1
1000085	CASE, CENTER, MACHINED ASSEMBLY	1
1000099	Connector Mount Assembly, One Speed	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
	DL 1000001

APPLICATION

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
CHECKED		
DRAWN		

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IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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NASA DRAWING NO.
1000001

SHEET 1 OF 1

PART NO.	DESCRIPTION	REQD.
1000002	Outer Axis Assy	1
1000085	CASE, CENTER, MACHINED ASSEMBLY	1
1000099	Connector Mount Assembly, One Speed	1
1000109	Fastener Assembly	4
1000082	Case Cover, Movable, Assembly	1
1000081	Case, Cover, Fixed Assembly	1

1000001

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00080	30Oct62	ajB	
B	TDR 000 94	8 Nov 62	ajB	WK
C	TDR00107	19 Nov 62	ajB	

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000001

APPLICATION

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CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
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IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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NASA DRAWING NO.
1000001

SHEET 1 OF 1

1000001

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000002	Outer Axis Assy	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING
MATERIAL:

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INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
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IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
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1000001

SHEET OF

1000002

REVISIONS	TDRR 00065		
SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000003	Middle Axis Assy	1
1000103	Outer Gimbal Housing Assy	1
1000007	Intergimbal Sub-Assy, 15 Speed	1
1000006	Intergimbal Sub-Assy, 1 Speed	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000001	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

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10-17-62
BY DIRECTION MIT Approval
10/17/62

OUTER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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NASA DRAWING NO.
1000002

SHEET OF

	1000003

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000004	Inner Axis Assy	1
1000074	Middle Gimbal Housing Assy	1
1000009	Intergimbal Sub-Assy,15 Speed	1
1000008	Intergimbal Sub-Assy,1 Speed	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000002	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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MATERIAL:

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CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10-17-62
BY DIRECTION MIT Approval
10/17/62

MIDDLE AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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NASA DRAWING NO.
1000003

SHEET OF

1000004

REVISIONS		TDRR 00065	
SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000005	Stable Member Assy	1
1000011	Intergimbal Sub-Assy, 15 Speed	1
1000010	Intergimbal Sub-Assy, 1 Speed	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INNER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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CAMBRIDGE, MASS.

DWG. NO.

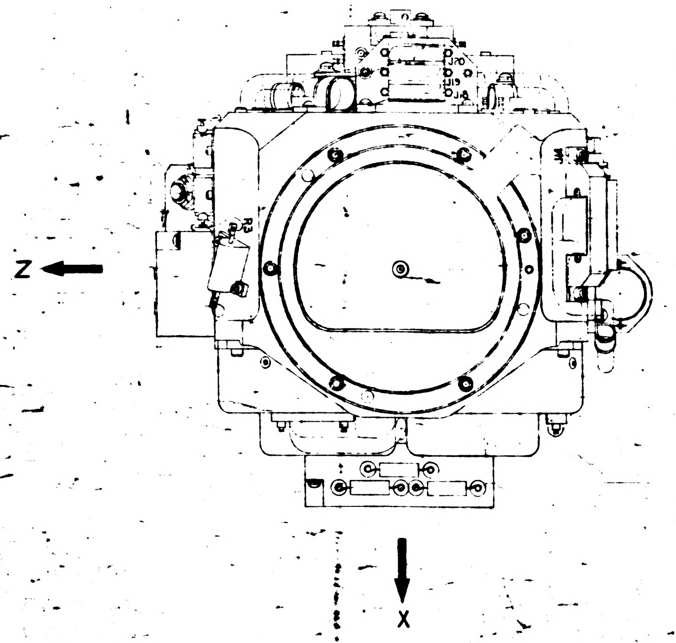
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

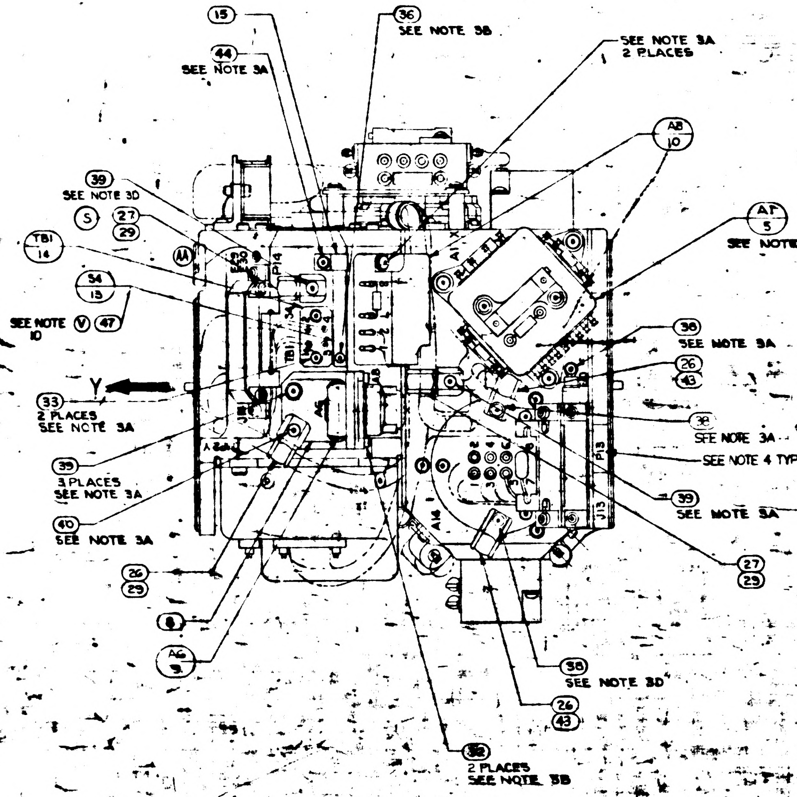
NASA DRAWING NO.
1000004

SHEET OF

COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
WIRING LEGEND					
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

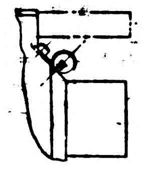
Ⓥ





15
36 SEE NOTE 3B
44 SEE NOTE 3A
SEE NOTE 3A 2 PLACES
A8 10
39 SEE NOTE 3D
Ⓢ 27 29
AA
TB1 14
S4 13
SEE NOTE Ⓥ 47 10
AF 5 SEE NOTE 11 Ⓨ
38 SEE NOTE 3A
26 43
Y
33 2 PLACES SEE NOTE 3A
38 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
39 SEE NOTE 3A
40 SEE NOTE 3A
27 29
26 29
8
A6 3
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P14
TB1
J12
A6
A1
P13
J13
A14

43 38 Ⓢ 27
33 2 PLACE SEE NOTE
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
Ⓨ SEE NOTE 11
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7%
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\substack{.10\\.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING ⑯ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

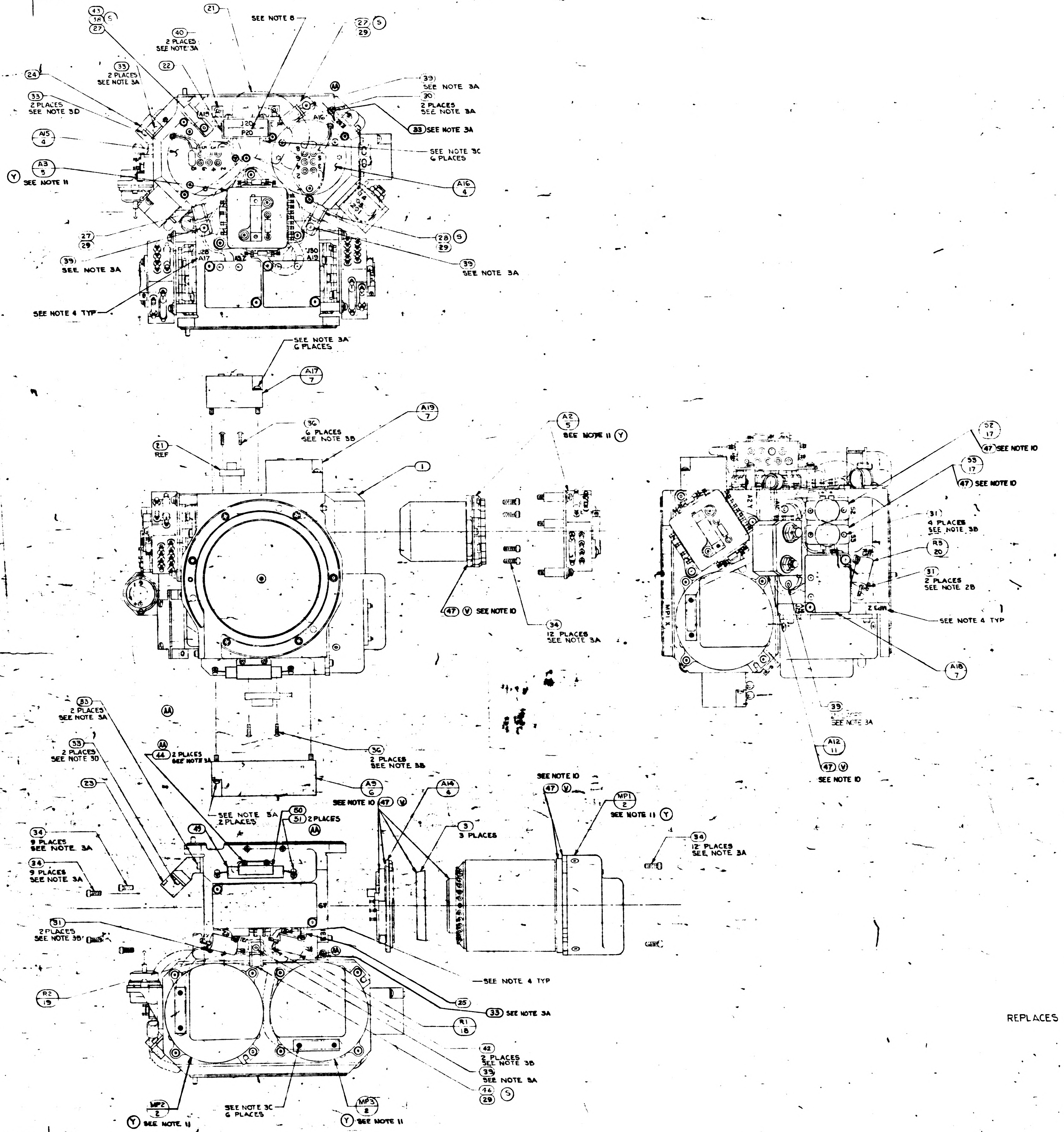
Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN, A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE
10. Ⓥ APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM ① AND ITEMS ②, ④, ⑤, ⑪, ⑬ & ⑰ AND BETWEEN ITEM ③ AND ITEM ④ AND BETWEEN ITEM ② AND ITEM ③
11. Ⓨ INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHT
1000005	AA	1



43 / 38 (S)
27
21
SEE NOTE 8
40
2 PLACES
SEE NOTE 3A
27 / 29 (S)
33
2 PLACES
SEE NOTE 3A
22
24
33
2 PLACES
SEE NOTE 3D
A15 / 4
A3 / 5
(Y) SEE NOTE 11
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
33 SEE NOTE 3A
SEE NOTE 3C
6 PLACES
A16 / 4
27 / 29
39
SEE NOTE 3A
28 (S) / 29
39
SEE NOTE 3A
SEE NOTE 4 TYP
SEE NOTE 3A
6 PLACES
A17 / 7
A19 / 7
36
6 PLACES
SEE NOTE 3B
21 / REF
1
A2 / 5
SEE NOTE 11 (Y)
47 (V) SEE NOTE 10
34
12 PLACES
SEE NOTE 3A
52 / 17
47 SEE NOTE 10
53 / 17
47 SEE NOTE 10
31
4 PLACES
SEE NOTE 3B
R3 / 20
31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18 / 7
39
SEE NOTE 3A
A12 / 11
47 (V)
SEE NOTE 10
33
2 PLACES
SEE NOTE 3A
(AA)
44 2 PLACES SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
36
2 PLACES
SEE NOTE 3B
A9 / 6
SEE NOTE 10 47 (V)
A14 / 4
SEE NOTE 10
47
MP1 / 2
SEE NOTE 11 (Y)
SEE NOTE 3A
2 PLACES
50
51 2 PLACES
(AA)
49
3
3 PLACES
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
12 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
R2 / 19
25
33 SEE NOTE 3A
R1 / 18
42
2 PLACES
SEE NOTE 3B
33
SEE NOTE 3A
46 (S) / 29
MP2 / 2
(Y) SEE NOTE 11
SEE NOTE 3C
6 PLACES
MP3 / 2
(Y) SEE NOTE 11

(N)

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63	WK
	L	TDRR 03186	9-17-63	WK
	M	TDRR 03945	10-15-63	WK
	N	TDRR 06173		WK
	P	TDRR 06174	2 4 64	WK
	R	TDRR 06237	18 FEB 64	WK
	S	TDRR 06385	18 FEB 64	WK
	T	TDRR 06527	25 FEB 64	WK
	U	TDRR 06744	9 MAR 64	WK
	V	TDRR 07082	24 MAR 64	WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR
	Y	REVISED PER TDRR 07964	8 MAY 64	JG
	Z	REVISED PER TDRR 07945	25 MAY 64	DEB
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G. CP

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(AA)	2	TERMINAL, INSULATED	1001600-1			51
(AA)	1	BRACKET, CAPACITOR	1001593			50
(AA)	1	CAPACITOR	1010279-245			49
(AA)	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~100158?~~			~~48~~
(V)	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
(S)	1	CLAMP, CABLE	1000220-6			46
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
(T) (AA) (P)	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
(S)	3	WASHER, FLAT, ROUND	MS15795-703			43
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
(P)	11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
(AA)	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
(P) (T)	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
(AA) (L)	[illegible]	~~SCREW, CAP, SELF LKG, SOC HD, HEX~~	[illegible]			35
(P) (L)	42	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
(AA) (L)	12	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
	5	CLAMP, CABLE	1000220-7			27
(S)	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS 'A' STABLE MEMBER	1000137			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
(U)	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
(M)	1	IRIG PREAMP ASSY	1007031			6
(Y)	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
(Y)	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

REPLACES REV K WITH CHANGES

NEXT ASSY	USED ON
1000204	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE

STABLE
MEMBER
ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

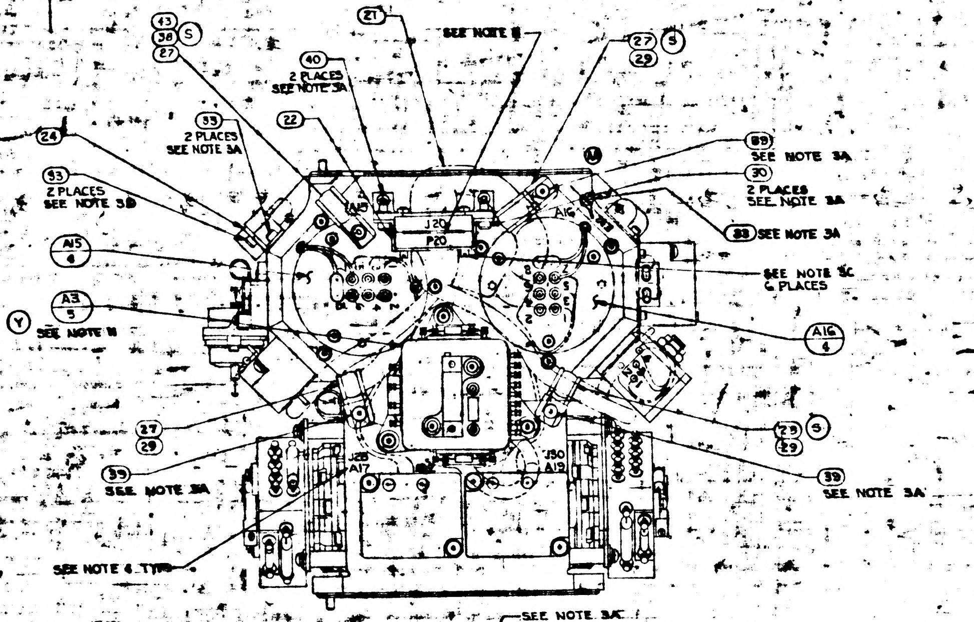
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

1000005

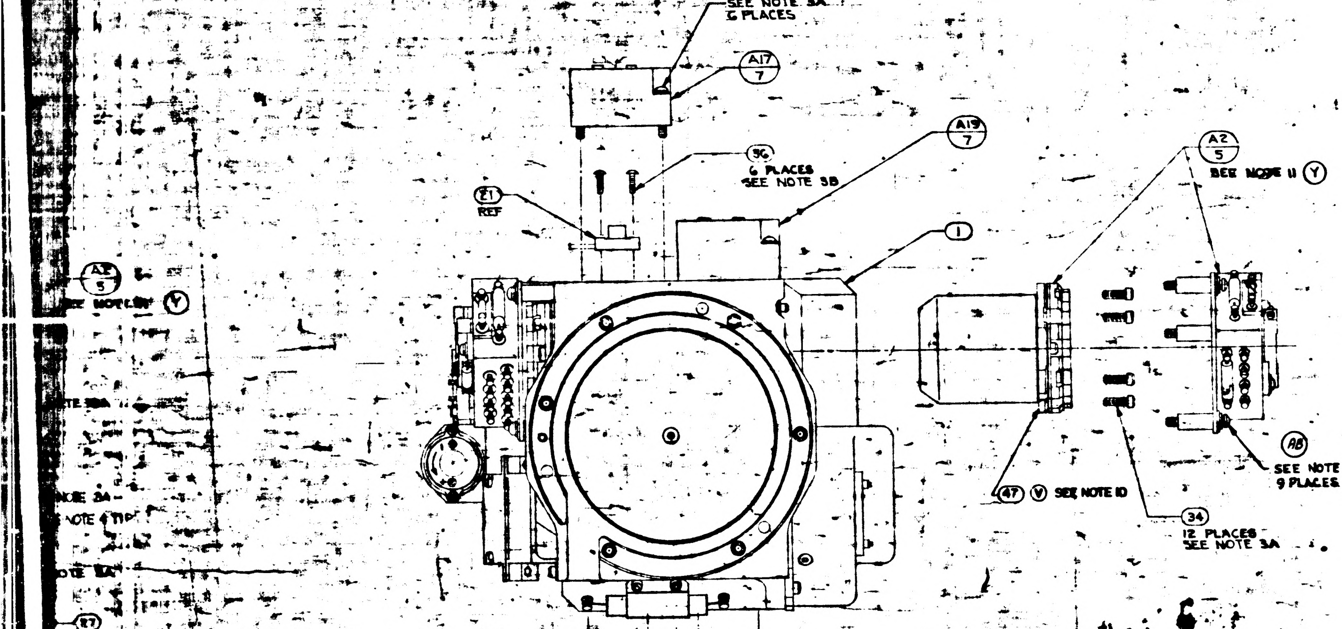
1000005

S REV SHT AA 1

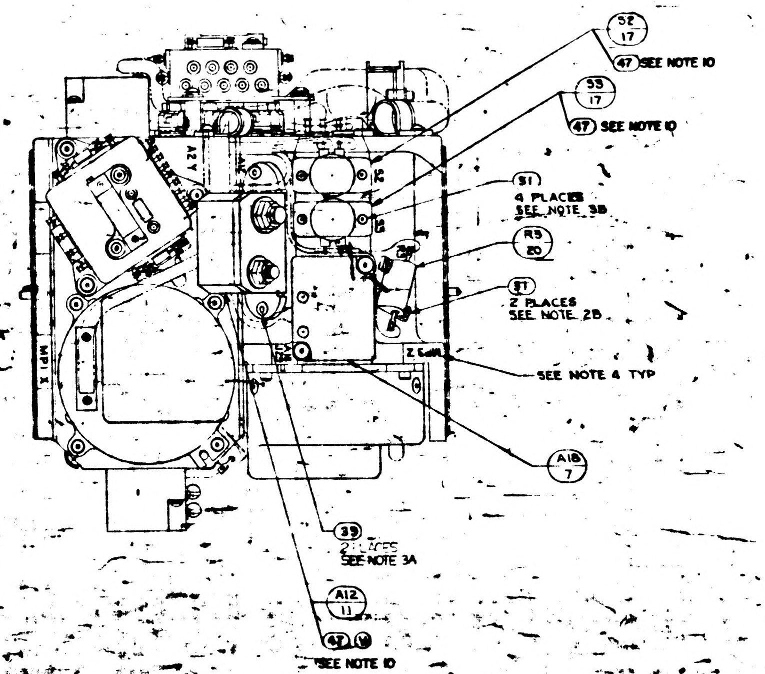
27 1000005



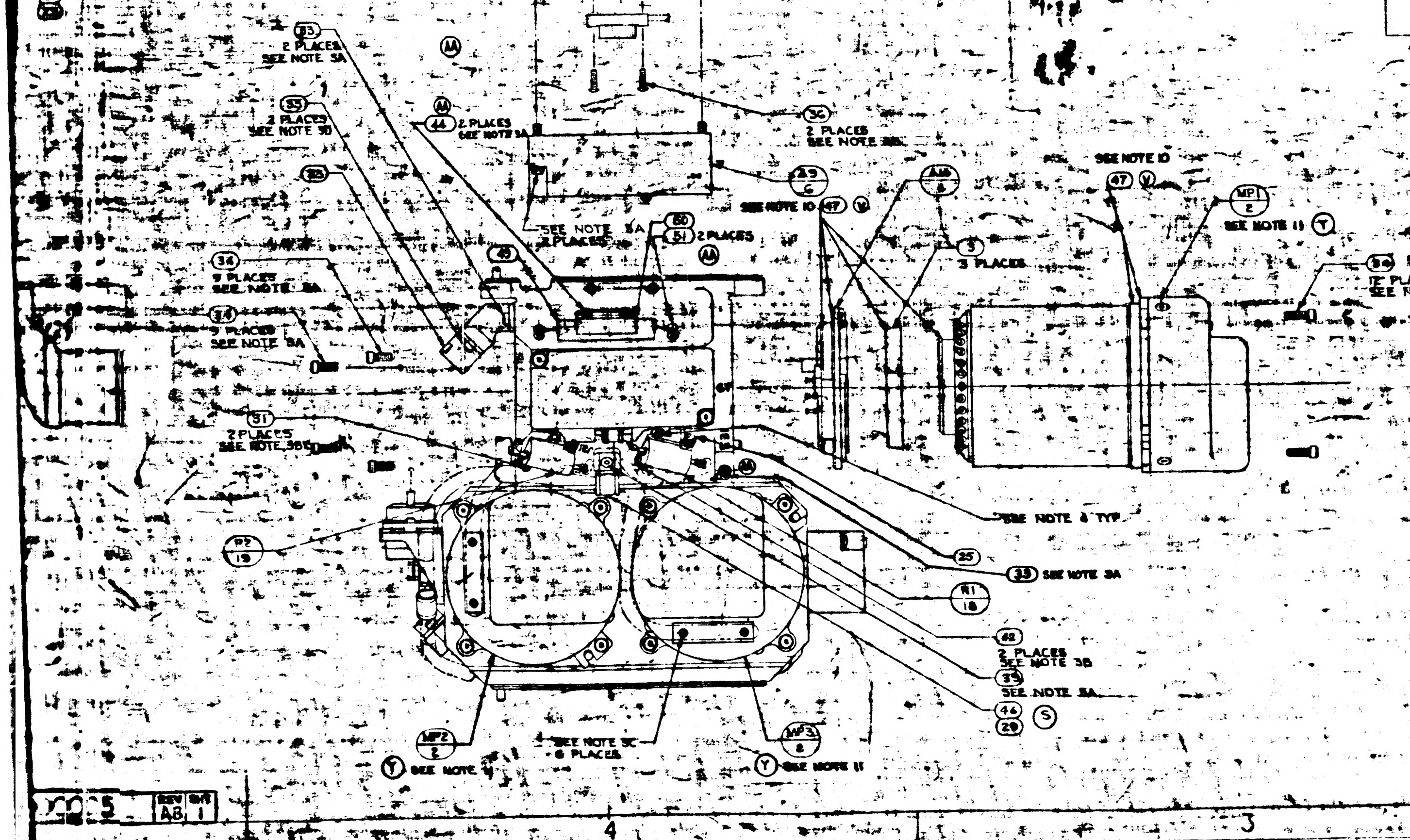
43
38 (S)
27
21
SEE NOTE 11
27 (S)
29
40
2 PLACES
SEE NOTE 3A
24
35
2 PLACES
SEE NOTE 3A
22
33
2 PLACES
SEE NOTE 3B
A15
6
A3
5
(Y) SEE NOTE 11
32
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
33 SEE NOTE 3A
SEE NOTE 3C
6 PLACES
A16
6
27
29
28 (S)
29
39
SEE NOTE 3A
39
SEE NOTE 3A
SEE NOTE 4 TYP



SEE NOTE 3C
6 PLACES
A17
7
A19
7
36
6 PLACES
SEE NOTE 3B
21
REF
A2
5
SEE NOTE 11 (Y)
1
A2
5
SEE NOTE 11 (Y)
47 (V) SEE NOTE 10
A8
SEE NOTE 3A
9 PLACES
34
12 PLACES
SEE NOTE 3A



52
17
47 SEE NOTE 10
53
17
47 SEE NOTE 10
51
4 PLACES
SEE NOTE 3B
R3
20
E1
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
7
39
SEE NOTE 3A
A12
11
47 (V)
SEE NOTE 10



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2 PLACES
SEE NOTE 3A
35
2 PLACES
SEE NOTE 3B
44
2 PLACES
SEE NOTE 3B
36
2 PLACES
SEE NOTE 3B
SEE NOTE 3A
5 PLACES
50
51 2 PLACES
34
4 PLACES
SEE NOTE 3A
34
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
SEE NOTE 10 47
A10
3 PLACES
SEE NOTE 10
47 (V)
MP1
2
SEE NOTE 11 (Y)
30
12 PLACES
SEE NOTE 3A
SEE NOTE 4 TYP
P7
19
25
33 SEE NOTE 3A
R1
18
42
2 PLACES
SEE NOTE 3B
33
SEE NOTE 3A
44
28 (S)
MP2
2
(Y) SEE NOTE 11
SEE NOTE 3C
6 PLACES
MP3
2
(Y) SEE NOTE 11

REPLACES REV K WITH CHANGES

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-295	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS					
ZONE	REV	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63	[illegible]	WK
	L	TDRR 03186	9-17-63	[illegible]	WK
	M	TDRR 03945	10-1963	[illegible]	WK
	N	TDRR 06173	2-4-64	[illegible]	WK
	P	TDRR 06174	2-4-64	[illegible]	WK
	R	TDRR 06237	18 FEB 64	[illegible]	WK
	S	TDRR 06385	18 FEB 64	[illegible]	WK
	T	TDRR 06527	25 FEB 64	[illegible]	WK
	U	TDRR 06744	3 MAR 64	[illegible]	WK
	V	TDRR 07082	24 MAR 64	[illegible]	WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	[illegible]
	Y	REVISED PER TDRR 07964	8 MAY 64	[illegible]	[illegible]
	Z	REVISED PER TDRR 07945	[illegible] 64	[illegible]	[illegible]
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	CP
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	[illegible]

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
(M)	2	TERMINAL, INSULATED	1001600-1			51
(M)	1	BRACKET, CAPACITOR	1001593			50
(M)	1	CAPACITOR	1010279-245			49
(M)	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			~~48~~
(V)	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
(S)	1	CLAMP, CABLE	1000220-6			46
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-[illegible]~~			~~45~~
(T) (M) (P)	3	SCREW, CAP, SELF LKG, SOC HD, HEX	[illegible]C04L3			44
(S)	3	WASHER, FLAT, ROUND	MS15795-703			43
(L)	2	SCREW, CAP, SELF LKG, SOC HD HEX	MS51962C0216			42
(P)	~~[illegible]~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-16			40
(P)	11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-18			39
(M)	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
(P) (T)	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
(M) (L)	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~			~~35~~
(P) (L)	42	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C0416			34
(M) (L)	12	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C0414			33
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02[illegible]			32
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C0213			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
	5	CLAMP, CABLE	1000220-7			27
(S)	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESIS FOR STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000160			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS A STABLE MEMBER	1000137			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
(U)	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WRP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, [illegible] MERCURY THERMO~~	~~[illegible]~~			~~12~~
	1	EMER HEATERS CONTROL, MODULE	1007012			11
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA, STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
(M)	1	IRIG PREAMP ASSY	1007031			6
(Y)	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
(Y)	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

1000286	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT
NAS 9-153
APPROVED | DATE
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE
31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1 | UNIT WT | CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000005
SHEET 1 OF 1

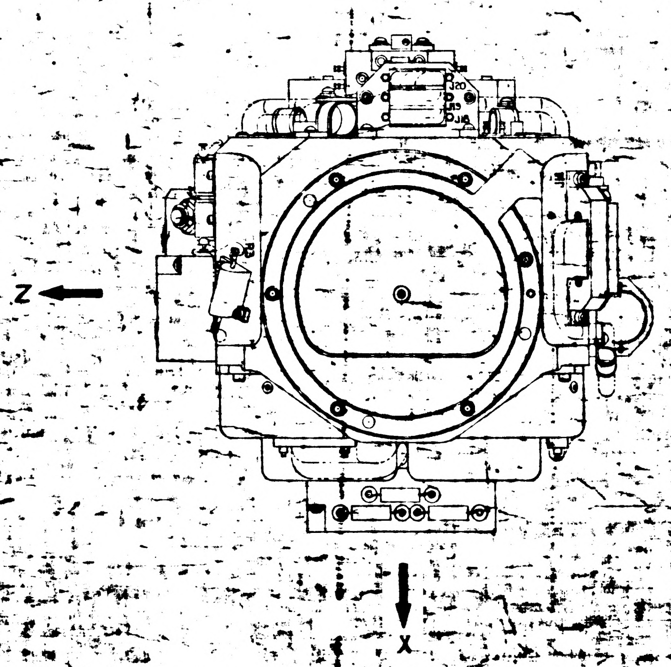
1000005 | REV AB | SHEET 1

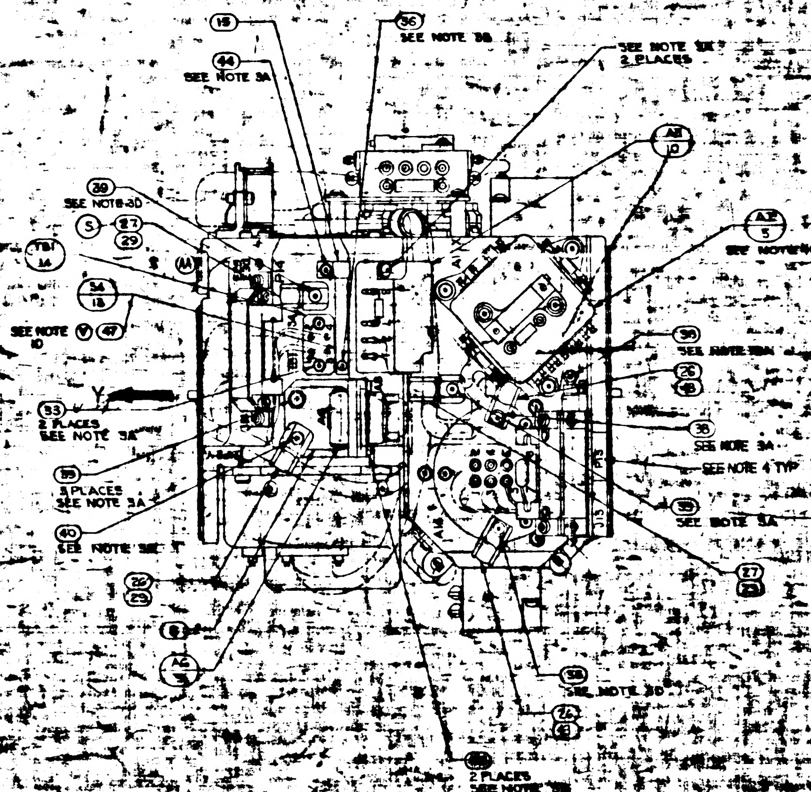
1000005

2/1000005

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4-BLACK	TB1-1	8
3	WHITE		S4-BLACK	TB1-2	
4	BLUE		S4-BLUE	TB1-3	8
5	BLUE		S4-BLUE	TB1-4	

Ⓥ




15
56
SEE NOTE 3B
44
SEE NOTE 3A
SEE NOTE 3C
2 PLACES
A8
10
39
SEE NOTE 3D
S
27
29
TB1
14
AA
A2
5
SEE NOTE 11 Ⓨ
34
13
SEE NOTE Ⓥ 47
10
Y
53
2 PLACES
SEE NOTE 3A
58
SEE NOTE 3A
26
48
38
SEE NOTE 3A
SEE NOTE 4 TYP
55
3 PLACES
SEE NOTE 3A
39
SEE NOTE 3A
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SEE NOTE 3C
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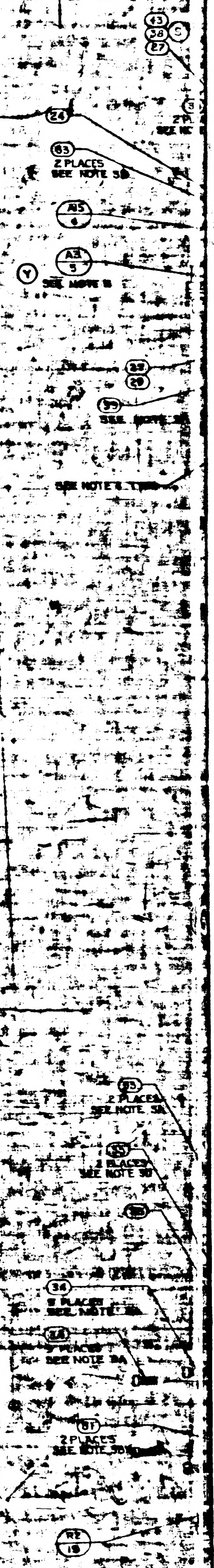
8
A6
3
58
SEE NOTE 3D
26
48
2 PLACES
SEE NOTE 3B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38
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63
2 PLACES
SEE NOTE 3B
A15
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A3
5
Y
SEE NOTE 11
27
29
39
SEE NOTE 3A
SEE NOTE 4 TYP
2 PLACES
SEE NOTE 3A
2 PLACES
SEE NOTE 3A
34
2 PLACES
SEE NOTE 3A
2 PLACES
SEE NOTE 3B
18

NOTES.

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 50 IN. LB
   - B. 35 IN. LB
   - C. 20 IN. LB AT FINAL SEATING, NOT TO EXCEED [illegible] IN. LB. WHILE ENGAGING [illegible]
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{10}{14}$ HIGH COLOR BLACK PER NO. [illegible] AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) ; WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF [illegible]~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN:
   A1 - P18   A2 - P19   A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE
10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (87) TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), [illegible] & (12) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

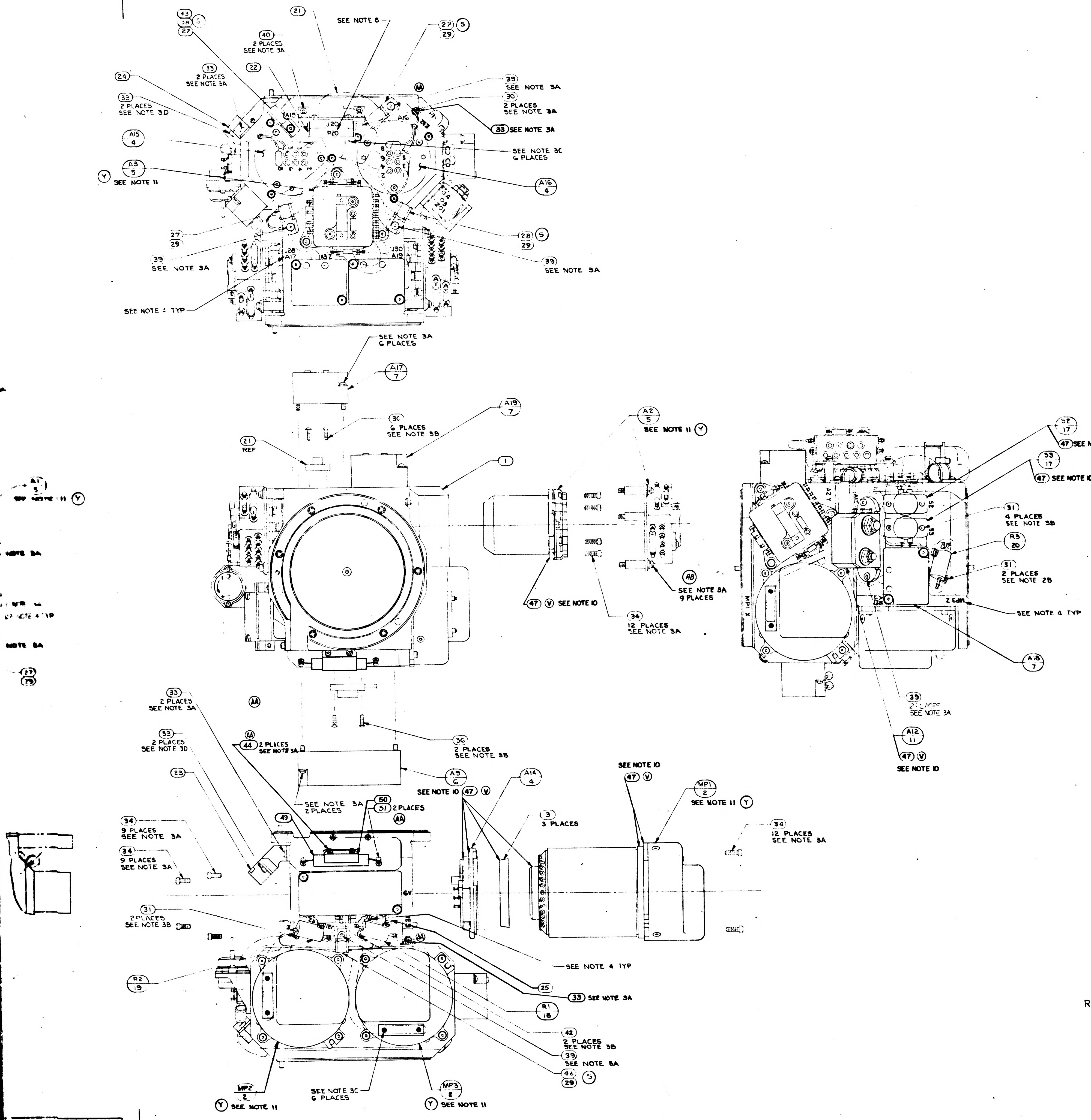
Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG. NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHT
1000005	AB	1

1/1000005



(N) R1,R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-16-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07376	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64		
	Z	REVISED PER TDRR 07945	25 MAY 64		
	AA	REVISED PER TDRR 08764	JUL 64		
C-3	AB	REVISED PER TDRR 10164	JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
(AA)	2	TERMINAL, INSULATED	1001600-1			51
(AA)	1	BRACKET, CAPACITOR	1001593			50
(AA)	1	CAPACITOR	1010279-245			49
(AA)	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			~~48~~
(V)	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
(S)	1	CLAMP, CABLE	1000220-6			46
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
(T)(AA)(P)	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
(S)	3	WASHER, FLAT, ROUND	MS15795-703			43
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
(P)	11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
(AA)	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
(P)(T)	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
(AA)(L)	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~			~~35~~
(P)(L)	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
(AA)(L)	12	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
	5	CLAMP, CABLE	1000220-7			27
(S)	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS A STABLE MEMBER	1001474			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
(U)	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA, STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
(M)	1	IRIG PREAMP ASSY	1007031			6
(Y)	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
(Y)	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED: OJ Bryne DATE
CHECKED
DRAWN: RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE 31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000005
SHEET 1 OF 1

1000005 REV AC SHT 1

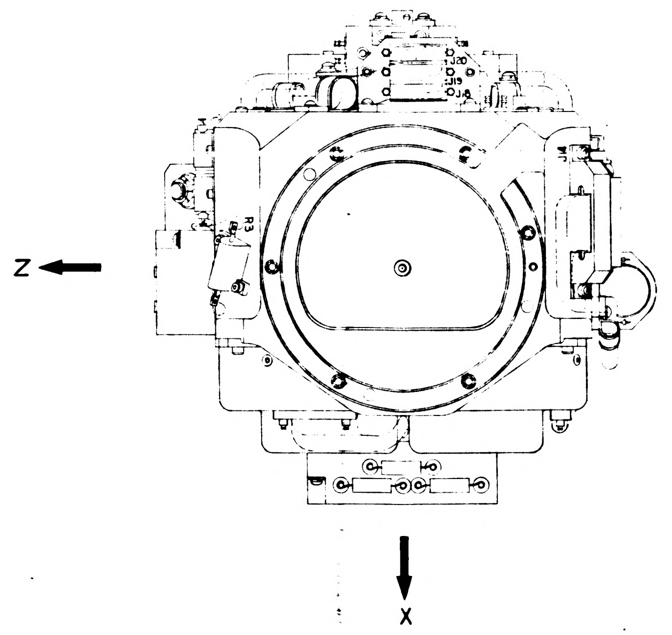
1000005

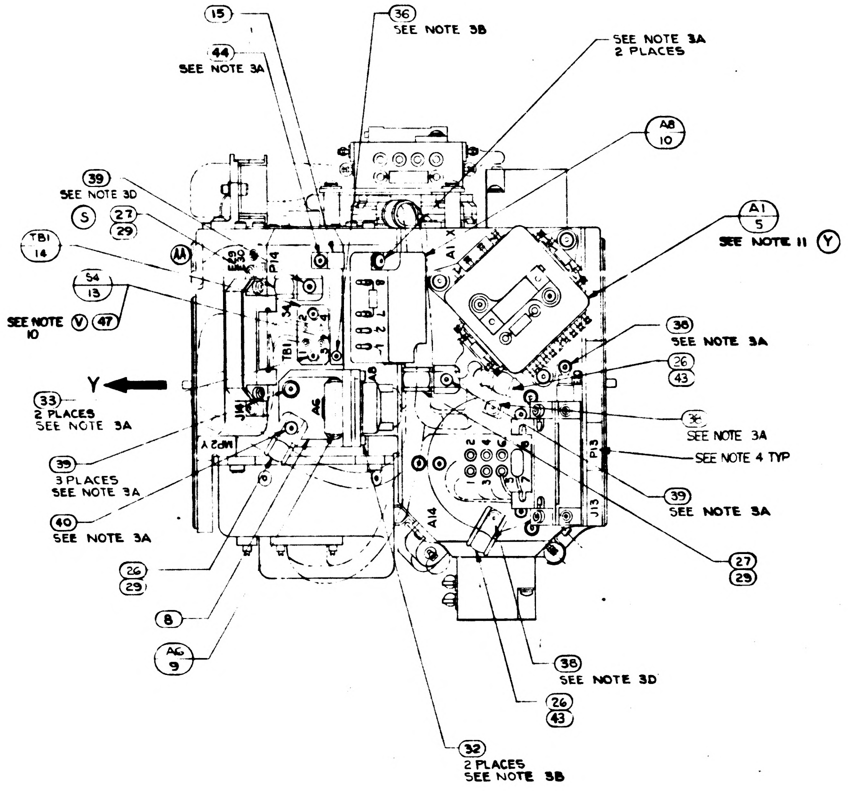
AC

27/1000005

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ





15
44 SEE NOTE 3A
36 SEE NOTE 3B
SEE NOTE 3A 2 PLACES
A8 10
39 SEE NOTE 3D
Ⓢ 27 29
Ⓐ
TB1 14
S4 13
SEE NOTE 10 Ⓥ 47
A1 5 SEE NOTE 11 Ⓨ
38 SEE NOTE 3A
26 43
Y
33 2 PLACES SEE NOTE 3A
38 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
39 SEE NOTE 3A
27 29
26 29
8
A6 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
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A1 X
TB1
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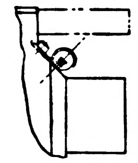
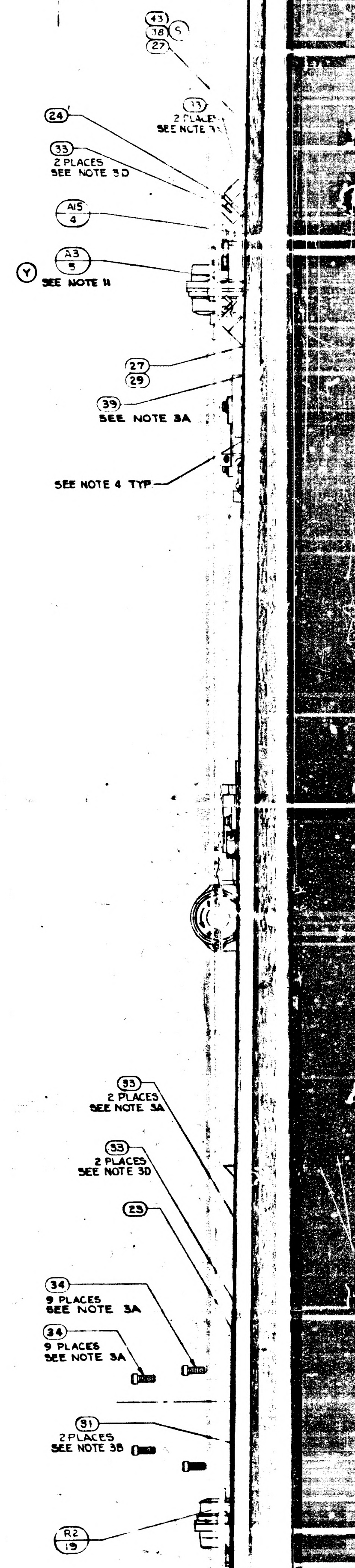
A8
MP2 Y
P13
J13
A14





43 38 Ⓢ 27
33 2 PLACES SEE NOTE 3
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5 Ⓨ SEE NOTE 11
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING ⑯ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM ㊼, TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM ① AND ITEMS ②, ④, ⑤, ⑪, ⑬ & ⑰ AND BETWEEN ITEM ③ AND ITEM ④ AND BETWEEN ITEM ② AND ITEM ③

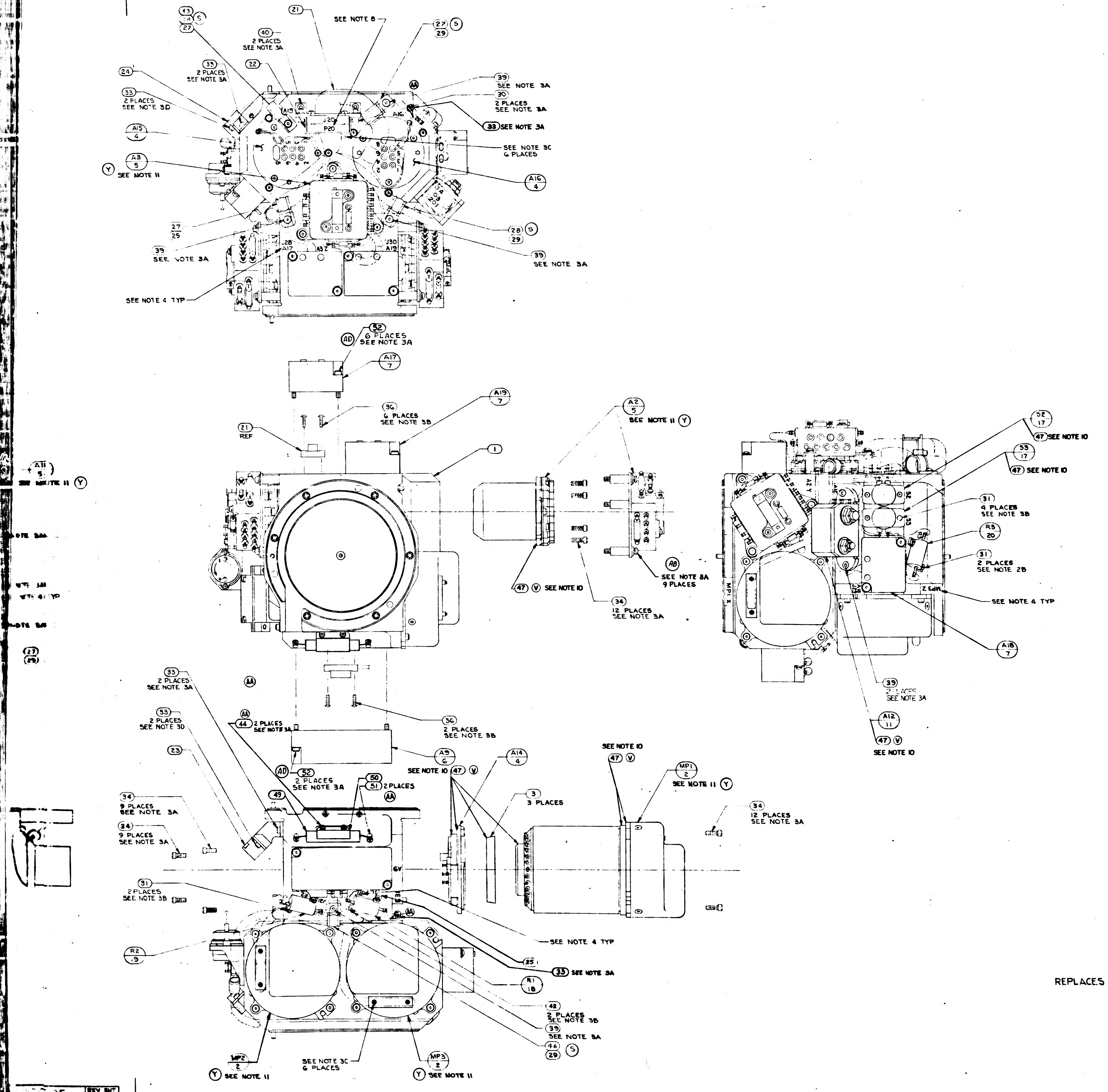
Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	-2	4
4 OR MORE	1	3

Ⓨ

	REV	SHT
1000005	AC	1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21
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2 PLACES
SEE NOTE 3A
43
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27
35
2 PLACES
SEE NOTE 3A
22
27
5
29
24
33
2 PLACES
SEE NOTE 3D
A15
4
A3
5
Y
SEE NOTE 11
A19
A16
J20
P20
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
33
SEE NOTE 3A
SEE NOTE 3C
6 PLACES
A16
4
27
25
39
SEE NOTE 3A
28
29
39
SEE NOTE 3A
A17
J30
SEE NOTE 4 TYP
AD
52
6 PLACES
SEE NOTE 3A
A17
7
36
6 PLACES
SEE NOTE 3B
A19
7
21
REF
1
A2
5
SEE NOTE 11
Y
A11
5
SEE NOTE 11
Y
47
V
SEE NOTE 10
AB
SEE NOTE 3A
9 PLACES
34
12 PLACES
SEE NOTE 3A
52
17
47
SEE NOTE 10
53
17
47
SEE NOTE 10
31
4 PLACES
SEE NOTE 3B
R3
20
31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
7
39
2 PLACES
SEE NOTE 3A
A12
11
47
V
SEE NOTE 10
MP1
AA
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
AA
44
2 PLACES
SEE NOTE 3A
36
2 PLACES
SEE NOTE 3B
23
AD
52
2 PLACES
SEE NOTE 3A
A5
6
A14
4
SEE NOTE 10
47
V
50
51
2 PLACES
AA
49
3
3 PLACES
SEE NOTE 10
47
MP1
2
SEE NOTE 11
Y
34
12 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
25
33
SEE NOTE 3A
R2
9
R1
18
42
2 PLACES
SEE NOTE 3B
39
SEE NOTE 3A
46
29
S
MP2
2
Y
SEE NOTE 11
SEE NOTE 3C
6 PLACES
MP3
2
Y
SEE NOTE 11
4
3
2
1
D
C
B
A

N	R1,R2 & R3	
	SELECTION CHART	
	PART NO.	VALUE IN OHMS
	1010498 -197	11.0
	-227	22.6
	-246	35.7
	-275	71.5
	-297	121.0
	-322	221.0
	-220	19.1
	-233	26.1
	-238	29.4
	-242	32.4
	-246	35.7
	-097	1.00
	-171	5.90
	-210	15.00
	-251	40.20
	-256	45.30
	-261	51.10
	-268	60.40
	-280	80.60
	-285	90.90
	-289	100.00
	-293	110.00
	-303	140.00
	1010498 -385	1000.00

REVISIONS

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M		K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
M		L	TDRR 03186	9-17-63		WK
M		M	TDRR 03945	10-16-63		WK
M		N	TDRR 06173	2-4-64		WK
		P	TDRR 06174	2-4-64		WK
		R	TDRR 06237	18 FEB 64	AAH	WK
M		S	TDRR 06385	18 FEB 64	AAH	WK
M		T	TDRR 06527	25 FEB 64	AAH	WK
		U	TDRR 06744	3 MAR 64	AAH	WK
		V	TDRR 07082	24 MAR 64	AAH	WK
M		W	REVISED PER TDRR 07576	17 APR 64	JHR	
M		Y	REVISED PER TDRR 07964	8 MAY 64	GG	
M		Z	REVISED PER TDRR 07945	25 MAY 64	BBB	
		AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	CF
	C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
M		AC	REVISED PER TDRR 10500	8 JUL 64	GG	
		AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.A.

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AD	2	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL10			53
AD	8	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL18			52
AA	2	TERMINAL, INSULATED	1001600-1			51
AA	1	BRACKET, CAPACITOR	1001593			50
AA	1	CAPACITOR	1010279-245			49
AA	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			~~48~~
V	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
S	1	CLAMP, CABLE	1000220-6			46
P	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
T AA P	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
S	3	WASHER, FLAT, ROUND	MS15795-703			43
L	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
P	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
P	11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
AA	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
N	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
P T	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
AA L	[illegible]	[illegible]	[illegible]			~~35~~
P L	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
AA L	12	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
L	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
L	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
	5	CLAMP, CABLE	1000220-7			27
S	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS 'A' STABLE MEMBER	1001474			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010499		SEE NOTE 5	18
U	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
P	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	[illegible]			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
AD	1	ADA PREAMP ASSY, STABLE MEMBER	1015780			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA, STABLE MEMBER	1000166			8
AD	3	PIP PREAMP ASSY	1015779			7
AD M	1	IRIG PREAMP ASSY	1015781			6
Y	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
Y	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

REPLACES REV K WITH CHANGES

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
7-30-63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL
DATE
31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DWG NO
1000005
SHEET 1 OF 1

1000005 REV AD

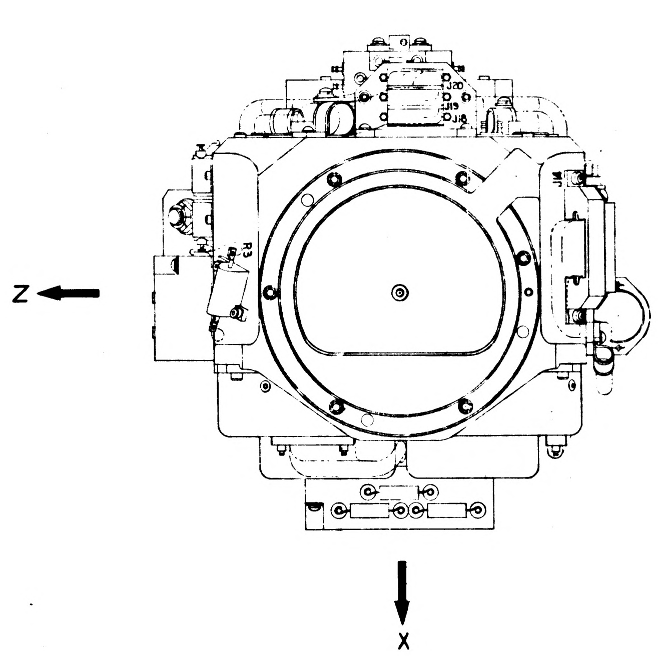
SH

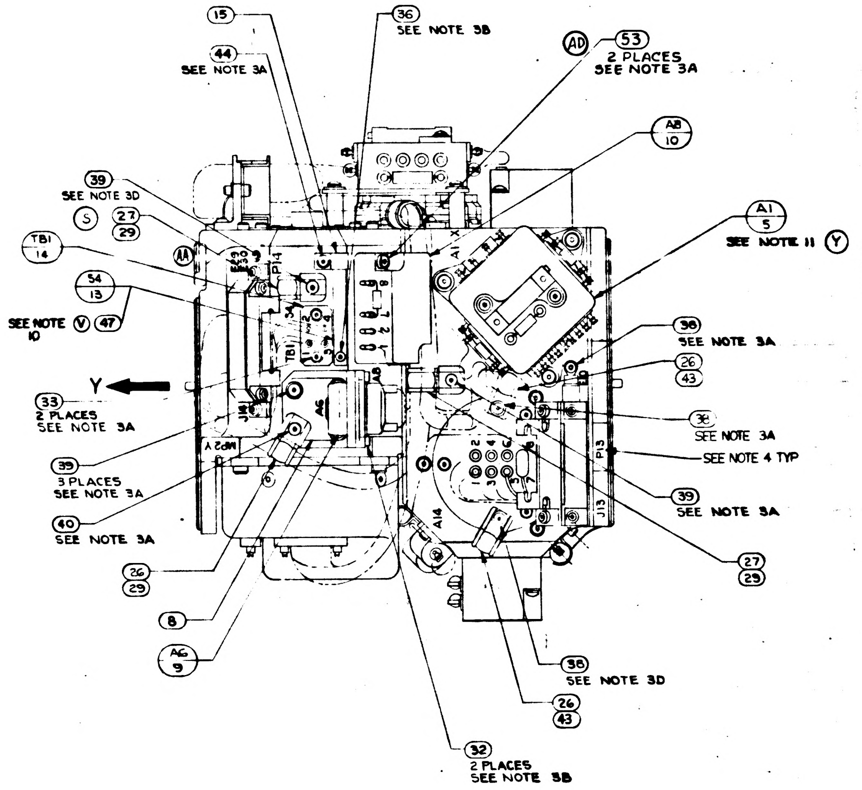
05 REV AC SHT 1

2/1000005

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




15
44
SEE NOTE 3A
36
SEE NOTE 3B
AD
53
2 PLACES
SEE NOTE 3A
A8
10
A1
5
SEE NOTE 11 Y
39
SEE NOTE 3D
S
27
29
TB1
14
AA
54
13
SEE NOTE V 47
10
Y
33
2 PLACES
SEE NOTE 3A
39
3 PLACES
SEE NOTE 3A
40
SEE NOTE 3A
26
29
8
A6
9
38
SEE NOTE 3A
26
43
38
SEE NOTE 3A
SEE NOTE 4 TYP
39
SEE NOTE 3A
27
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38
SEE NOTE 3D
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TB1
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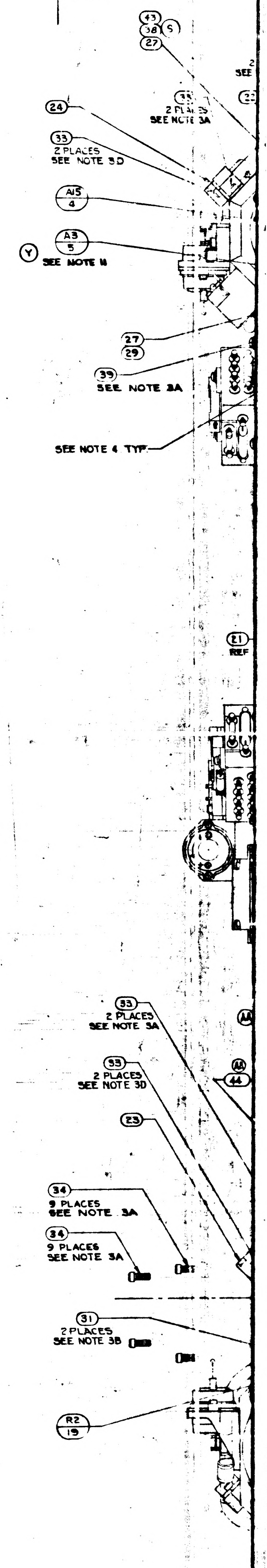
J13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A3
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SEE NOTE 11
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SEE NOTE 3A
SEE NOTE 4 TYP
21
REF
33
2 PLACES
SEE NOTE 3A
AA
AA
44
33
2 PLACES
SEE NOTE 3D
23
34
9 PLACES
SEE NOTE 3A
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9 PLACES
SEE NOTE 3A
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2 PLACES
SEE NOTE 3B
R2
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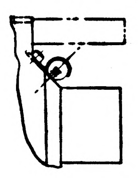
P2
2
SEE



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING ⑯ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM ㊼, TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM ① AND ITEMS ②, ④, ⑤, ⑪, ⑬ & ⑰ AND BETWEEN ITEM ③ AND ITEM ④ AND BETWEEN ITEM ② AND ITEM ③

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

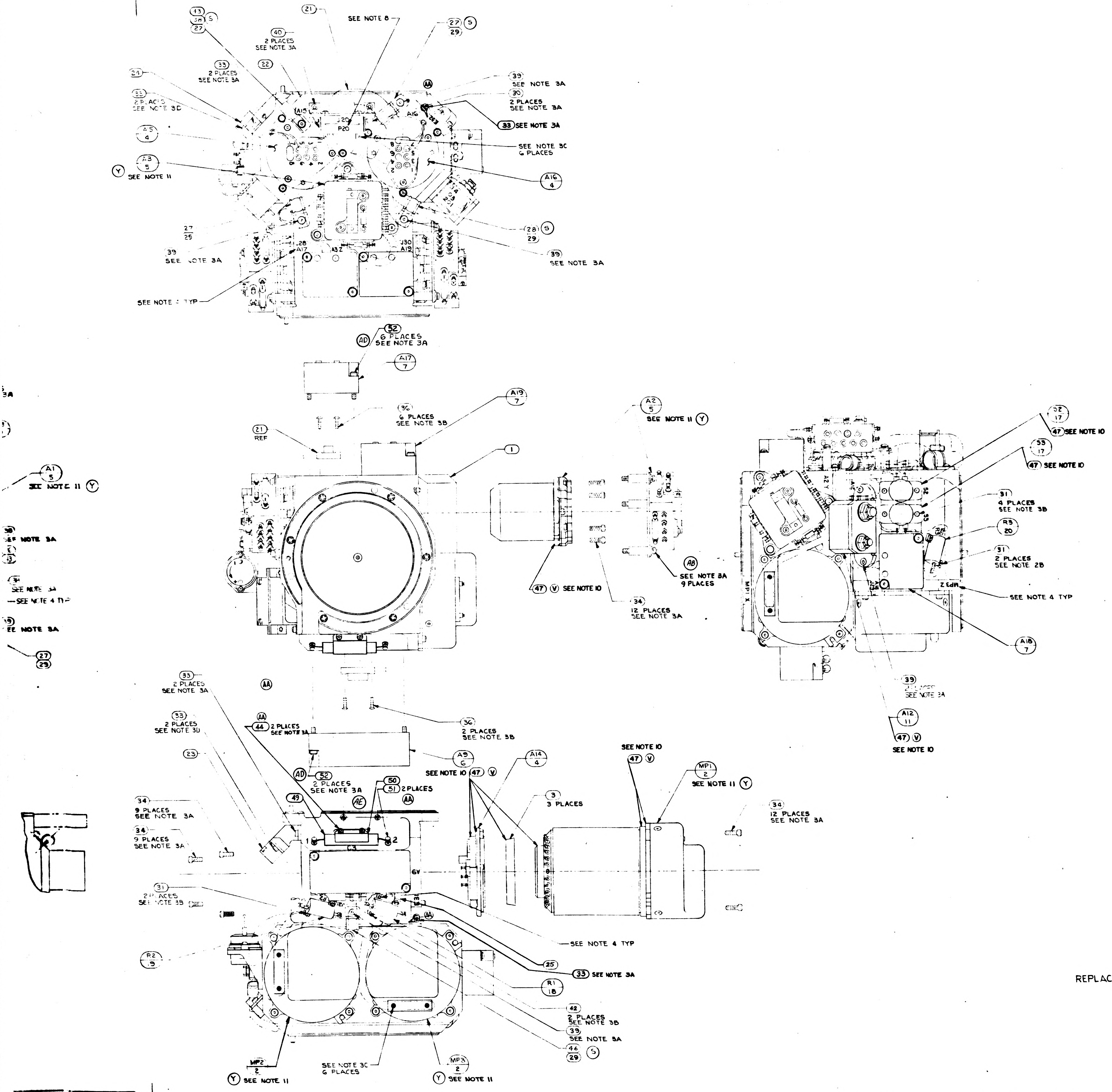
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓡ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV AD	SHT 1

1/1000005



13 5 S 27
40 2 PLACES SEE NOTE 3A
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SEE NOTE 8
27 S 29
33 2 PLACES SEE NOTE 3A
22
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
33 SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A5 4
A3 5
Y SEE NOTE 11
A16 4
28 S 29
39 SEE NOTE 3A
SEE NOTE 2 TYP
AD 32 6 PLACES SEE NOTE 3A
A17 7
A19 7
36 6 PLACES SEE NOTE 3B
21 REF
1
A2 5 SEE NOTE 11 Y
A1 5 SEE NOTE 11 Y
47 V SEE NOTE 10
AB SEE NOTE 3A 9 PLACES
34 12 PLACES SEE NOTE 3A
52 17
47 SEE NOTE 10
53 17
47 SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 7
39 SEE NOTE 3A
A12 11
47 V SEE NOTE 10
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
AA 44 2 PLACES SEE NOTE 3A
36 2 PLACES SEE NOTE 3B
23
AD 52 2 PLACES SEE NOTE 3A
49
AE 50 51 2 PLACES
A5 6
A14 4
SEE NOTE 10 47 V
3 3 PLACES
SEE NOTE 10 47 V
MP1 2 SEE NOTE 11 Y
34 12 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
SEE NOTE 4 TYP
R2 19
25
33 SEE NOTE 3A
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
46 29 S
MP2 2 Y SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 Y SEE NOTE 11
27 29

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-18-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18FEB64		WK
	S	TDRR 06385	18FEB64		WK
	T	TDRR 06527	25FEB64		WK
	U	TDRR 06744	3MAR64		WK
	V	TDRR 07082	24MAR64		WK
	W	REVISED PER TDRR 07576	17APR 64	JHR	
	Y	REVISED PER TDRR 07964	8MAY 64	GG	
	Z	REVISED PER TDRR 07945	25MAY 64	BBB	
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	CP
C-3	AB	REVISED PER TDRR 10164	7JUL 64	FL	
	AC	REVISED PER TDRR 10500	8JUL 64	GG	
	AD	REVISED PER TDRR 10813	17JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 1.379	12AUG 64	JWP	

REPLACES REV K WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL10			53
8	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL11			52
2	TERMINAL, INSULATED	1001600-1			51
1	BRACKET, CAPACITOR	1001593			50
1	CAPACITOR	1010279-245			49
~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			~~48~~
A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
1	CLAMP, CABLE	1000220-6			46
~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			~~45~~
3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
3	WASHER, FLAT, ROUND	MS15795-703			43
2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
[illegible]	[illegible]	[illegible]			~~35~~
42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
12	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
2	SCREW, CAP, SOC HD, HEX	1000110-302			30
7	WASHER, CABLE CLAMP	1000223			29
1	CLAMP, CABLE	1000220-11			28
5	CLAMP, CABLE	1000220-7			27
3	CLAMP, CABLE	1000220-5			26
1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
1	COVER, BRKT, CONNECTOR	1000150			24
1	COVER, BRKT, CONNECTOR	1000164			23
1	COVER, BRKT, CONN, 26 PIN	1000265			22
1	WIRING HARNESS A STABLE MEMBER	1001474			21
1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
2	THERMOSTAT, SAFETY	1001485			17
A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
1	CLAMP, MERCURY THERMO	1000248			15
1	TERM. ~~BOARD ASSY MERCURY~~ THERMO	1000253			14
1	THERMO & HEATER ASSY	1000247			13
~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
1	EMER HEATERS CONTROL MODULE	1007012			11
1	ADA PREAMP ASSY, STABLE MEMBER	1015780			10
1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
1	MOUNT, ADA STABLE MEMBER	1000166			8
3	PIP PREAMP ASSY	1015779			7
1	IRIG PREAMP ASSY	1015781			6
3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
3	CLAMP, SPLIT, GYRO	1000138			3
3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED G. Bogus DATE 3-63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE 31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY Cambridge Mass
DWG NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000005
SHEET 1 OF 1

1000005 AE

5 REV AE SHT 1

27 1000005

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
-1	WHITE		A6 - +	A8 - 1	8
1-2	BLACK		A6 - −	A8 - 2	
2	BLACK		S4 - BLACK	TB1 - 1	8
3	WHITE		S4 - BLACK	TB1 - 2	
4	BLUE		S4 - BLUE	TB1 - 3	8
5	BLUE		S4 - BLUE	TB1 - 4	

Ⓥ

NOTES

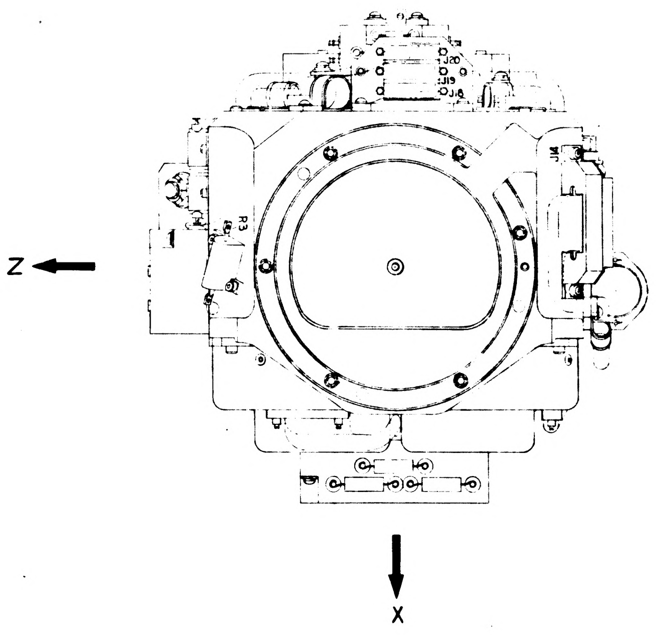
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\substack{.10\\.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING ⑯ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

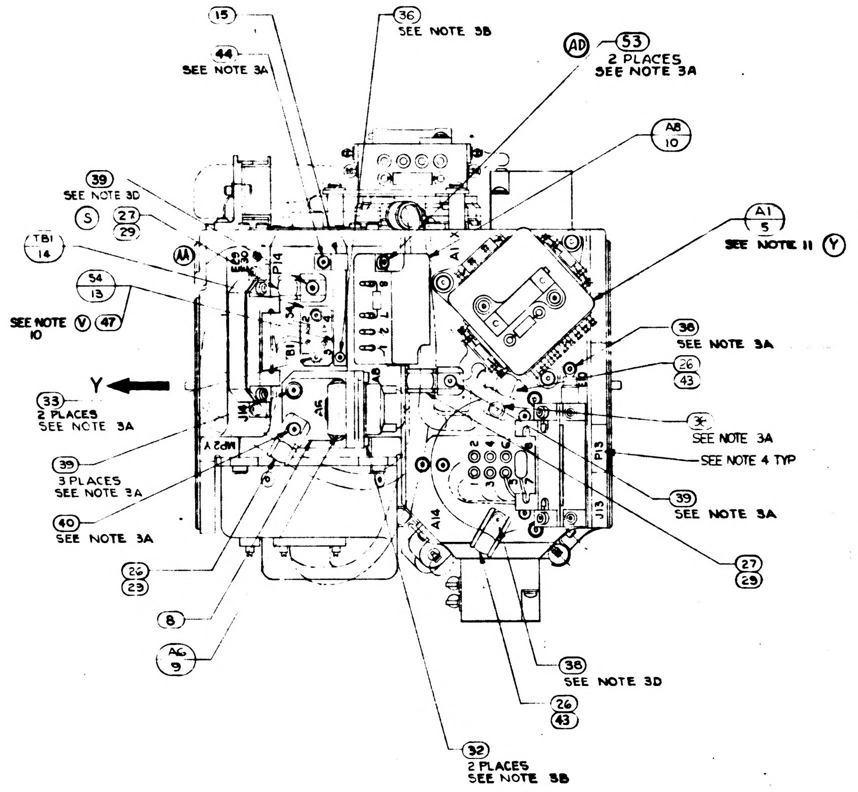
Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

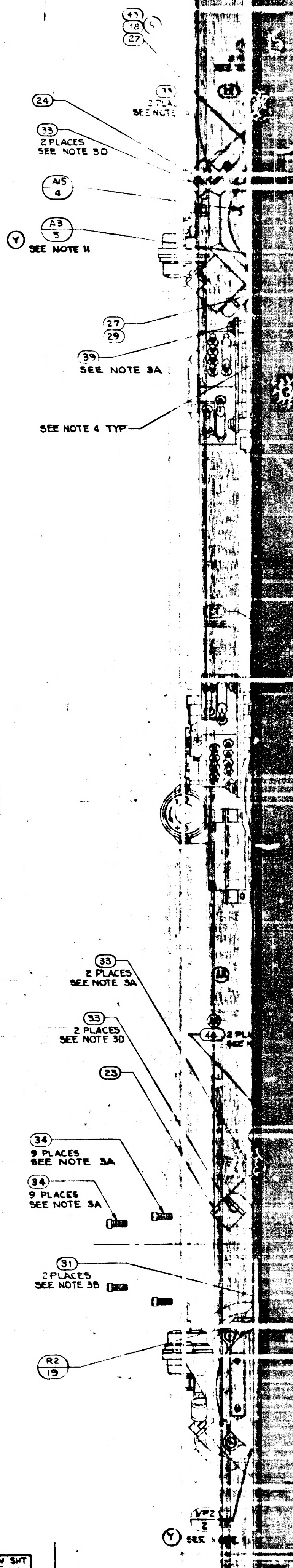
8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

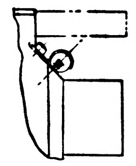
Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM ㊼, TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM ① AND ITEMS ②, ④, ⑤, ⑪, ⑬ & ⑰ AND BETWEEN ITEM ③ AND ITEM ④ AND BETWEEN ITEM ② AND ITEM ③

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.




15
44 SEE NOTE 3A
36 SEE NOTE 3B
AD 53 2 PLACES SEE NOTE 3A
A8 10
39 SEE NOTE 3D
S 27 29
TB1 14
S4 13
SEE NOTE V 47 10
A1 5 SEE NOTE 11 Y
Y
33 2 PLACES SEE NOTE 3A
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
26 29
8
A6 9
38 SEE NOTE 3A
26 43
36 SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
27 29
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P14
J14
J15
A8
MP2 Y
A14
P13
J13


43
38
27
S
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
Y SEE NOTE 11
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
44
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
VP2 2
Y



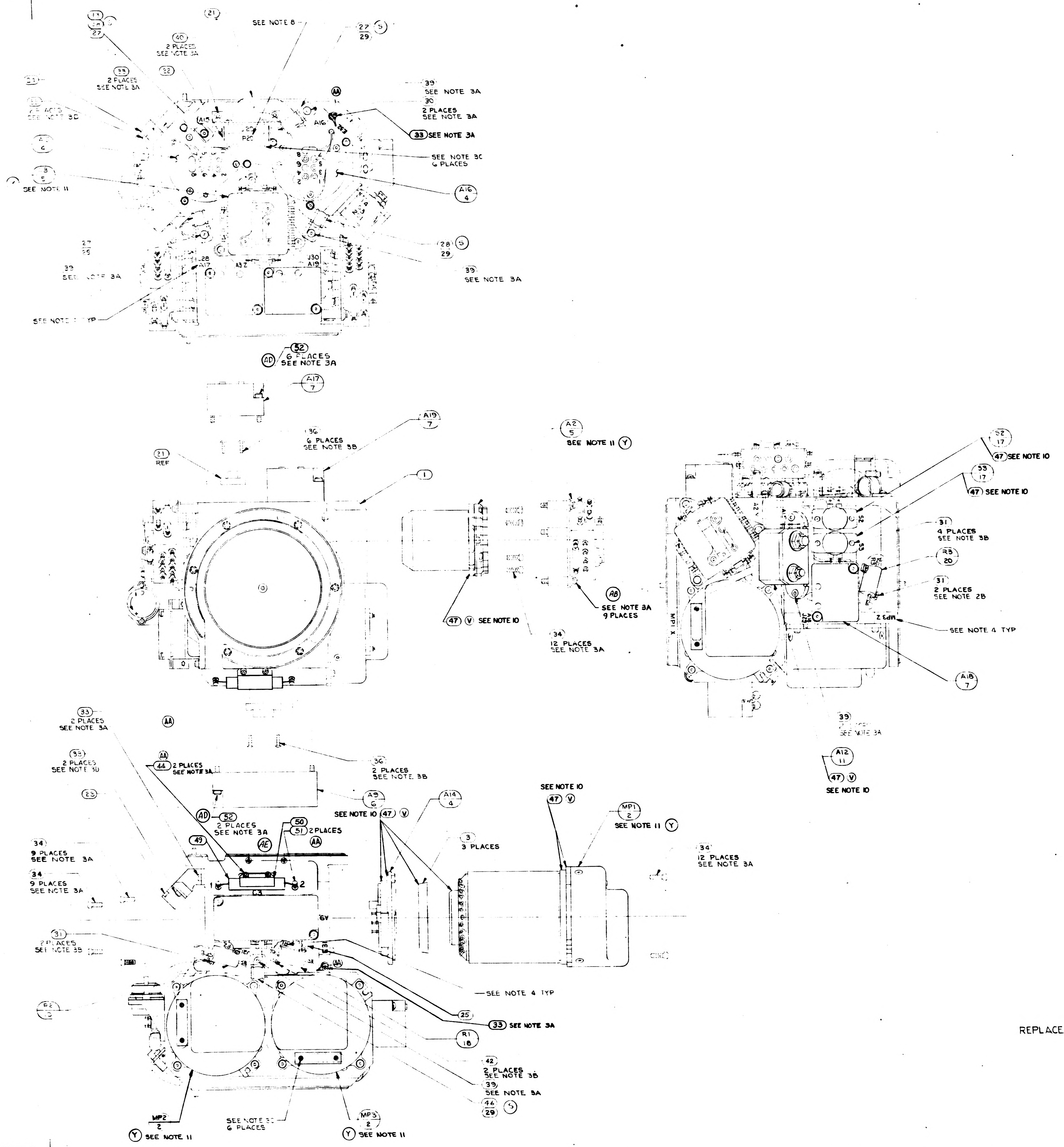
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓡ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV AE	SHT 1

1/1000005



SEE NOTE 8
40
2 PLACES SEE NOTE 3A
33
2 PLACES SEE NOTE 3A
22
21
27 (S)
29
27
39
SEE NOTE 3A
30
2 PLACES SEE NOTE 3A
33 SEE NOTE 3A
(AA)
A15
A16
J29
P20
SEE NOTE 3C
6 PLACES
A16
4
SEE NOTE 11
28 (S)
29
39
SEE NOTE 3A
J28
A17
A3Z
J30
A19
SEE NOTE 4 TYP
52
(AD)
6 PLACES
SEE NOTE 3A
A17
7
A19
7
36
6 PLACES
SEE NOTE 3B
21
REF
1
A2
5
SEE NOTE 11 (Y)
47 (V) SEE NOTE 10
34
12 PLACES
SEE NOTE 3A
(AB)
SEE NOTE 3A
9 PLACES
52
17
47 SEE NOTE 10
53
17
47 SEE NOTE 10
31
4 PLACES
SEE NOTE 3B
R3
20
31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
MP1
MP2
A18
7
39
SEE NOTE 3A
A12
11
47 (V)
SEE NOTE 10
33
2 PLACES
SEE NOTE 3A
(AA)
33
2 PLACES
SEE NOTE 3D
(AA)
44 2 PLACES SEE NOTE 3A
23
36
2 PLACES
SEE NOTE 3B
(AD) 52
2 PLACES
SEE NOTE 3A
50
51 2 PLACES
(AE)
(AA)
49
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
A9
6
SEE NOTE 10 47 (V)
A14
4
3
3 PLACES
SEE NOTE 10
47 (V)
MP1
2
SEE NOTE 11 (Y)
34
12 PLACES
SEE NOTE 3A
C3
A9
31
2 PLACES
SEE NOTE 3B
P2
SEE NOTE 4 TYP
25
33 SEE NOTE 3A
R1
18
42
2 PLACES
SEE NOTE 3B
39
SEE NOTE 3A
46 (S)
29
MP2
2
(Y) SEE NOTE 11
SEE NOTE 3C
6 PLACES
MP3
2
(Y) SEE NOTE 11

(N)

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
(M)		K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
(M)		L	TDRR 03186	9-17-63		WK
(S)		M	TDRR 03945	10-15-63		WK
(M)		N	TDRR 06173	2-4-64		WK
		P	TDRR 06174	2-4-64		WK
		R	TDRR 06237	18FEB64		WK
(M)		S	TDRR 06385	18FEB64		WK
		T	TDRR 06527	25FEB64		WK
		U	TDRR 06744	3MAR64		WK
		V	TDRR 07082	24MAR64		WK
(M)		W	REVISED PER TDRR 07576	17APR64	JHR	
(M)		Y	REVISED PER TDRR 07964	8MAY64	JG	
(M)		Z	REVISED PER TDRR 07945	25MAY64	BEB	
		AA	REVISED PER TDRR 08764	1-JUL-64	W.G.	CP
	C-3	AB	REVISED PER TDRR 10164	7JUL64	FL	
(M)		AC	REVISED PER TDRR 10500	8JUL64	GG	
(M)		AD	REVISED PER TDRR 10813	17JUL64	JWP	J.E.
(M)		AE	REVISED PER TDRR 11379	12AUG64	JWP	
		AF	REVISED PER TDRR 1245	9SEP64	JWF	CP

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
						53
(AD)	2	SCREW,CAP,SELF LKG, SOC HD HEX	NAS1352C04LL10			52
(AD)	8	SCREW,CAP, SELF LKG, SOC HD HEX	NAS1352C04LL11			51
(AA)	2	TERMINAL, INSULATED	1001600-1			50
(AA)	1	BRACKET, CAPACITOR	1001593			49
(AA)	1	CAPACITOR	1010279-245			48
(AA)	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			~~48~~
(V)	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
(S)	1	CLAMP, CABLE	1000220-6			46
(P)	~~1~~	~~SCREW,BUT HD,SELF LKG,SPL SOC~~	~~1000250-1~~			45
(T)(AA)(P)	3	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C04LL3			44
(S)	3	WASHER, FLAT, ROUND	MS15795-703			43
(L)	2	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C02LL6			42
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
(P)	11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
(AA)	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON WAXED		ML-T-713 TYPE P CLASS 2		37
(P)(T)	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
(AA)(L)	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~			~~35~~
(P)(L)	42	SCREW,CAP SELF LKG,SOC HD,HEX	NAS1352C04LL6			34
(AA)(L)	12	SCREW,CAP SELF LKG,SOC HD,HEX	NAS1352C04LL4			33
(L)	2	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C02LL4			32
(L)	8	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C02LL3			31
	2	SCREW,CAP, SOC HD, HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
	5	CLAMP, CABLE	1000220-7			27
(S)	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS A STABLE MEMBER	1001474			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
(U)	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SNGC WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. ~~BOARD ASSY MERCURY~~ THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
(AF)(AD)	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA STABLE MEMBER	1000166			8
(AF)(AD)	3	PIP PREAMP ASSY	1007214-011			7
(AF)(AD)(M)(Y)	1	IRIG PREAMP ASSY	1007209-011			6
	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
(Y)	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T. INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED O. Boyce DATE 7-2-63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC Jack Barnard
MIT IL APPROVAL DATE 31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

M.I.T.
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

5 REV AF SHT 1

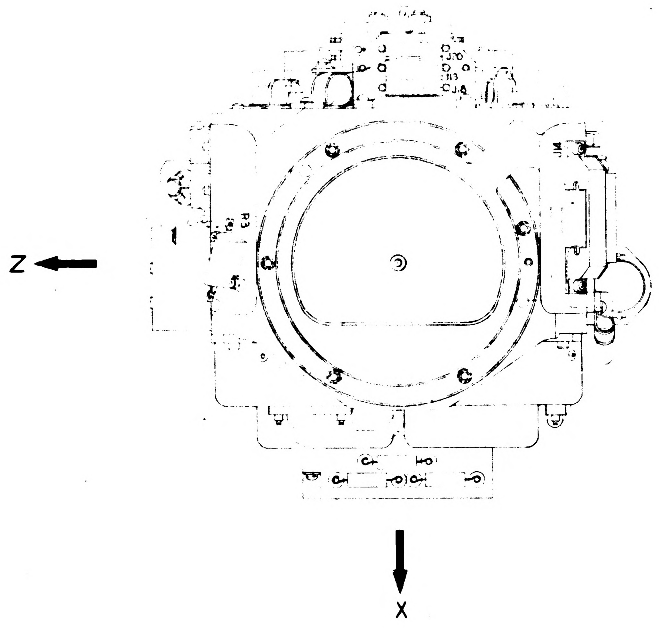
1000005 AF

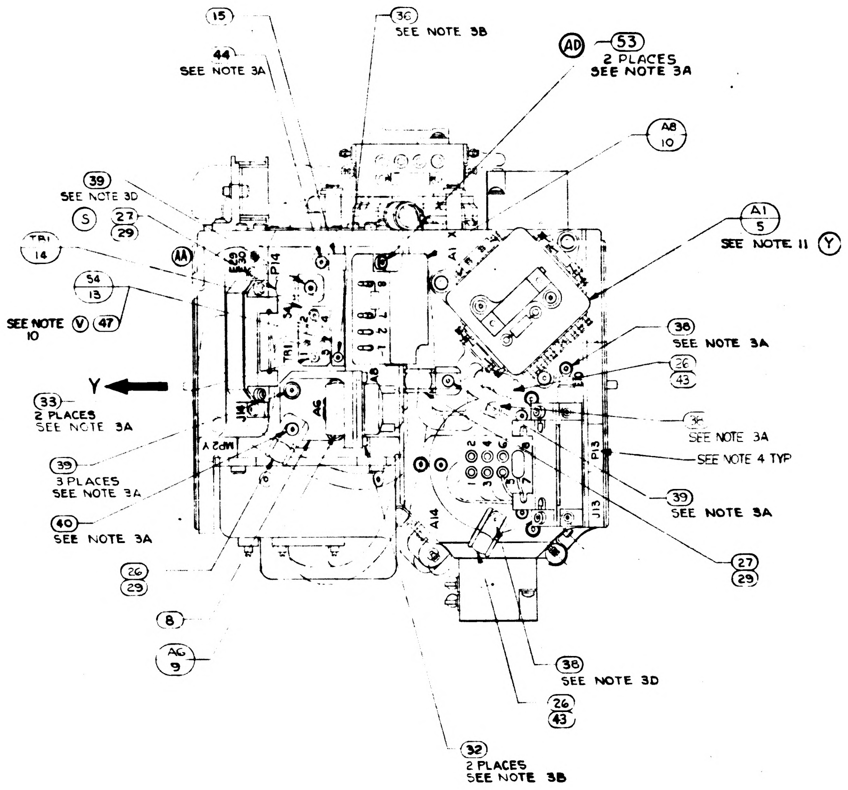
2/1000005

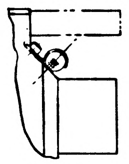
WIRING LEGEND

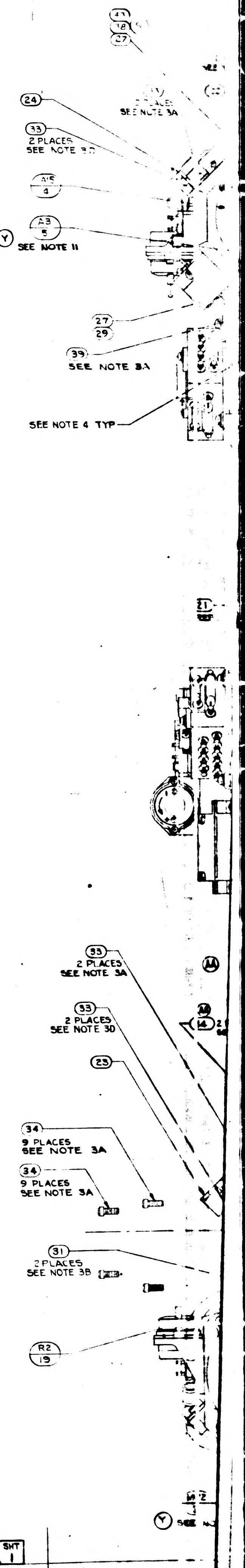
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1	WHITE		A6 - +	A8-1	8
-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




15
36 SEE NOTE 3B
44 SEE NOTE 3A
AD 53 2 PLACES SEE NOTE 3A
A8 10
39 SEE NOTE 3D
S 27 29
TB1 14
AA
S4 13
SEE NOTE 10 V 47
A1 5 SEE NOTE 11 Y
38 SEE NOTE 3A
26 43
Y
33 2 PLACES SEE NOTE 3A
36 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
39 SEE NOTE 3A
40 SEE NOTE 3A
27 29
26 29
8
A6 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P14
TB1
A6
A8
A1
P13
J13
A14




47 18 27
2 PLACES SEE NOTE 3A
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
Y SEE NOTE 11
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
21
33 2 PLACES SEE NOTE 3A
AA
A2 14
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
Y SEE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL D 70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   A. 5.0 IN. LB
   B. 3.5 IN. LB
   C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING 16 : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

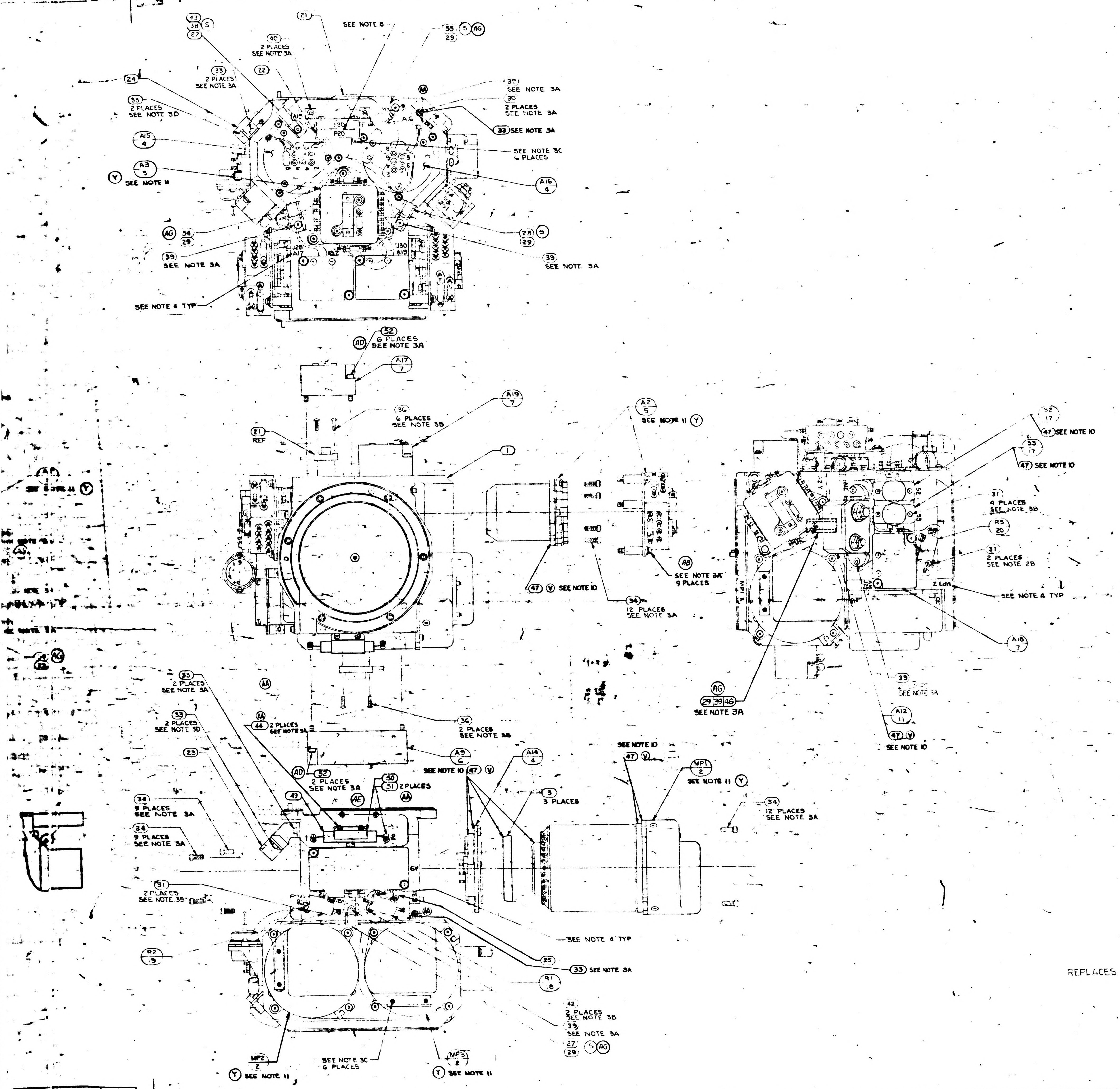
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓡ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV AF	SHT 1

1/1000005



REPLACES REV K WITH CHANGES

R1, R2 & R3 SELECTION CHART (N)

PART NO	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.80
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63	GRB	WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-15-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	FG	
	Z	REVISED PER TDRR 07945	25 MAY 64	DFB	
	AA	REVISED PER TDRR 08764	1-JUL-64	W.G.	CP
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
	AC	REVISED PER TDRR 10580	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	9 SEP 64	JWP	CP
	AG	REVISED PER TDRR 12633	25 SEP 64	JWP	

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	1	CLAMP, CABLE	1000220-9			55
	2	CLAMP, CABLE	1000220-8			54
(AD)	2	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL10			53
(AD)	8	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL14			52
(AA)	2	TERMINAL, INSULATED	1001600-1			51
(AA)	1	BRACKET, CAPACITOR	1001593			50
(AA)	1	CAPACITOR	1010279-245			49
(AA)	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			~~48~~
(V)	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
(AG)(S)	2	CLAMP, CABLE	1000220-6			46
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			~~45~~
(T)(AA)(P)	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
(S)	3	WASHER, FLAT, ROUND	MS15795-203			43
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
(AG)(P)	12	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
(AA)	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON, WAXED		MIL-T-713 TYPE P CLASS 2		37
(P)(T)	9	SCREW, BUT HD SELF LKG, SPL SOC	1000250-3			36
(AA)(L)	~~2~~	~~[illegible]~~	~~[illegible]~~			~~35~~
(P)(L)	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
(AG)(AA)(L)	13	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
(AG)	8	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
(AG)(S)	3	CLAMP, CABLE	1000220-7			27
(AG)	2	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS "A" STABLE MEMBER	1001474			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
(U)	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WRP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~100025[illegible]~~			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
(AF)(AD)	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	ACCEL ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA STABLE MEMBER	1000166			8
(AF)(AD)	3	PIP PREAMP ASSY	1007214-011			7
(AF)(AD)(M)	1	IRIG PREAMP ASSY	1007209-011			6
(Y)	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
(Y)	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE

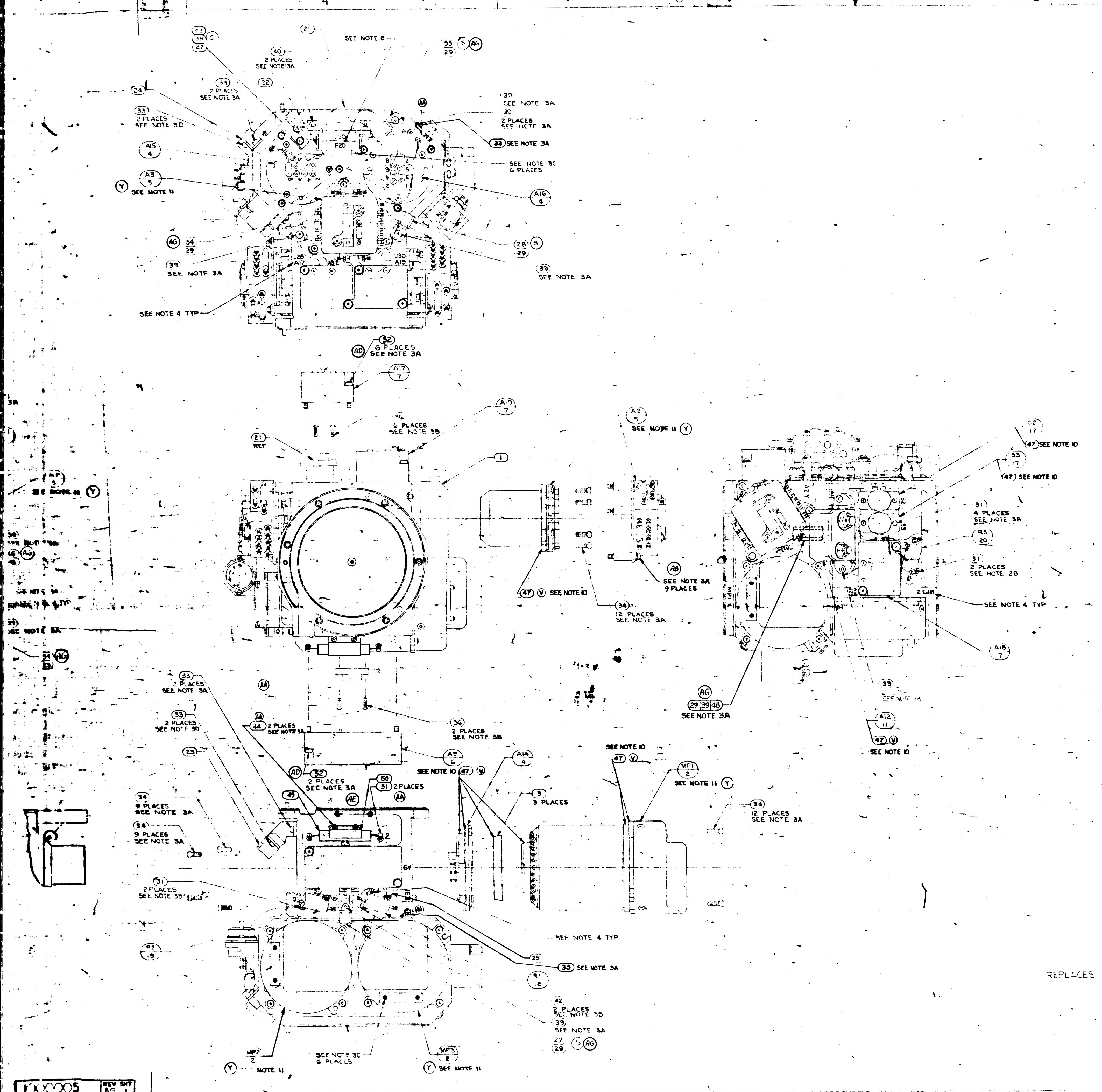
STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000005
SHEET 1 OF 1

AG

1000005


4
3
2
SEE NOTE 8
55 29 (S) (AG)
(40) 2 PLACES SEE NOTE 3A
(35) 2 PLACES SEE NOTE 3A
(33) 2 PLACES SEE NOTE 3D
(39) SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
(33) SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A15 4
A3 5
(Y) SEE NOTE 11
A16 4
(AG) 54 29
(28) (S) 29
(39) SEE NOTE 3A
(39) SEE NOTE 3A
SEE NOTE 4 TYP
P20
A17
J28
J30
A19
(AD) (52) 6 PLACES SEE NOTE 3A
A17 7
(21) REF
(36) 6 PLACES SEE NOTE 3B
A9 7
(1)
A2 5 SEE NOTE 11 (Y)
(AP) 5 SEE NOTE 11 (Y)
(47) (V) SEE NOTE 10
(AB) SEE NOTE 3A 9 PLACES
(34) 12 PLACES SEE NOTE 3A
(47) SEE NOTE 10
(47) SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 7
(AG) 29 39 46 SEE NOTE 3A
39 SEE NOTE 3A
A12 11
(47) (V) SEE NOTE 10
MP1
(33) 2 PLACES SEE NOTE 3A
(AA)
(35) 2 PLACES SEE NOTE 3D
(44) 2 PLACES SEE NOTE 3A
(23)
(36) 2 PLACES SEE NOTE 3B
(AD) (52) 2 PLACES SEE NOTE 3A
(AE)
(49)
(50) (51) 2 PLACES
(AA)
A5 6
SEE NOTE 10 (47) (V)
A14 4
(3) 3 PLACES
SEE NOTE 10 (47) (V)
MP1 2 SEE NOTE 11 (Y)
(34) 12 PLACES SEE NOTE 3A
(34) 9 PLACES SEE NOTE 3A
(34) 9 PLACES SEE NOTE 3A
(31) 2 PLACES SEE NOTE 3B
SEE NOTE 4 TYP
R2 19
(25)
(33) SEE NOTE 3A
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
27 29 (S) (AG)
MP2 2 (Y) NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 (Y) SEE NOTE 11

(N) R1,R2 & R3 SELECTION CHART

PART NO.		VALUE IN OHMS
1010498	-197	11.0
	-227	22.6
	-246	35.7
	-275	71.5
	-297	121.0
	-322	221.0
	-220	19.1
	-233	26.1
	-238	29.4
	-242	32.4
	-246	35.7
	-097	1.00
	-171	5.90
	-210	15.00
	-251	40.20
	-256	45.30
	-261	51.10
	-268	60.40
	-280	80.60
	-285	90.90
	-289	100.00
	-295	110.00
	-303	140.00
1010498	-385	1000.00

REVISIONS

	ZONE	SYM	DESCRIPTION	DATE		APPROVAL
(M)		K	REPLACES REV J WITH CHANGES TDRR 02303	7 30 63	GGB	WK
(M)		L	TDRR 03186	9-17 63		WK
(M)		M	TDRR 03345	10-15 63		WK
(M)		N	TDRR 06173	2 4 64		WK
		P	TDRR 06174	2 4 64		WK
		R	TDRR 06237	6 FEB 64		WK
(M)		S	TDRR 06385	13 FEB 64		WK
		T	TDRR 06527	25 FEB 64		WK
(M)		U	TDRR 06744	3 MAR 64		WK
		V	TDRR 07082	24 MAR 64		WK
(M)		W	REVISED PER TDRR 07576	APR 64	JHR	
(M)		Y	REVISED PER TDRR 07964	8 MAY 64	JG	
(M)		Z	REVISED PER TDRR 07345	25 MAY 64		
		AA	REVISED PER TDRR 08764	1 JUL 64	W.G.	CP
	C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
(M)		AC	REVISED PER TDRR 10500	8 JUL 64	GG	
(M)		AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
(M)		AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
(M)		AF	REVISED PER TDRR 12145	9 SEP 64	JWP	CP
		AG	REVISED PER TDRR 12633	25 SEP 64	JWP	

D
C
B
A

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	1	CLAMP, CABLE	1000220-9			55
	2	CLAMP, CABLE	1000220-8			54
(AD)	2	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL10			53
(AD)	8	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL14			52
(AA)	2	TERMINAL, INSULATED	1001600-1			51
(AA)	1	BRACKET, CAPACITOR	1001593			50
(AA)	1	CAPACITOR	1010279-245			49
(AA)	~~1~~	~~[illegible]~~	~~[illegible]~~			~~48~~
(V)	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
(AG) (S)	2	CLAMP, CABLE	1000220-6			46
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000880-1~~			45
(T) (AA) (P)	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
(S)	3	WASHER, FLAT, ROUND	MS15795-703			43
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
(AG) (P)	12	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
(AA)	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
(P) (T)	9	SCREW, BUT HD SELF LKG, SPL SOC	1000250-3			36
(AA) (L)	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~			~~35~~
(AG) (P) (L)	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
(AA) (L)	13	SCREW, CAP SELF LKG, SOC HD HEX	NAS1352C04LL4			33
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
(AG)	8	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
(AG) (S)	3	CLAMP, CABLE	1000220-7			27
(AG)	2	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS "A" STABLE MEMBER	1001474			21
	1	RESISTOR-FIXED ~~R3~~	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
(U)	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SNGC MAPP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
(AF) (AD)	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA STABLE MEMBER	1000166			8
(AF) (AD)	3	PIP PREAMP ASSY	1007214-011			7
(AF) (AD) (M)	1	IRIG PREAMP ASSY	1007209-011			6
(Y)	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, ~~GYRO~~	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
(Y)	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
DATE
APPROVED
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL
DATE

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

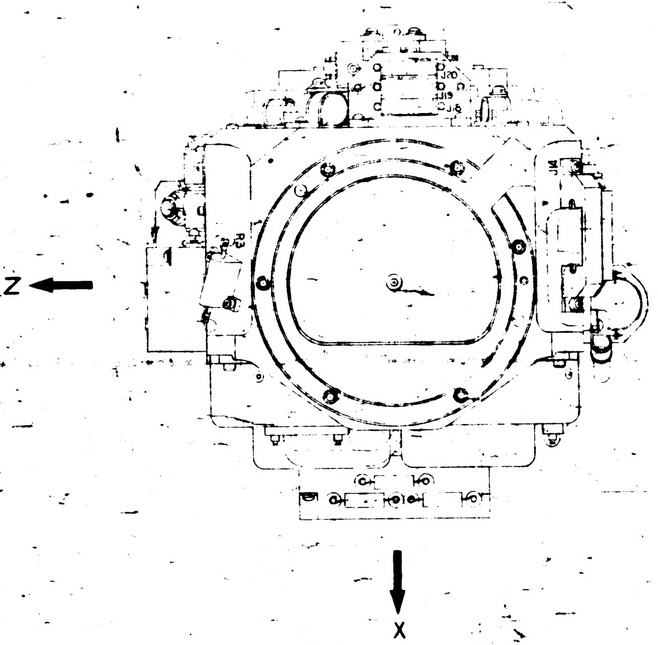
A6
1000005

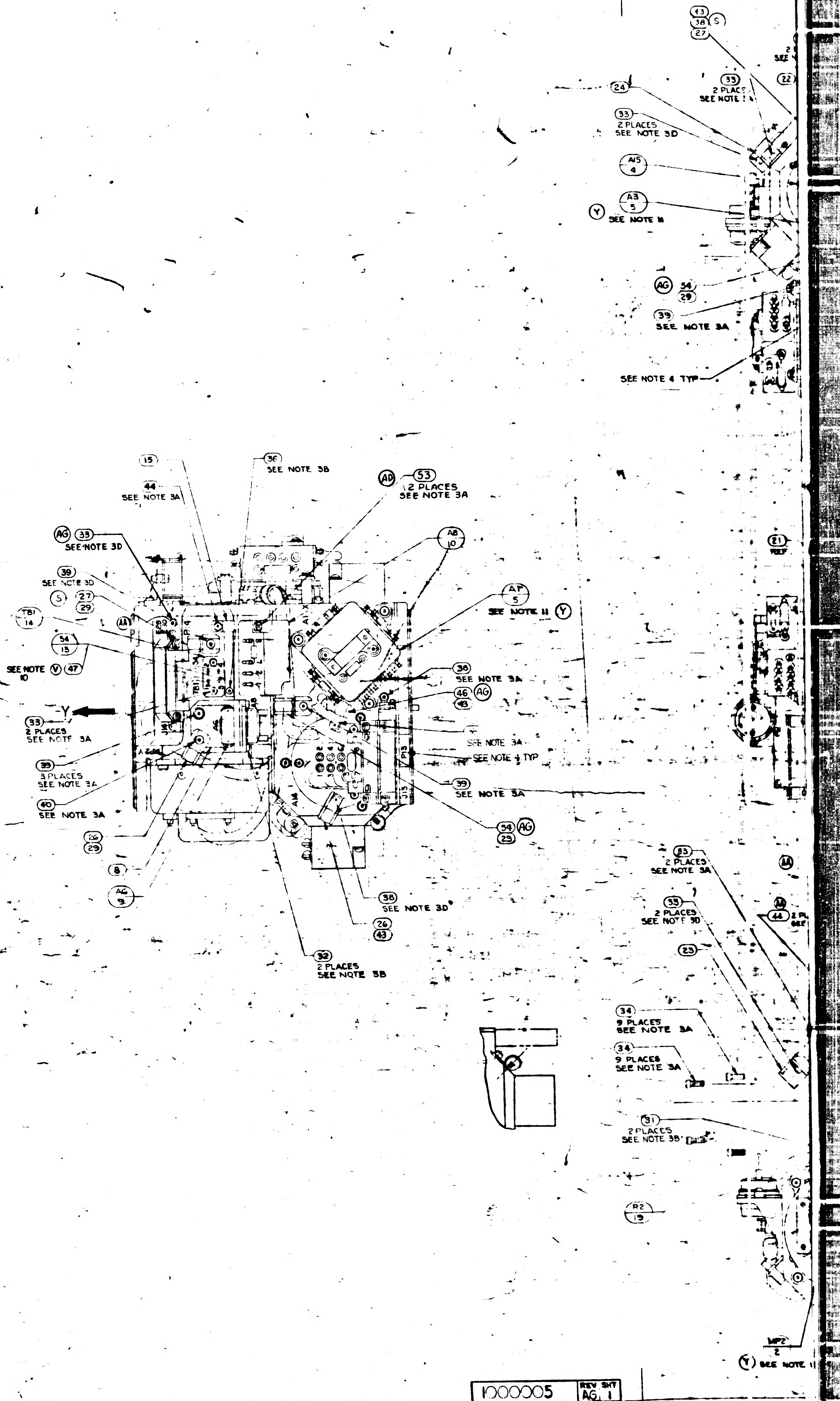
1000005 REV AG SHT 1

2 / 1000005

COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

WIRING LEGEND ⓥ





NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70827
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP1000001
3. SCREW TORQUE REQUIREMENTS ± 7%
   - A. 5.0 IN LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP1000001
6. SOLDER PER MIL-STD-440 USING ⑯ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE.
10. ⓥ APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM ① AND ITEMS ②, ④, ⑤, ⑪, ⑬ & ⑰ AND BETWEEN ITEM ③ AND ITEM ④ AND BETWEEN ITEM ② AND ITEM ③
11. Ⓨ INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

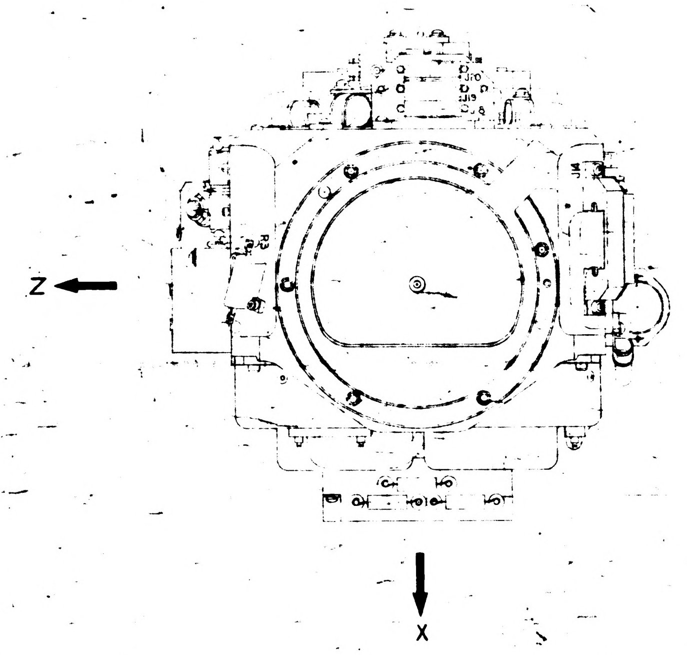
NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

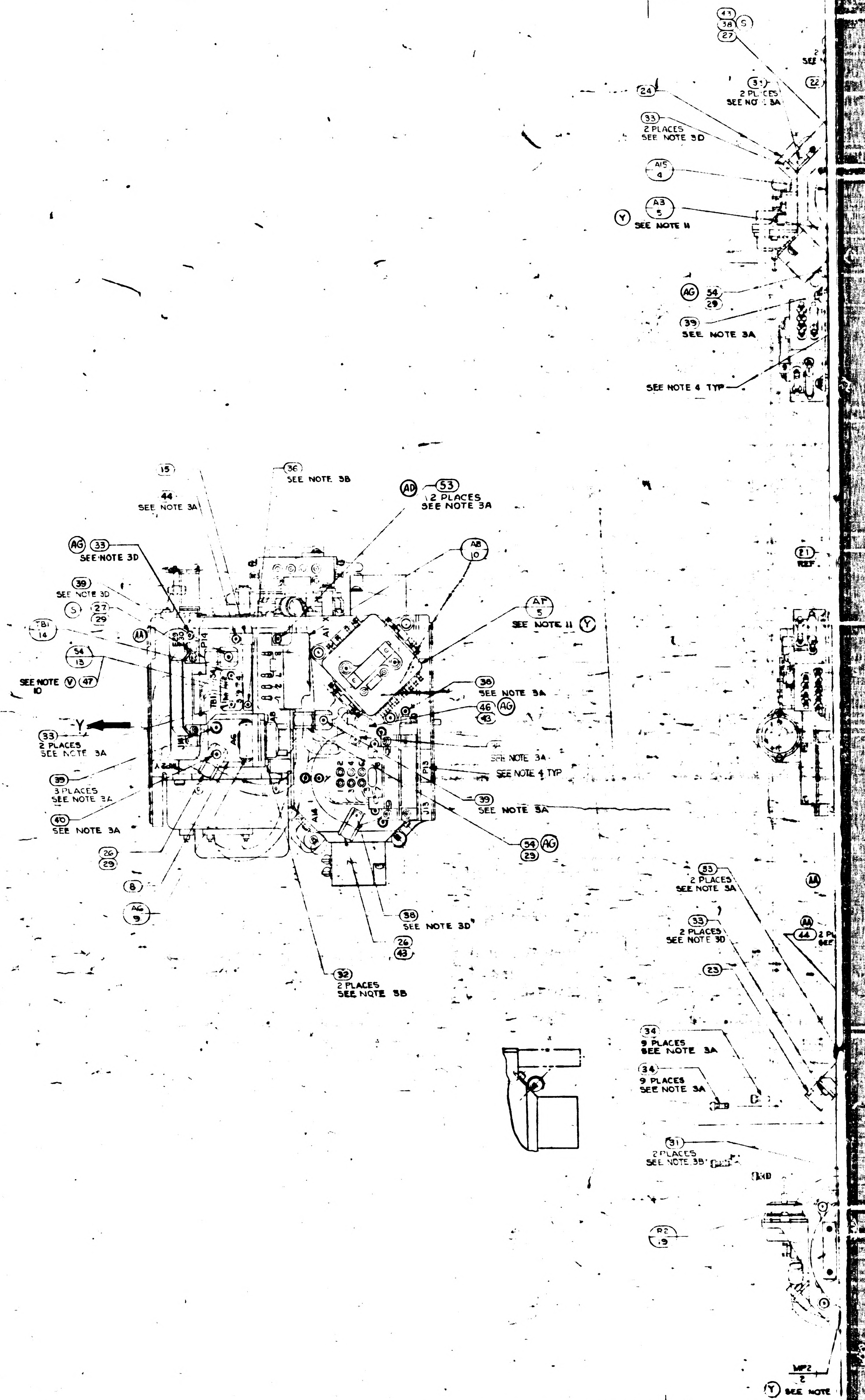
1000005	REV SHT
	AG 1

WIRING LEGEND

COND NC	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




SEE NOTE 3B
44
SEE NOTE 3A
AD 53
2 PLACES
SEE NOTE 3A
AG 33
SEE NOTE 3D
39
SEE NOTE 3D
S 27 29
TB1 14
S4 13
SEE NOTE V 47 10
A8 10
A7 5
SEE NOTE 11 Y
36
SEE NOTE 3A
46 43
AG
Y
33
2 PLACES
SEE NOTE 3A
39
3 PLACES
SEE NOTE 3A
40
SEE NOTE 3A
SEE NOTE 3A
SEE NOTE 4 TYP
39
SEE NOTE 3A
54 29 AG
26 29
8
A6 9
38
SEE NOTE 3D
26 43
32
2 PLACES
SEE NOTE 3B
24
33
2 PLACES
SEE NOTE 3D
A15 4
A3 3
Y SEE NOTE 11
AG 54 29
39
SEE NOTE 3A
SEE NOTE 4 TYP
E1
REF.
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R2 19
MP2 2
Y SEE NOTE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN, A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

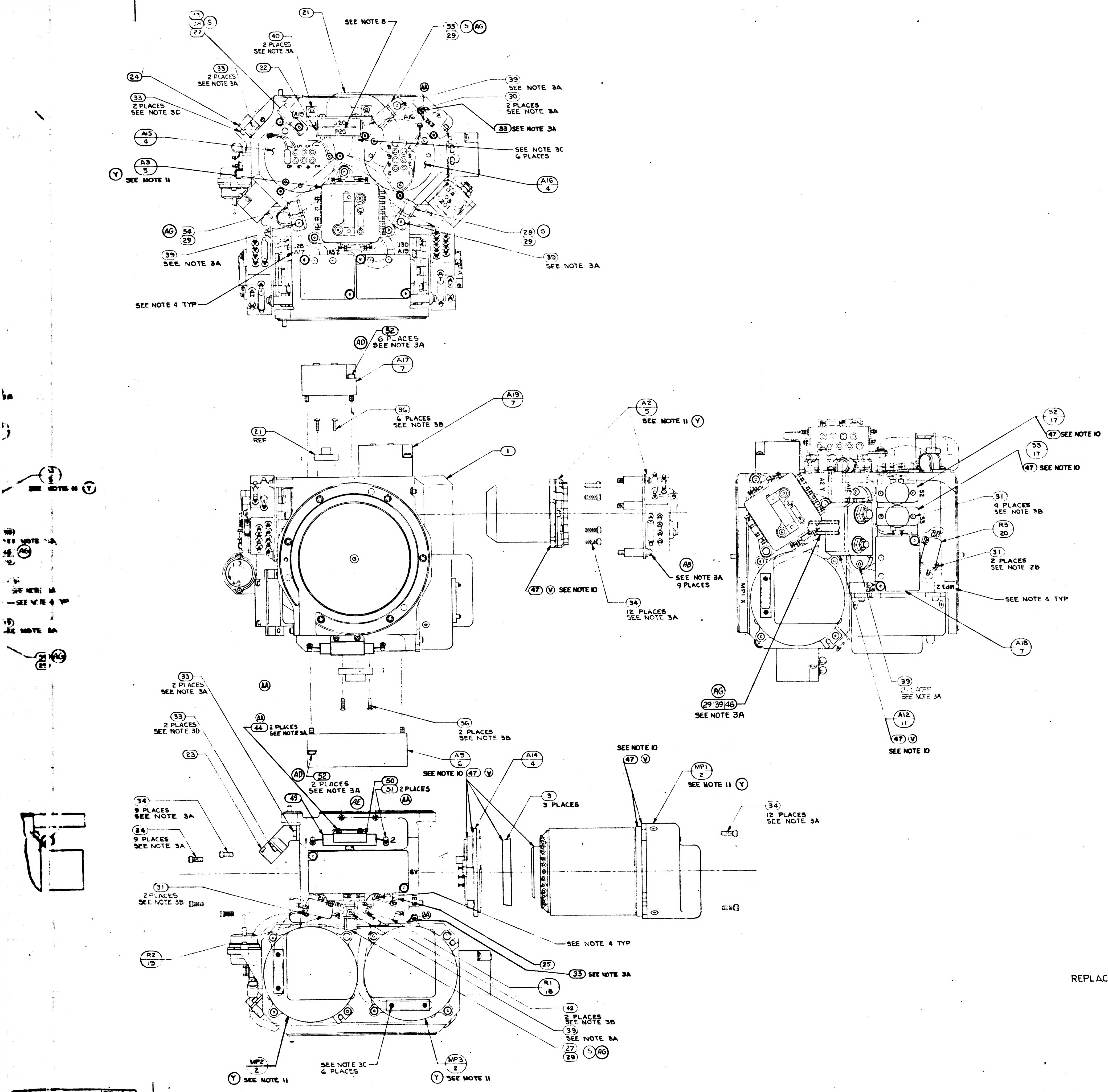
NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005 REV AG SHT 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-15-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	5 MAR 64		WK
	V	TDRR 07082	MAR 64		WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	18 MAY 64	IG	
	Z	REVISED PER TDRR 07945	25 MAY 64		
	AA	REVISED PER TDRR 08764	JUL 64	W.G.	CP
C-3	AB	REVISED PER TDRR 10164	JUL 64	FL	
	AC	REVISED PER TDRR 10500	3 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	2 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	SEP 64	JWP	CP
	AG	REVISED PER TDRR 12633	25 SEP 64	JWP	
	AH	REVISED PER TDRR 12634	25 SEP 64	JWP	CP

N R1, R2 & R3 SELECTION CHART

PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00



21
SEE NOTE 8
35 S AG 29
17 S 27
40 2 PLACES SEE NOTE 3A
35 2 PLACES SEE NOTE 3A
22
24
33 2 PLACES SEE NOTE 3C
A15 4
A3 5
Y SEE NOTE 11
AG 34 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
33 SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A16 4
28 S 29
39 SEE NOTE 3A
J20
P20
A15
A16
A17
A19
J30
AD 52 6 PLACES SEE NOTE 3A
A17 7
36 6 PLACES SEE NOTE 3B
21 REF
A19 7
1
A2 5 SEE NOTE 11 Y
47 V SEE NOTE 10
34 12 PLACES SEE NOTE 3A
AB SEE NOTE 3A 9 PLACES
AA
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
AA 44 2 PLACES SEE NOTE 3A
36 2 PLACES SEE NOTE 3B
AD 52 2 PLACES SEE NOTE 3A
49
AE
50 51 2 PLACES AA
A9 6
SEE NOTE 10 47 V
A14 4
3 3 PLACES
SEE NOTE 10 47 V
MP1 2 SEE NOTE 11 Y
34 12 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
SEE NOTE 4 TYP
25
33 SEE NOTE 3A
R2 19
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
27 29 S AG
MP2 2 Y SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 Y SEE NOTE 11
52 17 47 SEE NOTE 10
53 17 47 SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 7
39 SEE NOTE 3A
A12 11
47 V SEE NOTE 10
AG 29 39 46 SEE NOTE 3A
MPI X
A2 Y

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	1	CLAMP, CABLE	1000220-9			55
	2	CLAMP, CABLE	1000220-8			54
AH AD	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD HEX~~	~~NAS1352C04LL10~~			~~53~~
AH AD	10	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL11			52
AA	2	TERMINAL, INSULATED	1001600-1			51
AA	1	BRACKET, CAPACITOR	1001593			50
AA	1	CAPACITOR	1010279-245			49
AA	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			~~48~~
V	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
AG S	2	CLAMP, CABLE	1000220-6			46
P	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
T AA P	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
S	3	WASHER, FLAT, ROUND	MS15795-703			43
L	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
P	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
AG P	12	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
AA	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
N	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
P T	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
AA L	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD, HEX~~	~~NAS1352C04LL[illegible]~~			~~35~~
L	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
AG P AA L	13	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
L	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
L	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
AG	8	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
AG S	3	CLAMP, CABLE	1000220-7			27
AG	2	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS A' STABLE MEMBER	1001474			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
U	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
P	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
AF AD	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA, STABLE MEMBER	1000166			8
AF AD	3	PIP PREAMP ASSY	1007214-011			7
AF AD M	1	IRIG PREAMP ASSY	1007209-011			6
Y	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTP & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
Y	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED C.J. Boyce DATE 7-30-63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT II APPROVAL DATE
31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

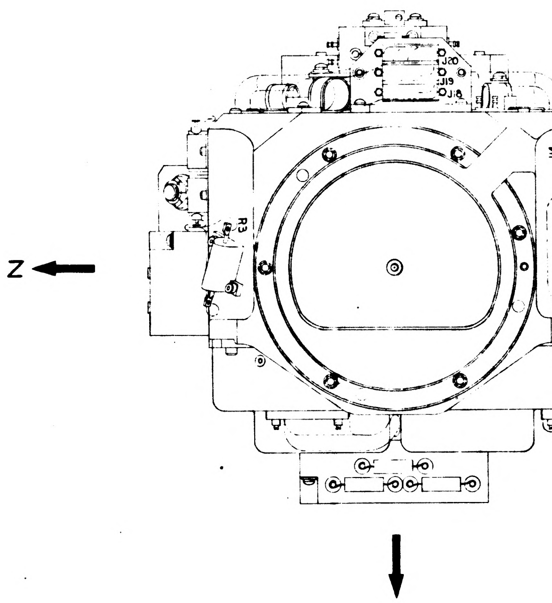
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

AH
1000005

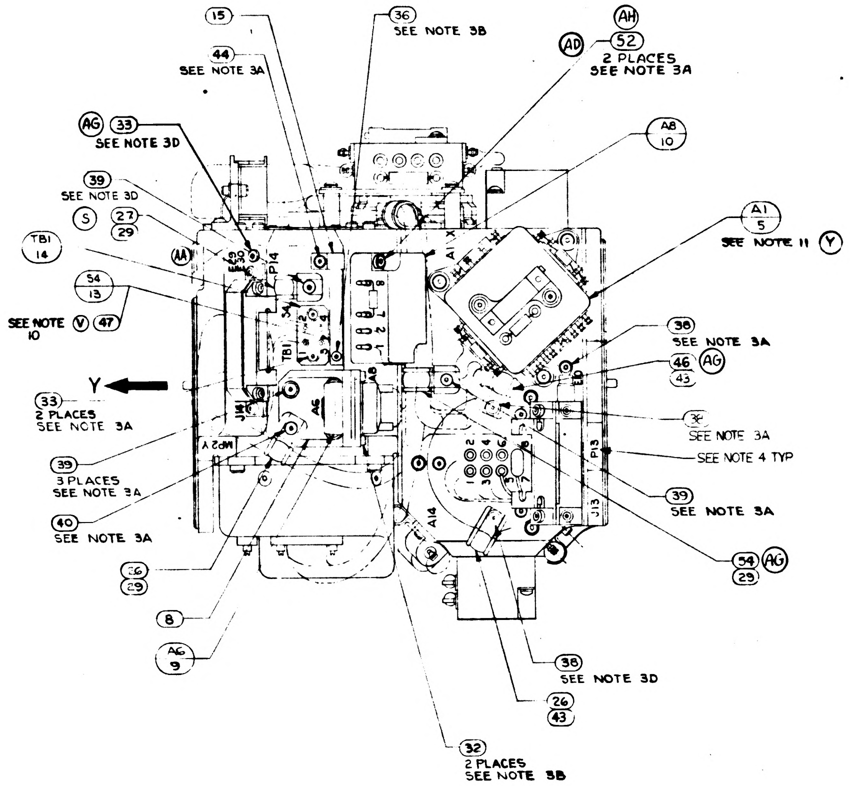
2 / 1000005

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

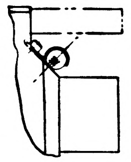
(V)

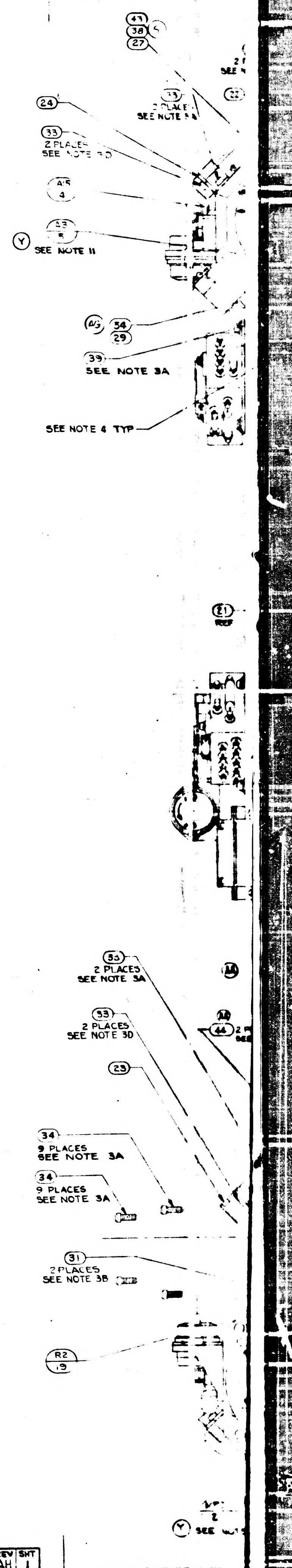


Z
X
R3
J20
J19
J18



15
36 SEE NOTE 3B
44 SEE NOTE 3A
AH
AD 52 2 PLACES SEE NOTE 3A
AG 33 SEE NOTE 3D
A8 10
39 SEE NOTE 3D
S 27 29
TB1 14
AA
S4 13
SEE NOTE 10 V 47
A1 5 SEE NOTE 11 Y
Y
33 2 PLACES SEE NOTE 3A
38 SEE NOTE 3A
46 43 AG
38 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
39 SEE NOTE 3A
40 SEE NOTE 3A
54 29 AG
26 29
8
A6 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P14
S4
TB1
A8
A6
J14
MP2 Y
A14
P13
J13
A11 X





47
38
27
24
33 2 PLACES SEE NOTE 3D
A8 4
Y SEE NOTE 11
54 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
21 REF
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
Y SEE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

(R) ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

(Y) (V) 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

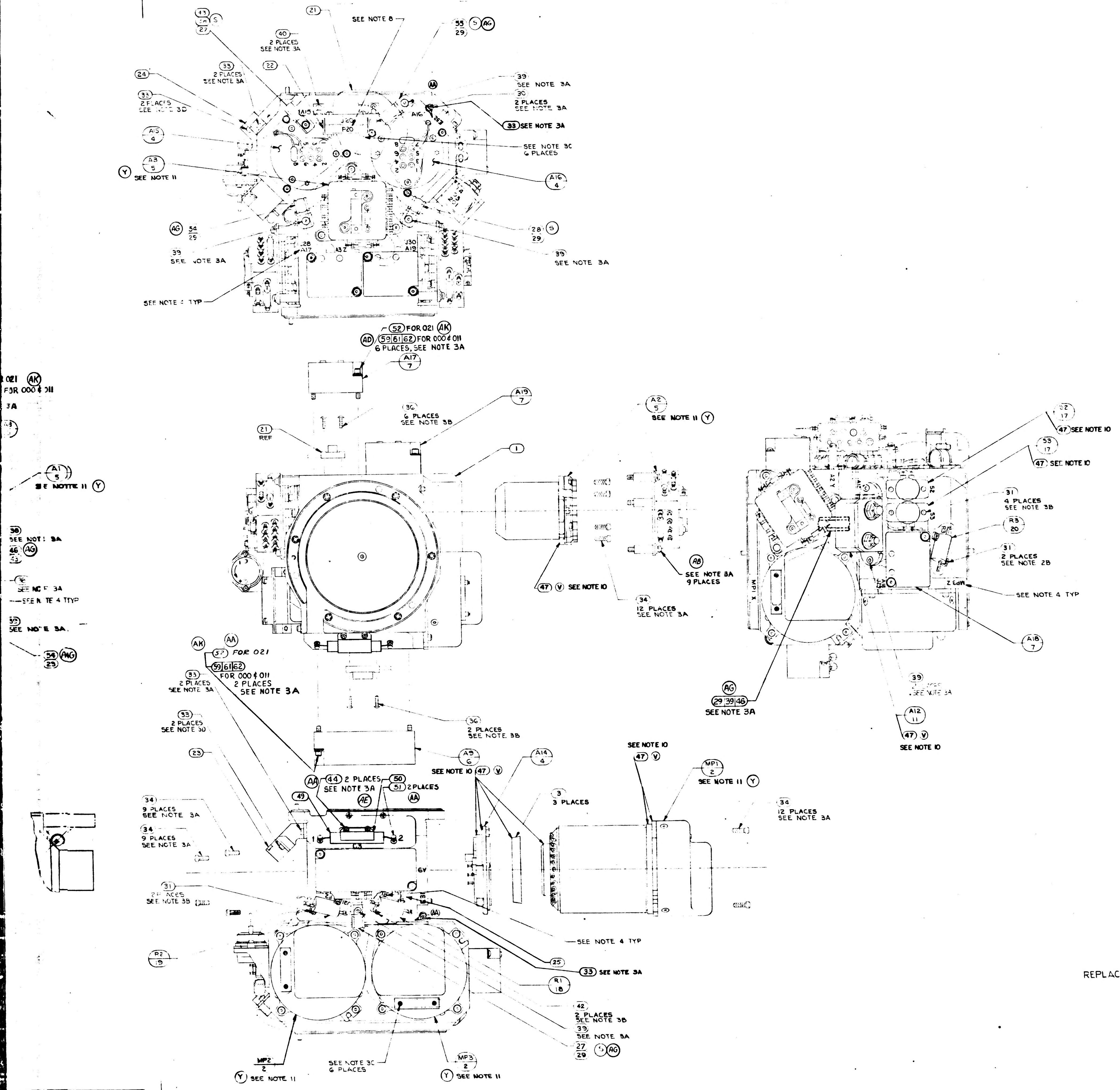
(Y) 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

(R)

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV AH	SHT 1



SEE NOTE 8
55 5 AG 29
21
40 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3A
22
24
33 2 PLACES SEE NOTE 3C
A15 4
A3 5
Y SEE NOTE 11
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
33 SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A16 4
AG 34 25
28 5 29
39 SEE NOTE 3A
39 SEE NOTE 3A
SEE NOTE 4 TYP
52 FOR 021 AK
AD 59 61 62 FOR 000 & 011 6 PLACES, SEE NOTE 3A
A17 7
021 AK FOR 000 & 011 3A
A19 7
36 6 PLACES SEE NOTE 3B
A2 5 SEE NOTE 11 Y
21 REF
1
A1 5 SEE NOTE 11 Y
38 SEE NOTE 3A
46 AG 43
SEE NOTE 3A
SEE NOTE 4 TYP
37 SEE NOTE 3A
34 AG 29
47 V SEE NOTE 10
AB SEE NOTE 3A 9 PLACES
34 12 PLACES SEE NOTE 3A
52 17
47 SEE NOTE 10
53 17
47 SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 7
AG 29 39 46 SEE NOTE 3A
39 SEE NOTE 3A
A12 11
47 V SEE NOTE 10
AK 37 FOR 021
AA 59 61 62 FOR 000 & 011 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3C
23
36 2 PLACES SEE NOTE 3B
A5 6
SEE NOTE 10 47 V
A14 4
3 3 PLACES
SEE NOTE 10 47 V
MP1 2 SEE NOTE 11 Y
34 12 PLACES SEE NOTE 3A
AA 44 2 PLACES SEE NOTE 3A
50
51 2 PLACES
AE
AA
49
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
P2 18
SEE NOTE 4 TYP
25
33 SEE NOTE 3A
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
27 29 5 AG
MP2 2 Y SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 Y SEE NOTE 11

N

R1, R2 & R3 SELECTION CHART PART NO.	VALUE IN OHMS
1010498 -197	1.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03345	10-16-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18FEB64		WK
	S	TDRR 06385	18FEB64		WK
	T	TDRR 06527	25FEB64		WK
	U	TDRR 06744	3 MAR64		WK
	V	TDRR 07082	24 MAR64		WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	GG	
	Z	REVISED PER TDRR 07945	25 MAY 64		
	AA	REVISED PER TDRR 08764	1 JUL 64		CP
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	9 SEP 64	JWP	CP
	AG	REVISED PER TDRR 12533	25 SEP 64	JWP	
	AH	REVISED PER TDRR 12634	28 SEP 64	JWP	CH
	AJ	REVISED PER TDRR 13372	20 [illegible] 64	JWP	AU
	AK	REVISED PER TDRR 14540	8 DEC 64	JWP	PT

REPLACES REV K WITH CHANGES

QTY	QTY 021	QTY 011	QTY REQD 000	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	-	10	10	WASHER FLAT	MS15795-303			62
	-	10	10	WASHER LOCK	MS35337-78			61
	-	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
	-	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
	3	-	-	PIP & CALIB. MOD.	1001598-021			58
	-	3	-	PIP & CALIB. MOD.	1001598-011			57
	3	3	-	GYRO & CALIB. MOD.	1001599-011			56
	1	1	1	CLAMP, CABLE	1000220-9			55
	2	2	2	CLAMP, CABLE	1000220-8			54
	-	-	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD HEX~~	~~NAS1352C04LL10~~			53
	10	-	-	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL11			52
	2	2	2	TERMINAL, INSULATED	1001600-1			51
	1	1	1	BRACKET CAPACITOR	1001593			50
	1	1	1	CAPACITOR	1010279-245			49
	-	-	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			48
	A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
	2	2	2	CLAMP, CABLE	1000220-6			46
	-	-	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
	3	3	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
	3	3	3	WASHER, FLAT, ROUND	MS15795-703			43
	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
	-	-	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
	4	4	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
	12	12	12	SCREW BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	3	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
	A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
	9	9	9	SCREW BUT HD SELF LKG SPL SOC	1000250-3			36
	-	-	~~2~~	~~[illegible]~~	~~[illegible]~~			35
	42	42	42	SCREW CAP SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
	13	13	13	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
	2	2	2	SCREW CAP SELF LKG, SOC HD, HEX	NAS1352C02 LL4			32
	8	8	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	2	2	SCREW CAP SOC HD HEX	1000110-302			30
	8	8	8	WASHER, CABLE CLAMP	1000223			29
	1	1	1	CLAMP, CABLE	1000220-11			28
	3	3	3	CLAMP, CABLE	1000220-7			27
	2	2	2	CLAMP, CABLE	1000220-5			26
	1	1	1	SPACER, RESISTOR, STABLE MEMBER	100146[illegible]			25
	1	1	1	COVER, BRKT, CONNECTOR	1000150			24
	1	1	1	COVER, BRKT, CONNECTOR	1000164			23
	1	1	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	1	1	WIRING HARNESS A STABLE MEMBER	1001474			21
	1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
	2	2	2	THERMOSTAT, SAFETY	1001485			17
	A/R	A/R	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	1	1	CLAMP, MERCURY THERMO	1000248			15
	1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000233			14
	1	1	1	THERMO & HEATER ASSY	1000247			13
	-	1	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
	1	1	1	EMER HEATERS CONTROL MODULE	1007012			11
	1	1	1	ADA PREAMP ASSY STABLE MEMBER	1007212-011			10
	1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	1	1	MOUNT, ADA STABLE MEMBER	1000166			8
	3	3	3	PIP PREAMP ASSY	1007214-011			7
	1	1	1	IRIG PREAMP ASSY	1007209-011			6
	-	-	3	PIP & CAL B. MOD.	1001598		SEE NOTE 11	5
	3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	3	3	CLAMP, SPLIT, GYRO	1000138			3
	-	-	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	1	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN RES 6-7-63

STABLE MEMBER ASSEMBLY

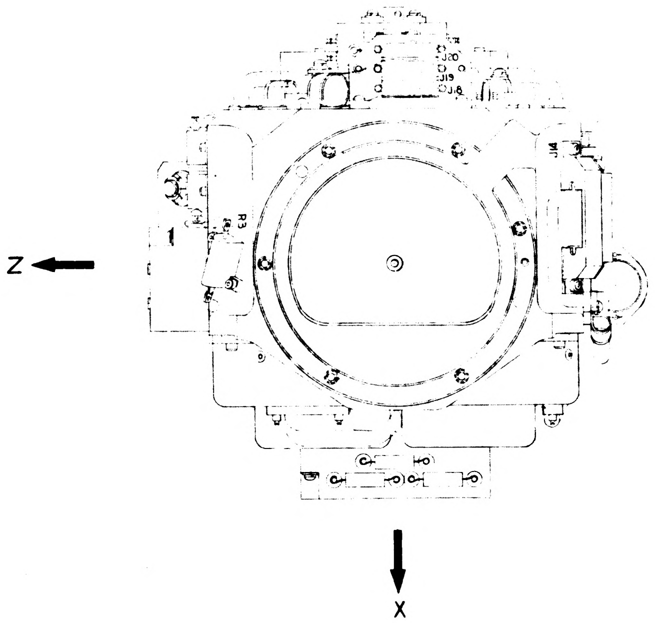
SCALE 1/1
UNIT WT
CODE IDENT

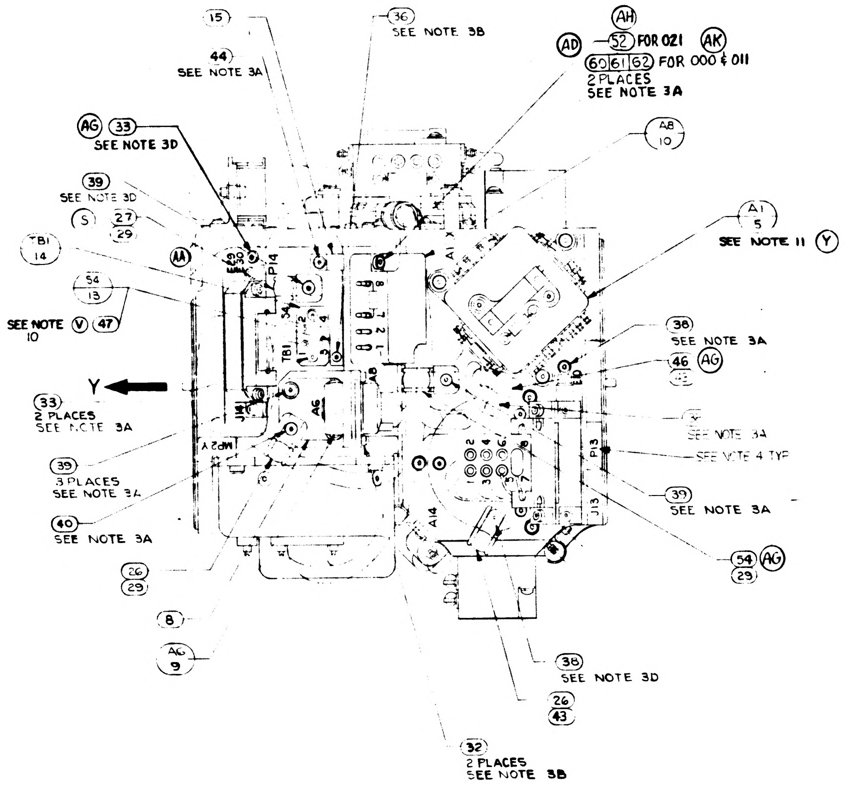
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO. 1000005
SHEET 1 OF 1

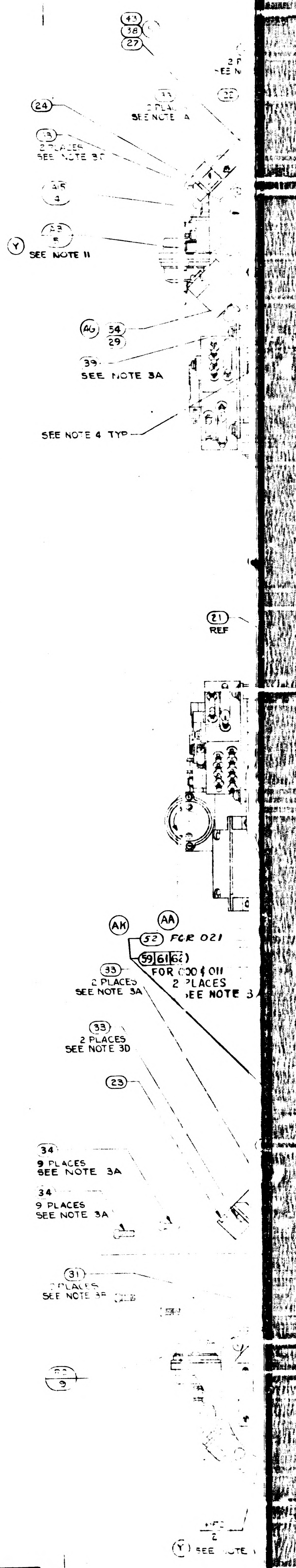
AK 1000005

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




(15)
(36) SEE NOTE 3B
(44) SEE NOTE 3A
(AH)
(AD) (52) FOR 021 (AK)
(60)(61)(62) FOR 000 & 011
2 PLACES
SEE NOTE 3A
(AG) (33) SEE NOTE 3D
(A8/10)
(39) SEE NOTE 3D
(S) (27/29)
(TB1/14)
(AA)
(S4/13)
(A1/5)
SEE NOTE 11 (Y)
SEE NOTE 10 (V) (47)
P14
TB1
S4
A8
A6
A14
P13
J13
J14
Y
(33) 2 PLACES SEE NOTE 3A
(38) SEE NOTE 3A
(46) (AG)
SEE NOTE 3A
SEE NOTE 4 TYP
(39) 3 PLACES SEE NOTE 3A
(39) SEE NOTE 3A
(40) SEE NOTE 3A
(54/29) (AG)
(26/29)
(8)
(AG/9)
(38) SEE NOTE 3D
(26/43)
(32) 2 PLACES SEE NOTE 3B


(43)
(38)
(27)
(24)
2 PLACES
SEE NOTE 3A
(33) 2 PLACES SEE NOTE 3D
(A15/4)
(A3/5)
(Y) SEE NOTE 11
(AG) (54/29)
(39) SEE NOTE 3A
SEE NOTE 4 TYP
(21) REF
(AK) (AA)
(52) FOR 021
(59)(61)(62) FOR 000 & 011
2 PLACES
SEE NOTE 3A
(33) 2 PLACES SEE NOTE 3A
(33) 2 PLACES SEE NOTE 3D
(23)
(34) 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
(31) 2 PLACES SEE NOTE 3B
(9)
(Y) SEE NOTE

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   A. 5.0 IN.LB
   B. 3.5 IN.LB
   C. 2.0 IN.LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~
8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

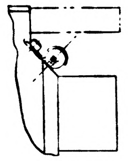
Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. & PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS 1001599 AND 1001598. TO BE MAINTAINED IN CONJUCTION WITH THIS ASSY.

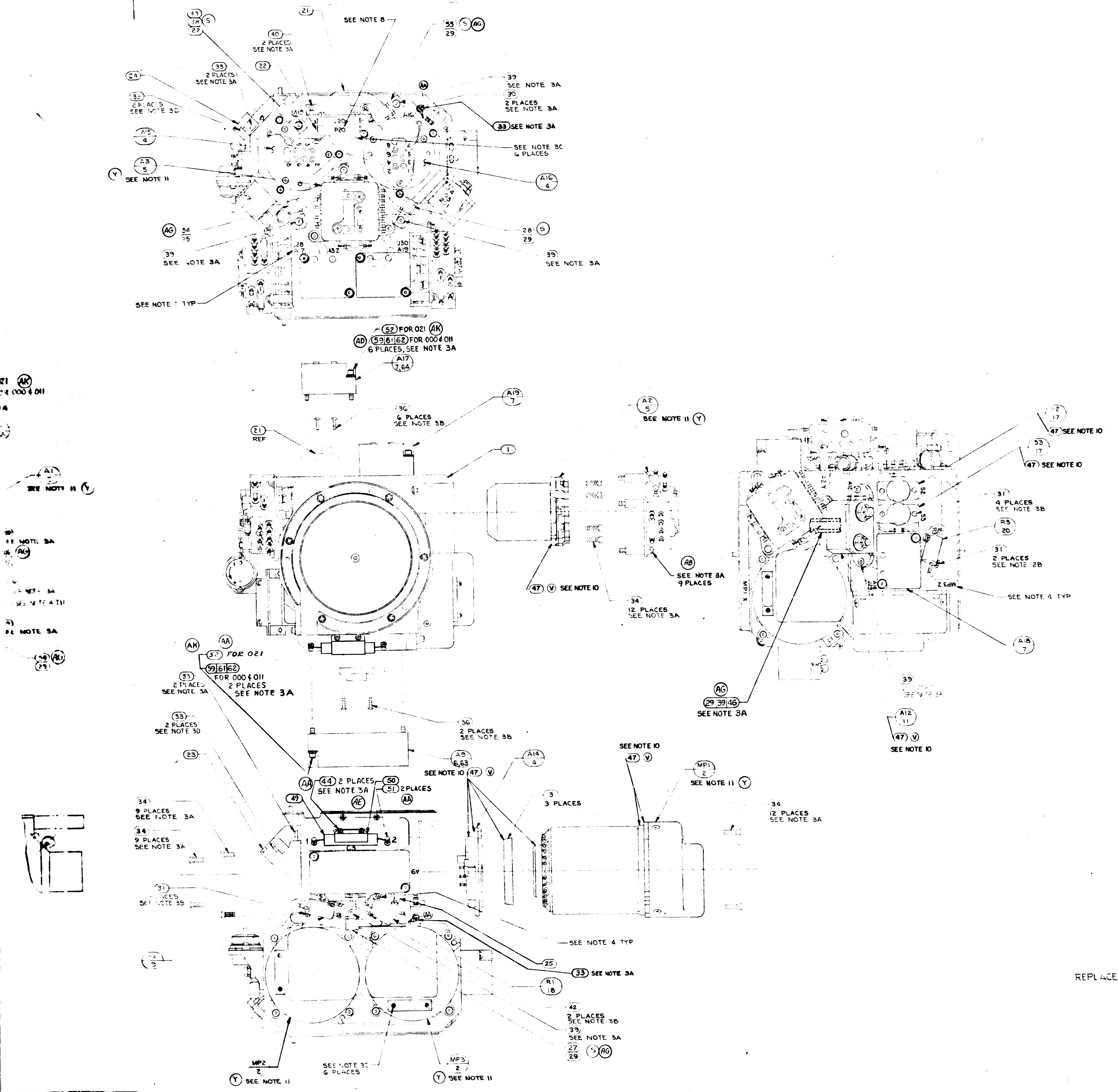
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓡ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3



1000005	REV AK	SHT 1



SEE NOTE 8
55 (S) (AG) 29
40 2 PLACES SEE NOTE 3A
39 2 PLACES SEE NOTE 3A
32 2 PLACES SEE NOTE 3D
A15 4
A3 5
(Y) SEE NOTE 11
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
33 SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A16 4
28 (S) 29
39 SEE NOTE 3A
SEE NOTE 1 TYP
52 FOR 021 (AK)
(AD) 59 61 62 FOR 000 & 011 6 PLACES, SEE NOTE 3A
A17 7,64
21 REF
36 6 PLACES SEE NOTE 3B
A19 7
A2 5 SEE NOTE 11 (Y)
47 (V) SEE NOTE 10
A8 SEE NOTE 3A 9 PLACES
34 12 PLACES SEE NOTE 3A
47 SEE NOTE 10
53 17
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 7
(AG) 29 39 46 SEE NOTE 3A
A12 11
(47) (V) SEE NOTE 10
(AK) (AA) 52 FOR 021
59 61 62 FOR 000 & 011 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
36 2 PLACES SEE NOTE 3B
A9 6,63
SEE NOTE 10 (47) (V)
A14 4
SEE NOTE 10 47 (V)
MP1 2 SEE NOTE 11 (Y)
44 2 PLACES SEE NOTE 3A
50 51 2 PLACES (AA)
49 (AE)
3 3 PLACES
34 12 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
SEE NOTE 4 TYP
25
33 SEE NOTE 3A
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
27 29 (S) (AG)
MP2 2 (Y) SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 (Y) SEE NOTE 11

(N)

R1, R2 & R3 SELECTION CHART	
PART NO	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-18-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	JG	
	Z	REVISED PER TDRR 07945	25 MAY 64		
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	CO
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	7 SEP 64	JWP	CP
	AG	REVISED PER TDRR 12633	25 SEP 64	JWP	
	AH	REVISED PER TDRR 12634	25 SEP 64	JWP	CP
	AJ	REVISED PER TDRR 13372	[illegible] 64	JWP	AU
	AK	REVISED PER TDRR 14540	8 DEC 64	JWP	PF
	AL	REVISED PER TDRR 15015	4 JAN 65		CP

REPLACES REV K WITH CHANGES

QTY	QTY	QTY	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	1	1	–	ADA PREAMP ASSY STABLE MEMBER	1008282-011			65
	3	3	–	PIP PREAMP ASSY	1008285-011			64
	1	1	–	IRIG PREAMP ASSY	1008284-011			63
	–	10	10	WASHER FLAT	MS15795-303			62
	–	10	10	WASHER LOCK	MS35337-78			61
	–	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
	–	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
	3	–	–	PIP & CALIB. MOD.	1001598-021			58
	–	3	–	PIP & CALIB. MOD.	1001598-011			57
	3	3	–	GYRO & CALIB. MOD.	1001599-011			56
	1	1	1	CLAMP, CABLE	1000220-9			55
	2	2	2	CLAMP, CABLE	1000220-8			54
	–	–	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD HEX~~	~~NAS1352C04LL[illegible]~~			53
	10	–	–	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL11			52
	2	2	2	TERMINAL, INSULATED	1001600-1			51
	1	1	1	BRACKET, CAPACITOR	1001593			50
	1	1	1	CAPACITOR	1010279-245			49
	–	–	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001597~~			48
	A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
	2	2	2	CLAMP, CABLE	1000220-6			46
	–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
	3	3	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
	3	3	3	[illegible]	MS15795-[illegible]03			43
	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
	–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
	4	4	4	SCREW, BUT HD SELF LKG, SPL SOC	1000250-14			40
	12	12	12	SCREW BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	3	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
	A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
	9	9	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
	–	–	~~2~~	~~[illegible]~~	~~[illegible]~~			35
	42	42	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
	13	13	13	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
	2	2	2	SCREW CAP SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
	8	8	8	SCREW CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	2	2	SCREW CAP SOC HD HEX	1000110-302			30
	8	8	8	WASHER, CABLE CLAMP	1000223			29
	1	1	1	CLAMP, CABLE	1000220-11			28
	3	3	3	CLAMP, CABLE	1000220-7			27
	2	2	2	CLAMP, CABLE	1000220-5			26
	1	1	1	[illegible], STABLE MEMBER	100146[illegible]			25
	1	1	1	COVER, BRKT, CONNECTOR	1000150			24
	1	1	1	COVER, BRKT, CONNECTOR	1000164			23
	1	1	1	COVER, BRKT, CONN. 26 PIN	1000265			22
	1	1	1	WIRING HARNESS A STABLE MEMBER	1001474			21
	1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
	2	2	2	THERMOSTAT, SAFETY	1001485			17
	A/R	A/R	A/R	SOLDER		SN60 WRAP 2 QQ-S-571		16
	1	1	1	CLAMP, MERCURY THERMO	1000248			15
	1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	1	1	THERMO & HEATER ASSY	1000247			13
	–	1	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
	1	1	1	EMER HEATERS CONTROL MODULE	[illegible]			11
	–	–	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	1	1	MOUNT, ADA STABLE MEMBER	1000166			8
	–	–	3	PIP PREAMP ASSY	1007214-011			7
	–	–	1	IRIG PREAMP ASSY	1007209-011			6
	–	–	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	3	3	CLAMP, SPLIT, GYRO	1000138			3
	–	–	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	1	1	HOUSING, STABLE MEMBER	1001476			1
	021	011	000	LIST OF PARTS AND MATERIALS				

1000204 DL1000201
NEXT ASSY
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED
CHECKED
DRAWN RES 6-7-63

STABLE
MEMBER
ASSEMBLY

SCALE 1/1

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000005
SHEET 1 1

5 REV AL SH 1

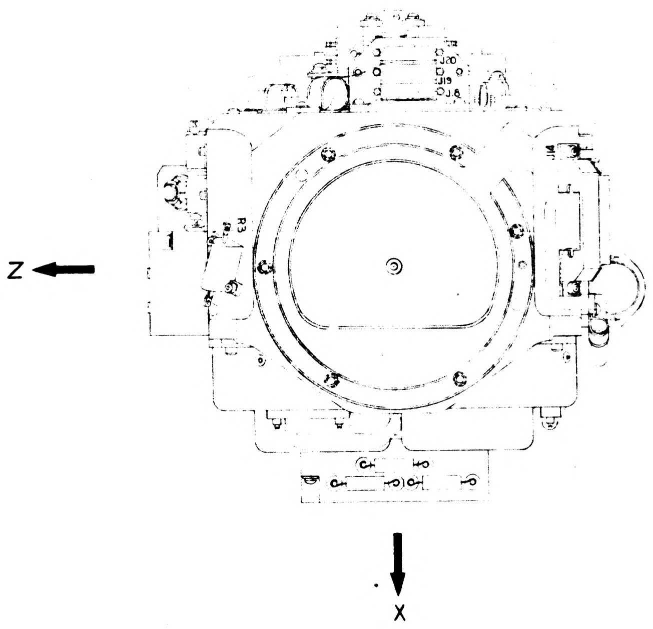
AL

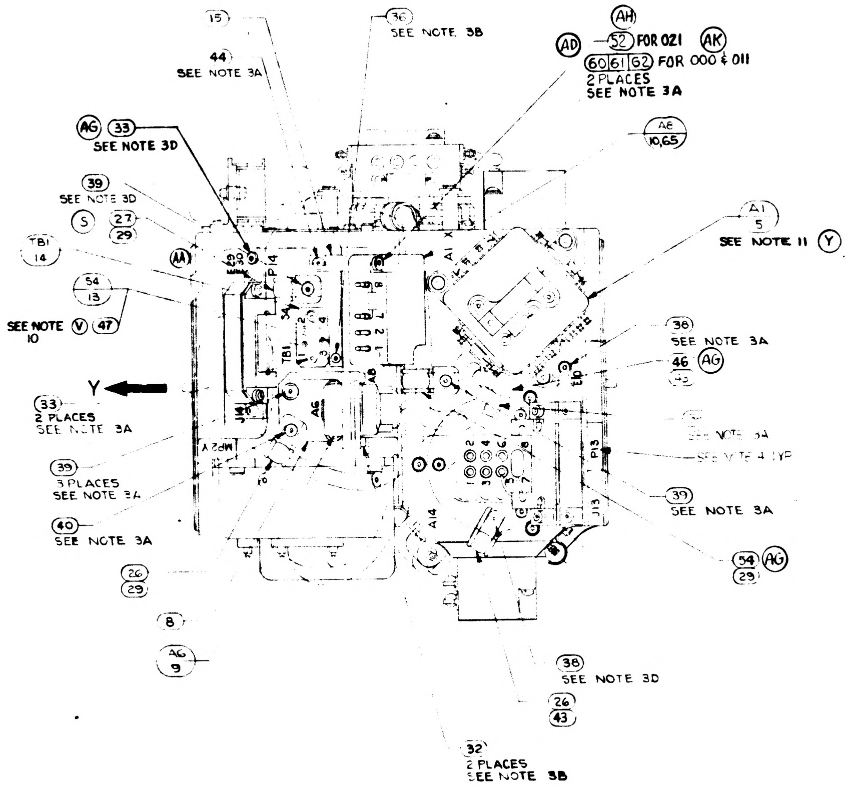
1000005

2/1000005

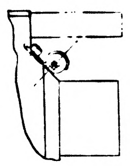
WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

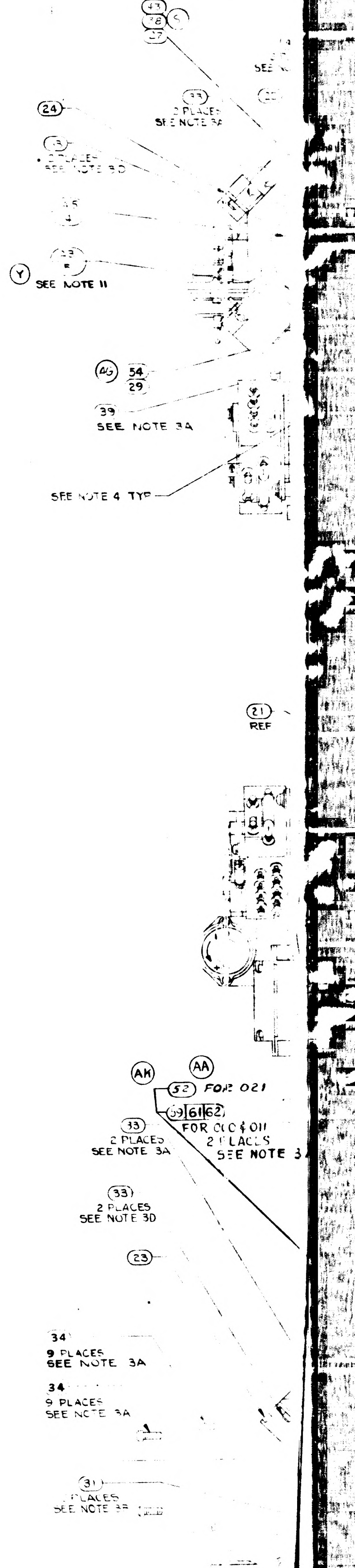
Ⓥ





15
36 SEE NOTE 3B
44 SEE NOTE 3A
(AH)
(AD) 52 FOR 021 (AK)
60 61 62 FOR 000 & 011
2 PLACES
SEE NOTE 3A
(AG) 33 SEE NOTE 3D
A8 10,65
39 SEE NOTE 3D
(S) 27 29
TB1 14
(AA)
54 13
SEE NOTE 10 (V) 47
A1 5 SEE NOTE 11 (Y)
38 SEE NOTE 3A
46 (AG) 43
Y
33 2 PLACES SEE NOTE 3A
SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
39 SEE NOTE 3A
40 SEE NOTE 3A
54 (AG) 29
26 29
8
AG 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
TB1
P14
A6
A8
A14
P13
J13
J14
MP2 Y
A1 X





24
2 PLACES
SEE NOTE 3D
(Y) SEE NOTE 11
AG 54 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
21 REF
(AK) (AA) 52 FOR 021
60 61 62 FOR 000 & 011
2 PLACES
SEE NOTE 3
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
MP2

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{10}{14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING 6 : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
7. Ⓡ ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~
8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN, A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE
10. Ⓨ Ⓥ APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)
11. Ⓨ INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. & PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS 1001599 AND 1001598. TO BE MAINTAINED IN CONJUCTION WITH THIS ASSY.

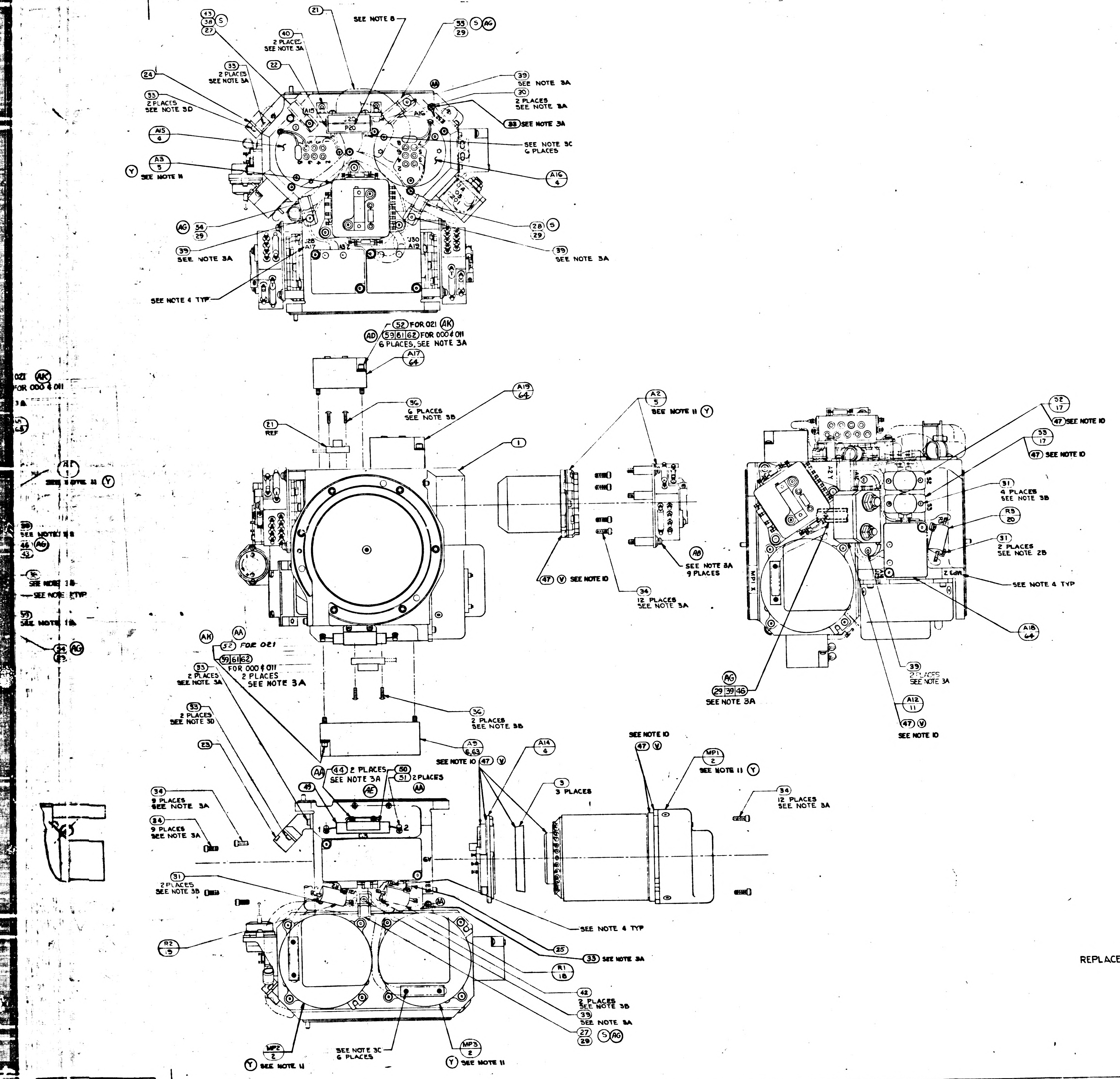
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓡ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV. AL	SHT 1

1/1000005


43
38
27
S
21
SEE NOTE 8
55
29
S
AG
40
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3A
22
24
33
2 PLACES
SEE NOTE 3D
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
33 SEE NOTE 3A
A15
A16
J20
P20
SEE NOTE 3C
6 PLACES
A15
4
A3
5
Y
SEE NOTE 11
A16
4
AG
54
29
28
29
S
39
SEE NOTE 3A
J28
A17
J30
A19
39
SEE NOTE 3A
SEE NOTE 4 TYP
52 FOR 021
AK
AD
59 61 62 FOR 000 & 011
6 PLACES, SEE NOTE 3A
A17
64
A19
64
36
6 PLACES
SEE NOTE 3B
21
REF
1
A2
5
SEE NOTE 11
Y
47
V
SEE NOTE 10
AB
SEE NOTE 3A
9 PLACES
34
12 PLACES
SEE NOTE 3A
52
17
47 SEE NOTE 10
53
17
47 SEE NOTE 10
31
4 PLACES
SEE NOTE 3B
R3
20
31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
64
MP1 X
MP3 Z
A2 Y
AG
29 39 46
SEE NOTE 3A
39
2 PLACES
SEE NOTE 3A
A12
11
47
V
SEE NOTE 10
AK
AA
52 FOR 021
59 61 62
FOR 000 & 011
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
36
2 PLACES
SEE NOTE 3B
A9
6,63
SEE NOTE 10
47
V
A14
4
SEE NOTE 10
47
V
MP1
2
SEE NOTE 11
Y
AA
44 2 PLACES
SEE NOTE 3A
AE
50
51 2 PLACES
AA
49
3
3 PLACES
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
12 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R2
19
SEE NOTE 4 TYP
25
33 SEE NOTE 3A
R1
18
42
2 PLACES
SEE NOTE 3B
39
SEE NOTE 3A
27
29
S
AG
MP2
2
Y
SEE NOTE 11
SEE NOTE 3C
6 PLACES
MP3
2
Y
SEE NOTE 11

REPLACES REV K WITH CHANGES

	R1, R2 & R3 SELECTION CHART
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	28.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63	[illegible]	WK
	L	TDRR 03186	9-17-63	[illegible]	WK
	M	TDRR 03945	10-18-63	[illegible]	WK
	N	TDRR 06173	2-4-64	[illegible]	WK
	P	TDRR 06174	2-4-64	[illegible]	WK
	R	TDRR 06237	18FEB64	[illegible]	WK
	S	TDRR 06385	18FEB64	[illegible]	WK
	T	TDRR 06527	25FEB64	[illegible]	WK
	U	TDRR 06744	3MAR64	[illegible]	WK
	V	TDRR 07082	24MAR64	[illegible]	WK
	W	REVISED PER TDRR 07376	17APR 64	JHR	[illegible]
	Y	REVISED PER TDRR 07964	8MAY 64	JG	[illegible]
	Z	REVISED PER TDRR 07945	25MAY 64	BBB	[illegible]
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	CP
C-3	AB	REVISED PER TDRR 10164	7JUL 64	FL	[illegible]
	AC	REVISED PER TDRR 10500	8JUL 64	GG	[illegible]
	AD	REVISED PER TDRR 10813	17JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	12AUG 64	JWP	[illegible]
	AF	REVISED PER TDRR 12145	9SEP 64	JWP	CP
	AG	REVISED PER TDRR 12633	25SEP 64	JWP	[illegible]
	AH	REVISED PER TDRR 12634	26SEP 64	JWP	CP
	AJ	REVISED PER TDRR 13372	2OCT64	JWP	AU
	AK	REVISED PER TDRR 14540	8DEC 64	JWP	PJ
	AL	REVISED PER TDRR 15015	4JAN 65	JJJ	CP
	AM	REVISED PER TDRR 15902	9FEB 65	[illegible]	PJ

QTY	QTY	QTY	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	1	1	–	ADA PREAMP ASSY STABLE MEMBER	1008282-011			65
	3	3	3	PIP PREAMP ASSY	1008285-011			64
	1	1	–	IRIG PREAMP ASSY	1008284-011			63
	–	10	10	WASHER FLAT	MS15795-303			62
	–	10	10	WASHER LOCK	MS35337-78			61
	–	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
	–	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
	3	–	–	PIP & CALIB. MOD.	1001598-021			58
	–	3	–	PIP & CALIB. MOD.	1001598-011			57
	3	3	–	GYRO & CALIB. MOD.	1001599-011			56
	1	1	1	CLAMP, CABLE	1000220-9			55
	2	2	2	CLAMP, CABLE	1000220-8			54
	–	–	~~2~~	~~SCREW,CAP,SELF LKG. SOC HD HEX~~	~~NAS1352C04LL6~~			53
	10	–	–	SCREW,CAP,SELF LKG. SOC HD HEX	NAS1352C04LL11			52
	2	2	2	TERMINAL, INSULATED	1001600-1			51
	1	1	1	BRACKET, CAPACITOR	1001593			50
	1	1	1	CAPACITOR	1010279-245			49
	–	–	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			48
	A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
	2	2	2	CLAMP, CABLE	1000220-6			46
	–	–	~~1~~	~~SCREW,BUT HD,SELF LKG,SPL SOC~~	~~1000250-1~~			45
	3	3	3	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C04LL3			44
	3	3	3	WASHER,FLAT,ROUND	MS15795-703			43
	2	2	2	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C02LL6			42
	–	–	~~1~~	~~SCREW, BUT HD,SELF LKG, SPL SOC~~	~~1000250-17~~			41
	4	4	4	SCREW, BUT HD,SELF LKG, SPL SOC	1000250-14			40
	12	12	12	SCREW, BUT HD,SELF LKG, SPL SOC	1000250-13			39
	3	3	3	SCREW, BUT HD,SELF LKG,SPL SOC	1000250-12			38
	A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
	9	9	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
	–	–	~~2~~	~~SCREW,CAP,SELF LKG,SOC HD,HEX~~	[illegible]			35
	42	42	42	SCREW,CAP. SELF LKG,SOC HD, HEX	NAS1352C04LL6			34
	13	13	13	SCREW,CAP SELF LKG,SOC HD. HEX	NAS1352C04LL4			33
	2	2	2	SCREW,CAP SELF LKG, SOC HD. HEX	NAS1352C02LL4			32
	8	8	8	SCREW,CAP, SELF LKG,SOC HD, HEX	NAS1352C02LL3			31
	2	2	2	SCREW CAP. SOC HD. HEX	1000110-302			30
	8	8	8	WASHER, CABLE CLAMP	1000223			29
	1	1	1	CLAMP, CABLE	1000220-11			28
	3	3	3	CLAMP, CABLE	1000220-7			27
	2	2	2	CLAMP, CABLE	1000220-5			26
	1	1	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	1	1	COVER, BRKT, CONNECTOR	1000150			24
	1	1	1	COVER, BRKT, CONNECTOR	1000164			23
	1	1	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	1	1	WIRING HARNESS A STABLE MEMBER	1001474			21
	1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
	2	2	2	THERMOSTAT, SAFETY	1001485			17
	A/R	A/R	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	1	1	CLAMP, MERCURY THERMO	1000248			15
	1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	1	1	THERMO & HEATER ASSY	1000247			13
	–	1	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
	1	1	1	EMER HEATERS CONTROL, MODULE	1007012			11
	–	–	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	1	1	MOUNT, ADA, STABLE MEMBER	1000166			8
			~~3~~	~~PIP PREAMP ASSY~~	~~1007214-011~~			7
	–	–	1	IRIG PREAMP ASSY	1007209-011			6
	–	–	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	3	3	CLAMP, SPLIT, GYRO	1000138			3
	–	–	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	1	1	HOUSING, STABLE MEMBER	1001476			1
	021	011	000	LIST OF PARTS AND MATERIALS				

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T INSTRUMENTATION LAB CONTRACT
NAS 9 153
APPROVED O.J. Boyce DATE 7-30-63
CHECKED
DRAWN RES 7-1-63
APPROVED FOR MSC
MIT IL APPROVAL DATE 31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

M I T INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

AM

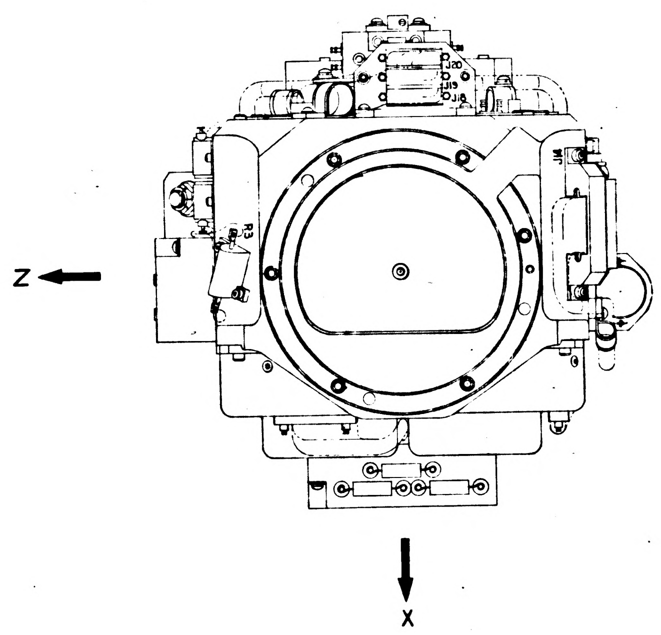
1000005

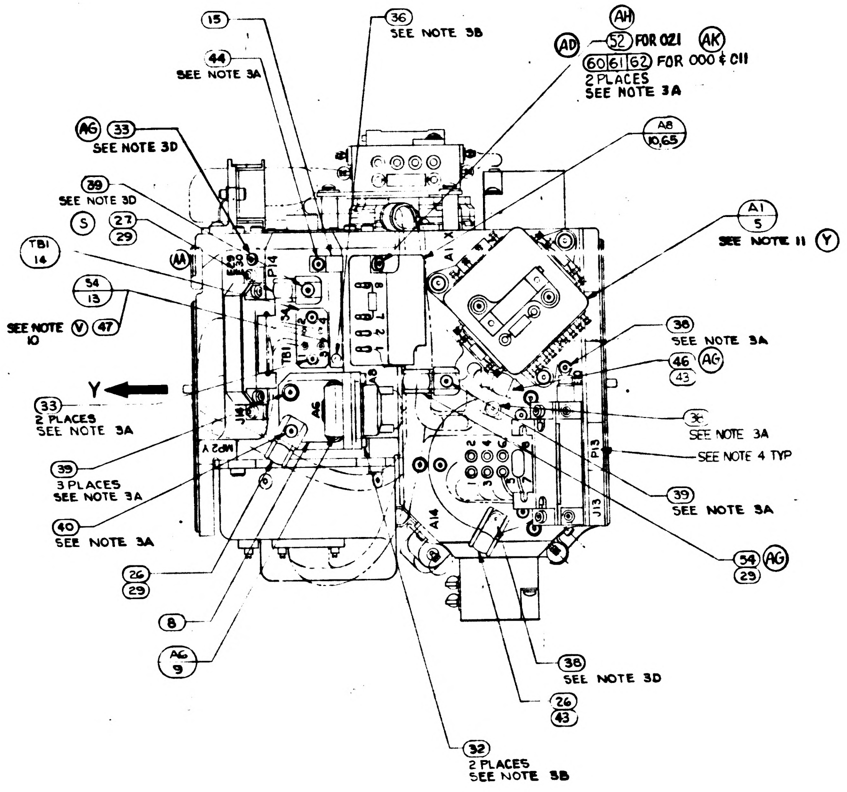
1000005	REV AH	SHT 1

2/1000005

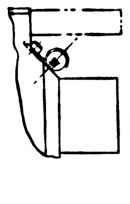
WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4-BLACK	TB1-1	8
3	WHITE		S4-BLACK	TB1-2	
4	BLUE		S4-BLUE	TB1-3	8
5	BLUE		S4-BLUE	TB1-4	

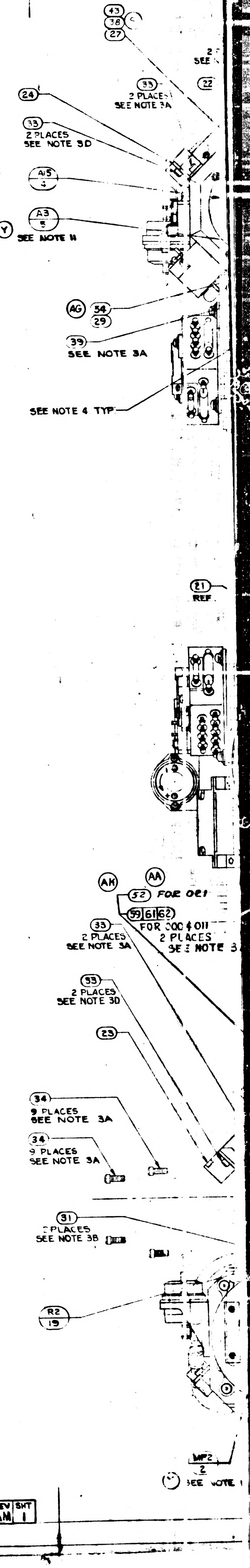
(V)





15
36 SEE NOTE 3B
(AH)
(AD) 52 FOR 021 (AK)
60 61 62 FOR 000 & 011
2 PLACES
SEE NOTE 3A
44 SEE NOTE 3A
(AG) 33 SEE NOTE 3D
A8 10,65
39 SEE NOTE 3D
(S) 27 29
TB1 14
(AA)
54 13
SEE NOTE 10 (V) 47
A1 5
SEE NOTE 11 (Y)
P14
TB1
A6
A8
A1
A14
J14
J13
P13
MP2 Y
Y
33 2 PLACES SEE NOTE 3A
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
26 29
8
AG 9
38 SEE NOTE 3A
46 (AG) 43
36 SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
54 (AG) 29
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B





43
38
27
2
SEE
22
33 2 PLACES SEE NOTE 3A
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
(Y) SEE NOTE 11
(AG) 54 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
21 REF.
(AK) (AA)
52 FOR 021
59 61 62 FOR 000 & 011
2 PLACES
SEE NOTE 3
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
MP2 2
SEE NOTE

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

(R) ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN, A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

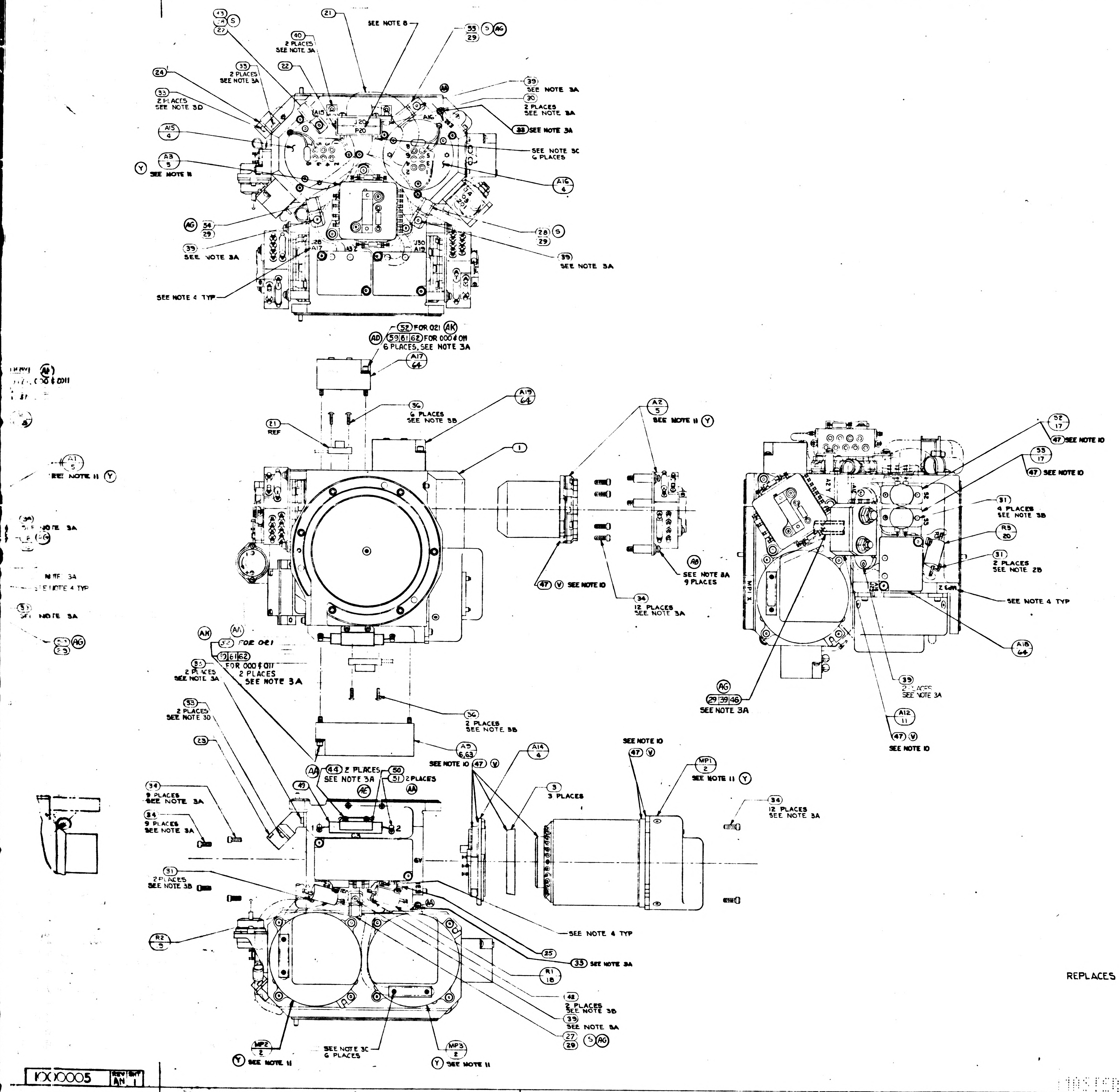
(Y) (V) 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

(Y) 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. & PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS. 1001599 AND 1001598. TO BE MAINTAINED IN CONJUCTION WITH THIS ASSY.

(R) TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHT
1000005	AM	1


SEE NOTE 8
SEE NOTE 3A
2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3D
SEE NOTE 3C 6 PLACES
SEE NOTE 11
SEE NOTE 4 TYP
52 FOR 021
59 61 62 FOR 000 & 011
6 PLACES, SEE NOTE 3A
6 PLACES SEE NOTE 3B
REF
SEE NOTE 11
SEE NOTE 8A 9 PLACES
12 PLACES SEE NOTE 3A
SEE NOTE 10
4 PLACES SEE NOTE 3B
2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3B
9 PLACES SEE NOTE 3A
3 PLACES
12 PLACES SEE NOTE 3A
SEE NOTE 4 TYP
2 PLACES SEE NOTE 3B
SEE NOTE 3A
SEE NOTE 3C 6 PLACES
MP1
MP2
MP3
A1
A2
A3
A5
A12
A14
A15
A16
A17
A18
A19
R1
R2
R3
MP1 X
A2Y

REPLACES REV K WITH CHANGES

R1, R2 & R3

SELECTION CHART

PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	28.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-16-63		WK
	N	TDRR 06173			WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TLRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07376	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	JG	
	Z	REVISED PER TDRR 07945	25 MAY 64	BBB	
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	CP
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	SEP 64	JWP	CP
	AG	REVISED PER TDRR 12633	25 SEP 64	JWP	
	AH	REVISED PER TDRR 12634	26 SEP 64	JWP	CP
	AJ	REVISED PER TDRR 13372	24 OCT 64	JWP	AU
	AK	REVISED PER TDRR 14540	8 DEC 64	JWP	PJ
	AL	REVISED PER TDRR 15015	4 JAN 65		CP
	AM	REVISED PER TDRR 15902	9 FEB 65		PJ
	AN	REVISED PER TDRR 16314	15 65		EF

QTY	QTY	QTY	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR MIL. ES	FIND NO
	A/R	A/R	A/R	TAPE, ADH, ELEC, PRESS. SENSITIVE	TYPE ACT	MIL-T-15126	1/2 WIDE SEE NOTE 12	66
	1	1	-	ADA PREAMP ASSY STABLE MEMBER	1008282-011			65
	3	3	3	PIP PREAMP ASSY	1008285-011			64
	1	1	-	IRIG PREAMP ASSY	1008284-011			63
	-	10	10	WASHER FLAT	MS15795-303			62
	-	10	10	WASHER LOCK	MS35337-78			61
	-	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
	-	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
	3	-	-	PIP & CALIB. MOD.	1001598-021			58
	-	3	-	PIP & CALIB. MOD.	1001598-011			57
	3	3	-	GYRO & CALIB. MOD.	1001599-011			56
	1	1	1	CLAMP, CABLE	1000220-9		SEE NOTE 12	55
	2	2	2	CLAMP, CABLE	1000220-8		SEE NOTE 12	54
	-	-	~~2~~	~~SCREW, CAP, SELF LKG. SOC HD HEX~~	~~NAS1352C04LL~~			53
	10	-	-	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL11			52
	2	2	2	TERMINAL, INSULATED	1001600-1			51
	1	1	1	BRACKET, CAPACITOR	1001593			50
	1	1	1	CAPACITOR	1010279-245			49
	-	-	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			48
	A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
	2	2	2	CLAMP, CABLE	1000220-6		SEE NOTE 12	46
	-	-	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
	3	3	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			44
	3	3	3	WASHER, FLAT, ROUND	MS15795-703			43
	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
	-	-	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
	4	4	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
	12	12	12	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	3	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
	A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
	9	9	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
	-	-	[illegible]	[illegible]	[illegible]			35
	42	42	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
	13	13	13	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
	8	8	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	2	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	8	8	8	WASHER, CABLE CLAMP	1000223			29
	1	1	1	CLAMP, CABLE	1000220-11		SEE NOTE 12	28
	8	3	3	CLAMP, CABLE	1000220-7		SEE NOTE 12	27
	2	2	2	CLAMP, CABLE	1000220-5		SEE NOTE 12	26
	1	1	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	1	1	COVER, BRKT, CONNECTOR	1000150			24
	1	1	1	COVER, BRKT, CONNECTOR	1000164			23
	1	1	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	1	1	WIRING HARNESS A STABLE MEMBER	1001474			21
	1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
	2	2	2	THERMOSTAT, SAFETY	1001485			17
	A/R	A/R	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	1	1	CLAMP, MERCURY THERMO	1000248			15
	1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	1	1	THERMO & HEATER ASSY	1000247			13
	-	1	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	[illegible]			12
	1	1	1	EMER HEATERS CONTROL MODULE	1007012			11
	-	-	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	1	1	MOUNT, ADA STABLE MEMBER	1000166			8
	-	-	~~3~~	~~PIP PREAMP ASSY~~	~~1007214-011~~			7
	-	-	1	IRIG PREAMP ASSY	1007209-011			6
	-	-	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	3	3	CLAMP, SPLIT, GYRO	1000138			3
	-	-	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	1	1	HOUSING, STABLE MEMBER	1001476			1
	021	011	000	LIST OF PARTS AND MATERIALS				

NEXT ASSY	USED ON
1000204	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN RES
APPROVED FOR MSC
MIT APPROVAL DATE

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

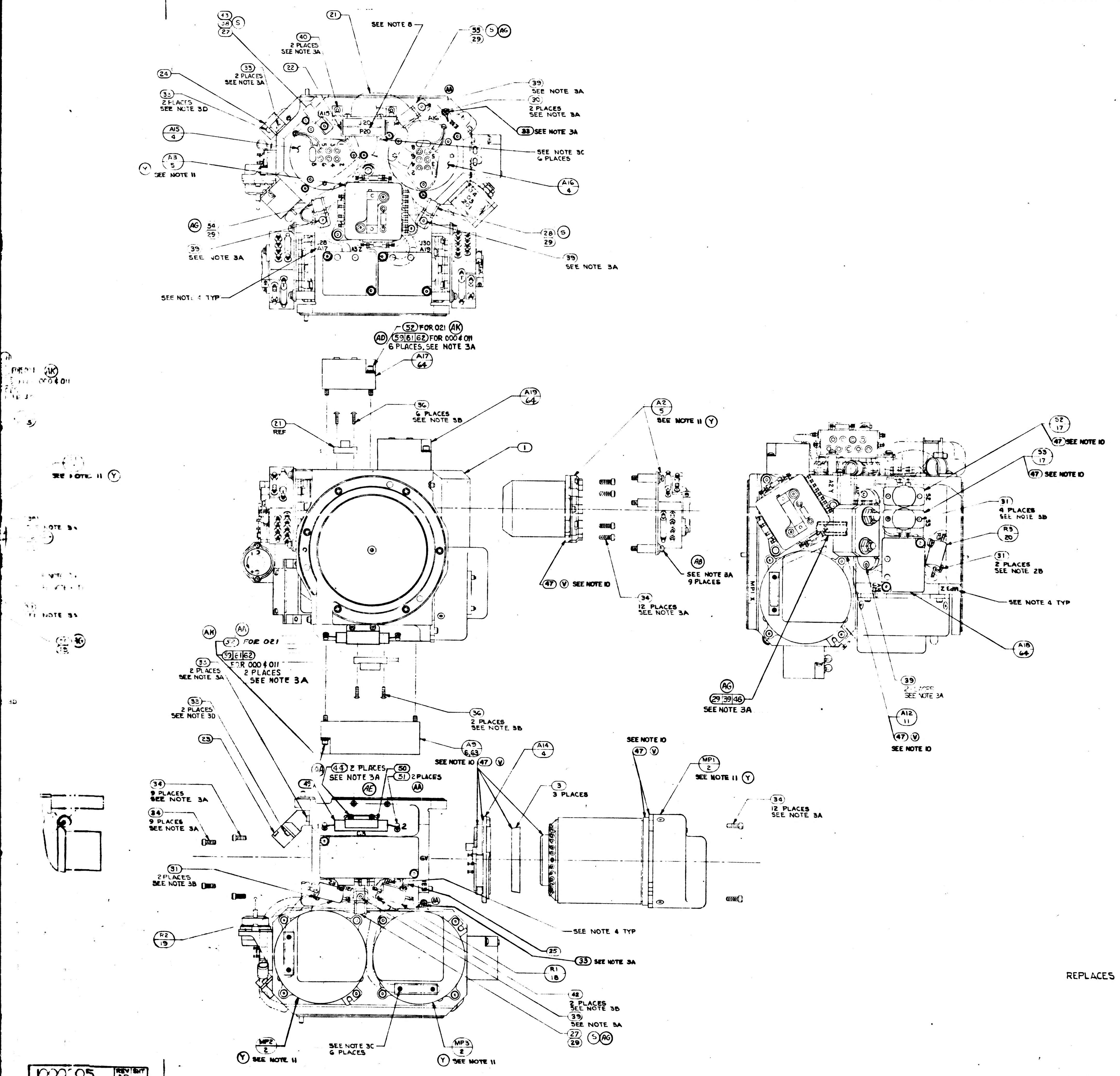
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NASA DRAWING NO 1000005

SHEET 1 OF 1

1000005	REV AN	SHEET 1

2/1000005


SEE NOTE 8
SEE NOTE 3A
2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3D
SEE NOTE 3C 6 PLACES
SEE NOTE 11
SEE NOTE 4 TYP
(52) FOR 021 (AK)
(59)(61)(62) FOR 000 & 011 6 PLACES, SEE NOTE 3A
A17 64
A19 64
6 PLACES SEE NOTE 3B
21 REF
A2 5 SEE NOTE 11 (Y)
(AB) SEE NOTE 8A 9 PLACES
(47) (V) SEE NOTE 10
34 12 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3B
A5 6,63
A14 4
MP1 2 SEE NOTE 11 (Y)
(44) 2 PLACES SEE NOTE 3A
(50) (51) 2 PLACES
9 PLACES SEE NOTE 3A
3 PLACES
R2 19
R1 18
MP2 2 (Y) SEE NOTE 11
MP3 2 (Y) SEE NOTE 11
(33) SEE NOTE 3A
SEE NOTE 4 TYP
(42) 2 PLACES SEE NOTE 3B
(39) SEE NOTE 3A
(27) (29) (S) (AG)
(52) 17 (47) SEE NOTE 10
(53) 17 (47) SEE NOTE 10
(31) 4 PLACES SEE NOTE 3B
R3 20
(31) 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 64
(AG) 29 39 46 SEE NOTE 3A
(39) 2 PLACES SEE NOTE 3A
A12 11
(47) (V) SEE NOTE 10

REPLACES REV K WITH CHANGES

R1, R2 & R3 SELECTION CHART

PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-308	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE		APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63	GRB	WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-18-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	GG	
	Z	REVISED PER TDRR 07945	25 MAY 64	BBB	
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.C.
	AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	9 SEP 64	JWP	CP
	AG	REVISED PER TDRR 12633	25 SEP 64	JWP	
	AH	REVISED PER TDRR 12634	26 SEP 64	JWP	CP
	AJ	REVISED PER TDRR 13372	2 OCT 64	JWP	AU
	AK	REVISED PER TDRR 14540	8 DEC 64	JWP	PJ
	AL	REVISED PER TDRR 15015	4 JAN 65	JJJ	CP
	AM	REVISED PER TDRR 15902	9 FEB 65		PJ
	AN	REVISED PER TDRR 16314	15 FEB 65		EF
	AP	REVISED PER TDRR 16399	24 FEB 65	JJJ	

LIST OF PARTS AND MATERIALS

QTY 021	QTY 011	QTY 000	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
A/R	A/R	A/R	TAPE, ADH, ELEC, PRESS. SENSITIVE	TYPE ACT	MIL-I-15126	1/2 WIDE SEE NOTE 12	66
1	1	–	ADA PREAMP ASSY STABLE MEMBER	1007263-011			65
3	3	3	PIP PREAMP ASSY	1008285-011			64
1	1	–	IRIG PREAMP ASSY	1008284-011			63
–	10	10	WASHER FLAT	MS15795-303			62
–	10	10	WASHER LOCK	MS35337-78			61
–	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
–	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
3	–	–	PIP & CALIB. MOD.	1001598-021			58
–	3	–	PIP & CALIB. MOD.	1001598-011			57
3	3	–	GYRO & CALIB. MOD.	1001599-011			56
1	1	1	CLAMP, CABLE	1000220-9		SEE NOTE 12	55
2	2	2	CLAMP, CABLE	1000220-8		SEE NOTE 12	54
–	–	~~2~~	~~SCREW, CAP, SELF LKG. SOC HD HEX~~	~~NAS1352C04LL~~			53
10	–	–	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL11			52
2	2	2	TERMINAL, INSULATED	1001600-1			51
1	1	1	BRACKET, CAPACITOR	1001593			50
1	1	1	CAPACITOR	1010279-245			49
–	–	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~100159[illegible]~~			48
A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
2	2	2	CLAMP, CABLE	1000220-6		SEE NOTE 12	46
–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
3	3	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
3	3	3	WASHER, FLAT, ROUND	MS15795-703			43
2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
4	4	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
12	12	12	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
3	3	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
9	9	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
–	–	~~2~~	[illegible]	[illegible]			35
42	42	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
13	13	13	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
8	8	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
2	2	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
8	8	8	WASHER, CABLE CLAMP	1000223			29
1	1	1	CLAMP, CABLE	1000220-11		SEE NOTE 12	28
3	3	3	CLAMP, CABLE	1000220-7		SEE NOTE 12	27
2	2	2	CLAMP, CABLE	1000220-5		SEE NOTE 12	26
1	1	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
1	1	1	COVER, BRKT, CONNECTOR	1000150			24
1	1	1	COVER, BRKT, CONNECTOR	1000164			23
1	1	1	COVER, BRKT, CONN, 26 PIN	1000265			22
1	1	1	WIRING HARNESS A STABLE MEMBER	1001474			21
1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
2	2	2	THERMOSTAT, SAFETY	1001485			17
A/R	A/R	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
1	1	1	CLAMP, MERCURY THERMO	1000248			5
1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
1	1	1	THERMO & HEATER ASSY	1000247			13
–	1	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
1	1	1	EMER HEATERS CONTROL, MODULE	1007012			11
–	–	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
1	1	1	MOUNT, ADA, STABLE MEMBER	1000166			8
~~–~~	~~–~~	~~3~~	~~PIP PREAMP ASSY~~	~~1007214-011~~			7
–	–	1	IRIG PREAMP ASSY	1007209-011			6
–	–	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
3	3	3	CLAMP, SPLIT, GYRO	1000138			3
–	–	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
1	1	1	HOUSING, STABLE MEMBER	1001476			1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN RES
APPROVAL FOR MSC
MIT APPROVAL DATE 31 [illegible] 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

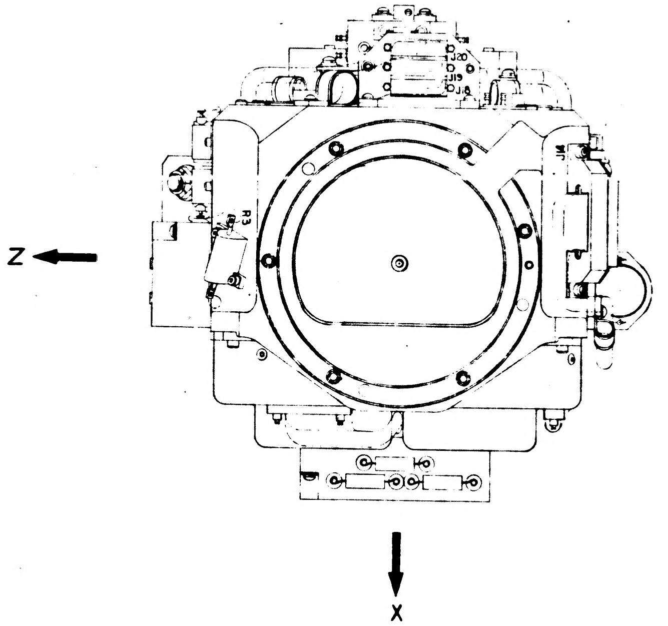
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO 1000005
SHEET 1 OF 1

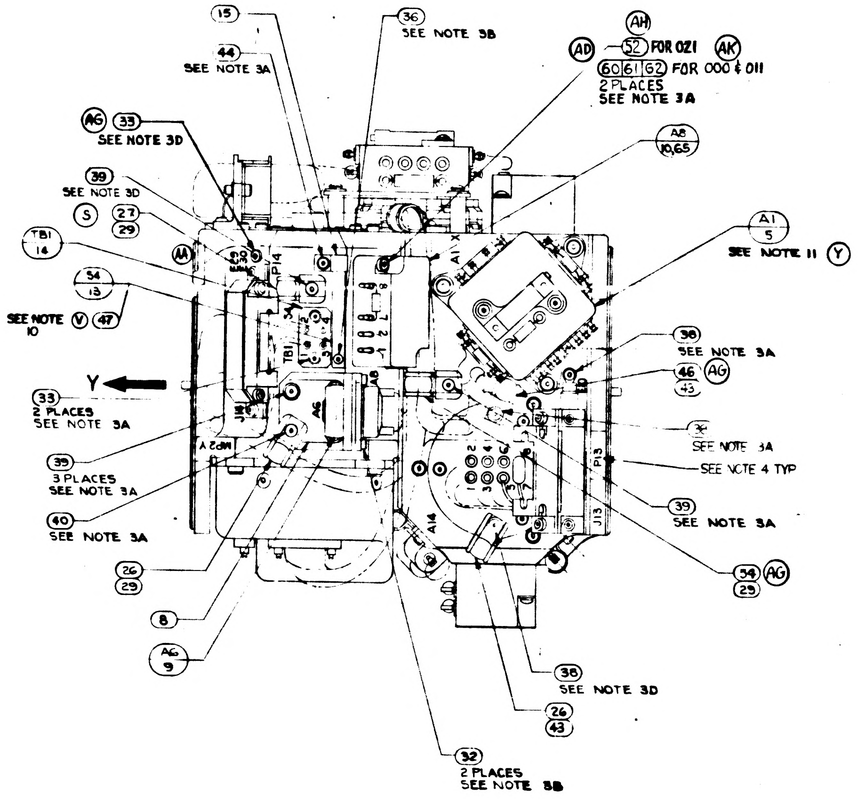
1000204 DL1000201
NEXT ASSY USED ON
APPLICATION

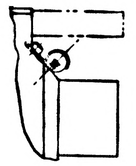
1000005 REV AP SHT 1

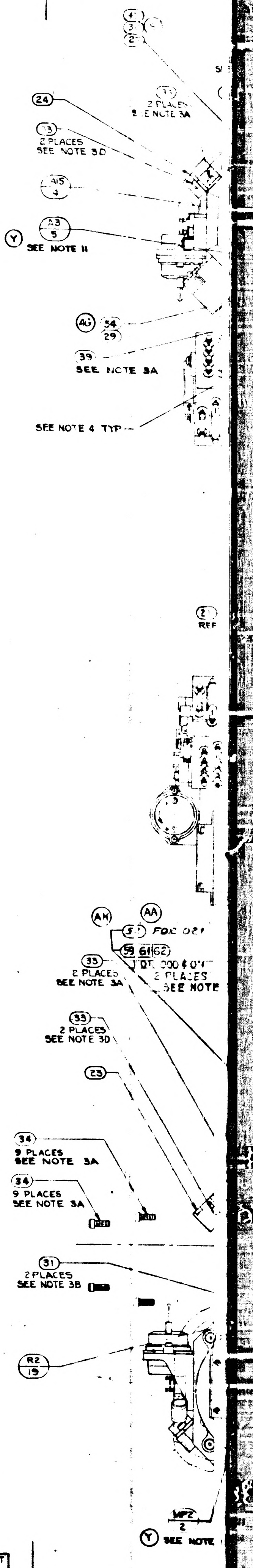
WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




15
44
SEE NOTE 3A
36
SEE NOTE 3B
AH
AD
52 FOR 021
AK
60 61 62 FOR 000 & 011
2 PLACES
SEE NOTE 3A
AG 33
SEE NOTE 3D
A8
10,65
39
SEE NOTE 3D
S
27
29
AA
TB1
14
54
13
SEE NOTE 10
V 47
A1
5
SEE NOTE 11 Y
Y
33
2 PLACES
SEE NOTE 3A
38
SEE NOTE 3A
46 AG
43
SEE NOTE 3A
SEE NOTE 4 TYP
39
3 PLACES
SEE NOTE 3A
40
SEE NOTE 3A
39
SEE NOTE 3A
54 AG
29
26
29
8
AG
9
38
SEE NOTE 3D
26
43
32
2 PLACES
SEE NOTE 3B
P14
TB1
J18
A6
A8
A1
MP2 Y
A14
P13
J13




24
33
2 PLACES
SEE NOTE 3D
2 PLACES
SEE NOTE 3A
A15
4
A3
5
Y
SEE NOTE 11
AG 54
29
39
SEE NOTE 3A
SEE NOTE 4 TYP
AH
AA
FOR 021
59 61 62
FOR 000 & 011
2 PLACES
SEE NOTE
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R2
19
MP2
2
Y SEE NOTE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. & PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS. 1001599 AND 1001598. TO BE MAINTAINED IN CONJUCTION WITH THIS ASSY.

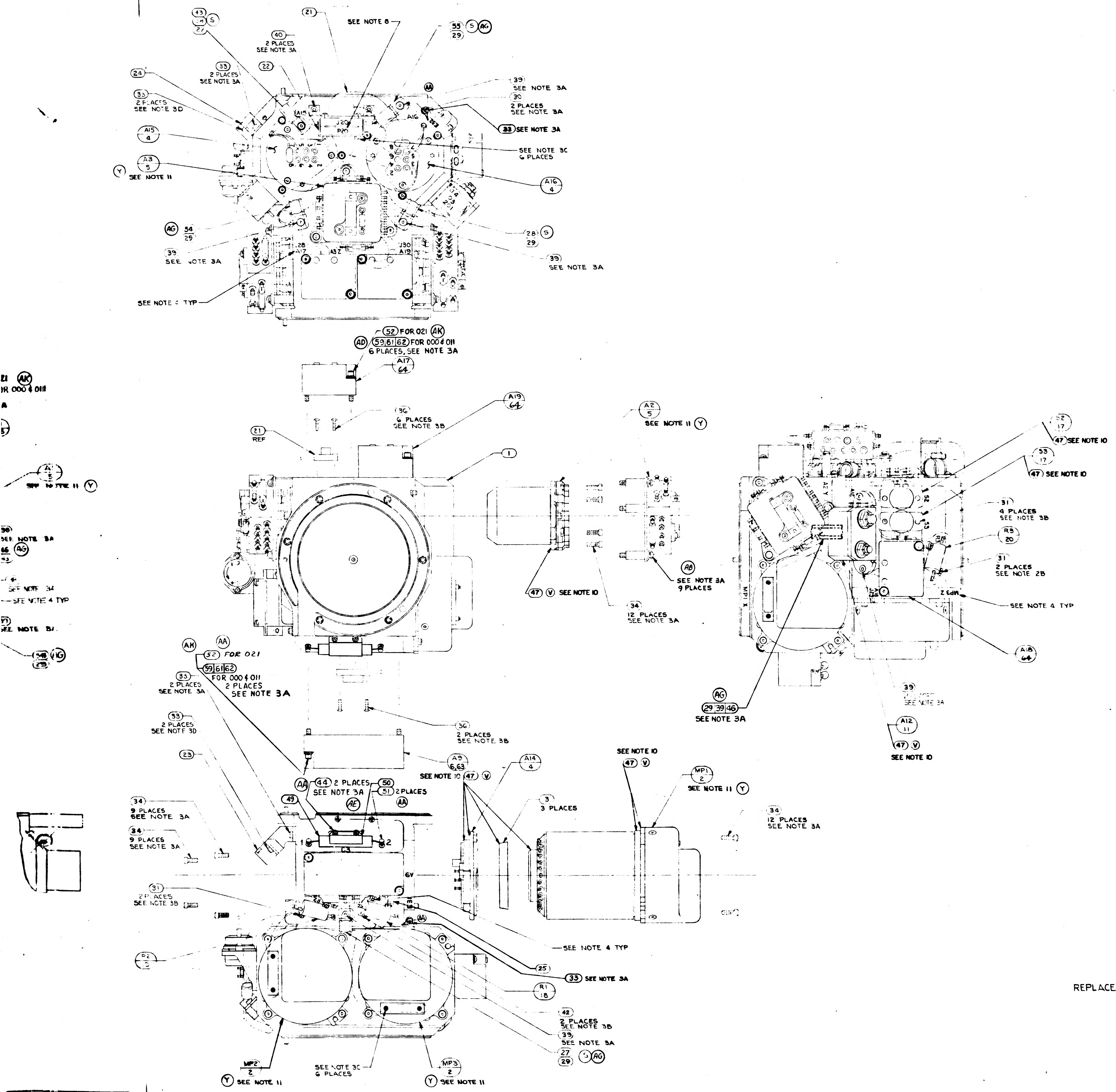
12. TAPE (66) SHALL BE USED AS REQUIRED TO RESTRICT MOVEMENT OF THE HARNESS IN THE CABLE CLAMPS.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHT
1000005	AP	1

1/1000005


SEE NOTE 8
21
43 S 27
40 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3A
22
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
Y SEE NOTE 11
AG 34 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
55 S AG 29
AA
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
33 SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A16 4
28 S 29
39 SEE NOTE 3A
52 FOR 021 AK
AD 59 61 62 FOR 000 & 011 6 PLACES, SEE NOTE 3A
A17 64
36 6 PLACES SEE NOTE 3B
A19 64
21 REF
1
A2 5 SEE NOTE 11 Y
47 V SEE NOTE 10
AB SEE NOTE 3A 9 PLACES
34 12 PLACES SEE NOTE 3A
MP1 X
AG 29 39 46 SEE NOTE 3A
52 17 47 SEE NOTE 10
53 17 47 SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 64
39 SEE NOTE 3A
A12 11
47 V SEE NOTE 10
AK 52 FOR 021
AA 59 61 62 FOR 000 & 011 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
36 2 PLACES SEE NOTE 3B
A9 6,63
SEE NOTE 10 47 V
A14 4
SEE NOTE 10 47 V
MP1 2 SEE NOTE 11 Y
AA 44 2 PLACES SEE NOTE 3A
AE 50 51 2 PLACES AA
49
3 3 PLACES
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
34 12 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
6V
SEE NOTE 4 TYP
62 2
25
33 SEE NOTE 3A
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
27 29 S AG
MP2 2 Y SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 Y SEE NOTE 11

N

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63	GGB	WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-18-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	GG	
	Z	REVISED PER TDRR 07945	25 MAY 64	BEB	
	AA	REVISED PER TDRR 08764	1-JUL 64	W.G.	
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	9 SEP 64	JWP	CP
	AG	REVISED PER TDRR 12633	25 SEP 64	JWP	
	AH	REVISED PER TDRR 12634	26 SEP 64	JWP	CP
	AJ	REVISED PER TDRR 13372	[illegible] 64	JWP	AU
	AK	REVISED PER TDRR 14540	8 DEC 64	JWP	PF
	AL	REVISED PER TDRR 15015	4 JAN 65	JJJ	CP
	AM	REVISED PER TDRR 15902	9 FEB 65		PF
	AN	REVISED PER TDRR 16314	15 FEB 65	CMK	EF
	AP	REVISED PER TDRR 16399	24 FEB 65	JJJ	WD
	AR	REVISED PER TDRR 16808	4 MAR 65	RWT	

	QTY 021	QTY 011	QTY REQD 000	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	A/R	A/R	A/R	TAPE, ADH, ELEC, PRESS. SENSITIVE	TYPE ACT	MIL-I-15126	1/2 WIDE SEE NOTE 12	66
	1	1	-	ADA PREAMP ASSY STABLE MEMBER	1007263-011			65
	3	3	3	PIP PREAMP ASSY	1008285-011			64
	1	1	-	IRIG PREAMP ASSY	1008284-011			63
	-	10	10	WASHER FLAT	MS15795-303			62
	-	10	10	WASHER LOCK	MS35337-78			61
	-	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
	-	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
	3	-	-	PIP & CALIB. MOD.	1001598-021			58
	-	3	-	PIP & CALIB. MOD.	1001598-011			57
	3	3	-	GYRO & CALIB. MOD.	1001599-011			56
	1	1	1	CLAMP, CABLE	1000220-9		SEE NOTE 12	55
	2	2	2	CLAMP, CABLE	1000220-8		SEE NOTE 12	54
	-	-	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD HEX~~	~~NAS1352C04LL16~~			53
	10	-	-	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL11			52
	2	2	2	TERMINAL, INSULATED	1001600-1			51
	1	1	1	BRACKET, CAPACITOR	1001593			50
	1	1	1	CAPACITOR	1010279-245			49
	-	-	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			48
	A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
	2	2	2	CLAMP, CABLE	1000220-6		SEE NOTE 12	46
	-	-	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
	3	3	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
	3	3	3	WASHER, FLAT, ROUND	MS15795-703			43
	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
	-	-	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
	4	4	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
	12	12	12	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	3	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
	A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
	9	9	9	SCREW BUT HD, SELF LKG, SPL SOC	1000250-3			36
	-	-	~~2~~	[illegible]	[illegible]			35
	42	42	42	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
	13	13	13	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
	8	8	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	2	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	8	8	8	WASHER, CABLE CLAMP	1000223			29
	1	1	1	CLAMP, CABLE	1000220-11		SEE NOTE 12	28
	3	3	3	CLAMP, CABLE	1000220-7		SEE NOTE 12	27
	2	2	2	CLAMP, CABLE	1000220-5		SEE NOTE 12	26
	1	1	1	SPACER, RESISTOR, STABLE MEMBER	10014[illegible]			25
	1	1	1	COVER, BRKT, CONNECTOR	1000150			24
	1	1	1	COVER, BRKT, CONNECTOR	1000164			23
	1	1	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	1	1	WIRING HARNESS AT STABLE MEMBER	1001474			21
	1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
	2	2	2	THERMOSTAT, SAFETY	1001485			17
	A/R	A/R	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	1	1	CLAMP, MERCURY THERMO	1000248			15
	1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	1	1	THERMO & HEATER ASSY	1000247			13
	-	1	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
	1	1	1	EMER HEATERS CONTROL, MODULE	1007012			11
	-	-	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
	1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	1	1	MOUNT, ADA, STABLE MEMBER	1000166			8
	-	-	~~3~~	~~PIP PREAMP ASSY~~	~~1007214-011~~			7
	-	-	1	IRIG PREAMP ASSY	1007209-011			6
	-	-	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	3	3	CLAMP, SPLIT, GYRO	1000138			3
	-	-	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	1	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

REPLACES REV K WITH CHANGES

NEXT ASSY	USED ON
1000204	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED DATE 3-2-63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT II APPROVAL DATE 31 Jul 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

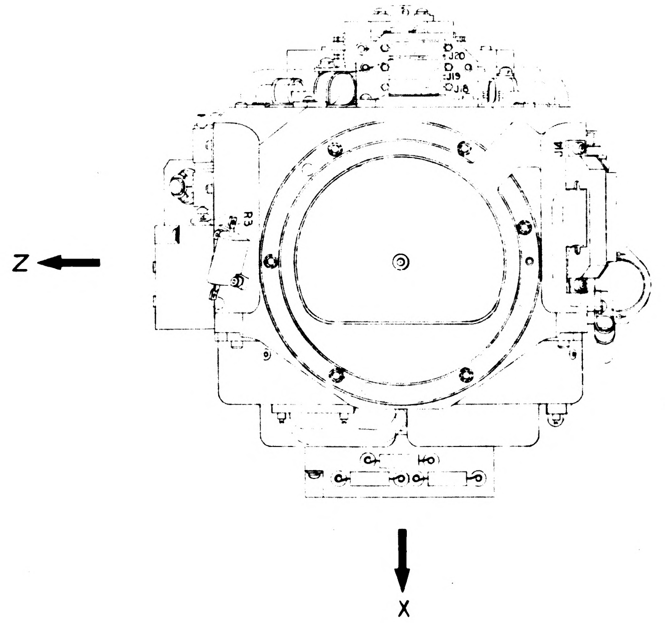
AR
1000005

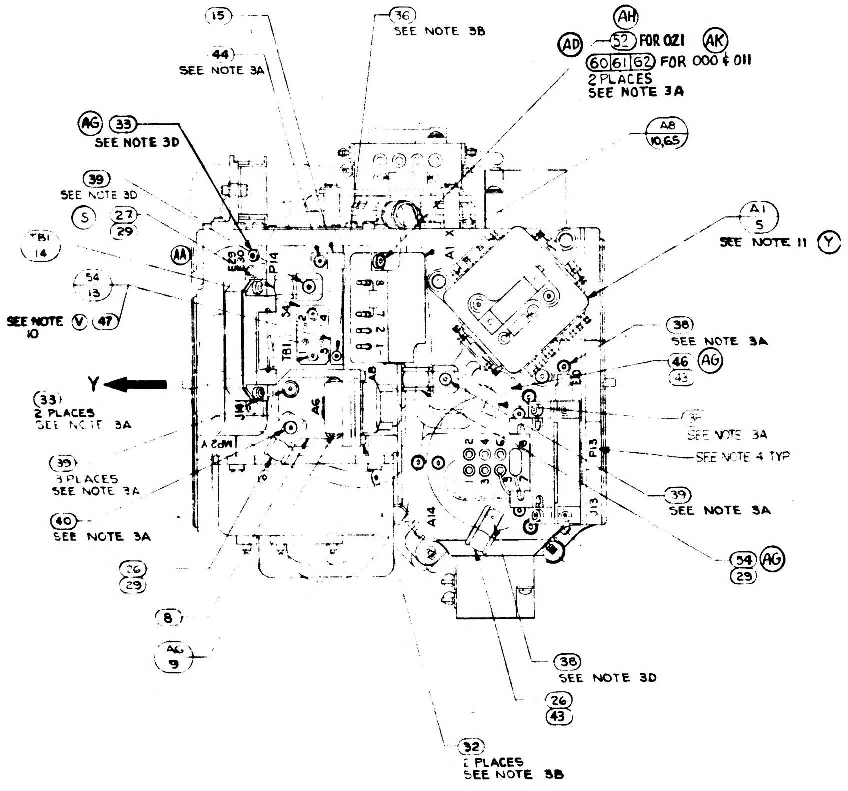
1[illegible]05	REV AP	SHT 1

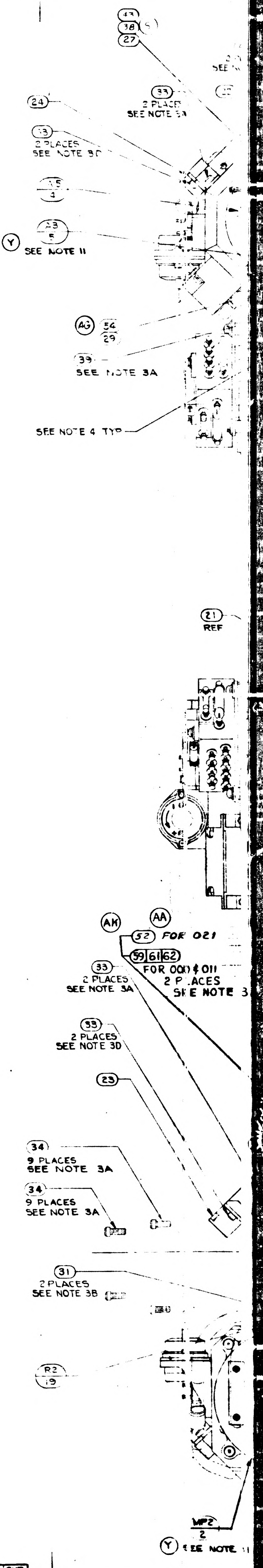
WIRING LEGEND

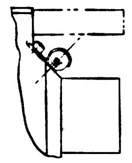
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




15
44 SEE NOTE 3A
36 SEE NOTE 3B
AH
AD
52 FOR 021
AK
60 61 62 FOR 000 & 011
2 PLACES
SEE NOTE 3A
AG 33 SEE NOTE 3D
A8 10,65
39 SEE NOTE 3D
S
27 29
TB1 14
AA
54 13
SEE NOTE V 47
10
A1 5
SEE NOTE 11 Y
Y
33 2 PLACES SEE NOTE 3A
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
26 29
8
A6 9
38 SEE NOTE 3A
46 43 AG
SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
54 29 AG
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P14
S4
TB1
A6
A8
A1
A14
P13
J13
MP2


43
38
27
S
33 2 PLACES SEE NOTE 3A
24
33 2 PLACES SEE NOTE 3D
A5 4
A3 5
Y SEE NOTE 11
AG 54 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
21 REF
AK
AA
52 FOR 021
59 61 62 FOR 000 & 011
2 PLACES
SEE NOTE 3
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
MP2 2
Y SEE NOTE 11



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 1.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING .16 : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN, A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

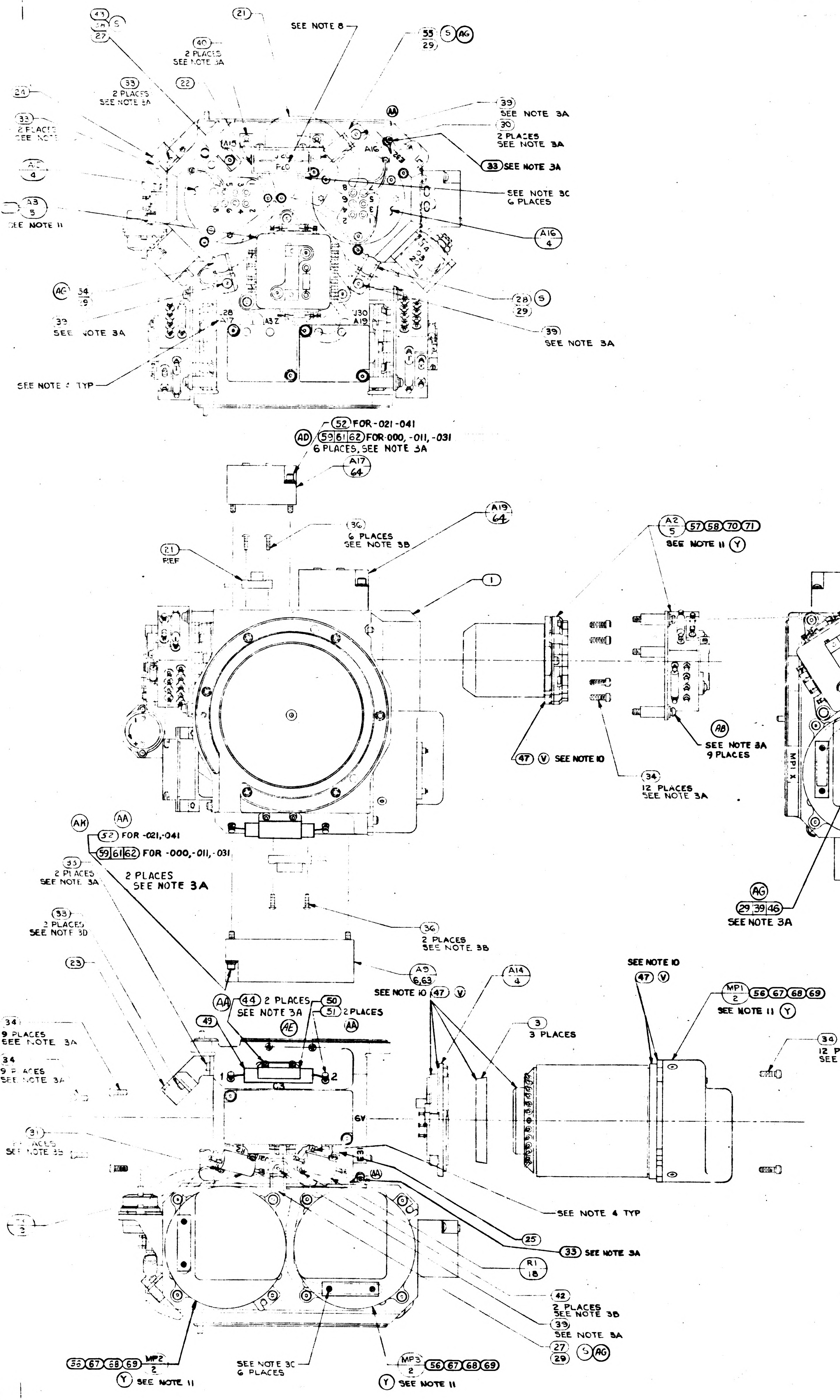
Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. & PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS 1001599 AND 1001598. TO BE MAINTAINED IN CONJUCTION WITH THIS ASSY.

12. TAPE (66) SHALL BE USED AS REQUIRED TO RESTRICT MOVEMENT OF THE HARNESS IN THE CABLE CLAMPS.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV AR	SHT 1


SEE NOTE 8
2 PLACES SEE NOTE 3A
SEE NOTE 11
SEE NOTE 3A
SEE NOTE 3C 6 PLACES
SEE NOTE 4 TYP
52 FOR -021,-041
59 61 62 FOR -000,-011,-031 6 PLACES, SEE NOTE 3A
A17 64
36 6 PLACES SEE NOTE 3B
A19 64
21 REF
A2 5 57 58 70 71 SEE NOTE 11 Y
47 V SEE NOTE 10
AB SEE NOTE 3A 9 PLACES
34 12 PLACES SEE NOTE 3A
52 17
47 SEE NOTE 10
53 17
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
A18 64
AG 29 39 46 SEE NOTE 3A
39 2 PLACES SEE NOTE 3A
A12 11
47 V SEE NOTE 10
AK AA 52 FOR -021,-041
59 61 62 FOR -000,-011,-031
35 2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3A
53 2 PLACES SEE NOTE 3D
36 2 PLACES SEE NOTE 3B
A9 6,63
A14 4
SEE NOTE 10 47 V
MP1 2 56 67 68 69 SEE NOTE 11 Y
44 2 PLACES SEE NOTE 3A
50 51 2 PLACES
3 3 PLACES
34 12 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
25
33 SEE NOTE 3A
R1 18
42 2 PLACES SEE NOTE 3B
33 SEE NOTE 3A
27 29 5 AG
MP2 2 55 67 68 69 Y SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 56 67 68 69 Y SEE NOTE 11

Ⓝ R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	BY	APPROVED
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-18-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07576	17 APR 64		
	Y	REVISED PER TDRR 07964	8 MAY 64		
	Z	REVISED PER TDRR 0[illegible]45	25 MAY 64		
	AA	REVISED PER TDRR 08764	1-JUL 64		CP
C-3	AB	REVISED PER TDRR [illegible]64	7 JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 1[illegible]79	12 AUG 64	JWP	
	AF	REVISED PER TDRR 1[illegible]45	5 SEP 64	JWP	CP
	AG	REVISED PER TDRR 1[illegible]33	25 SEP 64	JWP	
	AH	REVISED PER TDRR 1[illegible]34	26 SEP 64	JWP	
	AJ	REVISED PER TDRR [illegible]372	2 OCT 64		AU
	AK	REVISED PER TDRR 14340	8 DEC 64	JWP	PJ
	AL	REVISED PER TDRR 15015	4 JAN 65	JJJ	CP
	AM	REVISED PER TDRR 15902	9 FEB 65		PJ
	AN	REVISED PER TDRR 16314	15 FEB 65		CF
	AP	REVISED PER TDRR 16399	24 FEB 65	JJJ	
	AK	REVISED PER TDRR 16808	4 MAR 65	RWT	
	AS	REVISED PER TDRR-25751	10-MAR-66	B.	

QTY 041	QTY 031	QTY 021	QTY 011	QTY REQD 000	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO		MATERIAL OR NOTES	FIND NO
3	–	–	–	–	PIP AND CALIB MOD	1001598-031		SEE NOTE 11	71
–	3	–	–	–	PIP AND CALIB MOD	1001598-041			70
3	–	–	–	–	GYRO AND CALIB MOD	1001599-031			69
–	3	–	–	–	GYRO AND CALIB MOD	1001599-041			68
–	–	3	–	–	GYRO AND CALIB MOD	1001599-021		SEE NOTE 11	67
A/R	A/R	A/R	A/R	A/R	TAPE, ADH, ELEC, PRESS. SENSITIVE	TYPE ACT	MIL-T-15126	1/2 WIDE SEE NOTE 12	66
1	1	1	1	–	ADA PREAMP ASSY STABLE MEMBER	1007263-011			65
3	3	3	3	3	PIP PREAMP ASSY	1008285-011			64
1	1	1	1	–	IRIG PREAMP ASSY	1008284-011			63
–	10	–	10	10	WASHER FLAT	MS15795-303			62
–	10	–	10	10	WASHER LOCK	MS35337-78			61
–	2	–	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
–	8	–	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
–	–	3	–	–	PIP & CALIB. MOD.	1001598-021		SEE NOTE 11	58
–	–	–	3	–	PIP & CALIB. MOD.	1001598-011		SEE NOTE 11	57
–	–	–	3	–	GYRO & CALIB. MOD.	1001599-011		SEE NOTE 11	56
1	1	1	1	1	CLAMP, CABLE	1000220-9		SEE NOTE 12	55
2	2	2	2	2	CLAMP, CABLE	1000220-8		SEE NOTE 12	54
–	–	–	–	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD HEX~~	~~[illegible]~~			53
10	–	10	–	–	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL11			52
2	2	2	2	2	TERMINAL, INSULATED	1001600-1			51
1	1	1	1	1	BRACKET, CAPACITOR	1001593			50
1	1	1	1	1	CAPACITOR	1010279-245			49
–	–	–	–	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			48
A/R	A/R	A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
2	2	2	2	2	CLAMP, CABLE	1000220-6		SEE NOTE 12	46
–	–	–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
3	3	3	3	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
3	3	3	3	3	WASHER, FLAT, ROUND	MS15795-703			43
2	2	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
–	–	–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
4	4	4	4	4	SCREW, BUT HD SELF LKG, SPL SOC	1000250-14			40
12	12	12	12	12	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
3	3	3	3	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
A/R	A/R	A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
9	9	9	9	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
–	–	–	–	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD, HEX~~	~~[illegible]~~			35
42	42	42	42	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
13	13	13	13	13	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
2	2	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
8	8	8	8	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
2	2	2	2	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
8	8	8	8	8	WASHER, CABLE CLAMP	1000223			29
1	1	1	1	1	CLAMP, CABLE	1000220-11		SEE NOTE 12	28
3	3	3	3	3	CLAMP, CABLE	1000220-7		SEE NOTE 12	27
2	2	2	2	2	CLAMP, CABLE	1000220-5		SEE NOTE 12	26
1	1	1	1	1	SPACER, RESISTOR, STABLE MEMBER	1001[illegible]			25
1	1	1	1	1	COVER, BRKT, CONNECTOR	1000150			24
1	1	1	1	1	COVER, BRKT, CONNECTOR	1000164			23
1	1	1	1	1	COVER, BRKT, CONN, 26 PIN	1000265			22
1	1	1	1	1	WIRING HARNESS A STABLE MEMBER	1001474			21
1	1	1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
1	1	1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
1	1	1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
2	2	2	2	2	THERMOSTAT, SAFETY	1001485			17
A/R	A/R	A/R	A/R	A/R	SOLDER	SN60 NAPP 2	QQ-S-571		16
1	1	1	1	1	CLAMP, MERCURY THERMO	1000248			15
1	1	1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000233			14
1	1	1	1	1	THERMO & HEATER ASSY	1000247			13
–	–	–	+	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
1	1	1	1	1	EMER HEATERS CONTROL [illegible]	[illegible]			11
–	–	–	–	1	ADA PREAMP ASSY, STABLE MEMBER	1007212-011			10
1	1	1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
1	1	1	1	1	MOUNT, ADA STABLE MEMBER	1000166			8
			–	~~3~~	~~PIP PREAMP ASSY~~	~~1007214-011~~			7
–	–	–	–	1	IRIG PREAMP ASSY	1007209-011			6
–	–	–	–	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
3	3	3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
3	3	3	3	3	CLAMP, SPLIT, GYRO	1000138			3
–	–	–	–	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
1	1	1	1	1	HOUSING, STABLE MEMBER	1001476			1

LIST OF PARTS AND MATERIALS

REPLACES REV K WITH CHANGES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED G. Bryce DATE 7-30-63
CHECKED
DRAWN RES 7-7-63
APPROVAL FOR MSC
MIT IL APPROVAL DATE 7-17-63

STABLE MEMBER ASSEMBLY

SCALE 1/1 UNIT WT CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005

REV AS SHT 1

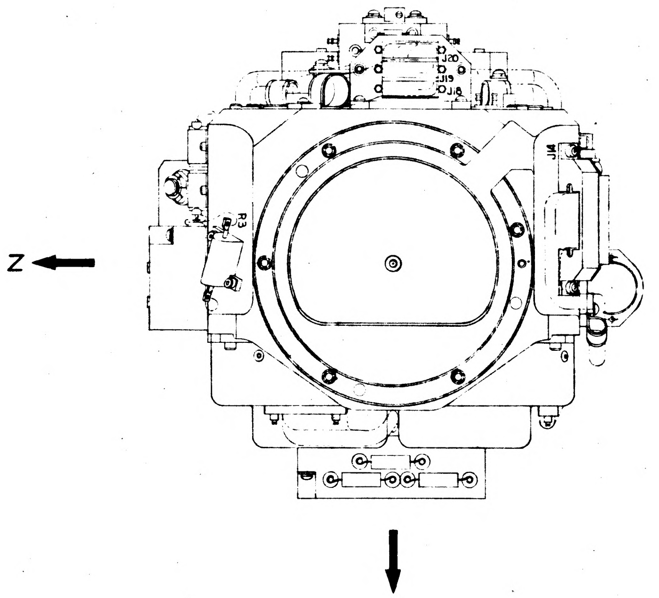
A5
1000005

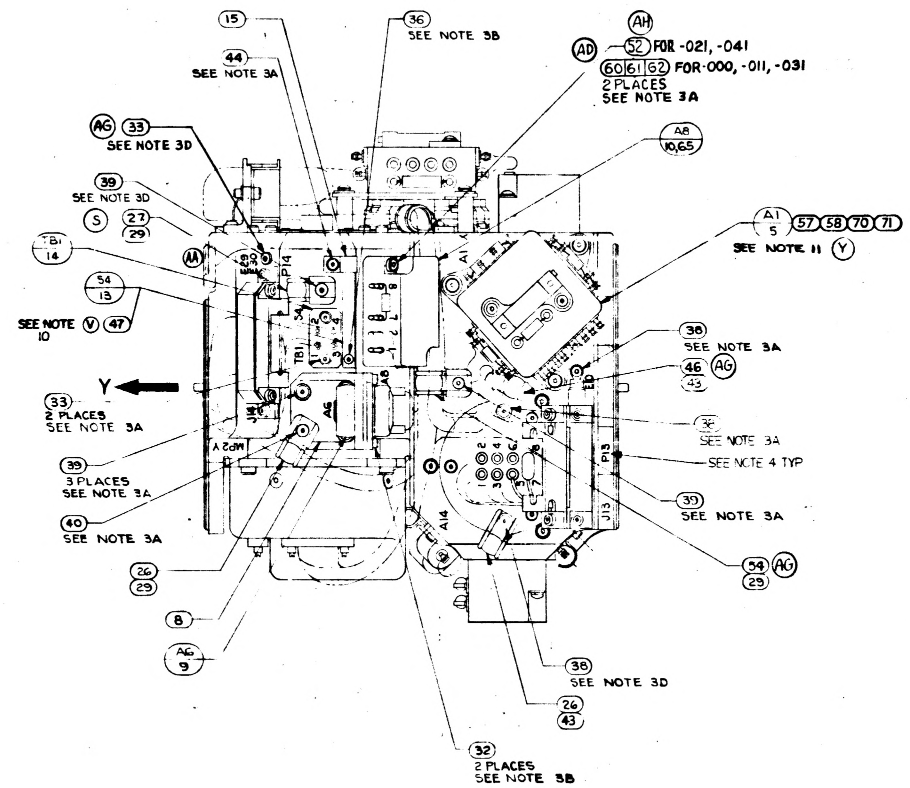
2/1000005

WIRING LEGEND

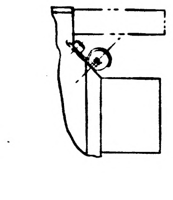
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

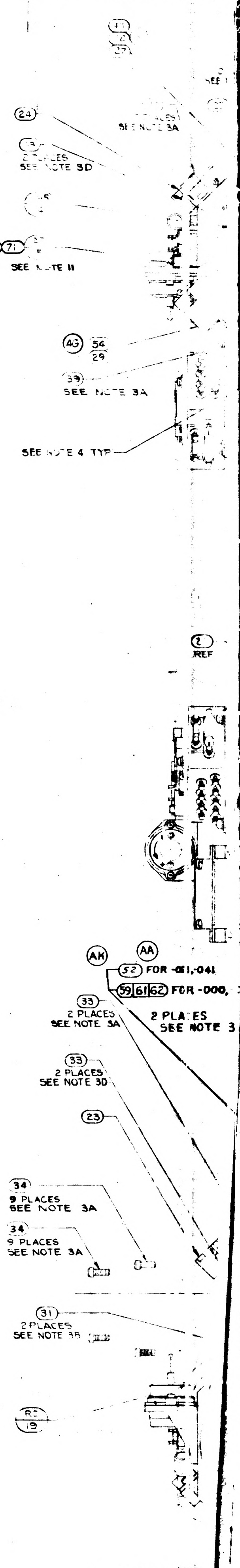
Ⓥ





15
36 SEE NOTE 3B
44 SEE NOTE 3A
AH
AD
52 FOR -021, -041
60 61 62 FOR-000, -011, -031 2 PLACES SEE NOTE 3A
AG 33 SEE NOTE 3D
A8 10,65
39 SEE NOTE 3D
S
27 29
TB1 14
AA
A1 5 57 58 70 71 SEE NOTE 11 Y
54 13
SEE NOTE V 47 10
38 SEE NOTE 3A
46 43 AG
Y
33 2 PLACES SEE NOTE 3A
38 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
39 SEE NOTE 3A
40 SEE NOTE 3A
54 29 AG
26 29
8
AG 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P14
E29
30
S4
TB1
A8
A6
A1
J14
MP2 Y
A14
P13
J13
E10





24
2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3D
38 70 71
SEE NOTE 11
AG 54 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
2 REF
AK AA
52 FOR -021,-041
59 61 62 FOR -000,
2 PLACES SEE NOTE 3
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
56

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN.LB
   - B. 3.5 IN.LB
   - C 1.0 IN.LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS .10/.14 HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13), (17), (56), (57), (58), (67) THRU (71) AS APPLICABLE; AND BETWEEN ITEM (3) AND ITEM (4); AND BETWEEN ITEMS (2), (5), (56), (57), (58), (67) THRU (71) AND ITEM (3).

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. & PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS 1001599 AND 1001598. TO BE MAINTAINED IN CONJUCTION WITH THIS ASSY.

12. TAPE (66) SHALL BE USED AS REQUIRED TO RESTRICT MOVEMENT OF THE HARNESS IN THE CABLE CLAMPS.

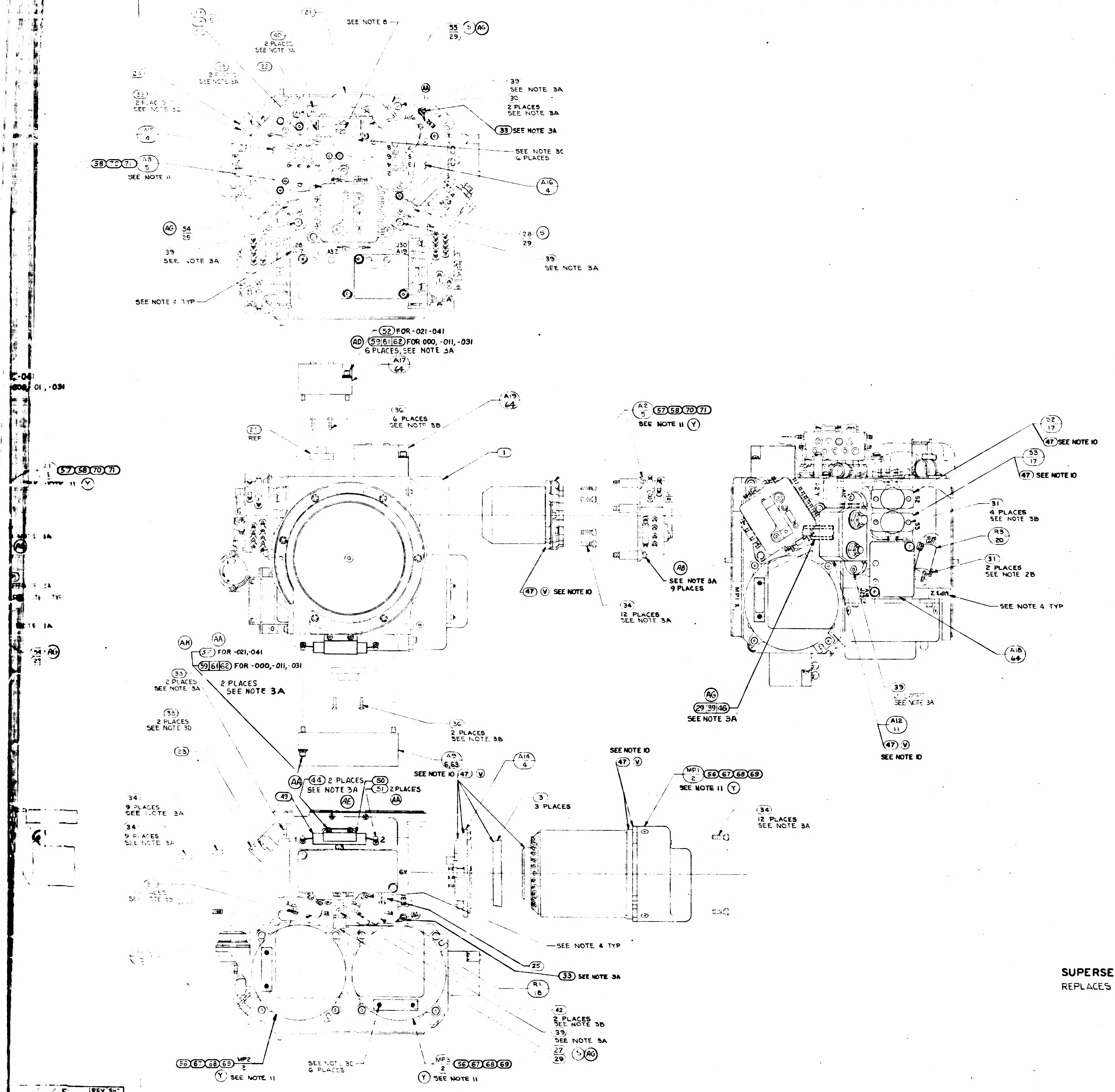
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓡ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV AS	SHT 1

1/1000005


SEE NOTE 8
55 29 (AG)
40 2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3D
MP 4
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
(AA)
33 SEE NOTE 3A
SEE NOTE 3C 6 PLACES
58 70 71
A8 5
SEE NOTE 11
A16 4
(AG) 54 25
28 (5) 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
52 FOR -021-041
(AD) 59 61 62 FOR 000, -011, -031
6 PLACES, SEE NOTE 3A
A17 64
A19 64
36 6 PLACES SEE NOTE 3B
REF
A2 5 57 58 70 71
SEE NOTE 11 (Y)
(AB)
SEE NOTE 3A 9 PLACES
47 (V) SEE NOTE 10
34 12 PLACES SEE NOTE 3A
52 17
47 SEE NOTE 10
53 17
47 SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 64
MPI X
(AK) 57 FOR -021,-041
(AA)
59 61 62 FOR -000,-011,-031
33 2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3A
35 2 PLACES SEE NOTE 3D
(AG) 29 39 46 SEE NOTE 3A
39
A12 11
47 (V) SEE NOTE 10
36 2 PLACES SEE NOTE 3B
A9 6,63
SEE NOTE 10 47 (V)
A14 4
SEE NOTE 10 47 (V)
MP1 2 56 67 68 69
SEE NOTE 11 (Y)
(AA) 44 2 PLACES SEE NOTE 3A
50 51 2 PLACES
(AE) (AA)
49
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
3 3 PLACES
34 12 PLACES SEE NOTE 3A
SEE NOTE 4 TYP
25
33 SEE NOTE 3A
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
27 29 (5) (AG)
56 67 68 69 MP2 2
(Y) SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 56 67 68 69
(Y) SEE NOTE 11
4
3
2
1
D
C
B
A5

SUPERSEDED
REPLACES REV K WITH CHANGES

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

ZONE	SYM	DESCRIPTION	DATE		APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63	GOR	
	L	TDRR 03186	9-7-63		
	M	TDRR 03945	10-16-63		
	N	TDRR 06173	2-4-64		
	P	TDRR 06174	2-4-64		
	R	TDRR 06237	18 FEB 64		
	S	TDRR 06385	18 FEB 64		
	T	TDRR 06527	25 FEB 64		
	U	TDRR 06744	9 MAR 64		
	V	TDRR 07082	24 MAR 64		
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	GG	
	Z	REVISED PER TDRR 07945	25 MAY 64	GG	
	AA	REVISED PER TDRR 08764	1 JUL 64		
C-3	AB	REVISED PER TDRR 10164	7 JUL 64	FL	
	AC	REVISED PER TDRR 10500	8 JUL 64	GG	
	AD	REVISED PER TDRR 10813	17 JUL 64	JWP	J.E.
	AE	REVISED PER TDRR 11379	12 AUG 64	JWP	
	AF	REVISED PER TDRR 12145	9 SEP 64	JWP	C.O
	AG	REVISED PER TDRR 12633	25 SEP 64	JWP	
	AH	REVISED PER TDRR 12634	26 SEP 64	JWP	
	AJ	REVISED PER TDRR 13372	64	JWP	AU
	AK	REVISED PER TDRR 14540	8 DEC 64	JWP	
	AL	REVISED PER TDRR 15015	4 JAN 65	JJJ	
	AM	REVISED PER TDRR 15902	9 FEB 65		
	AN	REVISED PER TDRR 16314	15 FEB 65		
	AP	REVISED PER TDRR 16399	24 FEB 65	JJJ	
	AR	REVISED PER TDRR 16808	4 MAR 65	RWT	
	AS	REVISED PER TDRR-25751	10-MAR-66	B.	
		REPLACED WITH CHANGE B/ REVISION "AT" PER TL PR 28174	2 MAY 66	JJJ	

3	–	–	–	–	PIP AND CALIB MOD	1001598-031		SEE NOTE 11	71
–	3	–	–	–	PIP AND CALIB MOD	1001598-041			70
3	–	–	–	–	GYRO AND CALIB MOD	1001599-031			69
–	3	–	–	–	GYRO AND CALIB MOD	1001599-041			68
–	–	3	–	–	GYRO AND CALIB MOD	1001599-021		SEE NOTE 11	67
A/R	A/R	A/R	A/R	A/R	TAPE, ADH, ELEC, PRESS. SENSITIVE	TYPE ACT	MIL-T-15126	1/2 WIDE SEE NOTE 12	66
1	1	1	1	–	ADA PREAMP ASSY STABLE MEMBER	1007263-011			65
3	3	3	3	3	PIP PREAMP ASSY	1008285-011			64
1	1	1	1	–	IRIG PREAMP ASSY	1008284-011			63
–	10	–	10	10	WASHER FLAT	MS15795-303			62
–	10	–	10	10	WASHER LOCK	MS35337-78			61
–	2	–	2	2	SCREW CAP SOC HD HEX	NAS1352C04-11			60
–	8	–	8	8	SCREW CAP SOC HD HEX	NAS1352C04-12			59
–	–	3	–	–	PIP & CALIB. MOD.	1001598-021		SEE NOTE 11	58
–	–	–	3	–	PIP & CALIB. MOD.	1001598-011		SEE NOTE 11	57
–	–	–	3	–	GYRO & CALIB. MOD.	1001599-011		SEE NOTE 11	56
1	1	1	1	1	CLAMP, CABLE	1000220-9		SEE NOTE 12	55
2	2	2	2	2	CLAMP, CABLE	1000220-8		SEE NOTE 12	54
–	–	–	–	~~2~~	~~SCREW, CAP, SELF LKG. SOC HD HEX~~	~~NAS1352C04LL10~~			53
10	–	10	–	–	SCREW, CAP, SELF LKG. SOC HD HEX	NAS1352C04LL11			52
2	2	2	2	2	TERMINAL, INSULATED	1001600-1			51
1	1	1	1	1	BRACKET CAPACITOR	1001593			50
1	1	1	1	1	CAPACITOR	1010279-245			49
–	–	–	–	~~1~~	~~CAPACITOR AND BRACKET ASSEMBLY~~	~~1001587~~			48
A/R	A/R	A/R	A/R	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
2	2	2	2	2	CLAMP, CABLE	1000220-6		SEE NOTE 12	46
–	–	–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
3	3	3	3	3	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
3	3	3	3	3	WASHER, FLAT, ROUND	MS15795-703			43
2	2	2	2	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
–	–	–	–	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
4	4	4	4	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
12	12	12	12	12	SCREW BUT HD, SELF LKG, SPL SOC	1000250-13			39
3	3	3	3	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
A/R	A/R	A/R	A/R	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
9	9	9	9	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
–	–	–	–	~~2~~	~~SCREW, CAP, SELF LKG, SOC HD, HEX~~	[illegible]			35
42	42	42	42	42	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
13	13	13	13	13	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
2	2	2	2	2	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
8	8	8	8	8	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
2	2	2	2	2	SCREW CAP. SOC HD. HEX	1000110-302			30
8	8	8	8	8	WASHER, CABLE CLAMP	1000223			29
1	1	1	1	1	CLAMP, CABLE	1000220-11		SEE NOTE 12	28
3	3	3	3	3	CLAMP, CABLE	1000220-7		SEE NOTE 12	27
2	2	2	2	2	CLAMP, CABLE	1000220-5		SEE NOTE 12	26
1	1	1	1	1	SPACER, RESISTOR, STABLE MEMBER	100146[illegible]			25
1	1	1	1	1	COVER, BRKT, CONNECTOR	1000150			24
1	1	1	1	1	COVER, BRKT, CONNECTOR	1000164			23
1	1	1	1	1	COVER, BRKT, CONN, 26 PIN	1000265			22
1	1	1	1	1	WIRING HARNESS A STABLE MEMBER	1001474			21
1	1	1	1	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
1	1	1	1	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
1	1	1	1	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
2	2	2	2	2	THERMOSTAT, SAFETY	1001485			17
A/R	A/R	A/R	A/R	A/R	SOLDER	SN60 WRP2	QQ-S-571		16
1	1	1	1	1	CLAMP, MERCURY THERMO	1000248			15
1	1	1	1	1	TERM. BOARD ASSY MERCURY THERMO	1000233			14
1	1	1	1	1	THERMO & HEATER ASSY	1000247			13
–	–	–	+	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
1	1	1	1	1	EMER HEATERS CONTROL MODULE	1007012			11
–	–	–	–	1	ADA PREAMP ASSY STABLE MEMBER	1007212-011			10
1	1	1	1	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
1	1	1	1	1	MOUNT, ADA STABLE MEMBER	1000166			8
			–	~~3~~	~~PIP PREAMP ASSY~~	~~1007214-011~~			7
–	–	–	–	1	IRIG PREAMP ASSY	1007209-011			6
–	–	–	–	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
3	3	3	3	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
3	3	3	3	3	CLAMP, SPLIT, GYRO	1000138			3
–	–	–	–	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
1	1	1	1	1	HOUSING, STABLE MEMBER	1001476			1
QTY	QTY	QTY	QTY	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL	ITEM NO.
041	031	021	011	000	LIST OF PARTS AND MATERIALS				

1000204	DL1000201
NEXT ASSY	USED ON

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T.
INSTRUMENTATION LAB
NAS 9-153
APPROVED G. Bays DATE
DRAWN RES 6-7-63
APPROVED FOR MSC

STABLE MEMBER ASSEMBLY

SCALE 1/1 UNIT WT CODE IDENT

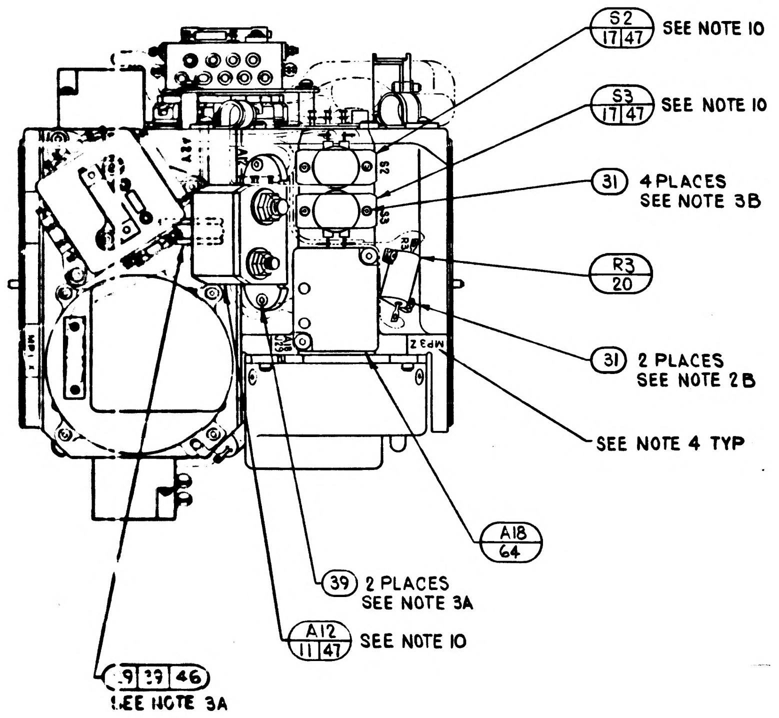
M.I.T. INSTRUMENTATION LABORATORY
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO.
1000005
SHEET 1 1

5 REV AS SH 1

2/1000005

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	AT	REPLACES REVISION 'AS' WITH CHANGE PER TDRR 28174		2 MAY 66	

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498-097	1.00
-171	5.90
-197	11.00
-210	15.00
-220	19.1
-227	22.6
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-275	71.5
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-297	121.00
-303	140.00
-322	221.0
1010498-385	1000.0
1010498-246	35.7



	041	031	021	011	000	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 11	-	3	-	-	-		71	1001598-031	PIP & CALIB MOD
SEE NOTE 11	3	-	-	-	-		70	1001598-041	PIP & CALIB MOD
SEE NOTE 11	3	3	-	-	-		69	1001599-031	GYRO & CALIB MOD
							68	~~1001599-041~~	
							67	~~1001599-021~~	
SEE NOTE 12	AR	AR	AR	AR	AR		66	TYPE ACT	TAPE, ADH, ELEC, PRES SENSITIVE MIL-I-15126 1/2 WIDE
	1	1	1	1	-		65	1007263-011	ADA PREAMP ASSY, STABLE MEMBER
	3	3	3	3	3		64	1008285-011	PIP PREAMP ASSY
	1	1	1	1	-		63	1008284-011	IRIG PREAMP ASSY
	-	10	-	10	10		62	MS15795-303	WASHER FLAT
	-	10	-	10	10		61	MS35337-78	WASHER LOCK
	-	2	-	2	2		60	NAS1352C04-11	SCREW CAP SOC HD HEX
	-	8	-	8	8		59	NAS1352C04-12	SCREW CAP SOC HD HEX
SEE NOTE 11	-	-	3	-	-		58	1001598-021	PIP & CALIB. MOD
SEE NOTE 11	-	-	-	3	-		57	1001598-011	PIP & CALIB. MOD
SEE NOTE 11	-	-	3	3	-		56	1001599-011	GYRO & CALIB. MOD
SEE NOTE 12	1	1	1	1	1		55	1000220-9	CLAMP, CABLE
SEE NOTE 12	2	2	2	2	2		54	1000220-8	CLAMP, CABLE
							53	~~NAS1352C04LL10~~	
	10	-	10	-	-		52	NAS1352C04LL11	SCREW, CAP, SELF LKG, SOC HD HEX
	2	2	2	2	2		51	1001600-1	TERMINAL, INSULATED
	1	1	1	1	1		50	1001593	BRACKET, CAPACITOR
	1	1	1	1	1		49	1010279-245	CAPACITOR
							48	~~1001597~~	
SEE NOTE 10	AR	AR	AR	AR	AR		47	1006879	SILICONE COMPOUND THERMO
SEE NOTE 12	2	2	2	2	2		46	1000220-6	CLAMP, CABLE
							45	~~1000250-1~~	
	3	3	3	3	3		44	NAS1352C04LL3	SCREW CAP SELF LKG SOC HD, HEX
	3	3	3	3	3		43	MS15795-703	WASHER, FLAT, ROUND
	2	2	2	2	2		42	NAS1352C02LL6	SCREW, CAP, SELF LKG, SOC HD, HEX
							41	~~1000250-17~~	
	4	4	4	4	4		40	1000250-14	SCREW, BUT HD, SELF LKG, SPL SOC
	12	12	12	12	12		39	1000250-13	SCREW, BUT HD, SELF LKG, SPL SOC
	3	3	3	3	3		38	1000250-12	SCREW, BUT HD, SELF LKG, SPL SOC
	AR	AR	AR	AR	AR		37		TAPE, NYLON WAXED MIL-T-713 TYPE P CLASS 2
	9	9	9	9	9		36	1000250-3	SCREW, BUT HD, SELF LKG, SPL SOC
							35	~~NAS1352C01LL4~~	
	42	42	42	42	42		34	NAS1352C04LL6	SCREW, CAP, SELF LKG, SOC HD, HEX
	13	13	13	13	13		33	NAS1352C04LL4	SCREW, CAP, SELF LKG, SOC HD, HEX
	2	2	2	2	2		32	NAS1352C02LL4	SCREW, CAP, SELF LKG, SOC HD, HEX
	8	8	8	8	8		31	NAS1352C02LL3	SCREW, CAP, SELF LKG, SOC HD, HEX
	2	2	2	2	2		30	1000110-302	SCREW, CAP, SOC HD, HEX
	8	8	8	8	8		29	1000223	WASHER, CABLE CLAMP
SEE NOTE 12	1	1	1	1	1		28	1000220-11	CLAMP, CABLE
SEE NOTE 12	3	3	3	3	3		27	1000220-7	CLAMP, CABLE
SEE NOTE 12	2	2	2	2	2		26	1000220-5	CLAMP, CABLE
	1	1	1	1	1		25	1001462	SPACER, RESISTOR, STABLE MEMBER
	1	1	1	1	1		24	1000150	COVER, BRKT, CONNECTOR
	1	1	1	1	1		23	1000164	COVER, BRKT, CONNECTOR
	1	1	1	1	1		22	1000265	COVER, BRKT, CONNECTOR, 26 PIN
	1	1	1	1	1		21	1001474	WIRING HARNESS 'A' STABLE MEMBER
SEE NOTE 5	1	1	1	1	1		20	1001498	RESISTOR-FIXED R3
SEE NOTE 5	1	1	1	1	1		19	1001498	RESISTOR-FIXED R2
SEE NOTE 5	1	1	1	1	1		18	1001498	RESISTOR-FIXED R1
	2	2	2	2	2		17	1001485	THERMOSTAT, SAFETY
	AR	AR	AR	AR	AR		16	SN60 WARP 2	SOLDER QQ-S-571
	1	1	1	1	1		15	1000248	CLAMP, MERCURY THERMO
	1	1	1	1	1		14	1000253	TERM BOARD ASSY MERCURY THERMO
	1	1	1	1	1		13	1000247	THERMO & HEATER ASSY
							12	~~1000251~~	
	1	1	1	1	1		11	1007012	ENER HEATERS CONTROL MODULE
	-	-	-	-	1		10	1007212-011	ADA PREAMP ASSY, STABLE MEMBER
	1	1	1	1	1		9	1000097	ACCEL, ANGULAR, DIFFERENTIATING
	1	1	1	1	1		8	1000166	MOUNT, ADA, STABLE MEMBER
							7	~~1007214-011~~	
	-	-	-	-	1		6	1007209-011	IRIG PREAMP ASSY
SEE NOTE 11	-	-	-	-	3		5	1001598	PIP & CALIB. MOD
	3	3	3	3	3		4	1000126	-TR & TAPERED VT ASSY, 25 IRIG
	3	3	3	3	3		3	1000138	CLAMP, SPLIT, GYRO
SEE NOTE 11	-	-	-	-	3		2	1001599	GYRO & CALIB. MOD
	1	1	1	1	1		1	1001476	HOUSING, STABLE MEMBER
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS		

	1000204	DL1000201
APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN RES DATE 6-7-63
CHECKED
APPROVAL
CONTRACT NAS 9-153
NASA APPROVAL E. C. MITZNER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

STABLE MEMBER
ASSEMBLY

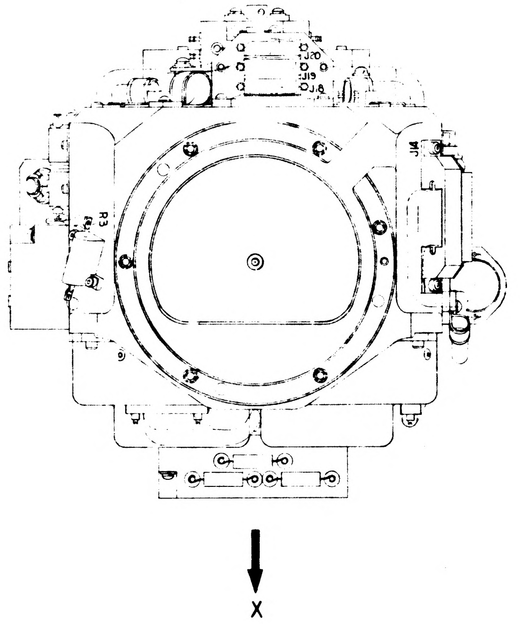
SIZE J2
CODE IDENT NO. 80230
1000005
SCALE 1/1
SHEET OF

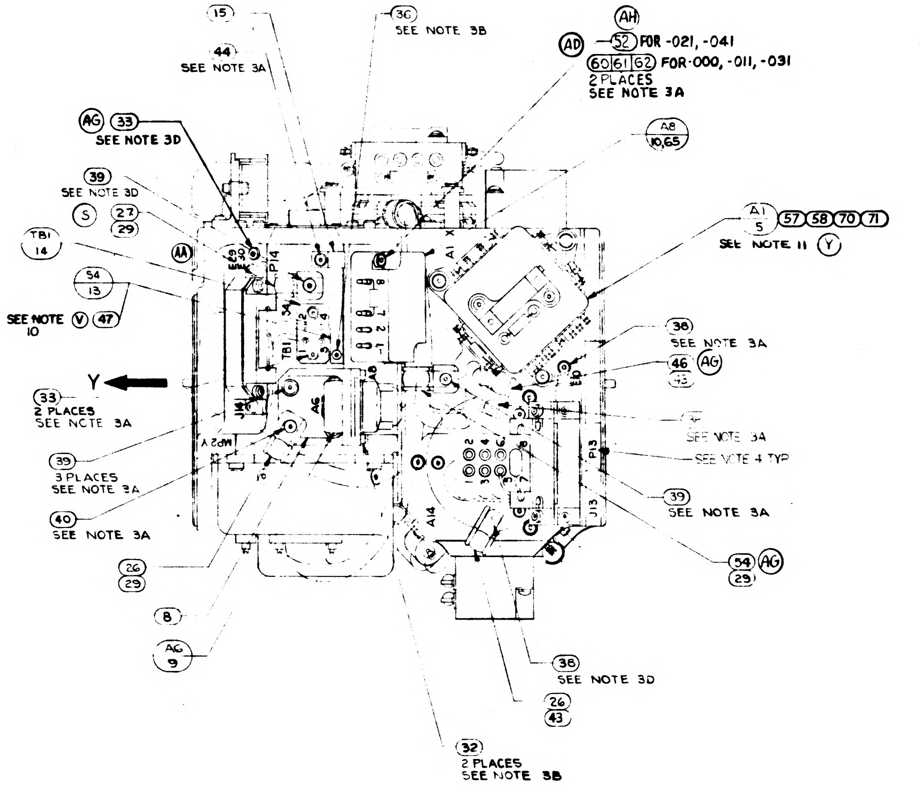
000005 REV LTR AT SHEET 1

WIRING LEGEND

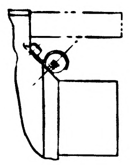
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4-BLACK	TB1-1	8
3	WHITE		S4-BLACK	TB1-2	
4	BLUE		S4-BLUE	TB1-3	8
5	BLUE		S4-BLUE	TB1-4	

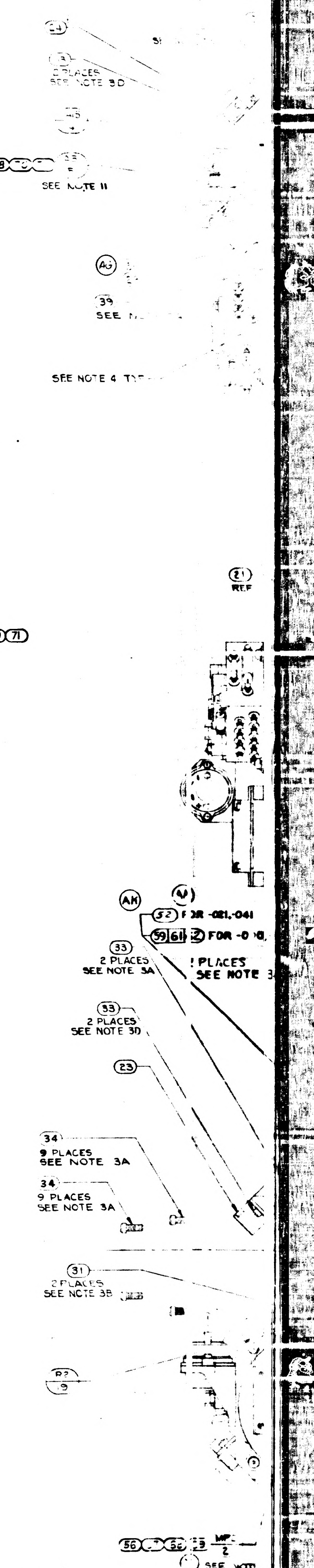
(V)





15
44 SEE NOTE 3A
36 SEE NOTE 3B
AH
AD 52 FOR -021, -041
60 61 62 FOR-000, -011, -031
2 PLACES
SEE NOTE 3A
AG 33 SEE NOTE 3D
A8 10,65
39 SEE NOTE 3D
S 27 29
TB1 14
AA
54 13
SEE NOTE 10 V 47
A1 5 57 58 70 71
SEE NOTE 11 Y
Y
33 2 PLACES SEE NOTE 3A
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
38 SEE NOTE 3A
46 AG 43
SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
54 AG 29
26 29
8
AG 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P14
TB1
S4
A6
A8
A1
P13
J13
A14
MP2 Y





2 PLACES SEE NOTE 3D
57 58
SEE NOTE 11
SEE NOTE 4 TYP
21 REF
AH 52 FOR -021,-041
59 61 62 FOR -0
33 2 PLACES SEE NOTE 3A
2 PLACES SEE NOTE 3
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
P2 9
56 53 SEE NOTE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN LB
   - B. 3.5 IN. LB
   - C. 1.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.0}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL STD-440 USING 16 ; WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

(R) ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

(Y) (V) 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13), (17), (56), (57), (58), (67) THRU (71) AS APPLICABLE; AND BETWEEN ITEM (3) AND ITEM (4) ; AND BETWEEN ITEMS (2), (5), (56), (57), (58), (67) THRU (71) AND ITEM (3).

(Y) 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. & PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS. 1001599 AND 1001598. TO BE MAINTAINED IN CONJUCTION WITH THIS ASSY.

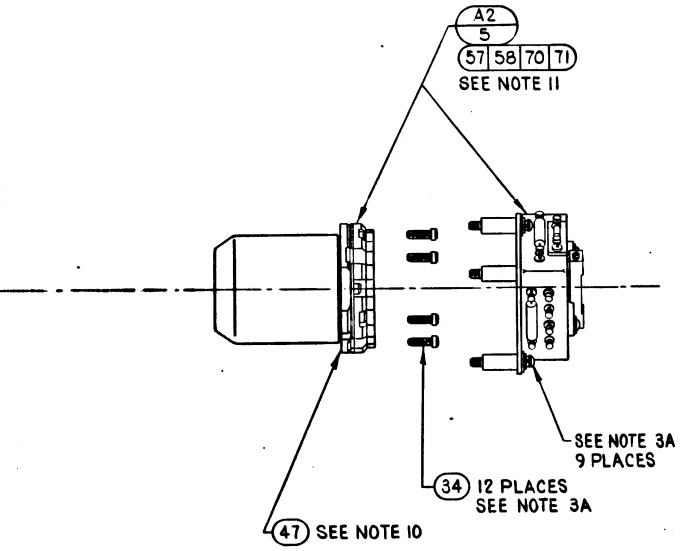
12. TAPE (66) SHALL BE USED AS REQUIRED TO RESTRICT MOVEMENT OF THE HARNESS IN THE CABLE CLAMPS.

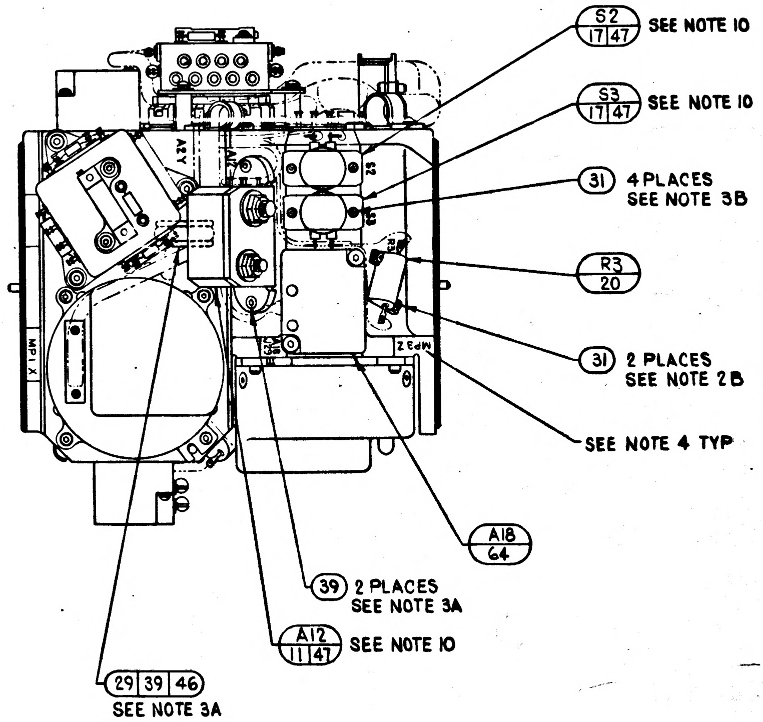
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

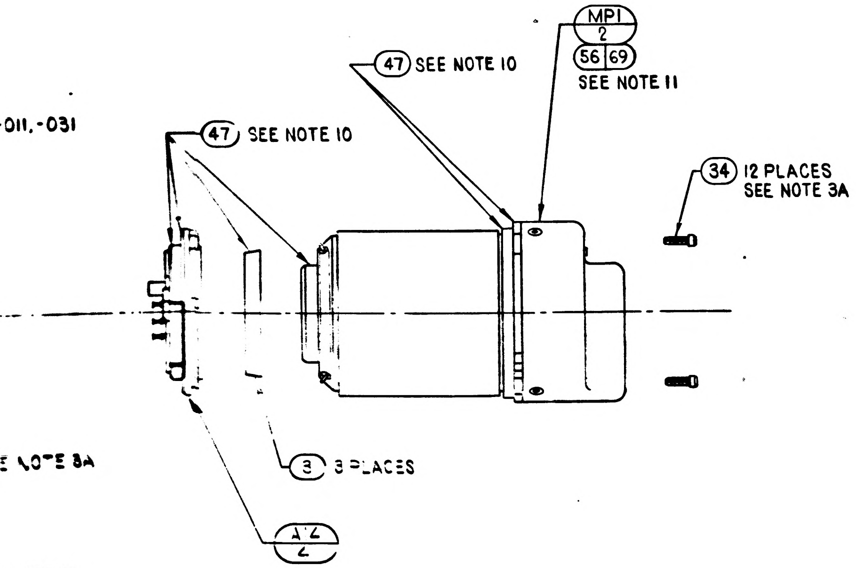
(R)

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498-097	1.00
-171	5.90
-197	11.00
-210	15.00
-220	19.1
-227	22.6
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-275	71.5
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-297	121.00
-303	140.00
-322	221.0
1010498-385	1000.0
1010498-246	35.7


A2
5
57 58 70 71
SEE NOTE 11
SEE NOTE 3A
9 PLACES
34 12 PLACES
SEE NOTE 3A
47 SEE NOTE 10


A2Y
MP1 X
MP3 Z
S2
S3
R3
A18
S2
17 47
SEE NOTE 10
S3
17 47
SEE NOTE 10
31 4 PLACES
SEE NOTE 3B
R3
20
31 2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
64
39 2 PLACES
SEE NOTE 3A
A12
11 47
SEE NOTE 10
29 39 46
SEE NOTE 3A


-011, -031
47 SEE NOTE 10
47 SEE NOTE 10
MP1
2
56 69
SEE NOTE 11
34 12 PLACES
SEE NOTE 3A
3 3 PLACES
A2
2
E NOTE 3A
E NOTE 3A

	QUANTITY REQUIRED 041	031	021	011	000	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 11	-	3	-	-	-		71	1001598-031	PIP & CALIB MOD
SEE NOTE 11	3	-	-	-	-		70	1001599-041	PIP & CALIB MOD
SEE NOTE 11	3	3	-	-	-		69	1001599-031	GYRO & CALIB MOD
							68	~~1001599-041~~	
							67	~~1001599-021~~	
SEE NOTE 12	AR	AR	AR	AR	AR		66	TYPE ACT	TAPE, ADH, ELEC, PRES SENSITIVE MIL-I-15126 1/2 WIDE
	1	1	1	1	-		65	1007263-011	ADA PREAMP ASSY, STABLE MEMBER
	3	3	3	3	3		64	1008285-011	PIP PREAMP ASSY
	1	1	1	1	-		63	1008284-011	IRIG PREAMP ASSY
	-	10	-	10	10		62	MS15795-303	WASHER FLAT
	-	10	-	10	10		61	MS35337-78	WASHER LOCK
	-	2	-	2	2		60	NAS1352C04-11	SCREW CAP SOC HD HEX
	-	8	-	8	8		59	NAS1352C04-12	SCREW CAP SOC HD HEX
SEE NOTE 11	-	-	3	-	-		58	1001598-021	PIP & CALIB. MOD
SEE NOTE 11	-	-	-	3	-		57	1001598-011	PIP & CALIB. MOD
SEE NOTE 11	-	-	3	3	-		56	1001599-011	GYRO & CALIB. MOD
SEE NOTE 12	1	1	1	1	1		55	1000220-9	CLAMP, CABLE
SEE NOTE 12	2	2	2	2	2		54	1000220-8	CLAMP, CABLE
							53	~~NAS1352C04LL10~~	
	10	-	10	-	-		52	NAS1352C04LL11	SCREW, CAP, SELF LKG, SOC HD HEX
	2	2	2	2	2		51	1001600-1	TERMINAL, INSULATED
	1	1	1	1	1		50	1001593	BRACKET, CAPACITOR
	1	1	1	1	1		49	1010279-245	CAPACITOR
							48	~~1001597~~	
SEE NOTE 10	AR	AR	AR	AR	AR		47	1006879	SILICONE COMPOUND THERMO
SEE NOTE 12	2	2	2	2	2		46	1000220-6	CLAMP, CABLE
							45	~~1000250-1~~	
	3	3	3	3	3		44	NAS1352C04LL3	SCREW, CAP, SELF LKG, SOC HD, HEX
	3	3	3	3	3		43	MS15795-703	WASHER, FLAT, ROUND
	2	2	2	2	2		42	NAS1352C02LL6	SCREW, CAP, SELF LKG, SOC HD, HEX
							41	~~1000250-17~~	

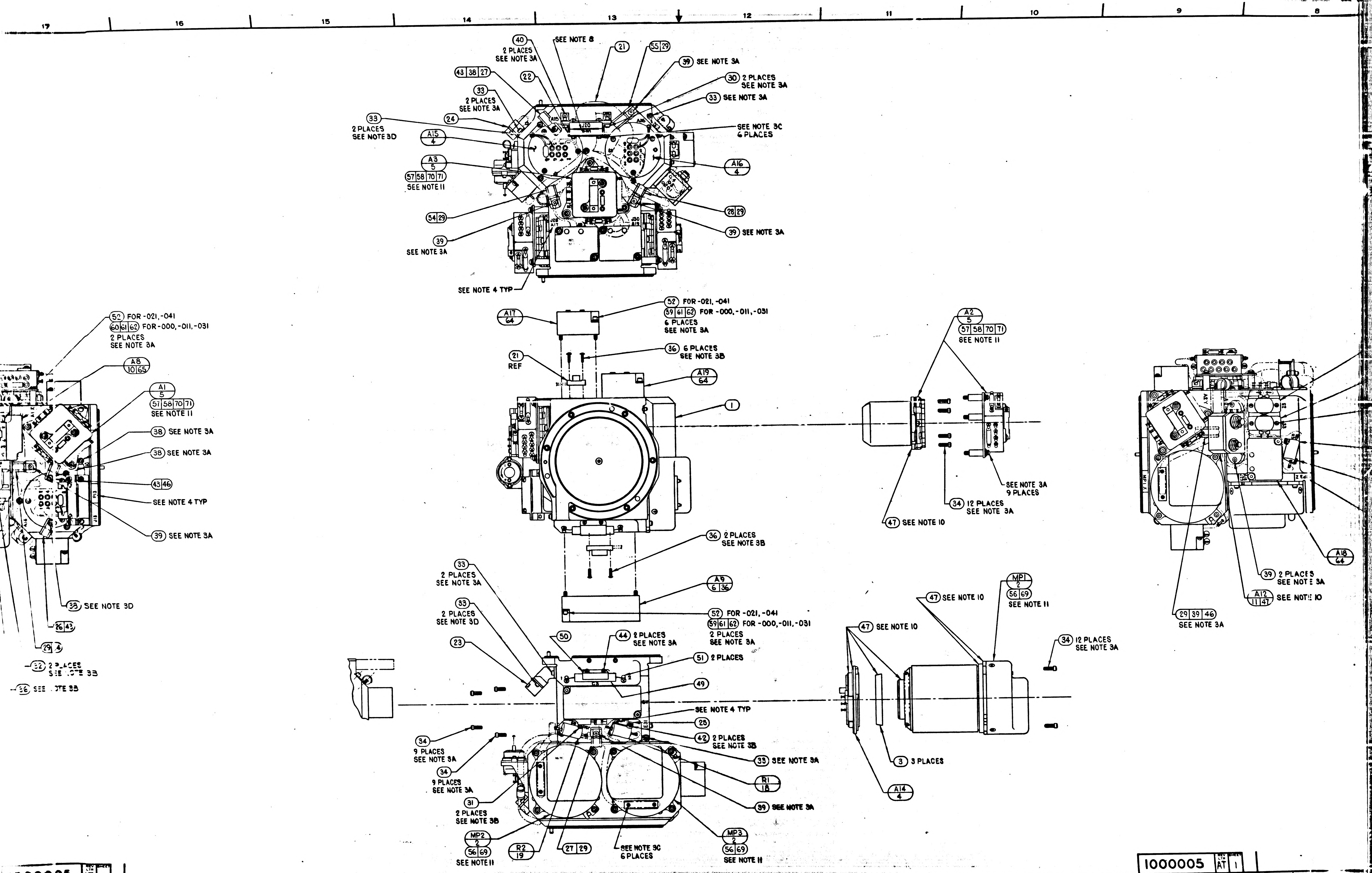
LIST OF PARTS AND MATERIALS

	4	4	4	4
	12	12	12	12
	3	3	3	3
	AR	AR	AR	AR
	9	9	9	9
	42	42	42	42
	13	13	13	13
	2	2	2	2
	8	8	8	8
	2	2	2	2
	8	8	8	8
SEE NOTE 12	1	1	1	1
SEE NOTE 12	3	3	3	3
SEE NOTE 12	2	2	2	2
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
SEE NOTE 5	1	1	1	1
SEE NOTE 5	1	1	1	1
SEE NOTE 5	1	1	1	1
	2	2	2	2
	AR	AR	AR	AR
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	-	-	-	-
	1	1	1	1
	1	1	1	1
	-	-	-	-
SEE NOTE 11	-	-	-	-
	3	3		
	3	3		
SEE NOTE 11	-	-		-
	04	03		

	1000204	DL1000 01
APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

1000005 REV AT SHEET 1



17
16
15
14
13
12
11
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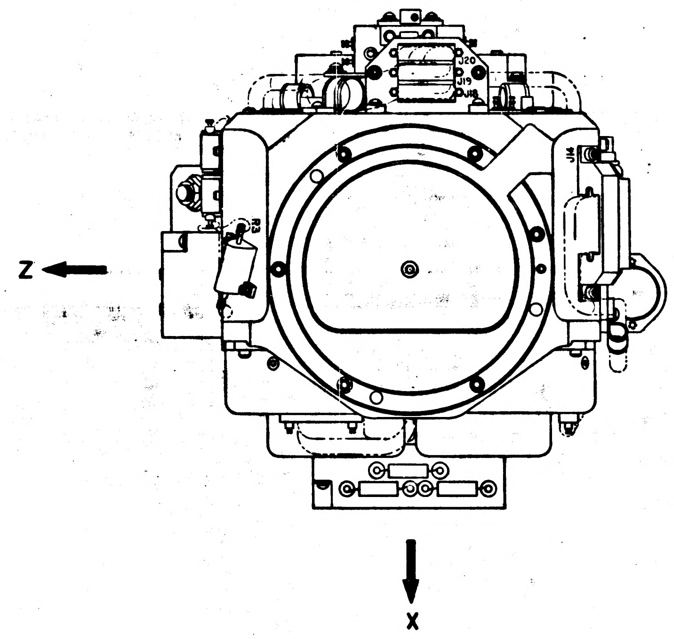
9
8
40
2 PLACES
SEE NOTE 3A
SEE NOTE 8
21
55 29
39 SEE NOTE 3A
43 38 27
22
30 2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3A
33 SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
24
A15
SEE NOTE 3C
6 PLACES
A15
4
J20
A3
5
57 58 70 71
SEE NOTE 11
A16
4
28 29
54 29
39
SEE NOTE 3A
39 SEE NOTE 3A
SEE NOTE 4 TYP
52 FOR -021, -041
59 61 62 FOR -000, -011, -031
6 PLACES
SEE NOTE 3A
A17
64
36 6 PLACES
SEE NOTE 3B
21
REF
A19
64
1
52 FOR -021, -041
60 61 62 FOR -000, -011, -031
2 PLACES
SEE NOTE 3A
A8
10 65
A1
5
51 58 70 71
SEE NOTE 11
38 SEE NOTE 3A
38 SEE NOTE 3A
43 46
SEE NOTE 4 TYP
39 SEE NOTE 3A
P13
J18
A14
38 SEE NOTE 3D
26 43
29
32 2 PLACES
SEE NOTE 3B
36 SEE NOTE 3B
A2
5
57 58 70 71
SEE NOTE 11
SEE NOTE 3A
9 PLACES
34 12 PLACES
SEE NOTE 3A
47 SEE NOTE 10
36 2 PLACES
SEE NOTE 3B
A9
6 36
52 FOR -021, -041
59 61 62 FOR -000, -011, -031
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
50
44 2 PLACES
SEE NOTE 3A
51 2 PLACES
49
SEE NOTE 4 TYP
25
42 2 PLACES
SEE NOTE 3B
33 SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R1
18
39 SEE NOTE 3A
MP2
2
56 69
SEE NOTE 11
R2
19
27 29
SEE NOTE 3C
6 PLACES
MP3
2
56 69
SEE NOTE 11
MP1
2
56 69
SEE NOTE 11
47 SEE NOTE 10
47 SEE NOTE 10
34 12 PLACES
SEE NOTE 3A
3 3 PLACES
A14
4
A18
64
39 2 PLACES
SEE NOTE 3A
A12
11 47
SEE NOTE 10
29 39 46
SEE NOTE 3A

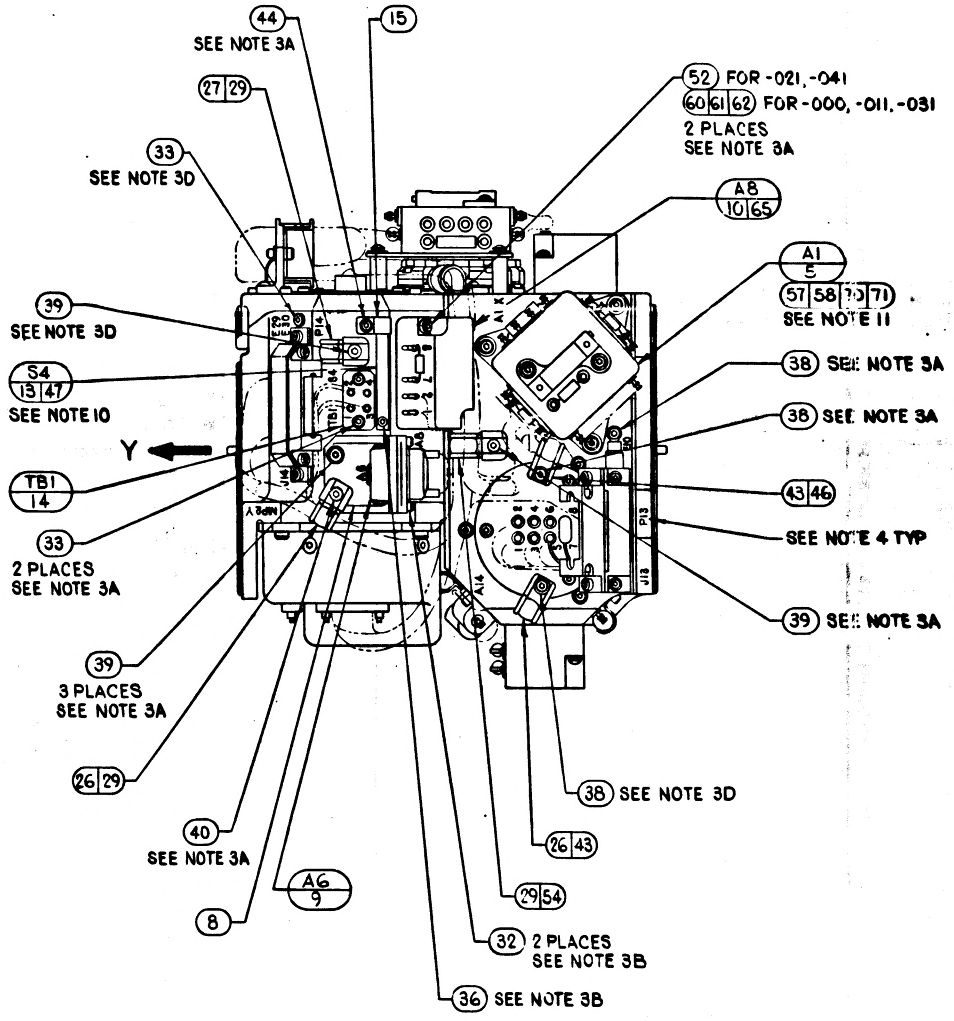
F2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP1000001.
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 1.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS.
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS .10-.14 HIGH COLOR BLACK PER ND1002019 AT LOCATION SHOWN.
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001.
6. SOLDER PER MIL-STD-440 USING ⑯ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN, A1-P18 A2-P19 A3-P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE.
10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM ㊼, TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM ① AND ITEMS ②, ④, ⑤, ⑪, ⑬, ⑰, (56), (57), (58), (69), (70), (71) AS APPLICABLE; AND BETWEEN ITEM ③, AND ITEM ④; AND BETWEEN ITEMS ②, ⑤, (56), (57), (58), (69), (70), (71) AND ITEM ③.
11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY NASA DWG NO. 1000012 AND PIP PRE-ALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY AND PIP CALIB. ASSY AS SPECIFIED ON NASA DWGS 1001599 AND 1001598, TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.
12. TAPE (66) SHALL BE USED AS REQUIRED TO RESTRICT MOVEMENT OF THE HARNESS IN THE CABLE CLAMPS.




44 SEE NOTE 3A
15
27 29
52 FOR -021, -041
60 61 62 FOR -000, -011, -031
2 PLACES
SEE NOTE 3A
33 SEE NOTE 3D
A8 10 65
A1 5
57 58 70 71
SEE NOTE 11
39 SEE NOTE 3D
S4 13 47
SEE NOTE 10
38 SEE NOTE 3A
38 SEE NOTE 3A
Y
TB1 14
43 46
33 2 PLACES SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
39 3 PLACES SEE NOTE 3A
26 29
38 SEE NOTE 3D
26 43
40 SEE NOTE 3A
A6 9
29 54
8
32 2 PLACES SEE NOTE 3B
36 SEE NOTE 3B
E29
E30
P14
S4
TB1
J14
A6
A1
P13
J13
A14

WIRING LEGEND					
COND NO.	COLOR	FIND NO.	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	8
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	8
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	8

TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV LTR AT	SHEET 1

1000005 Ⓜ

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00108	19 Nov 62	aJB	

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000004	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10-17-62
BY DIRECTION MIT Approval
10/17/62

STABLE MEMBER ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000005

SHEET OF

1000005

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1

REVISIONS TDRR 00065

	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDR 00108	19 Nov 62	ajB	
Ⓜ	B	TDR 00140	12 DEC 62	ajB	WK.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000204	
1000004	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

STABLE MEMBER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000005

SHEET OF

1000005

REVISIONS TDRR 00065				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00108	19 Nov 62	ajB	[illegible]
B	TDR 00140	12 DEC 62	ajB	WK.
C	TDR 00340	29 Jan 63	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1
1000013	PIP Prealighed Assembly	3
1000093-2	Screw, But Hd Hex Soc S. L.	2
1000093-13	Screw But Hd Hex Soc SL	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000204	
1000004	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10-17-62
BY DIRECTION MIT Approval
10/17/62

STABLE MEMBER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000005

SHEET OF

1000005

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00108	19 Nov 62	ajB	JM
B	TDR 00140	12 DEC 62	ajB	WK.
C	TDR 00340	29 Jan 63	ajB	WK.
D	TDR 00417	19 FEB 63	ajB	WK.

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1
1000013	PIP Prealighed Assembly	3
1000093-2	Screw, But Hd Hex Soc S. L.	2
1000093-13	Screw But Hd Hex Soc SL	4
1007015	PIP Preamp Assy.	3
1007012	Emergency Heater Control	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000204	
1000004	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT APPROVAL
W L Hopper 10/17/62

STABLE MEMBER ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

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REVISIONS TDRR 00065

	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDR 00108	19 Nov 62	ajB	JM
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M	C	TDR 00340	29 Jan 63	ajB	WK.
	D	TDR 00417	19 FEB 63	ajB	WK
	E	TDR 00586	7 MAR 63	ajB	WK.

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1
1000013	PIP Prealighed Assembly	3
1000093-2	Screw, But Hd Hex Soc S. L.	2
1000093-13	Screw But Hd Hex Soc SL	4
1007015	PIP Preamp Assy.	3
1007012	Emergency Heater Control	1
1007025	ADA Preamp Assembly	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	
1000004	DL 1000001

APPLICATION

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FRACTIONS DECIMALS ANGLES

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT Approval
W L Cooper 10/17/62

STABLE MEMBER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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PHOTOGRAPHIC SCALE ONLY

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REVISIONS TDRR 00065

Ⓜ	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDR 00108	19 Nov 62	ajB	
Ⓜ	B	TDR 00140	12 DEC 62	ajB	WK.
Ⓜ	C	TDR 00340	29 Jan 63	ajB	WK.
	D	TDR 00417	19 FEB 63	ajB	WK.
Ⓜ	E	TDR 00586	7 MAR 63	ajB	WK
	F	TDR 00642	26 MAR 63	ajB	WK.

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1
1000013	PIP Prealighed Assembly	3
1000093-2	Screw, But Hd Hex Soc S. L.	2
1000093-13	Screw But Hd Hex Soc SL	4
1007015	PIP Preamp Assy.	3
1007012	Emergency Heater Control	1
1007025	ADA Preamp Assembly	1
1007024	IRIG PREAMP ASSEMBLY	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000204	
1000004	DL 1000001

APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	9/12/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W L Cooper 10/17/62

STABLE MEMBER ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
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SHEET OF

	1000005

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00108	19 Nov 62	ajB	jm
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C	TDR 00340	29 Jan 63	ajB	WK.
D	TDR 00417	19 FEB 63	ajB	WK
E	TDR 00586	7 MAR 63	ajB	WK
F	TDR 00642	26 MAR 63	ajB	WK
G	TDR 00771	10 APR 63	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1
1000013	PIP Prealighed Assembly	3
1000093-2	Screw, But Hd Hex Soc S. L.	2
1000093-18	Screw But Hd Hex Soc SL	4
1007015	PIP Preamp Assy.	3
1007012	Emergency Heater Control	1
1007025	ADA Preamp Assembly	1
1007024	IRIG PREAMP ASSEMBLY	1
~~1000012~~	~~GYRO PREALIGNED ASSY 25 IRIG~~	~~3~~
1000247	Thermostat & Heater Assy	1
1000267	Bracket, Connector Assy	1
1000164	Cover, Bracket, Connect.	1
1000248	Clamp Mercury Thermostat	1
1000253	Terminal Board Assy	1
1000251	Plate, Mounting Merc. Thermo.	1
1000150	Cover, Bracket, Connector	1
1000265	Cover, Bracket Connector	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	
1000004	DL 1000001

APPLICATION

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MATERIAL:

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INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A J Boyce DATE 10/17/62
CHECKED
DRAWN
APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W L Cooper 10/17/62

STABLE MEMBER ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

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REVISIONS TDRR 00065

	SYM	DESCRIPTION	DATE	APPROVAL	
(M)	A	TDR 00108	19 Nov 62	ajB	JM
(M)	B	TDR 00140	12 DEC 62	ajB	WK.
(M)	C	TDR 00340	29 Jan 63	ajB	WK.
	D	TDR 00417	19 FEB 63	ajB	WK.
(M)	E	TDR 00586	7 MAR 63	ajB	WK.
(M)	F	TDR 00642	26 MAR 63	ajB	WK.
(M)	G	TDR 00771	10 APR 63	ajB	WK
	H	TDR 01058	30 APR 63	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1
1000013	PIP Prealighed Assembly	3
1000093-2	Screw, But Hd Hex Soc S. L.	2
1000093-13	Screw But Hd Hex Soc SL	4
1007015	PIP Preamp Assy.	3
1007012	Emergency Heater Control	1
1007025	ADA Preamp Assembly	1
1007024	IRIG PREAMP ASSEMBLY	1
1000012	GYRO PREALIGNED ASSY 25 IRIG	3
1000247	Thermostat & Heater Assy	1
1000267	Bracket, Connector Assy	1
1000164	Cover, Bracket, Connect.	1
1000248	Clamp Mercury Thermostat	1
1000253	Terminal Board Assy	1
1000251	Plate, Mounting Merc. Thermo.	1
1000150	Cover, Bracket, Connector	1
1000265	Cover, Bracket Connector	1
1000266	Thermostat, Safety	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000204	
1000004	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

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MATERIAL:

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CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10 17 62
BY DIRECTION MIT APPROVAL
[illegible] 10/17/62

STABLE MEMBER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
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1000005

PART NO.	DESCRIPTION	REQD.
1000025	**Housing Stable Member IMU**	1
1000138	Clamp, Split, Gyro	3
1000126	Heater & Taper Mount Assembly	3
1000137	Harness Assembly Stable Member	1
1000097	Accelerometer, Angular Differentiating	1
1000166	Mount, ADA, S/M	1
1000013	PIP Prealighed Assembly	3
1000093-2	Screw, But Hd Hex Soc S. L.	2
1000093-18	Screw But Hd Hex Soc SL	4
1007016	PIP Preamp Assy.	3
1007012	Emergency Heater Control	1
1007025	ADA Preamp Assembly	1
1007024	IRIG PREAMP ASSEMBLY	1
1000012	GYRO PREALIGNED ASSY 25 IRIG	3
1000247	Thermostat & Heater Assy	1
1000267	Bracket, Connector Assy	1
1000164	Cover, Bracket, Connect.	1
1000248	Clamp Mercury Thermostat	1
1000253	Terminal Board Assy	1
1000251	Plate, Mounting Merc. Thermo.	1
1000150	Cover, Bracket, Connector	1
1000265	Cover, Bracket Connector	1
1000266	Thermostat, Safety	2

REVISIONS TDRR 00065

	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDR 00108	19 Nov 62	ajB	JM
M	B	TDR 00140	12 DEC 62	ajB	WK.
M	C	TDR 00340	29 Jan 63	ajB	WK.
	D	TDR 00417	19 FEB 63	ajB	WK.
M	E	TDR 00586	7 MAR 63	ajB	WK.
M	F	TDR 00642	26 MAR 63	ajB	WK.
M	G	TDR 00771	10 APR 63	ajB	WK
	H	TDR 01058	30 APR 63	ajB	WK
M	J	REPLACED BY REV K WITH CHANGES TDRR 02303	29 July 63	ajB	WK 7/31/63

REPLACED BY REV K WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	
1000004	DL 1000001

APPLICATION

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FRACTIONS DECIMALS ANGLES
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MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED a J Boyce DATE 10/12/62
CHECKED
DRAWN
APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT Approval
W I Stoyer 10/17/62

STABLE MEMBER ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
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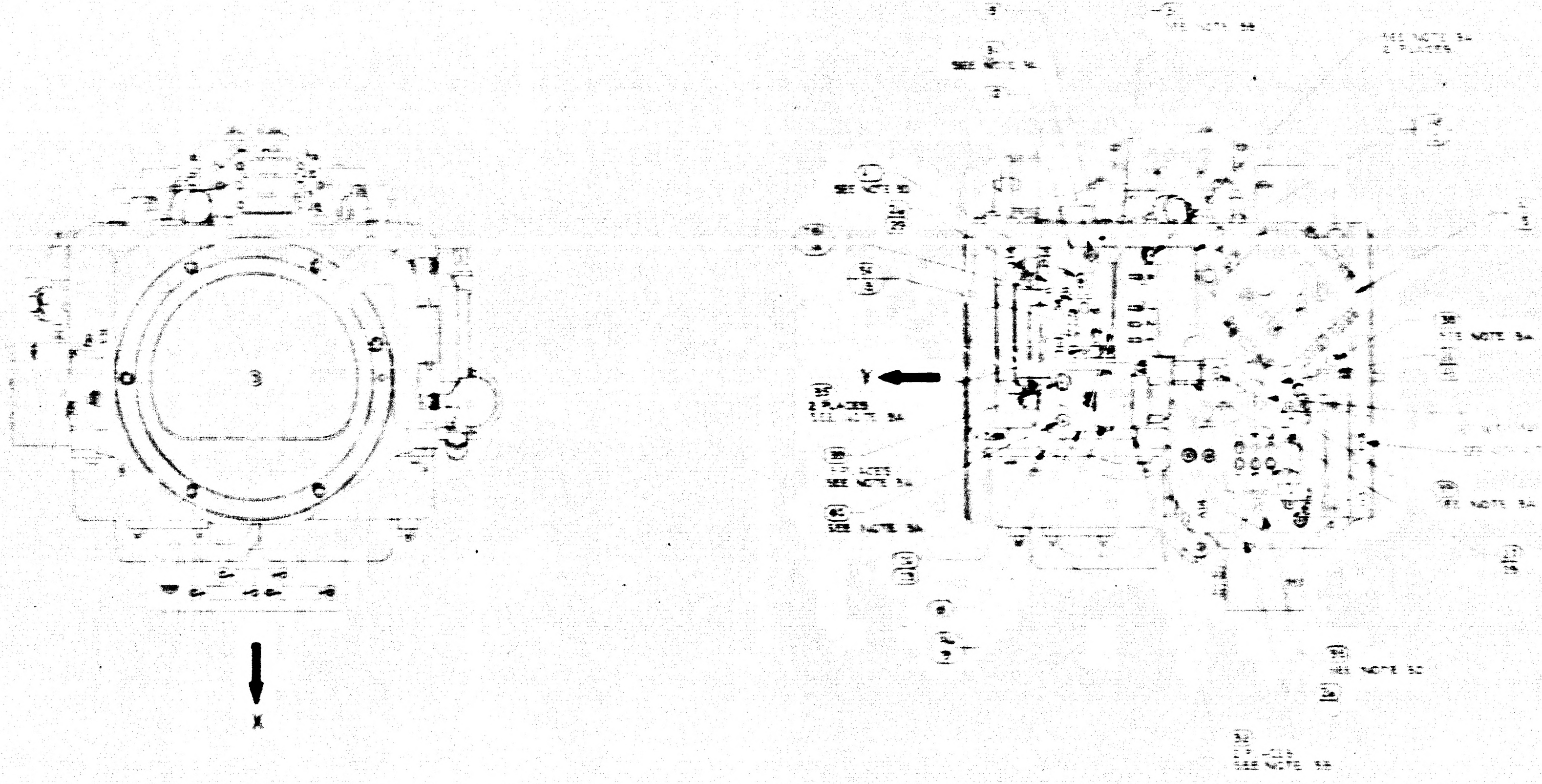
1000005
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND

ITEM	COLOR	WIRE NO	FROM		TO	SEE NOTE
	WHT		A6	-	A5	
2	BLK		A6	-	A5-2	
1	BLACK		54	BLACK	TB-1	
3	BLACK		54	BLACK	TB-2	
	BLUE		54	BLUE	TB-3	
	BLUE		54	BLUE	TB-4	

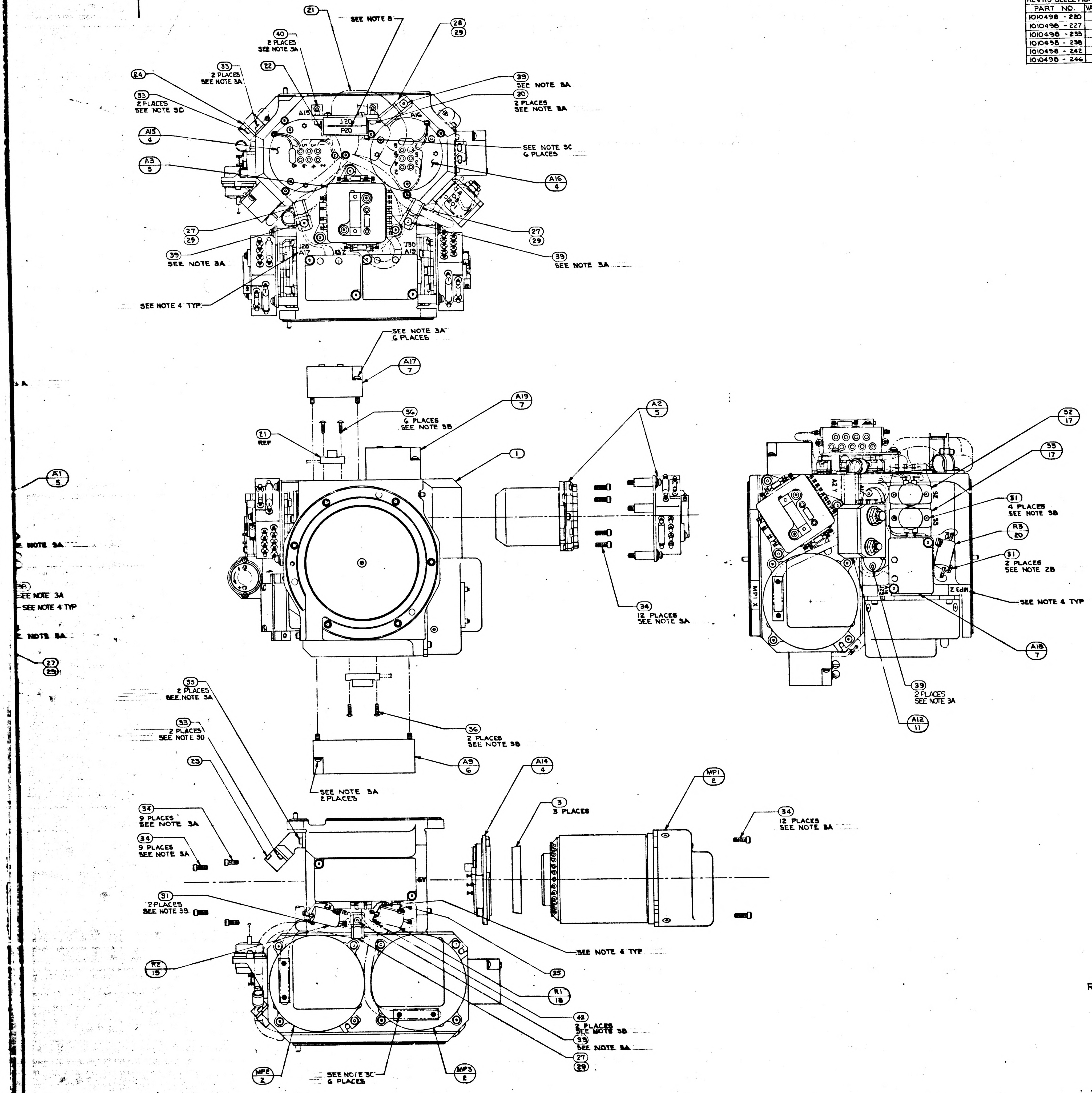


NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP [illegible]
3. STRAIN TORQUE REQUIREMENTS [illegible]
   A. [illegible] IN LB
   B. [illegible] IN LB
   C. [illegible] IN LB AT FINAL SEATING NOT TO EXCEED 10 IN LB WHILE ENGAGING PINS
   D. INITIAL FINGER TIGHT
4. MARK CHARACTERS 1/8 HIGH COLOR BLACK PER [illegible] AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP [illegible]
6. SOLDER PER MIL-STD-454, USING [illegible] WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
7. TWISTED CONDUCTORS TO CONSIST OF A FULL [illegible] TURNS PER INCH MIN
8. MARK THE PIN CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN
   A. [illegible] B. [illegible] C. [illegible]
9. USE DRAWING NO. [illegible] WIRING DIAGRAM FOR REFERENCE

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	K	REPLACES REV. WITH CHANGES TDRR 02303	7-30-63	WK
	L	TDRR 03186	9-17-63	WK

R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 - 220	19.1
1010498 - 227	22.6
1010498 - 233	26.1
1010498 - 238	29.4
1010498 - 242	32.4
1010498 - 246	35.7

R1 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
1010498 - 227	22.6
1010498 -246	35.7
1010498 - 275	71.5
1010498 - 297	121.0
1010498 - 322	221.0


21
SEE NOTE 8
28/29
40 2 PLACES SEE NOTE 3A
22
33 2 PLACES SEE NOTE 3A
24
33 2 PLACES SEE NOTE 3C
A15/4
A3/5
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A16/4
A15
J20
P20
A16
27/29
39 SEE NOTE 3A
J28
A17
J30
A19
SEE NOTE 4 TYP
SEE NOTE 3A 6 PLACES
A17/7
36 6 PLACES SEE NOTE 3B
A19/7
21 REF
1
A2/5
34 12 PLACES SEE NOTE 3A
A1/5
NOTE 3A
SEE NOTE 3A
SEE NOTE 4 TYP
NOTE 3A
27/29
52/17
53/17
31 4 PLACES SEE NOTE 3B
R3/20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18/7
39 2 PLACES SEE NOTE 3A
A12/11
A2 Y
MP1 X
MP3 Z
S2
S3
R3
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
36 2 PLACES SEE NOTE 3B
A9/6
SEE NOTE 3A 2 PLACES
A14/4
3 3 PLACES
MP1/2
34 12 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
A9
SEE NOTE 4 TYP
25
R1/18
R2/19
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
27/29
MP2/2
SEE NOTE 3C 6 PLACES
MP3/2

REPLACES REV K WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	WASHER, FLAT, ROUND	MS15795-703			43
Ⓛ 2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02L6			42
1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-17			41
3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
10	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
A/R	TWINE NYLON WAXED		MIL-T-713	TYPE P	37
9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
Ⓛ 2	SCREW, CAP SELF LKG, SOC HD, HEX	MS1352C04L8			35
Ⓛ 43	SCREW, CAP. SELF LKG, SOC HD, HEX	MS1352C04L6			34
Ⓛ 8	SCREW, CAP. SELF LKG, SOC HD, HEX	MS1352C04L4			33
Ⓛ 2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02 L4			32
Ⓛ 8	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02L3			31
2	SCREW, CAP, SOC HD, HEX	1000110-302			30
7	WASHER, CABLE CLAMP	1000223			29
1	CLAMP, CABLE	1000220-9			28
4	CLAMP, CABLE	1000220-7			27
4	CLAMP, CABLE	1000220-5			26
1	*SPACER, RESISTOR, STABLE MEMBER*	1001462			25
1	COVER, BRKT, CONNECTOR	1000150			24
1	COVER, BRKT, CONNECTOR	1000164			23
1	COVER, BRKT, CONN, 26 PIN	1000265			22
1	WIRING HARNESS "A" STABLE MEMBER	1000137			21
1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
2	THERMOSTAT, SAFETY	1000266			17
A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
1	CLAMP, MERCURY THERMO	1000248			15
1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
1	THERMO & HEATER ASSY	1000247			13
1	PLATE, MTG, MERCURY THERMO	1000251			12
1	EMER HEATERS CONTROL, MODULE	1007012			11
1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
1	MOUNT, ADA, STABLE MEMBER	1000166			8
3	PIP PREAMP ASSY	1007015			7
1	IRIG PREAMP ASSY	1007024			6
3	PIP PREALIGNED ASSY	1000013			5
3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
3	CLAMP, SPLIT, GYRO	1000138			3
3	GYRO PREALIGNED ASSY, 25 IRIG	1000012			2
1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	1000204
USED ON	DL1000201
APPLICATION	

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MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED G.J. Bryan DATE 7-30-63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC J. Bassard
MIT/IL APPROVAL W. Duffey DATE 31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000005
SHEET 1 OF 1

1000005 REV L SHT 1

1000005

INCHES
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F-3

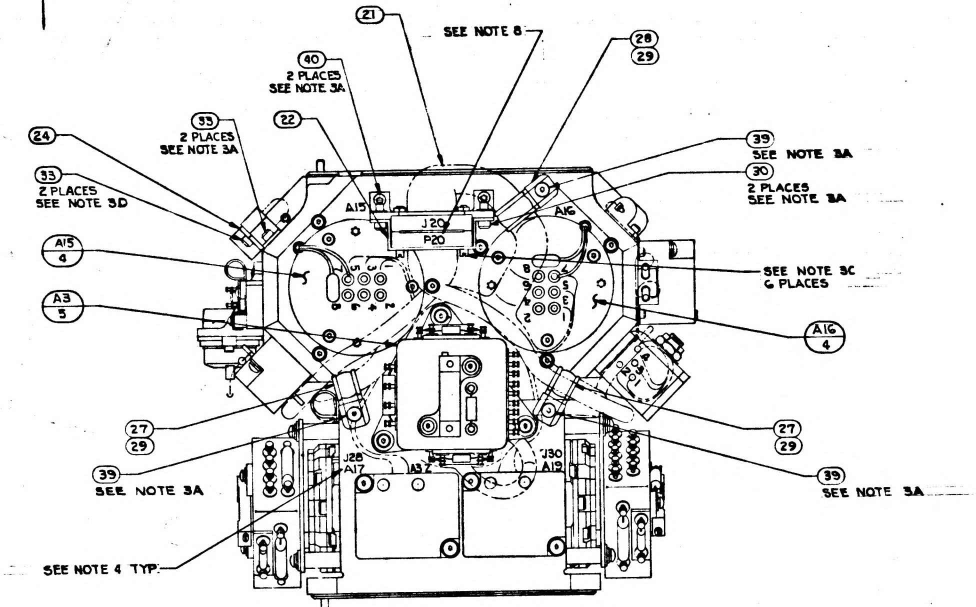
R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 - 220	19.1
1010498 - 227	22.6
1010498 - 233	26.1
1010498 - 238	29.4
1010498 - 242	32.4
1010498 - 246	35.7

R1 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
1010498 - 227	22.6
1010498 -246	35.7
1010498 - 275	71.5
1010498 - 297	121.0
1010498 - 322	221.0

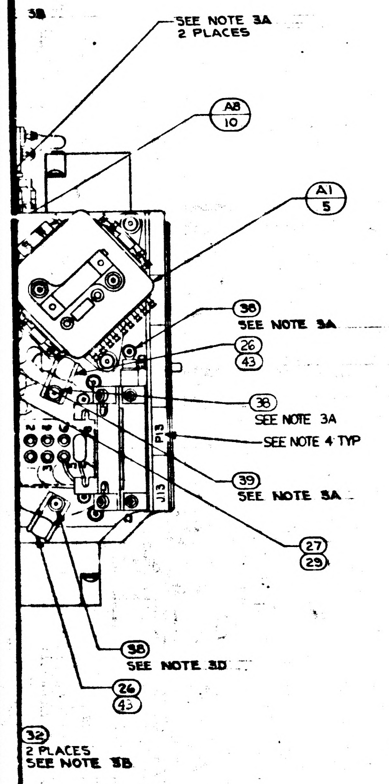
REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVED
	K	REPLACES REV J WITH CHANGES TDRR 02381	7-30-63	
	L	TDRR 03186	9-17-63	

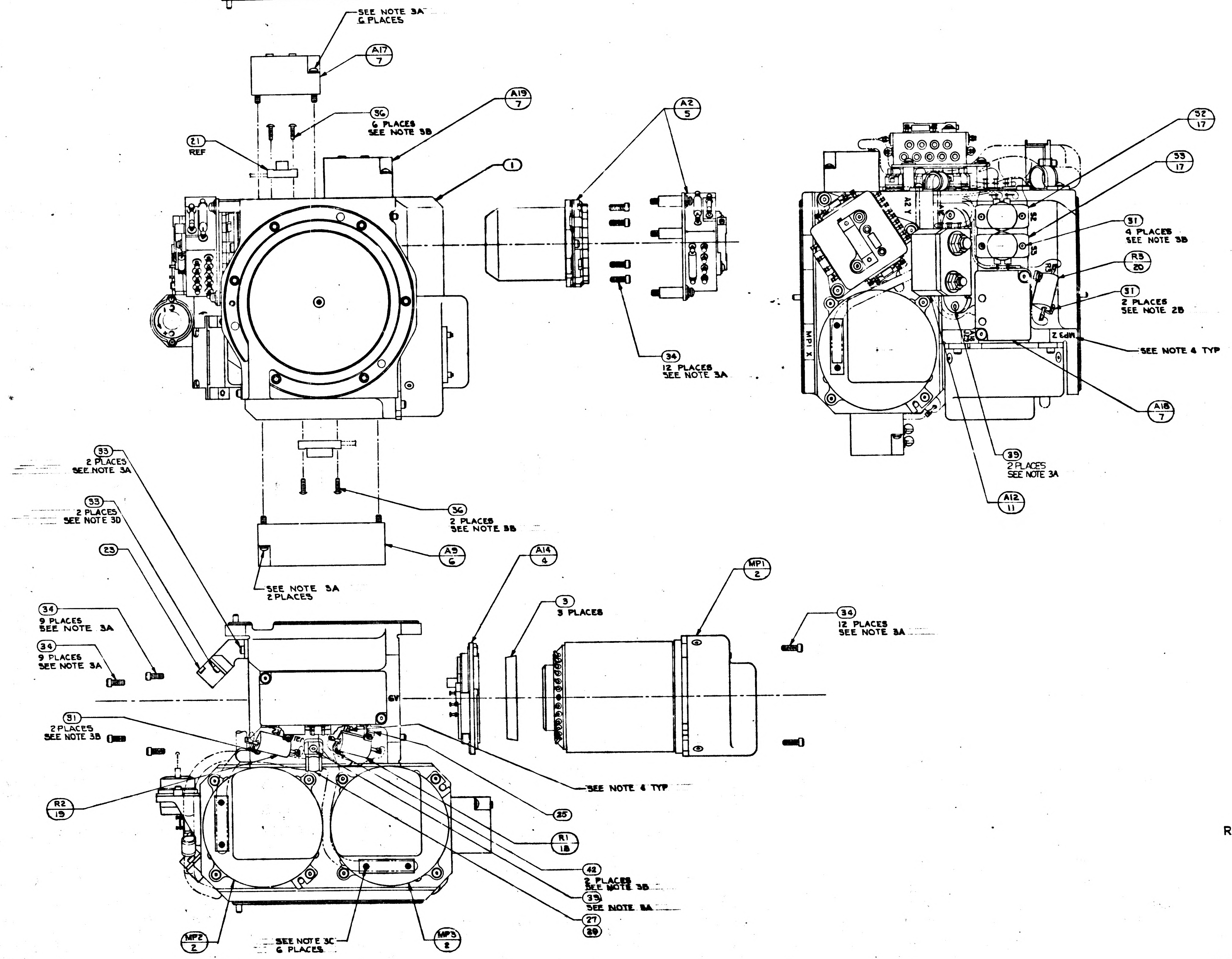
(4)



21
SEE NOTE 8
40
2 PLACES
SEE NOTE 3A
28
29
22
35
2 PLACES
SEE NOTE 3A
24
33
2 PLACES
SEE NOTE 3D
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
A15
J20
P20
A16
A15
4
SEE NOTE 3C
6 PLACES
A3
5
A16
4
27
29
27
29
J28
A17
A13
J30
A19
39
SEE NOTE 3A
39
SEE NOTE 3A
SEE NOTE 4 TYP.



3B
SEE NOTE 3A
2 PLACES
A8
10
A1
5
38
SEE NOTE 3A
26
43
38
SEE NOTE 3A
SEE NOTE 4 TYP
P13
J13
39
SEE NOTE 3A
27
29
38
SEE NOTE 3D
26
43
32
2 PLACES
SEE NOTE 3B



SEE NOTE 3A
6 PLACES
A17
7
36
6 PLACES
SEE NOTE 3B
A19
7
21
REF
1
A2
5
34
12 PLACES
SEE NOTE 3A
32
17
33
17
31
4 PLACES
SEE NOTE 3B
R3
20
31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
MP1 X
Z EdM
A18
7
39
2 PLACES
SEE NOTE 3A
A12
11
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
36
2 PLACES
SEE NOTE 3B
A9
6
SEE NOTE 3A
2 PLACES
23
A14
4
3
3 PLACES
MP1
2
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
12 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
25
R2
19
R1
18
42
2 PLACES
SEE NOTE 3B
35
SEE NOTE 3A
27
29
MP2
2
SEE NOTE 3C
6 PLACES
MP3
2

REPLACES REV K WITH CHANGES

	QTY. REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES
	2	WASHER, FLAT, ROUND	MS15795-703		
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02LL6		
	1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-17		
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14		
	10	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13		
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12		
	A/R	TWINE NYLON WAXED		M-T-713	TYPE P
	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3		
(L)	2	SCREW, CAP SELF LKG, SOC HD, HEX	MS1352C04LL8		
(L)	43	SCREW, CAP. SELF LKG, SOC HD, HEX	MS1352C04LL6		
(L)	8	SCREW, CAP. SELF LKG, SOC HD, HEX	MS1352C04LL4		
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02 LL4		
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02LL3		
	2	SCREW, CAP, SOC HD, HEX	1000110-302		
	7	WASHER, CABLE CLAMP	1000223		
	1	CLAMP, CABLE	1000220-9		
	4	CLAMP, CABLE	1000220-7		
	4	CLAMP, CABLE	1000220-5		
	1	SPACER, RESISTOR, STABLE MEMBER	1001162		
	1	COVER, BRKT, CONNECTOR	1000150		
	1	COVER, BRKT, CONNECTOR	1000164		
	1	COVER, BRKT, CONN, 26 PIN	1000265		
	1	WIRING HARNESS "A" STABLE MEMBER	1000137		
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5
	2	THERMOSTAT, SAFETY	1000266		
	A/R	SOLDER	SN60 WARP 2	QQ-S-571	
	1	CLAMP, MERCURY THERMO	1000248		
	1	TERM. BOARD ASSY MERCURY THERMO	1000253		
	1	THERMO & HEATER ASSY	1000247		
	1	PLATE, MTG, MERCURY THERMO	1000251		
	1	EMER HEATERS CONTROL, MODULE	1007012		
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025		
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097		
	1	MOUNT, ADA, STABLE MEMBER	1000166		
	3	PIP PREAMP ASSY	1007015		
	1	IRIG PREAMP ASSY	1007024		
	3	PIP PREALIGNED ASSY	1000013		
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126		
	3	CLAMP, SPLIT, GYRO	1000138		
	3	GYRO PREALIGNED ASSY, 25 IRIG	1000012		
	1	HOUSING, STABLE MEMBER	1000025		

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED 7-30-63
CHECKED
DRAWN RES
APPROVED FOR MSC
MIT/IL APPROVAL DATE
31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000
SHEET 1 OF

1000005	REV L	SHT 1

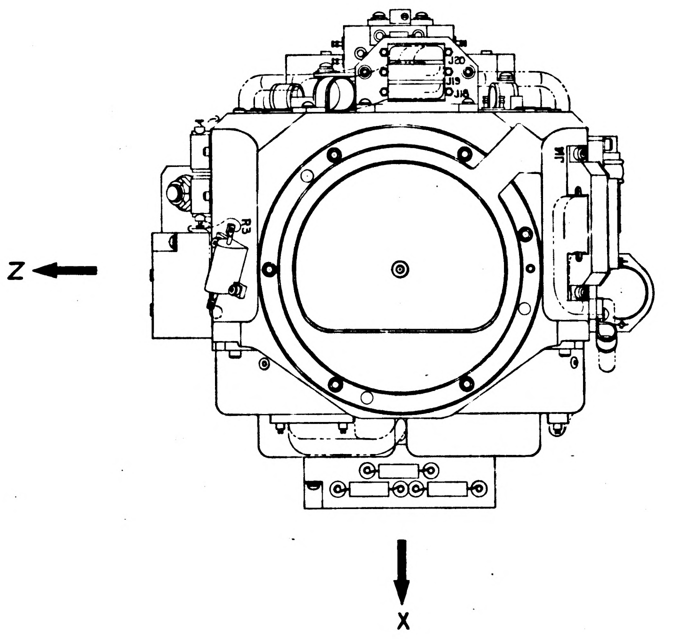
MASTER

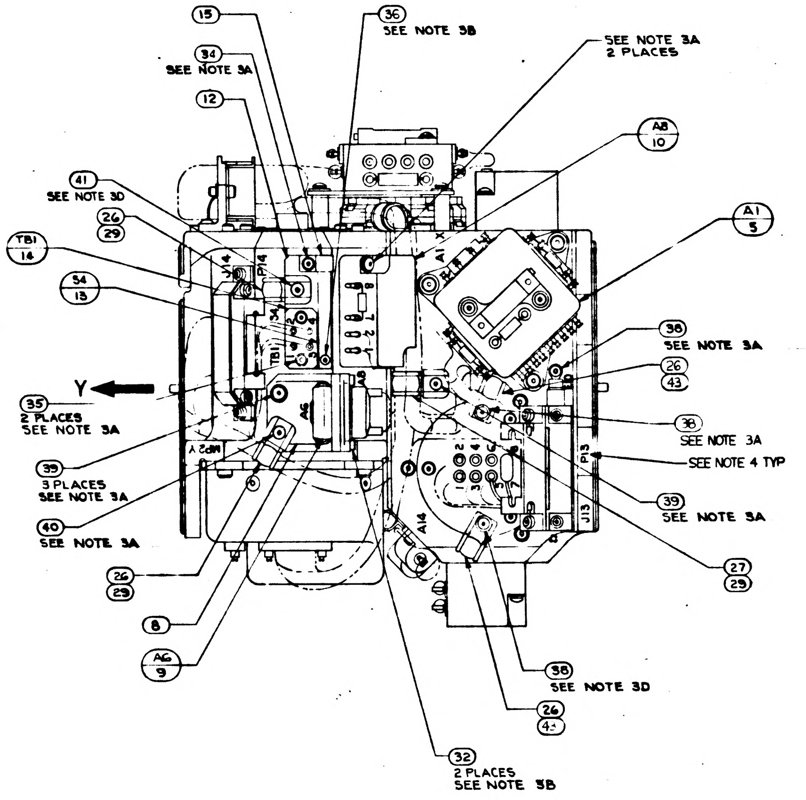
INCHES
PHOTOGRAPHIC SCALE ONLY

F-2

WIRING LEGEND

CORD NO	COLOR	FIND NO	FROM	TO	SEE NOTE 7
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	
3	BLACK		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	
5	BLUE		S4 - BLUE	TB1-4	

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36 SEE NOTE 3B
34 SEE NOTE 3A
12
SEE NOTE 3A 2 PLACES
A8 10
41 SEE NOTE 3D
26 29
TB1 14
S4 13
A1 5
J14
P14
A1
X
A6
A8
38 SEE NOTE 3A
26 43
Y
35 2 PLACES SEE NOTE 3A
38 SEE NOTE 3A
SEE NOTE 4 TYP
P13
39 3 PLACES SEE NOTE 3A
39 SEE NOTE 3A
40 SEE NOTE 3A
J13
A14
27 29
26 29
8
A6 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B

24
35 2 PLACES SEE NOTE
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
3 2 PLACES SEE NOTE 3B
R2 19

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000201
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.
8. MARK THE P1P CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

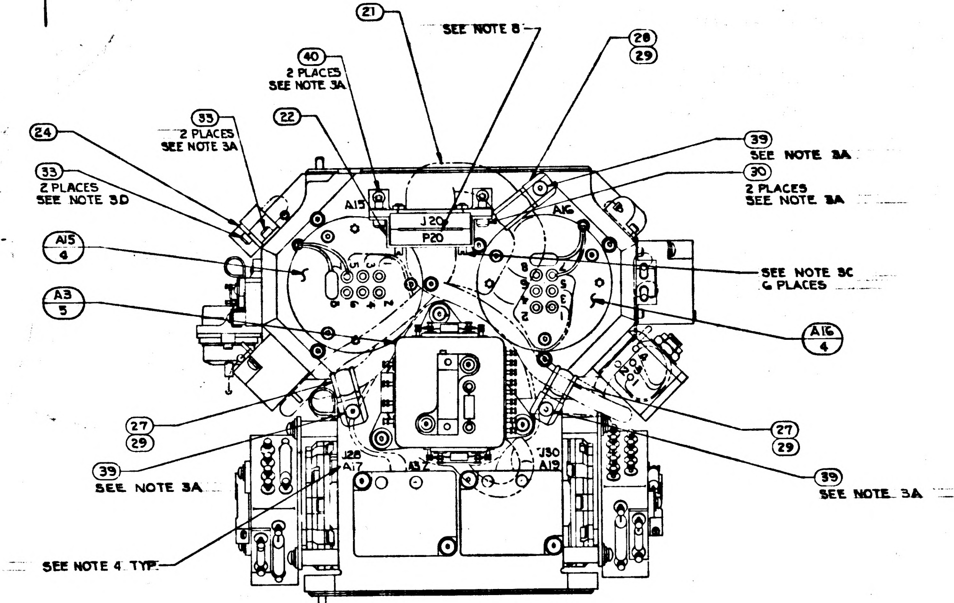
	REV	SHT
1000005	L	1

5 4 3 2 1

R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 - 220	19.1
1010498 - 227	22.6
1010498 - 233	26.1
1010498 - 238	29.4
1010498 - 242	32.4
1010498 - 246	35.7

R1 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 - 197	11.0
1010498 - 227	22.6
1010498 - 246	35.7
1010498 - 275	71.5
1010498 - 297	121.0
1010498 - 322	221.0

	REVISIONS		
ZONE	SYM	DESCRIPTION	
	K	REPLACES REV J WITH CHANGES TDRR 02303	
	L	TDRR C3186	
	M	TDRR 03945	



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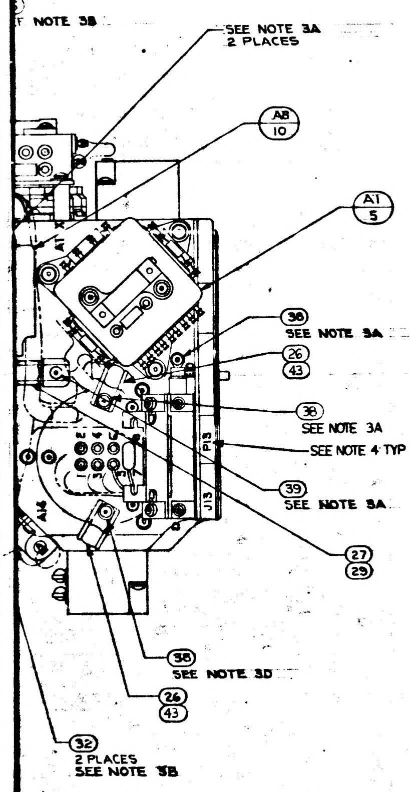
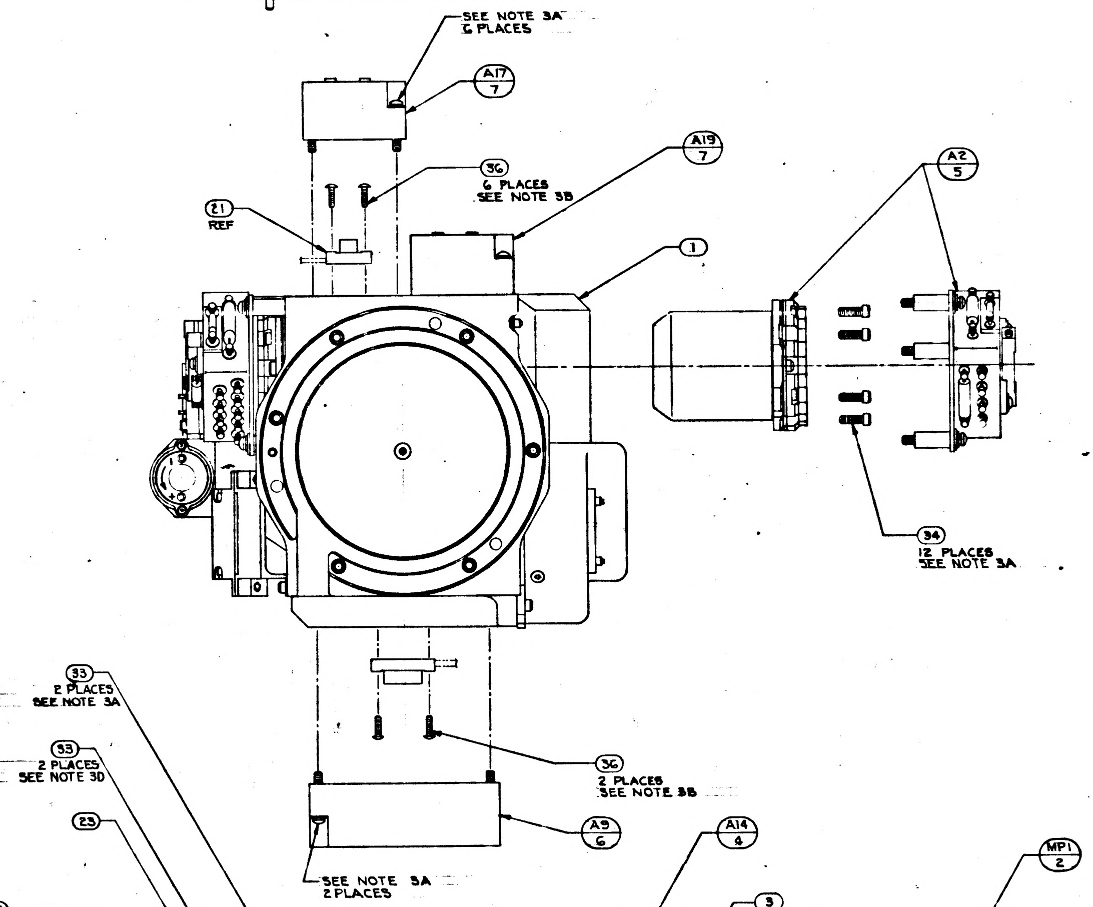
SEE NOTE 8
28
29
40
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3A
22
24
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
A15
4
A3
5
SEE NOTE 3C
6 PLACES
A16
4
J20
P20
A15
A16
27
29
27
29
39
SEE NOTE 3A
39
SEE NOTE 3A
J26
A17
J30
A19
SEE NOTE 4 TYP



NOTE 3B
SEE NOTE 3A
2 PLACES
A8
10
A1
5
38
SEE NOTE 3A
26
43
38
SEE NOTE 3A
SEE NOTE 4 TYP
39
SEE NOTE 3A
27
29
38
SEE NOTE 3D
26
43
32
2 PLACES
SEE NOTE 3B
A1
A14
P13
J13



SEE NOTE 3A
6 PLACES
A17
7
36
6 PLACES
SEE NOTE 3B
A19
7
21
REF
1
A2
5
34
12 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
36
2 PLACES
SEE NOTE 3B
A9
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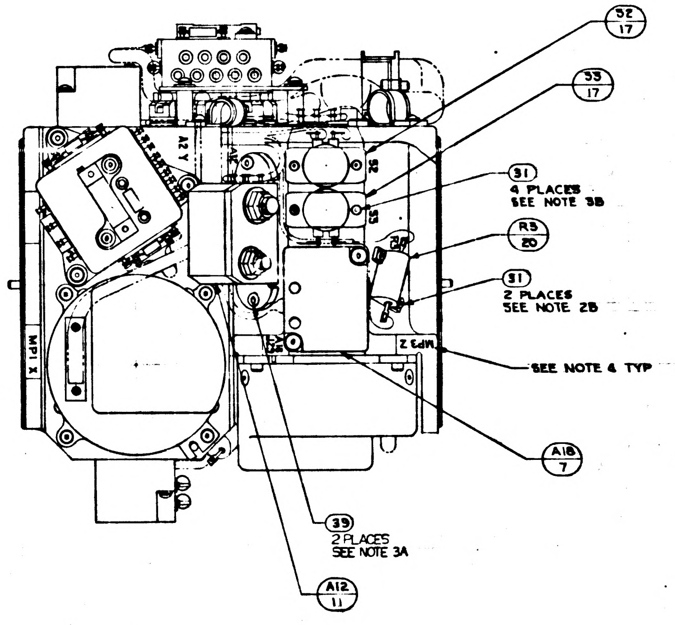
SEE NOTE 3A
2 PLACES



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17
33
17
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4 PLACES
SEE NOTE 3B
R3
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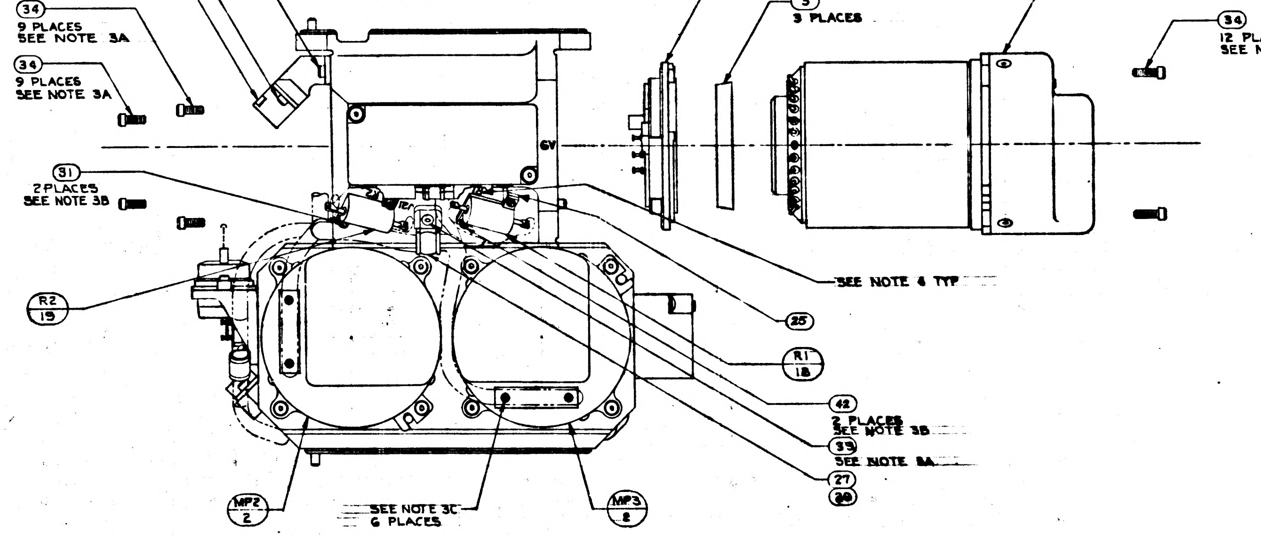
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
7
39
2 PLACES
SEE NOTE 3A
A12
11
MP1 X



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9 PLACES
SEE NOTE 3A
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9 PLACES
SEE NOTE 3A
A14
4
3
3 PLACES
MP1
2
34
12 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
GY
SEE NOTE 4 TYP
25
R2
19
R1
18
42
2 PLACES
SEE NOTE 3B
33
SEE NOTE 3A
27
29
MP2
2
SEE NOTE 3C
6 PLACES
MP3
2

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	
	2	WASHER, FLAT, ROUND	MS15795-703		
Ⓛ	2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS13520 2LL6		
	1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-17		
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14		
	10	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13		
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12		
	A/R	TWINE NYLON WAXED		MIL-T-713	TY
	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3		
Ⓛ	2	SCREW, CAP SELF LKG, SOC HD, HEX	MS13520 4LL8		
Ⓛ	43	SCREW, CAP, SELF LKG, SOC HD, HEX	MS13520 4LL6		
Ⓛ	8	SCREW, CAP, SELF LKG, SOC HD, HEX	MS135204 LL4		
Ⓛ	2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS13520 LL4		
Ⓛ	8	SCREW, CAP, SELF LKG, SOC HD, HEX	MS13520 2LL3		
	2	SCREW, CAP, SOC HD, HEX	1000110 302		
	7	WASHER, CABLE CLAMP	1000223		
	1	CLAMP, CABLE	1000220-9		
	4	CLAMP, CABLE	1000220-7		
	4	CLAMP, CABLE	1000220-5		
	1	SPACER, RESISTOR, STABLE MEMBER	100146.		
	1	COVER, BRKT, CONNECTOR	1000150		
	1	COVER, BRKT, CONNECTOR	1000164		
	1	COVER, BRKT, CONN, 26 PIN	1000245		
	1	WIRING HARNESS "A" STABLE MEMBER	1000137		
	1	RESISTOR-FIXED R3	101049[illegible]		SE
	1	RESISTOR-FIXED R2	101049[illegible]		SE
	1	RESISTOR-FIXED R1	101049[illegible]		SE
	2	THERMOSTAT, SAFETY	1000246		
	A/R	SOLDER	SN60 WRP 2	QQ-S-571	
	1	CLAMP, MERCURY THERMO	1000248		
	1	TERM. BOARD ASSY MERCURY THERMO	1000253		
	1	THERMO & HEATER ASSY	1000217		
	1	PLATE, MTG, MERCURY THERMO	1000251		
	1	EMER HEATERS CONTROL MODULE	100702		
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025		
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097		
	1	MOUNT, ADA, STABLE MEMBER	1000136		
	3	PIP PREAMP ASSY	1007015		
Ⓜ	1	IRIG PREAMP ASSY	1007031		
	3	PIP PREALIGNED ASSY	1000013		
	3	HTR & TAPERED MT ASSY 25 IRIG	1000126		
	3	CLAMP, SPLIT, GYRO	1000138		
	3	GYRO PREALIGNED ASSY, 25 IRIG	1000012		
	1	HOUSING, STABLE MEMBER	1000025		

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED DATE
CHECKED
DRAWN REG 5-7-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE
31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

1000005	REV M	SHT 1

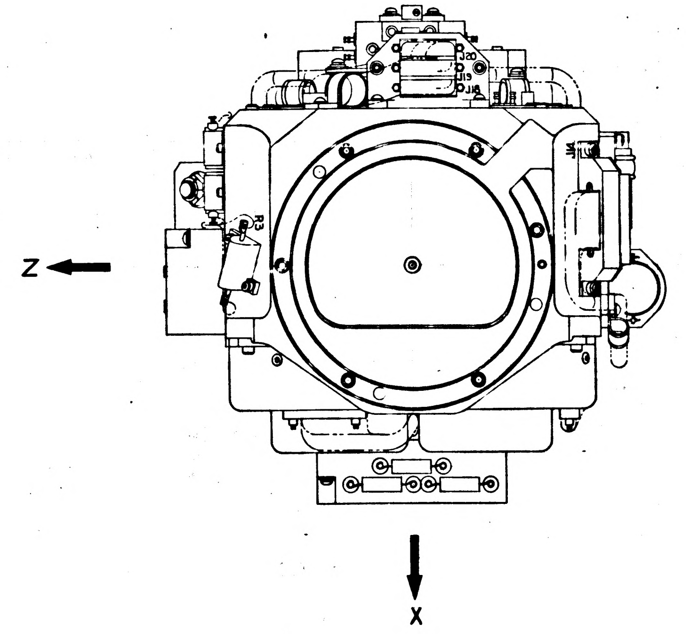
MASTER

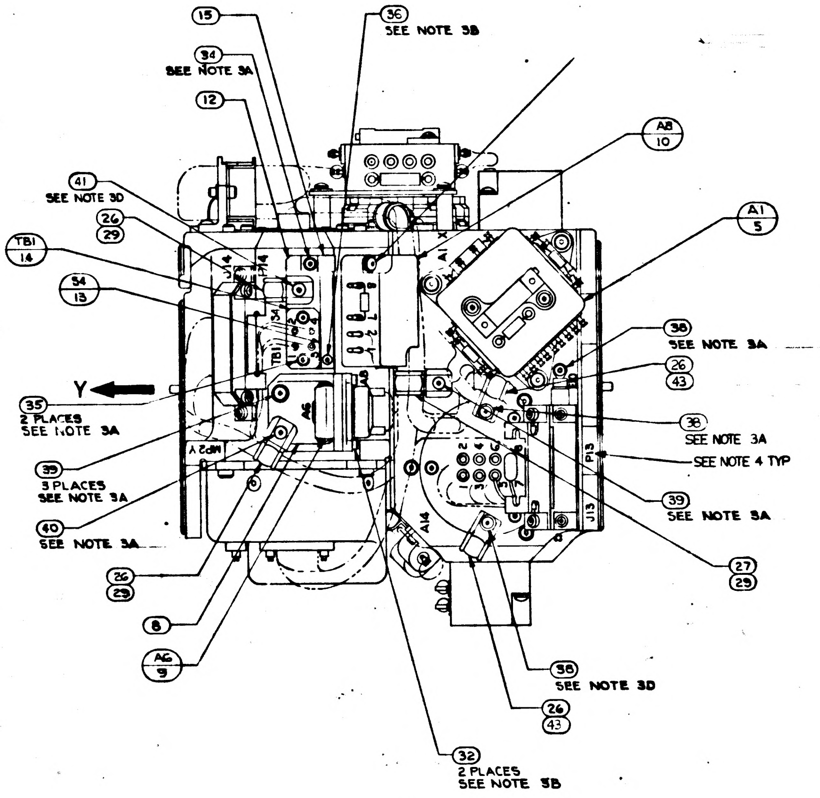
5 4 3 2 1

INCHES
PHOTOGRAPHIC SCALE ONLY

F-2

WIRING LEGEND					
CORD NO	COLOR	FIND NO	FROM	TO	SEE NOTE 7
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	
3	BLACK		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	
5	BLUE		S4 - BLUE	TB1-4	





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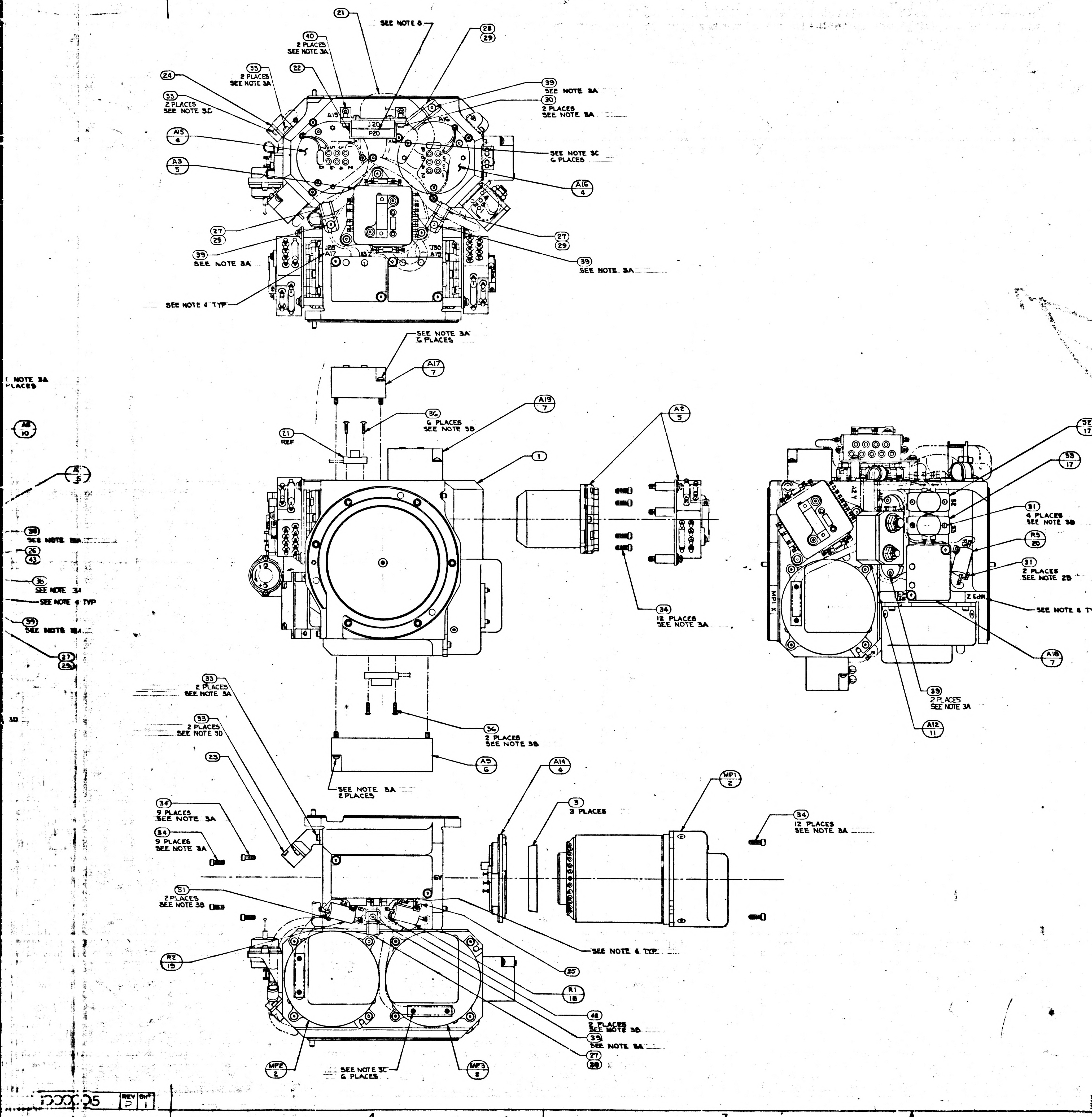
36 SEE NOTE 3B
34 SEE NOTE 3A
12
A8 10
41 SEE NOTE 3D
26 29
TB1 14
A1 5
S4 13
38 SEE NOTE 3A
26 43
Y
35 2 PLACES SEE NOTE 3A
38 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
39 SEE NOTE 3A
40 SEE NOTE 3A
27 29
26 29
8
A6 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
J14
P14
S4
TB1
A6
A8
A1
MP2 Y
P13
J13
A14

24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
33 2 PLACES SEE NOTE 3A
33 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000201
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.
8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

	REV	SHT
1000005	M	1

INCHES
PHOTOGRAPHIC SCALE ONLY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SEE NOTE 8
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2 PLACES
SEE NOTE 3A
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33
2 PLACES
SEE NOTE 3A
22
24
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2 PLACES
SEE NOTE 3C
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
A15
J20
P20
A16
A15
4
A3
5
SEE NOTE 3C
6 PLACES
A16
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27
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SEE NOTE 3A
J28
A17
A12
J30
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29
39
SEE NOTE 3A
SEE NOTE 4 TYP
SEE NOTE 3A
6 PLACES
A17
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NOTE 3A
PLACES
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A2
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SEE NOTE 3A
SEE NOTE 4 TYP
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SEE NOTE 3A
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2 PLACES
SEE NOTE 3A
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2 PLACES
SEE NOTE 3D
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2 PLACES
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4 PLACES
SEE NOTE 3B
R3
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31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
7
35
2 PLACES
SEE NOTE 3A
A12
11
AZ Y
MP1 X
MP2 Z
A14
4
3
3 PLACES
MP1
2
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
12 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
GY
SEE NOTE 4 TYP
25
R2
19
R1
18
48
2 PLACES
SEE NOTE 3B
39
SEE NOTE 3A
27
28
MP2
2
SEE NOTE 3C
6 PLACES
MP3
2

Ⓝ R1, R2 & R3	
SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-18-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK

REPLACES REV K WITH CHANGES

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓟ	1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-1			45
Ⓟ	1	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			44
	2	WASHER, FLAT, ROUND	MS15795-703			43
Ⓛ	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
Ⓟ	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
Ⓟ	11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
Ⓝ	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
Ⓟ	8	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
Ⓛ	2	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			35
Ⓟ Ⓛ	42	SCREW, CAP. SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
Ⓛ	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
Ⓛ	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
Ⓛ	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP. SOC HD. HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-9			28
	4	CLAMP, CABLE	1000220-7			27
	4	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS 'A' STABLE MEMBER	1000137			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
	2	THERMOSTAT, SAFETY	1000266			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
Ⓟ	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~[illegible]~~			~~12~~
	1	EMER HEATERS CONTROL, MODULE	1007012			11
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
Ⓜ	1	IRIG PREAMP ASSY	1007031			6
	3	PIP PREALIGNED ASSY	1000018			5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
	3	GYRO PREALIGNED ASSY, 25 IRIG	1000012			2
	1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED: O J Bayne DATE 7-30-63
CHECKED:
DRAWN: REB 7-7-63
APPROVED FOR MSC: Jack Barnard
MIT/IL APPROVAL: W Wyles DATE 31 July 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000005
SHEET 1 OF 1

1000005

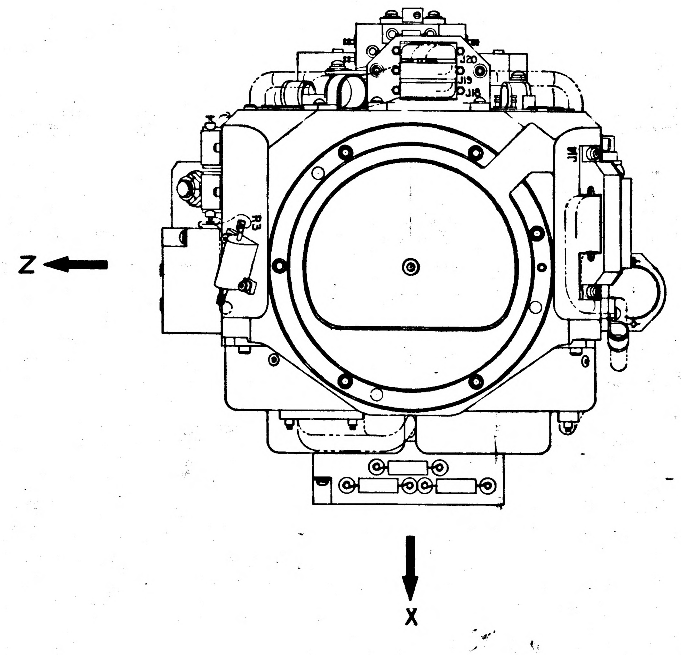
1000005 REV P SHT 1

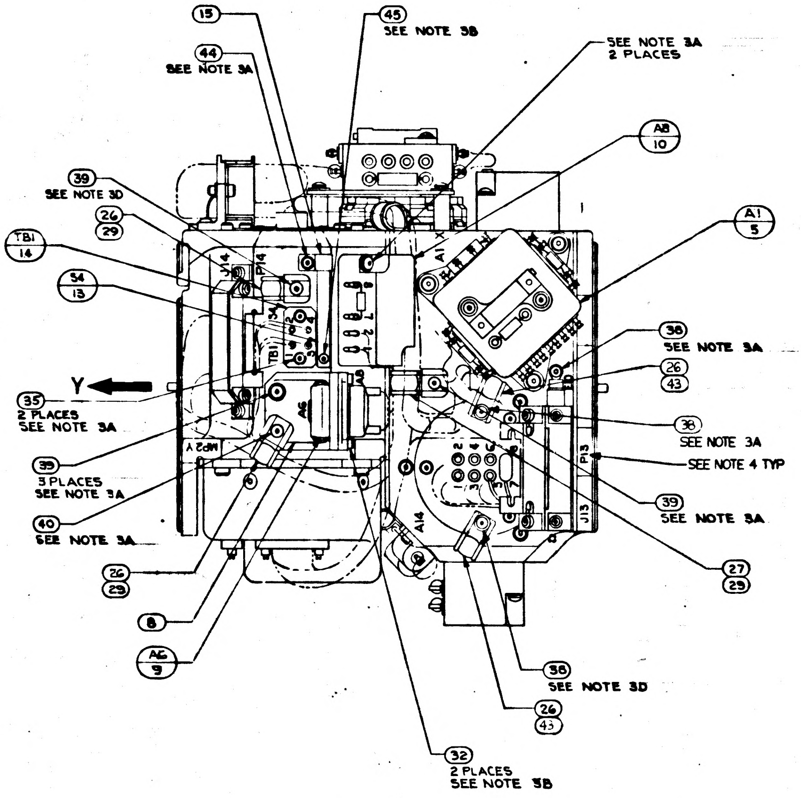
MASTER

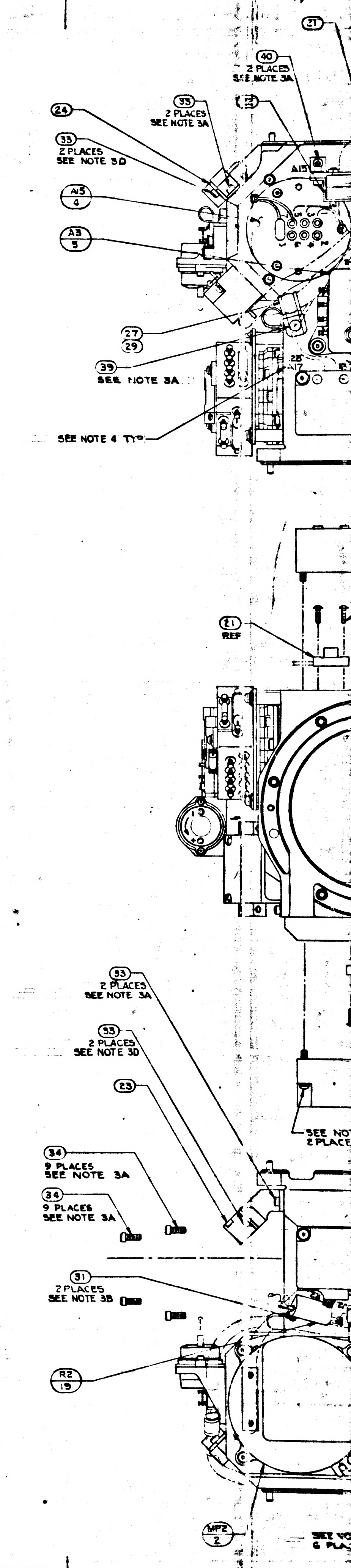
E-2

INCHES
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 7
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	
3	BLACK		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	
5	BLUE		S4 - BLUE	TB1-4	


J20
J19
J18
Z
X

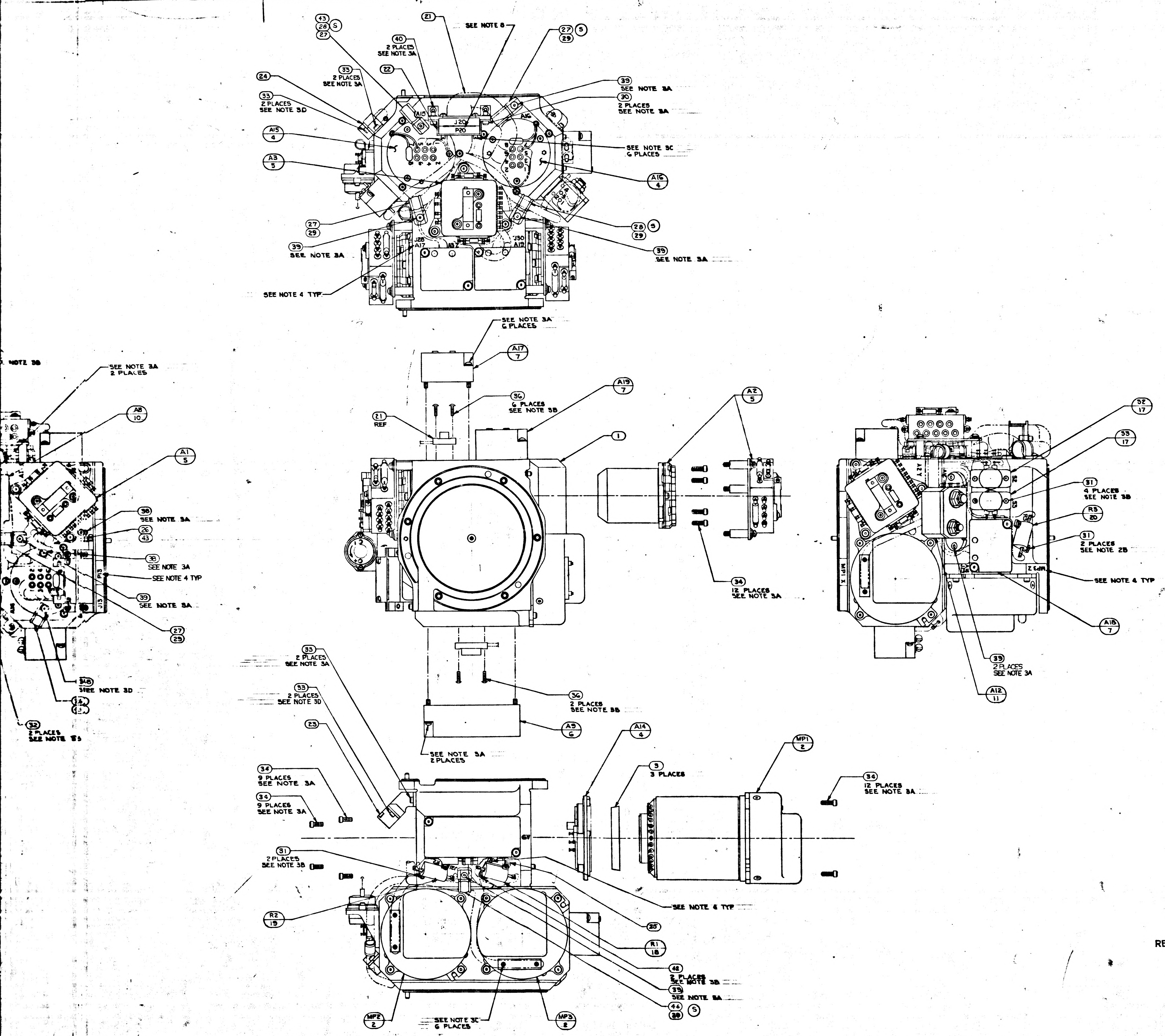

15
45 SEE NOTE 3B
44 SEE NOTE 3A
SEE NOTE 3A 2 PLACES
A8 10
39 SEE NOTE 3D
26 29
TB1 14
S4 13
A1 5
38 SEE NOTE 3A
26 43
Y
35 2 PLACES SEE NOTE 3A
38 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
39 SEE NOTE 3A
27 29
26 29
8
A6 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
J14
P14
A1
A6
P13
J13
A14
MP2 Y


21
40 2 PLACES SEE NOTE 3A
35 2 PLACES SEE NOTE 3A
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
A15
27 29
39 SEE NOTE 3A
28
A17
SEE NOTE 4 TYP
21 REF
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
MP2 2

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000201
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.
8. MARK THE P/P CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18   A2 - P19   A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

	REV	SHT
1000005	D	1

INCHES
PHOTOGRAPHIC SCALE ONLY


SEE NOTE 8
21
40
2 PLACES
SEE NOTE 3A
27 (S)
29
43
28 (S)
27
33
2 PLACES
SEE NOTE 3A
22
24
33
2 PLACES
SEE NOTE 3D
A15
J20
P20
A16
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
A15
4
A3
5
SEE NOTE 3C
6 PLACES
A16
4
27
29
39
SEE NOTE 3A
28 (S)
29
39
SEE NOTE 3A
J28
A17
J30
A19
SEE NOTE 4 TYP
SEE NOTE 3A
6 PLACES
A17
7
NOTE 3B
SEE NOTE 3A
2 PLACES
A8
10
21
REF
36
6 PLACES
SEE NOTE 3B
A19
7
1
A2
5
A1
5
38
SEE NOTE 3A
26
43
38
SEE NOTE 3A
SEE NOTE 4 TYP
39
SEE NOTE 3A
27
29
34
12 PLACES
SEE NOTE 3A
32
17
33
17
31
4 PLACES
SEE NOTE 3B
R3
20
31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
7
39
2 PLACES
SEE NOTE 3A
A12
11
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
32
SEE NOTE 3D
32
2 PLACES
SEE NOTE 3B
36
2 PLACES
SEE NOTE 3B
A5
6
SEE NOTE 3A
2 PLACES
A14
4
MP1
2
5
3 PLACES
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
12 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
25
R2
19
R1
18
46
2 PLACES
SEE NOTE 3B
39
SEE NOTE 3A
44
30 (S)
MP2
2
SEE NOTE 3C
6 PLACES
MP3
2

(N)

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE		
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		
	L	TDRR C3186	9-17-63		
	M	TDRR 03945	10-15-63		
	N	TDRR 06173	2-4-64		
	P	TDRR 06174	2-4-64		
	R	TDRR 06237	18FEB64		
	S	TDRR 06385	18FEB64		

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(S)	1	CLAMP, CABLE	1000220-6			46
(P)	1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-1			45
(P)	1	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			44
(S)	3	WASHER, FLAT, ROUND	MS15795-703			43
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
(P)	11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
(P)	8	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
(L)	2	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			35
(P) (L)	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
(S)	5	CLAMP, CABLE	1000220-7			27
	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS 'A' STABLE MEMBER	1000137			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
	2	THERMOSTAT, SAFETY	1000266			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
	1	EMER HEATERS CONTROL MODULE	1007012			11
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA, STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
(M)	1	IRIG PREAMP ASSY	1007031			6
	3	PIP PREALIGNED ASSY	1000013			5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
	3	GYRO PREALIGNED ASSY, 25 IRIG	1000012			2
	1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

REPLACES REV K WITH CHANGES

NEXT ASSY	USED ON
1000204	DL1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A J Bogue DATE 7-30-63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/R APPROVAL DATE
31 July 63

STABLE
MEMBER
ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1

1000005

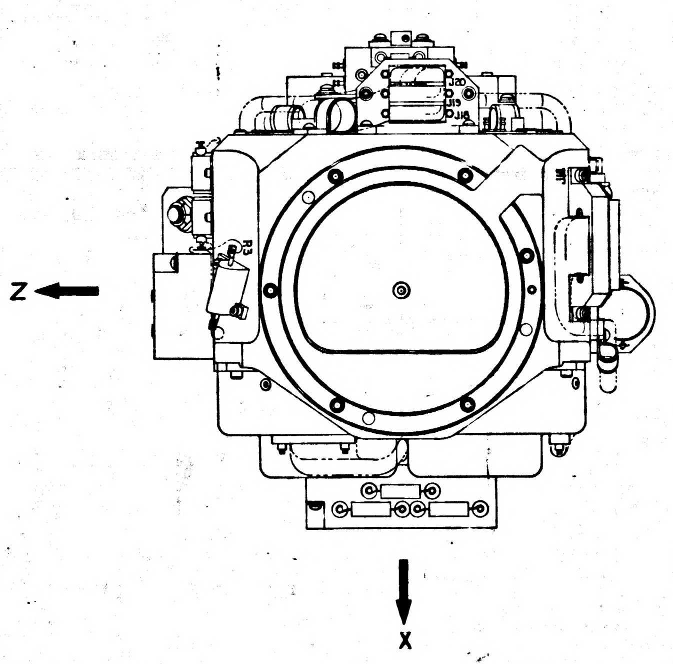
1000005 REV S SHT 1

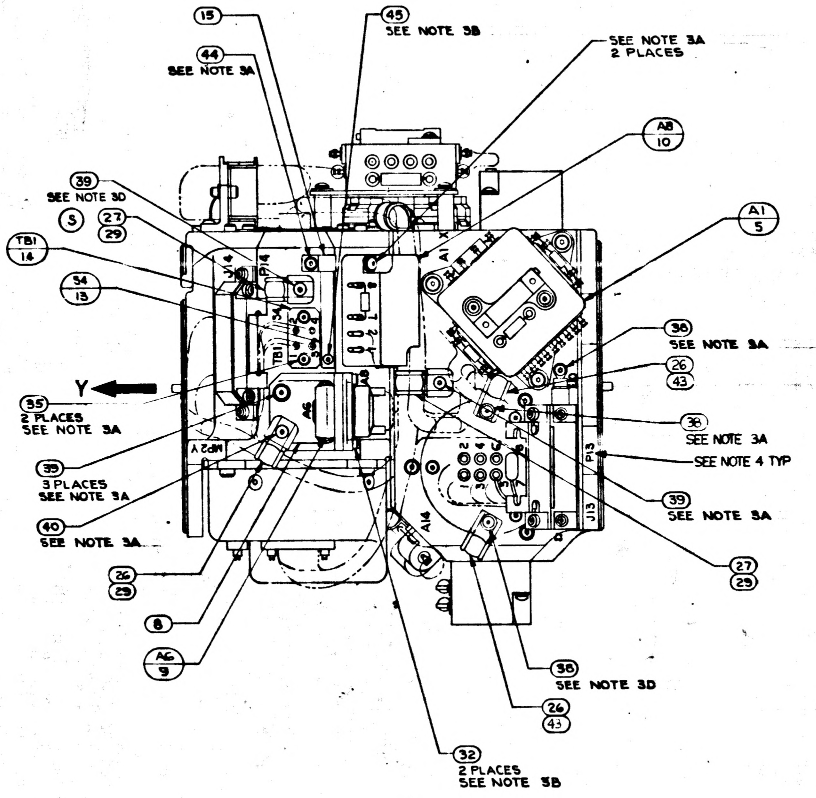
MASTER

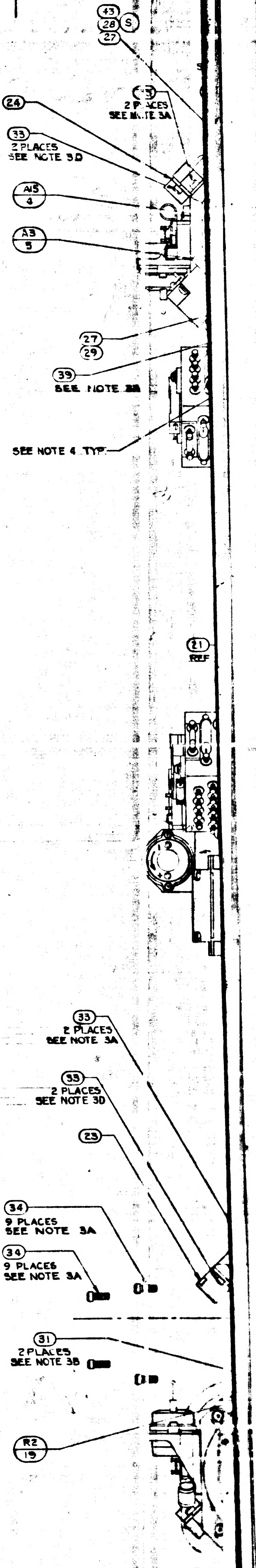
INCHES
PHOTOGRAPHIC SCALE ONLY

F-2

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 7
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	
3	BLACK		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	
5	BLUE		S4 - BLUE	TB1-4	




15
45
SEE NOTE 3B
44
SEE NOTE 3A
SEE NOTE 3A
2 PLACES
A8
10
39
SEE NOTE 3D
S
27
29
A1
5
TB1
14
S4
13
38
SEE NOTE 3A
26
43
Y
35
2 PLACES
SEE NOTE 3A
38
SEE NOTE 3A
SEE NOTE 4 TYP
39
3 PLACES
SEE NOTE 3A
39
SEE NOTE 3A
40
SEE NOTE 3A
27
29
26
29
8
A6
9
38
SEE NOTE 3D
26
43
32
2 PLACES
SEE NOTE 3B
P14
J14
TB1
A6
A8
MP2 Y
A1
A14
P13
J13


43
28
S
27
2 PLACES
SEE NOTE 3A
24
33
2 PLACES
SEE NOTE 3D
A15
4
A3
5
27
29
39
SEE NOTE 3A
SEE NOTE 4 TYP
21
REF
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R2
19

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000201
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

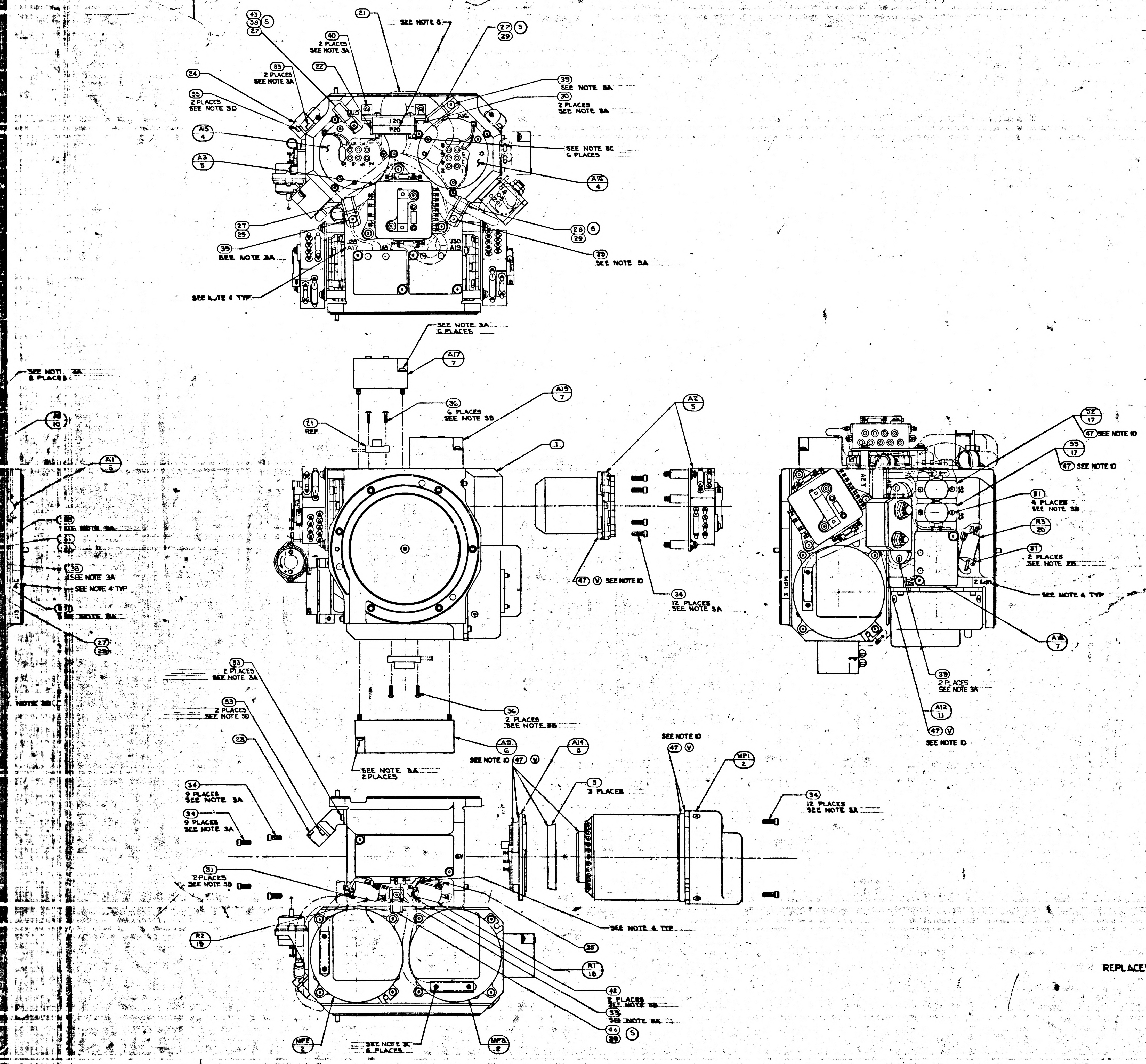
TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓡ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHT
1000005	S	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY



43
38 (S)
27
21
SEE NOTE 6
40
2 PLACES
SEE NOTE 3A
27 (S)
29
22
33
2 PLACES
SEE NOTE 3A
24
33
2 PLACES
SEE NOTE 3D
A15
4
A3
5
J20
P20
39
SEE NOTE 3A
30
2 PLACES
SEE NOTE 3A
SEE NOTE 3C
6 PLACES
A16
4
27
29
28 (S)
29
39
SEE NOTE 3A
39
SEE NOTE 3A
SEE NOTE 4 TYP
SEE NOTE 3A
6 PLACES
A17
7
SEE NOTE 3A
2 PLACES
A8
10
36
6 PLACES
SEE NOTE 3B
A19
7
21
REF.
1
A2
5
A1
3
SEE NOTE 3A
SEE NOTE 4 TYP
27
29
47 (V) SEE NOTE 10
34
12 PLACES
SEE NOTE 3A
32
17
47 SEE NOTE 10
33
17
47 SEE NOTE 10
31
4 PLACES
SEE NOTE 3B
R3
20
31
2 PLACES
SEE NOTE 2B
SEE NOTE 4 TYP
A18
7
39
2 PLACES
SEE NOTE 3A
A12
11
47 (V)
SEE NOTE 10
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
25
36
2 PLACES
SEE NOTE 3B
A9
6
SEE NOTE 3A
2 PLACES
SEE NOTE 10 47 (V)
A14
4
3
3 PLACES
SEE NOTE 10
47 (V)
MP1
2
34
12 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R2
19
SEE NOTE 4 TYP
25
R1
18
48
2 PLACES
SEE NOTE 3B
39
SEE NOTE 3A
46 (S)
29
MP2
2
SEE NOTE 3C
6 PLACES
MP3
2

(N)

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-298	110.00
-305	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		
	L	TDRR 03186	9-17-63		
	M	TDRR 03945	10-[illegible]-63		
	N	TDRR 06173	2-4-64		
	P	TDRR 06174	2-4-64		
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK

REPLACES REV K WITH CHANGES

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	ITEM NO.
A/R	SILICONE COMPOUND THERMO	1008879		SEE NOTE 10	47
1	CLAMP, CABLE	1000220-6			46
~~1~~	~~SCREW, BUT HD SELF LKG, SPL SOC~~	~~1000250-7~~			~~45~~
1	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS[illegible]C04LL3			44
3	WASHER, FLAT, ROUND	MS15795-703			43
2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02LL6			42
[illegible]	[illegible]	[illegible]			~~41~~
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
11	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
2	SCREW, CAP SELF LKG, SOC HD, HEX	MS1352C04LL4			35
42	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C04LL6			34
8	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C04LL4			33
2	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02LL4			32
8	SCREW, CAP, SELF LKG, SOC HD, HEX	MS1352C02LL3			31
2	SCREW, CAP, SOC HD, HEX	1000110-302			30
7	WASHER, CABLE CLAMP	1000223			29
1	CLAMP, CABLE	1000220-11			28
5	CLAMP, CABLE	1000220-7			27
3	CLAMP, CABLE	1000220-5			26
1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
1	COVER, BRKT, CONNECTOR	1000160			24
1	COVER, BRKT, CONNECTOR	1000164			23
1	COVER, BRKT, CONN, 26 PIN	1000265			22
1	WIRING HARNESS 'A' STABLE MEMBER	1000137			21
1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
2	THERMOSTAT, SAFETY	1001485			17
A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
1	CLAMP, MERCURY THERMO	1000248			15
1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
1	THERMO & HEATER ASSY	1000247			13
~~1~~	~~PLATE [illegible]~~	~~[illegible]~~			~~12~~
1	EMER HEATERS CONTROL, MODULE	1007012			11
1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
1	MOUNT, ADA, STABLE MEMBER	1000166			8
3	PIP PREAMP ASSY	1007015			7
1	IRIG PREAMP ASSY	1007031			6
3	PIP PREALIGNED ASSY	1000013			5
3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
3	CLAMP, SPLIT, GYRO	1000138			3
3	GYRO PREALIGNED ASSY, 25 IRIG	1000012			2
1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN
APPROVED FOR
INIT'L APPROVAL DATE
31 July 63

STABLE MEMBER ASSEMBLY

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCALE 1/1
SHEET 1 OF 1

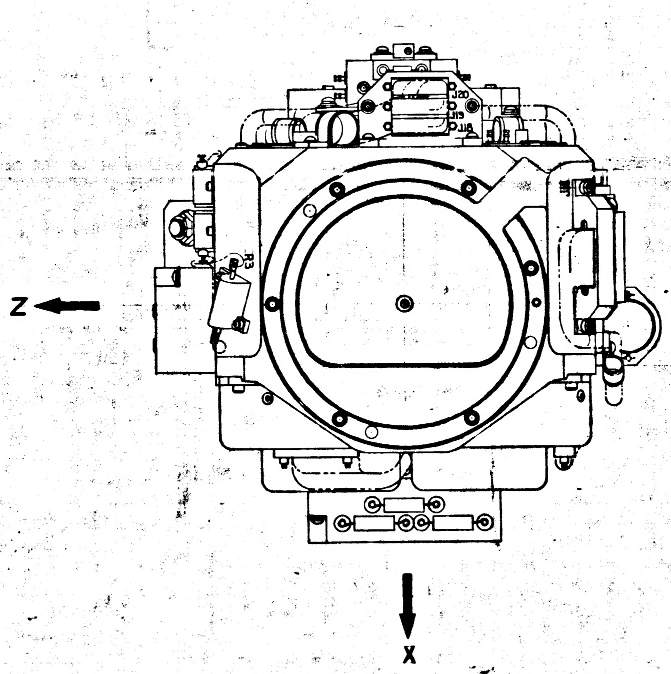
1000005

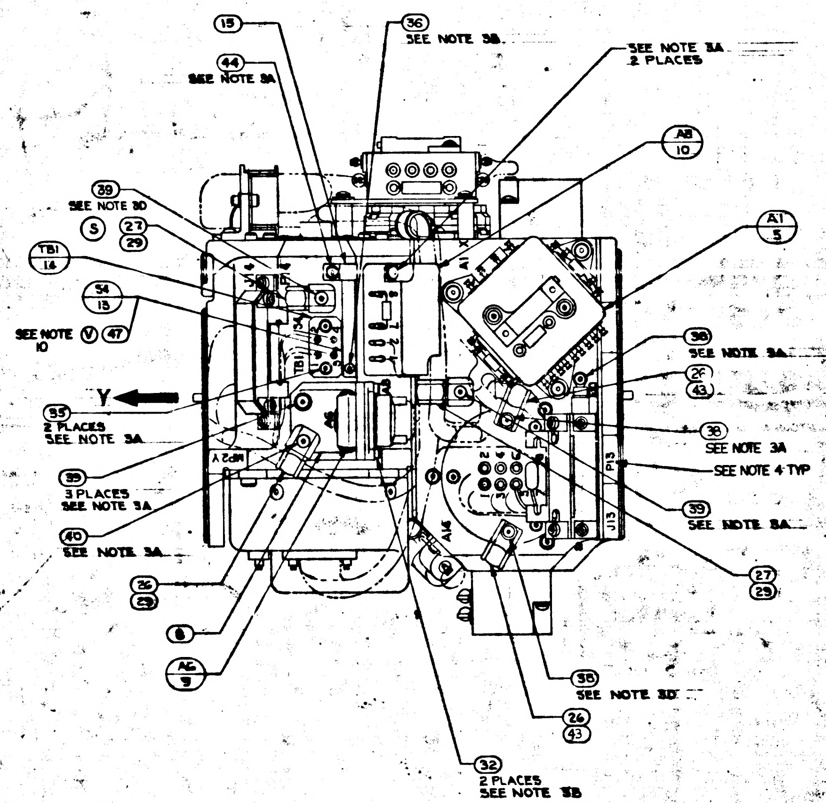
1000005 REV V SHT 1

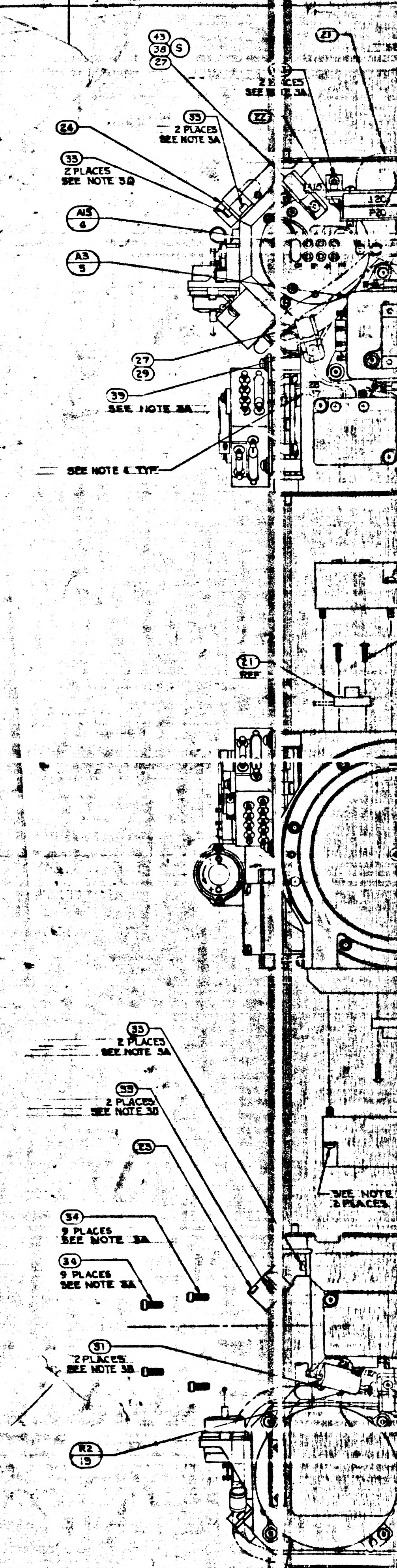
MASTER

WIRING LEGEND					
NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	ⓡ
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	ⓡ
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	ⓡ
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




15
36 SEE NOTE 3B
44 SEE NOTE 3A
SEE NOTE 3A 2 PLACES
A8 10
39 SEE NOTE 3D
S
27 29
TB1 14
S4 13
SEE NOTE 10 Ⓥ 47
A1 5
Y
35 2 PLACES SEE NOTE 3A
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
26 29
8
A6 9
38 SEE NOTE 3A
26 43
38 SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
27 29
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
P13
J13
A14


43 38 S 27
21
2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3A
22
24
33 2 PLACES SEE NOTE 3D
A13 6
A3 5
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
21 REF
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000201
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

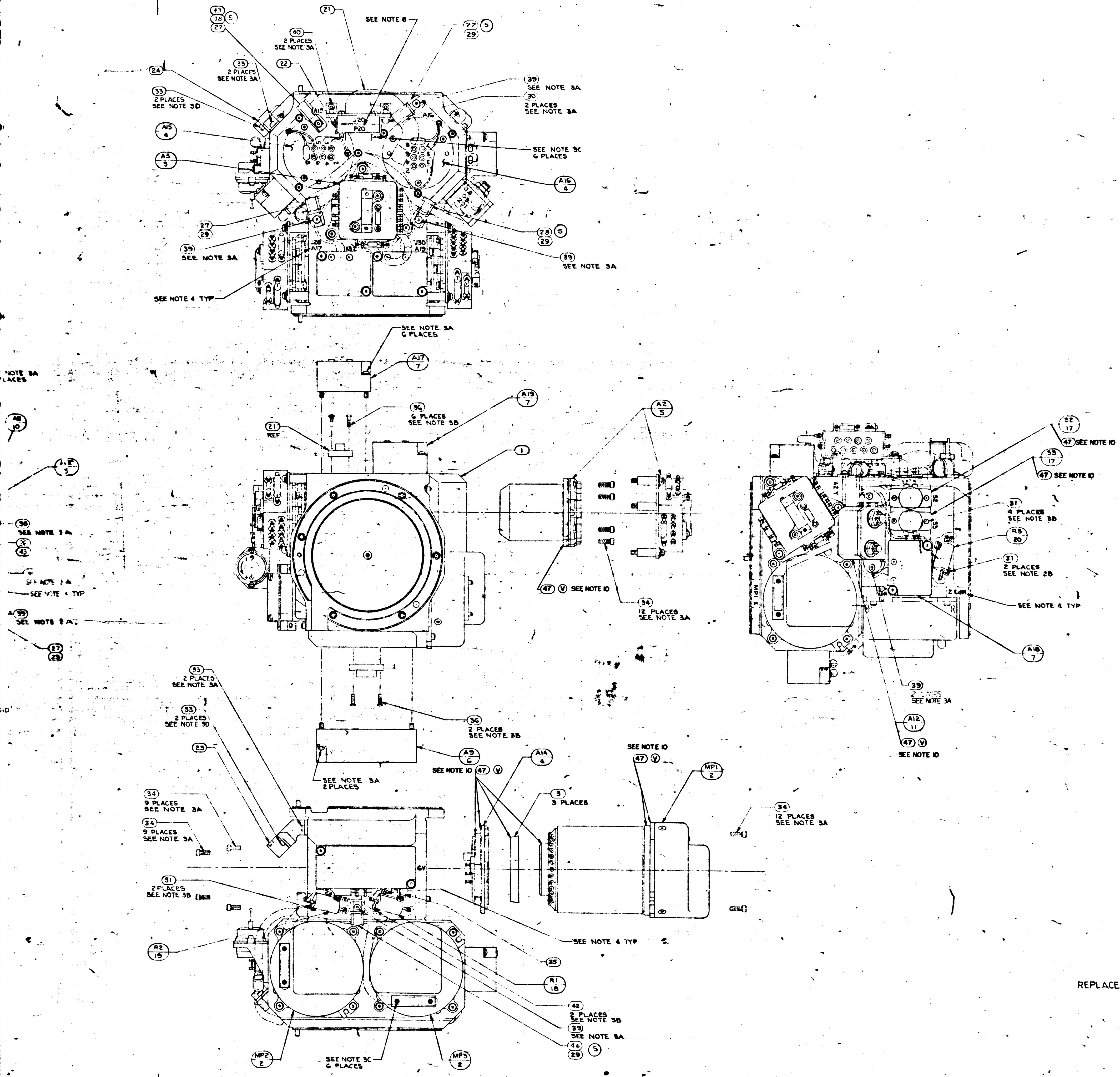
8. MARK THE P.I.P. CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN.
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND TO ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005 REV V SHT 1


SEE NOTE 8
43 38 S 27
40 2 PLACES SEE NOTE 3A
21
22
27 S 29
35 2 PLACES SEE NOTE 3A
24
33 2 PLACES SEE NOTE 3D
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
A15 4
A3 5
J29
P20
A16
SEE NOTE 3C 6 PLACES
A16 4
27 29
28 S 29
39 SEE NOTE 3A
J28
A17
A32
J30
A19
39 SEE NOTE 3A
SEE NOTE 4 TYP
SEE NOTE 3A 6 PLACES
A17 7
A19 7
36 6 PLACES SEE NOTE 3B
A2 5
21 REF
1
A8 10
47 V SEE NOTE 10
34 12 PLACES SEE NOTE 3A
NOTE 3A PLACES
38 SEE NOTE 3A
42
SEE NOTE 3A
SEE NOTE 4 TYP
39 SEE NOTE 3A
27 29
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
36 2 PLACES SEE NOTE 3B
A9 6
SEE NOTE 3A 2 PLACES
SEE NOTE 10 47 V
A14 4
3 3 PLACES
SEE NOTE 10 47 V
MP1 2
34 12 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
GV
SEE NOTE 4 TYP
R2 19
25
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
46 S 29
MP2 2
SEE NOTE 3C 6 PLACES
MP3 2
52 17
47 SEE NOTE 10
53 17
47 SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 7
39 2 PLACES SEE NOTE 3A
A12 11
47 V SEE NOTE 10
A2
MP1

N	R1,R2 & R3 SELECTION CHART	
	PART NO.	VALUE IN OHMS
	1010498 -197	11.0
	-227	22.6
	-246	7
	-275	5
	-297	
	-322	
	-220	19
	-233	28.1
	-238	29.4
	-242	32.4
	-246	35.7
	-097	1.00
	-171	5.90
	-210	15.00
	-251	40.20
	-256	45.30
	-261	51.10
	-268	60.40
	-280	80.60
	-285	90.80
	-289	100.00
	-293	110.00
	-303	140.00
	1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-?-63		WK
	M	TDRR 03945	10-15-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18FEB64		WK
	S	TDRR 06385	18FEB64		WK
	T	TDRR 06527	25FEB64		WK
	U	TDRR 06744	3MAR64		WK
	V	TDRR 07082	24MAR64		WK
	W	REVISED PER TDRR 07576	17APR64	JHR	R

REPLACES REV K WITH CHANGES

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓨ	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
Ⓢ	1	CLAMP, CABLE	1000220-6			46
Ⓣ Ⓟ	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
Ⓟ	1	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
Ⓢ	3	WASHER, FLAT, ROUND	MS15795-803			43
Ⓛ	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
Ⓟ	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			41
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-14			40
Ⓟ	11	SCREW BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
Ⓝ	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
Ⓟ Ⓣ	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
Ⓛ	2	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			35
Ⓟ, Ⓛ	42	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
Ⓛ	8	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
Ⓛ	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
Ⓛ	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD, HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
Ⓢ	5	CLAMP, CABLE	1000220-7			27
	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	100146[illegible]			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS A STABLE MEMBER	1000137			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
Ⓤ	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
Ⓟ	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
	1	EMER HEATERS CONTROL MODULE	1007012			11
	1	ADA PREAMP ASSY STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA, STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
Ⓜ	1	IRIG PREAMP ASSY	1007031			6
	3	PIP PREALIGNED ASSY	1000013			5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
	3	GYRO PREALIGNED ASSY, 25 IRIG	1000012			2
	1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED [illegible] DATE 63
CHECKED
DRAWN RES 6-7-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE 63

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

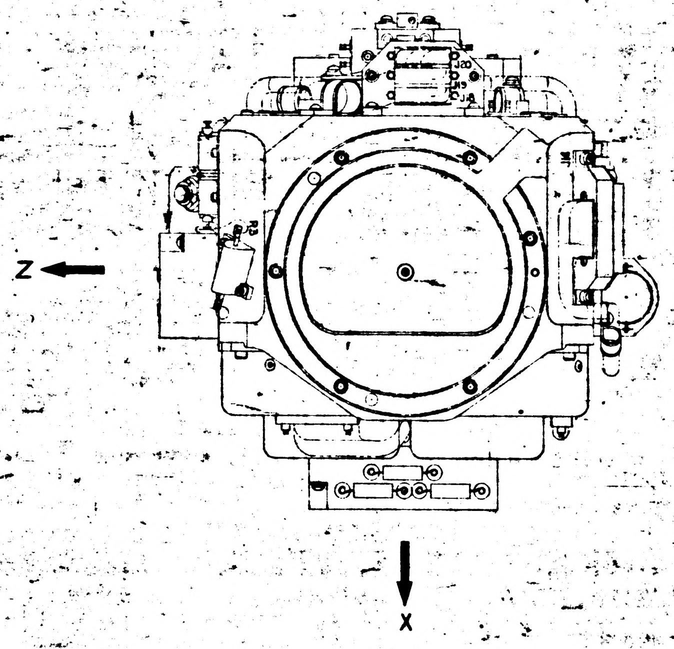
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000005
SHEET 1 OF 1

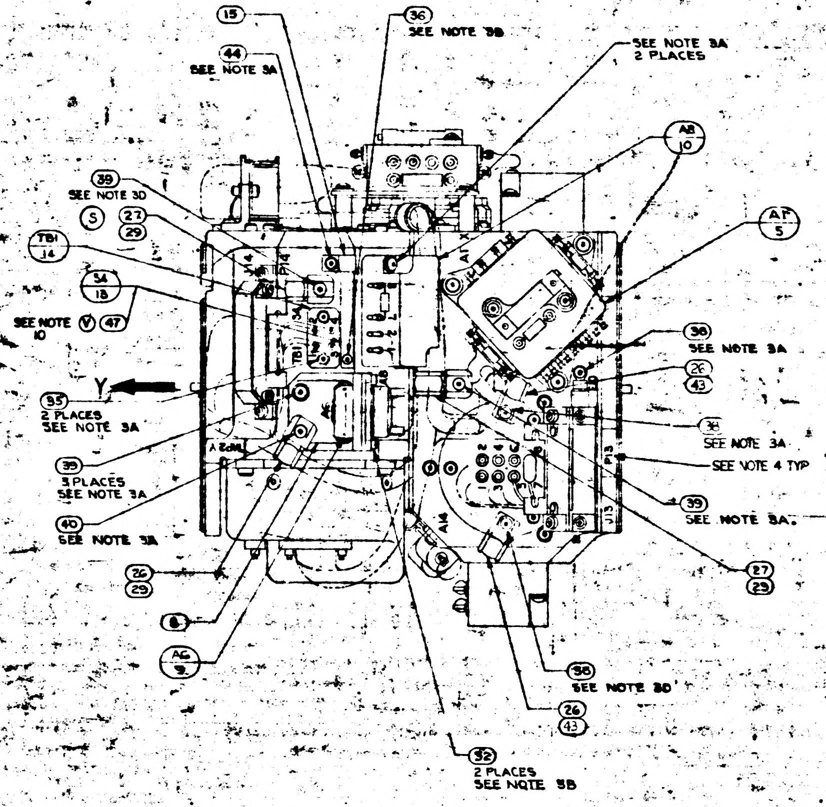
2

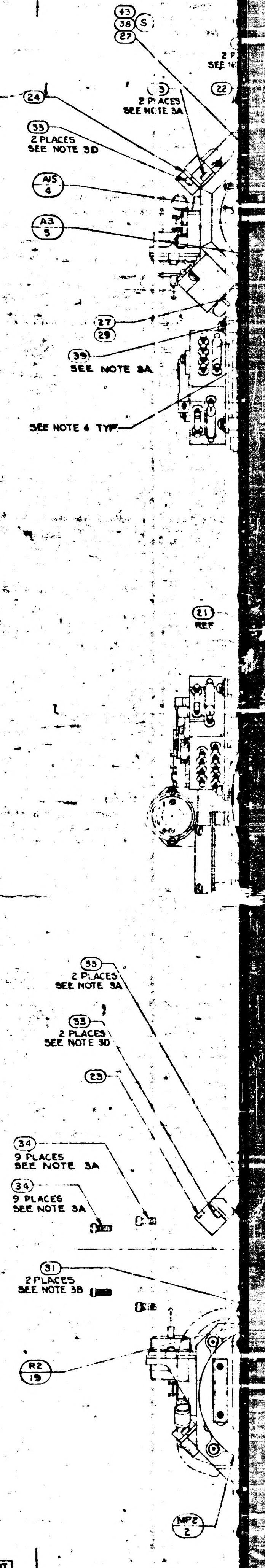
1000005 REV W SHT 1

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ




15
36
SEE NOTE 3B
44
SEE NOTE 3A
SEE NOTE 3A
2 PLACES
A8
10
A7
5
39
SEE NOTE 3D
S
27
29
TB1
14
S4
13
SEE NOTE 10
V
47
Y
35
2 PLACES
SEE NOTE 3A
39
3 PLACES
SEE NOTE 3A
40
SEE NOTE 3A
38
SEE NOTE 3A
26
43
38
SEE NOTE 3A
SEE NOTE 4 TYP
39
SEE NOTE 3A
27
29
26
29
6
A6
9
36
SEE NOTE 3D
26
43
32
2 PLACES
SEE NOTE 3B

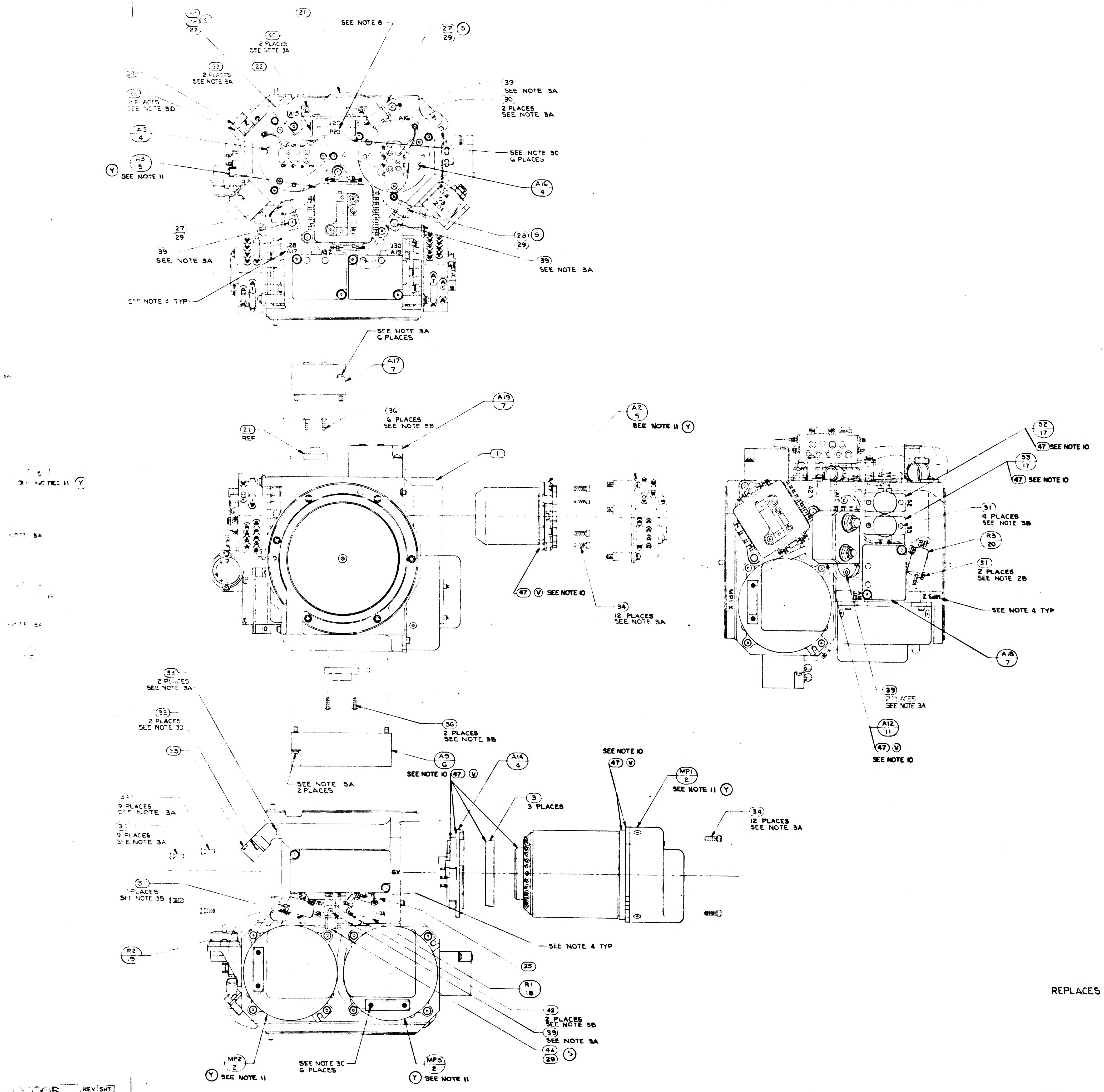

43
38
S
27
3
2 PLACES
SEE NOTE 3A
22
24
33
2 PLACES
SEE NOTE 3D
A15
4
A3
5
27
29
39
SEE NOTE 3A
SEE NOTE 4 TYP
21
REF
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R2
19
MP2
2

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70827
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
7. Ⓡ ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~
8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN, A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE
10. Ⓥ APPLY A THIN FILM OF SILICONE COMPOUND TO ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3


SEE NOTE 8
27 (S) 29
(21)
(42) 2 PLACES SEE NOTE 3A
(33) 2 PLACES SEE NOTE 3A
(22)
2 PLACES SEE NOTE 3D
A15 4
A3 5
(Y) SEE NOTE 11
A16
A18
R20
39 SEE NOTE 3A
30 2 PLACES SEE NOTE 3A
SEE NOTE 3C 6 PLACES
A16 4
27 29
39 SEE NOTE 3A
28 (S) 29
39 SEE NOTE 3A
A17
A12
J30
A19
SEE NOTE 4 TYP
SEE NOTE 3A 6 PLACES
A17 7
A19 7
(36) 6 PLACES SEE NOTE 3B
A2 5 SEE NOTE 11 (Y)
21 REF
1
47 (V) SEE NOTE 10
34 12 PLACES SEE NOTE 3A
32 17 47 SEE NOTE 10
33 17 47 SEE NOTE 10
31 4 PLACES SEE NOTE 3B
R3 20
31 2 PLACES SEE NOTE 2B
SEE NOTE 4 TYP
A18 7
39 2 PLACES SEE NOTE 3A
A12 11
47 (V) SEE NOTE 10
MP1 X
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
36 2 PLACES SEE NOTE 3B
SEE NOTE 3A 2 PLACES
A9 6
SEE NOTE 10 47 (V)
A14 4
3 3 PLACES
SEE NOTE 10 47 (V)
MP1 2 SEE NOTE 11 (Y)
34 12 PLACES SEE NOTE 3A
9 PLACES SEE NOTE 3A
9 PLACES SEE NOTE 3A
3 PLACES SEE NOTE 3B
6Y
SEE NOTE 4 TYP
R2 19
25
R1 18
42 2 PLACES SEE NOTE 3B
39 SEE NOTE 3A
46 (S) 29
MP2 2 (Y) SEE NOTE 11
SEE NOTE 3C 6 PLACES
MP3 2 (Y) SEE NOTE 11

(N)

R1, R2 & R3 SELECTION CHART	
PART NO.	VALUE IN OHMS
1010498 -197	11.0
-227	22.6
-246	35.7
-275	71.5
-297	121.0
-322	221.0
-220	19.1
-233	26.1
-238	29.4
-242	32.4
-246	35.7
-097	1.00
-171	5.90
-210	15.00
-251	40.20
-256	45.30
-261	51.10
-268	60.40
-280	80.60
-285	90.90
-289	100.00
-293	110.00
-303	140.00
1010498 -385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-15-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MAR 64		WK
	V	TDRR 07082	24 MAR 64		WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64	JG	

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(V)	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
(S)	1	CLAMP, CABLE	1000220-6			46
(T) (P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-1~~			45
(P)	1	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL3			44
(S)	3	WASHER, FLAT, ROUND	MS15795-703			43
(L)	2	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL6			42
(P)	~~1~~	~~SCREW, BUT HD, SELF LKG, SPL SOC~~	~~1000250-17~~			~~41~~
	4	SCREW, BUT HD SELF LKG, SPL SOC	1000250-14			40
(P)	1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-13			39
	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			38
(N)	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
(P) (T)	9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-3			36
(L)	2	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			35
(P) (L)	42	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL6			34
(L)	8	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			33
(L)	2	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C02LL4			32
(L)	8	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C02LL3			31
	2	SCREW, CAP, SOC HD HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
(S)	5	CLAMP, CABLE	1000220-7			27
	3	CLAMP, CABLE	1000220-5			26
	1	SPACER, RESISTOR, STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS A STABLE MEMBER	1000137			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
(U)	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM. BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
(P)	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			~~12~~
	1	EMER HEATERS CONTROL, MODULE	1007012			11
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
(M)	1	IRIG PREAMP ASSY	1007031			6
(Y)	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
(Y)	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED DATE
CHECKED
DRAWN RES
APPROVED FOR MSC
MIT/IL APPROVAL DATE

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

1000005

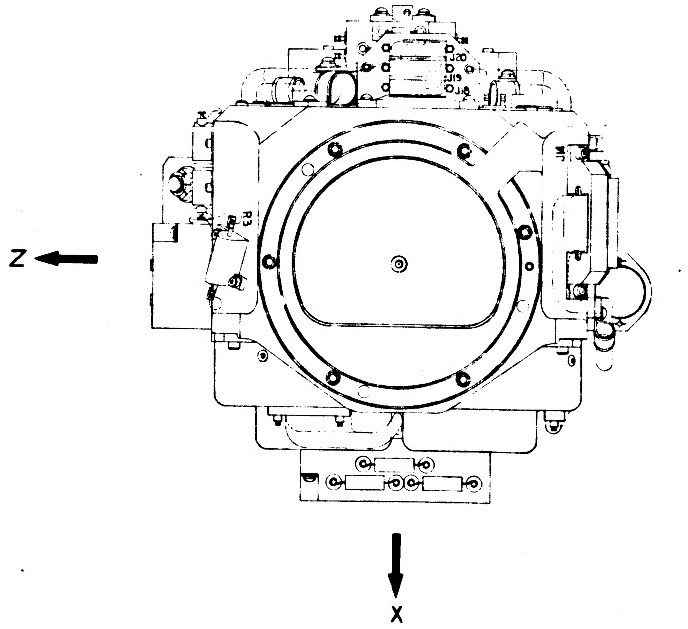
1000005

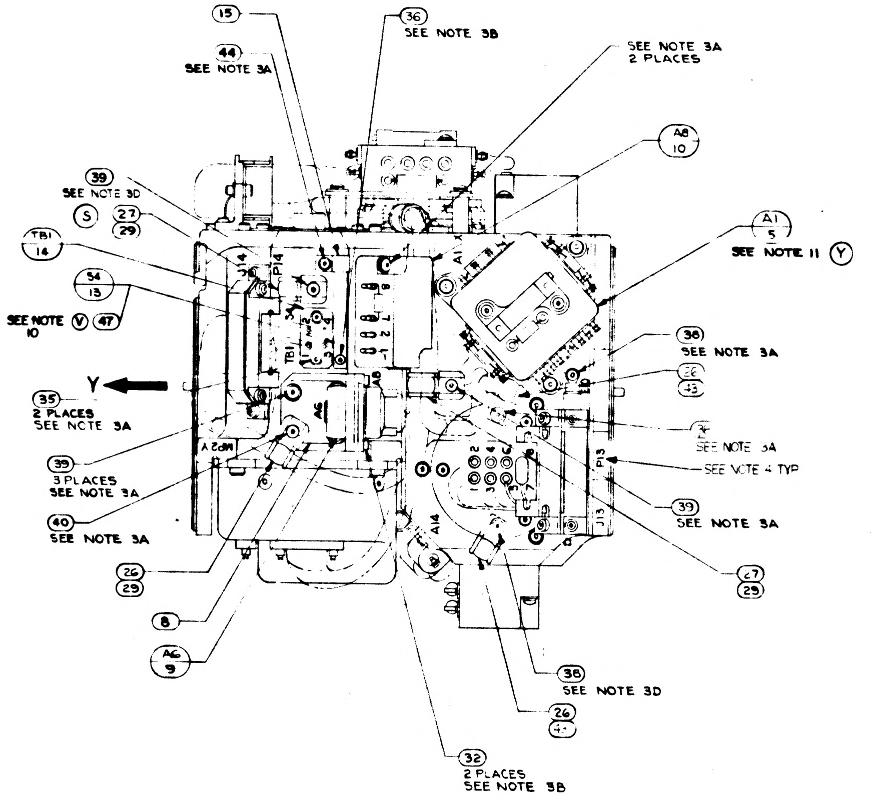
REV Y SHT 1

2/1000005

COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
-1	WHITE		A6 - +	A8-1	∞
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	∞
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	∞
5	BLUE		S4 - BLUE	TB1-4	

WIRING LEGEND (V)

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44
SEE NOTE 3A
36
SEE NOTE 3B
SEE NOTE 3A
2 PLACES
A8
10
39
SEE NOTE 3D
S
27
29
TB1
14
S4
13
SEE NOTE 10
V
47
A1
5
SEE NOTE 11
Y
38
SEE NOTE 3A
26
43
Y
35
2 PLACES
SEE NOTE 3A
39
3 PLACES
SEE NOTE 3A
SEE NOTE 3A
SEE NOTE 4 TYP
40
SEE NOTE 3A
39
SEE NOTE 3A
26
29
27
29
8
A6
9
38
SEE NOTE 3D
26
43
32
2 PLACES
SEE NOTE 3B
J14
P14
TB1
A6
A8
MP2 A
A14
P13
J13

43
38
27
33
2 PLACES
SEE NOTE 3A
22
24
33
2 PLACES
SEE NOTE 3D
A15
4
A3
5
Y
SEE NOTE 11
27
29
39
SEE NOTE 3A
SEE NOTE 4 TYP
33
2 PLACES
SEE NOTE 3A
33
2 PLACES
SEE NOTE 3D
23
34
9 PLACES
SEE NOTE 3A
34
9 PLACES
SEE NOTE 3A
31
2 PLACES
SEE NOTE 3B
R2
19
MP2
2
Y
SEE NOTE

NOTES

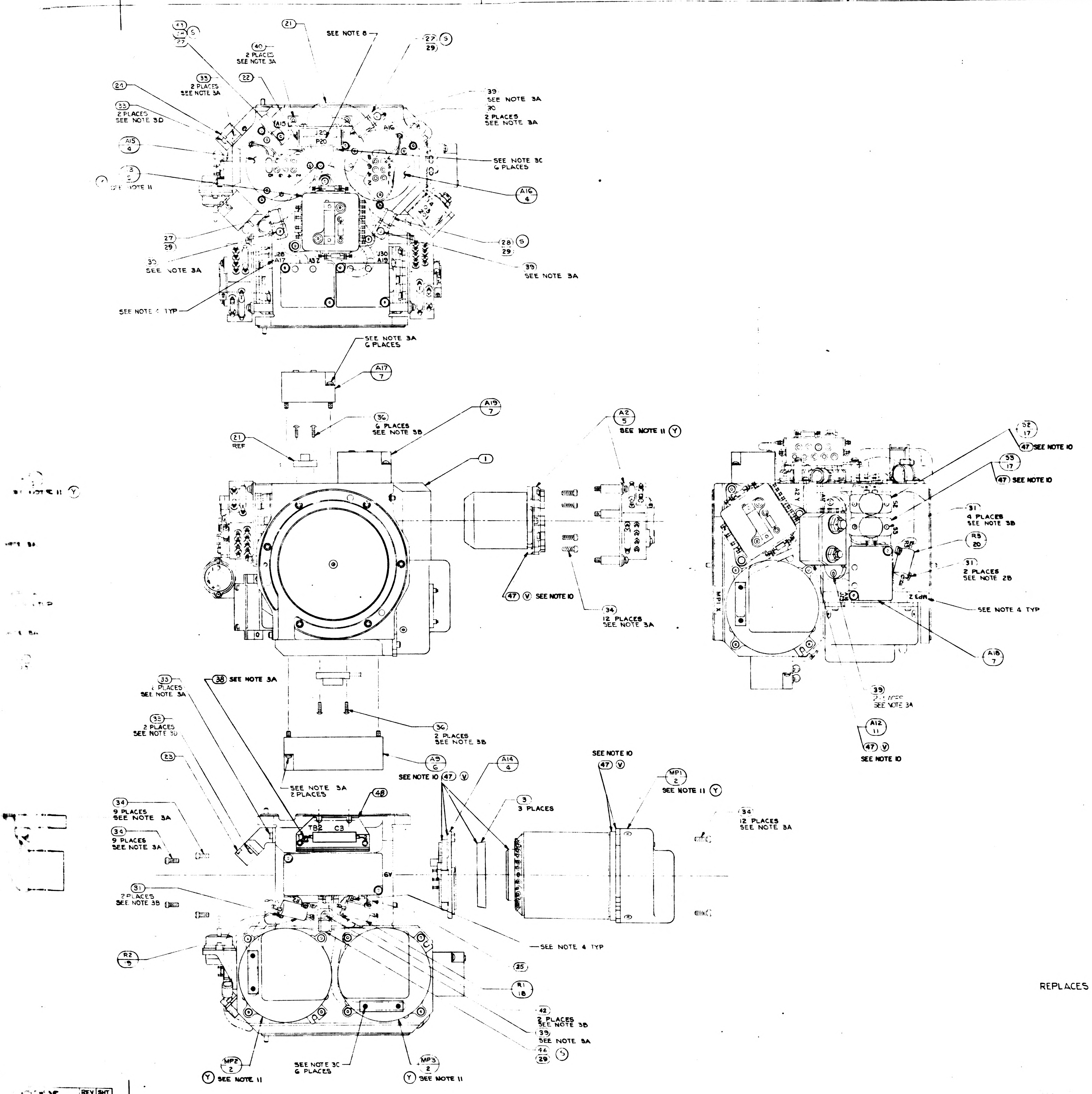
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %.
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{0}{14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
7. (R) ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~
8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE
10. (Y) (V) APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)
11. (Y) INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

(R) TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000005	REV Y	SHT 1

1/1000005



Ⓝ

R1, R2 & R3 SELECTION CHART PART NO.		VALUE IN OHMS
1010498	-197	11.0
	-227	22.6
	-246	35.7
	-275	71.5
	-297	121.0
	-322	221.0
	-220	19.1
	-233	26.1
	-238	29.4
	-242	32.4
	-246	35.7
	-097	1.00
	-171	5.90
	-210	15.00
	-251	40.20
	-256	45.30
	-261	51.10
	-268	60.40
	-280	80.60
	-285	90.90
	-289	100.00
	-293	110.00
	-303	140.00
1010498	-385	1000.00

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 02303	7-30-63		WK
	L	TDRR 03186	9-17-63		WK
	M	TDRR 03945	10-18-63		WK
	N	TDRR 06173	2-4-64		WK
	P	TDRR 06174	2-4-64		WK
	R	TDRR 06237	18 FEB 64		WK
	S	TDRR 06385	18 FEB 64		WK
	T	TDRR 06527	25 FEB 64		WK
	U	TDRR 06744	3 MARCH 64		WK
	V	TDRR 07082			WK
	W	REVISED PER TDRR 07576	17 APR 64	JHR	
	Y	REVISED PER TDRR 07964	8 MAY 64		
	Z	REVISED PER TDRR 07945			

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	1	CAPACITOR AND BRACKET ASSEMBLY	1001597			48
Ⓥ	A/R	SILICONE COMPOUND THERMO	1006879		SEE NOTE 10	47
Ⓢ	1	CLAMP, CABLE	1000220-6			46
Ⓣ Ⓟ	~~1~~	~~SCREW,BUT HD,SELF LKG,SPL SOC~~	~~1000250-1~~			45
Ⓟ	1	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C04LL3			44
Ⓢ	3	WASHER,FLAT,ROUND	MS15795-703			43
Ⓛ	2	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C02LL6			42
Ⓟ	~~1~~	~~SCREW,BUT HD,SELF LKG,SPL SOC~~	~~1000250-17~~			41
	4	SCREW,BUT HD,SELF LKG,SPL SOC	1000250-14			40
Ⓟ	1	SCREW BUT HD,SELF LKG,SPL SOC	1000250-13			39
	4	SCREW,BUT HD,SELF LKG,SPL SOC	1000250-12			38
Ⓝ	A/R	TAPE, NYLON WAXED		MIL-T-713 TYPE P CLASS 2		37
Ⓟ Ⓣ	9	SCREW,BUT HD,SELF LKG,SPL SOC	1000250-3			36
Ⓛ	2	SCREW,CAP SELF LKG,SOC HD,HEX	NAS1352C04LL4			35
Ⓟ Ⓛ	42	SCREW,CAP SELF LKG,SOC HD,HEX	NAS1352C04LL6			34
Ⓛ	8	SCREW,CAP SELF LKG,SOC HD,HEX	NAS1352C04LL4			33
Ⓛ	2	SCREW,CAP SELF LKG,SOC HD,HEX	NAS1352C02LL4			32
Ⓛ	8	SCREW,CAP,SELF LKG,SOC HD,HEX	NAS1352C02LL3			31
	2	SCREW CAP SOC HD,HEX	1000110-302			30
	7	WASHER, CABLE CLAMP	1000223			29
	1	CLAMP, CABLE	1000220-11			28
	5	CLAMP, CABLE	1000220-7			27
Ⓢ	3	CLAMP, CABLE	1000220-5			26
	1	SPACER,RESISTOR,STABLE MEMBER	1001462			25
	1	COVER, BRKT, CONNECTOR	1000150			24
	1	COVER, BRKT, CONNECTOR	1000164			23
	1	COVER, BRKT, CONN, 26 PIN	1000265			22
	1	WIRING HARNESS A STABLE MEMBER	1000137			21
	1	RESISTOR-FIXED R3	1010498		SEE NOTE 5	20
	1	RESISTOR-FIXED R2	1010498		SEE NOTE 5	19
	1	RESISTOR-FIXED R1	1010498		SEE NOTE 5	18
Ⓤ	2	THERMOSTAT, SAFETY	1001485			17
	A/R	SOLDER	SN60 WRP 2	QQ-S-571		16
	1	CLAMP, MERCURY THERMO	1000248			15
	1	TERM.BOARD ASSY MERCURY THERMO	1000253			14
	1	THERMO & HEATER ASSY	1000247			13
Ⓟ	~~1~~	~~PLATE, MTG, MERCURY THERMO~~	~~1000251~~			12
	1	EMER HEATERS CONTROL MODULE	1007012			11
	1	ADA PREAMP ASSY, STABLE MEMBER	1007025			10
	1	ACCEL, ANGULAR, DIFFERENTIATING	1000097			9
	1	MOUNT, ADA STABLE MEMBER	1000166			8
	3	PIP PREAMP ASSY	1007015			7
Ⓜ	1	IRIG PREAMP ASSY	1007031			6
Ⓨ	3	PIP & CALIB. MOD.	1001598		SEE NOTE 11	5
	3	HTR & TAPERED MT ASSY, 25 IRIG	1000126			4
	3	CLAMP, SPLIT, GYRO	1000138			3
Ⓨ	3	GYRO & CALIB. MOD.	1001599		SEE NOTE 11	2
	1	HOUSING, STABLE MEMBER	1000025			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED — DATE 7-30-63
CHECKED
DRAWN RES
APPROVED FOR MSC
MIT/IL APPROVAL — DATE

STABLE MEMBER ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000005
SHEET 1 OF 1

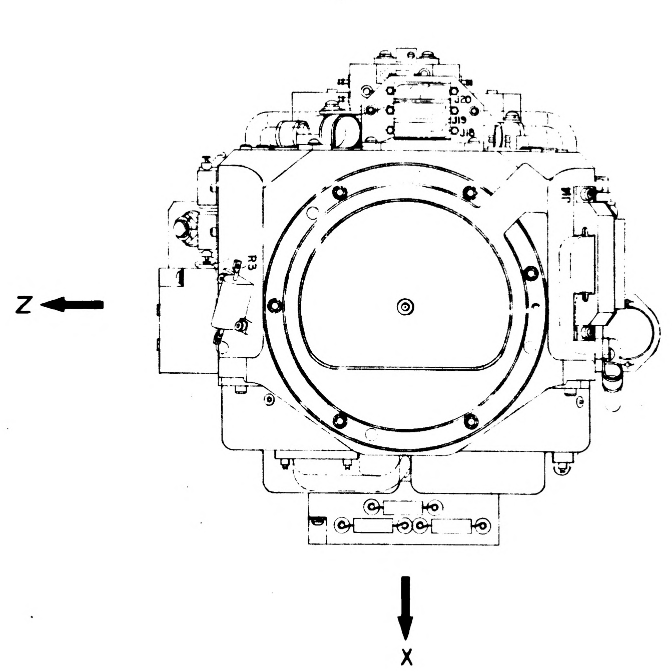
1000005

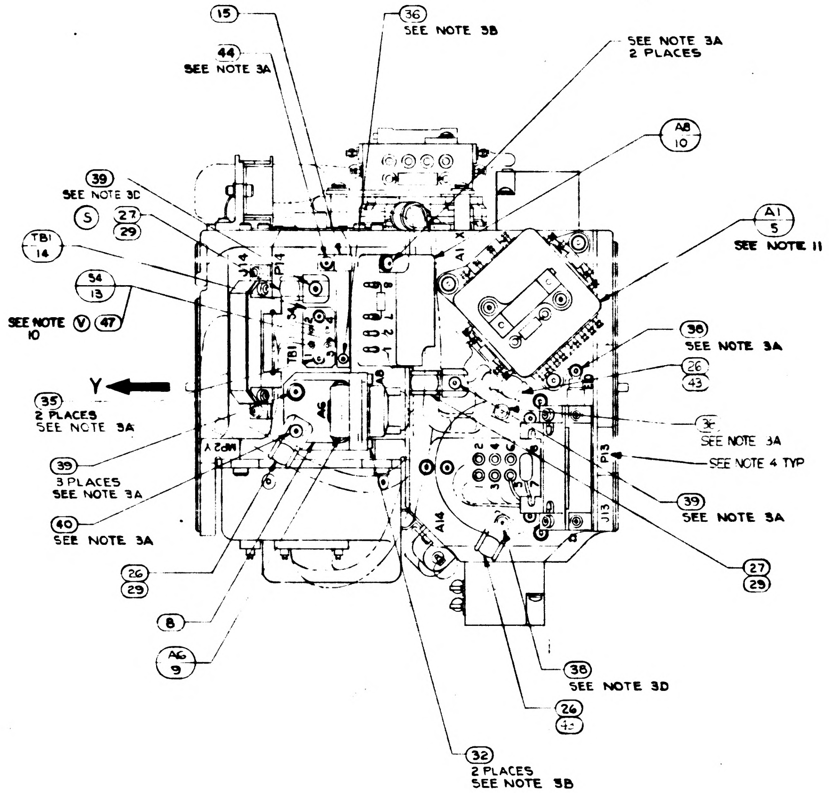
1000005 REV Y SHT 1

2/1000005

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE CHART
1-1	WHITE		A6 - +	A8-1	8
1-2	BLACK		A6 - −	A8-2	
2	BLACK		S4 - BLACK	TB1-1	8
3	WHITE		S4 - BLACK	TB1-2	
4	BLUE		S4 - BLUE	TB1-3	8
5	BLUE		S4 - BLUE	TB1-4	

Ⓥ

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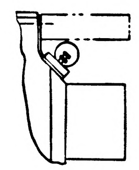
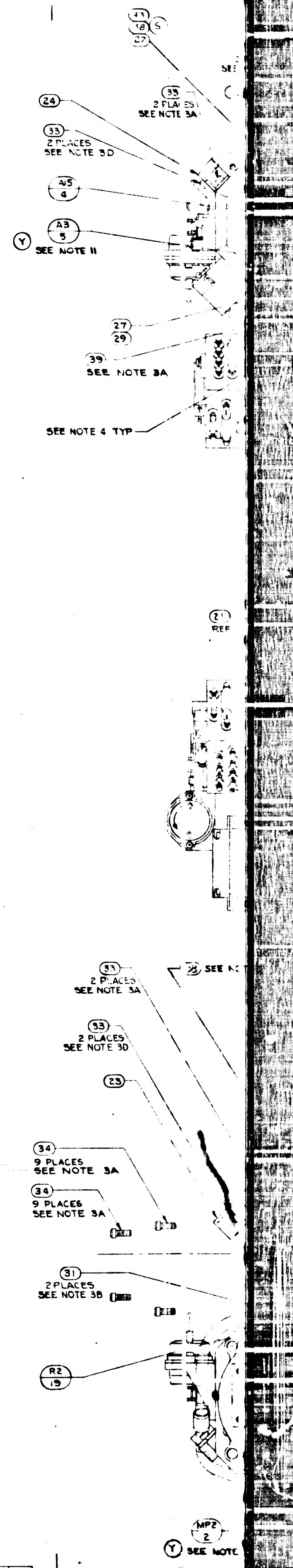
44 SEE NOTE 3A
36 SEE NOTE 3B
SEE NOTE 3A 2 PLACES
A8 10
39 SEE NOTE 3D
Ⓢ 27 29
TB1 14
S4 13
SEE NOTE Ⓥ 10 47
A1 5 SEE NOTE 11 Ⓨ
38 SEE NOTE 3A
26 43
Y
35 2 PLACES SEE NOTE 3A
36 SEE NOTE 3A
SEE NOTE 4 TYP
39 3 PLACES SEE NOTE 3A
40 SEE NOTE 3A
39 SEE NOTE 3A
26 29
27 29
8
A6 9
38 SEE NOTE 3D
26 43
32 2 PLACES SEE NOTE 3B
J14
P14
TB1
A6
A14
P13
J13
MP2 Y




43
18 Ⓢ
27
35 2 PLACES SEE NOTE 3A
24
33 2 PLACES SEE NOTE 3D
A15 4
A3 5
Ⓨ SEE NOTE 11
27 29
39 SEE NOTE 3A
SEE NOTE 4 TYP
21 REF
33 2 PLACES SEE NOTE 3A
33 2 PLACES SEE NOTE 3D
23
34 9 PLACES SEE NOTE 3A
34 9 PLACES SEE NOTE 3A
31 2 PLACES SEE NOTE 3B
R2 19
MP2 2
Ⓨ SEE NOTE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE AND TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ± 7 %
   - A. 5.0 IN. LB
   - B. 3.5 IN. LB
   - C. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN LB WHILE ENGAGING PINS
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO. 1002019 AT LOCATION SHOWN
5. RESISTORS TO BE SELECTED FROM SELECTION CHART PER ATP 1000001
6. SOLDER PER MIL-STD-440 USING (16) : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓡ ~~7. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MIN.~~

8. MARK THE PIP CONNECTORS WITH THE FOLLOWING DESIGNATIONS AS SHOWN,
   A1 - P18 A2 - P19 A3 - P20
9. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓨ Ⓥ 10. APPLY A THIN FILM OF SILICONE COMPOUND, ITEM (47), TO CONTACT SURFACE BETWEEN STABLE MEMBER, ITEM (1) AND ITEMS (2), (4), (5), (11), (13) & (17) AND BETWEEN ITEM (3) AND ITEM (4) AND BETWEEN ITEM (2) AND ITEM (3)

Ⓨ 11. INERTIAL COMPONENTS, GYRO PRE-ALIGNED ASSY. NASA DWG. NO. 1000012 AND PIP PREALIGNED ASSY NASA DWG. NO. 1000013, TO BE ASSEMBLED TO STABLE MEMBER. CALIBRATION MODULES, GYRO CALIB. ASSY. NASA DWG 1007021 & PIP CALIB. ASSY. NASA DWG NO. 1007009 TO BE MAINTAINED IN CONJUNCTION WITH THIS ASSY.

Ⓡ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHT
1000005	Y	1

1/1000005

	1000005

REVISIONS TDRR 00065			
SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000025	Housing Stable Member IMU	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000004	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/6
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W L Cooper 10/17/62

STABLE MEMBER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000005

SHEET OF

	1000006	Ⓜ	**REVISIONS** TDRR 00065			
			SYM	DESCRIPTION	DATE	APPROVAL
			A	TDR 00088	7Nov62	agb WK

PART NO.	DESCRIPTION	REQD.
1000033	Resolver Assy, One Speed Trans. Pitch, Yaw	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000096	Shaft, Stub One Speed, Outer Axis	1
1000101	Housing, Bearing One Speed, Outer Axis	1
1000091	Retainer, Bearing Outer Axis	1
1000116	Connector, Elect, Recepticle 29 Contacts	2
1000118-3	Connector, Elect, Plug 32 Contacts	1
1000118-4	Connector, Elec, Plug 32 Contacts	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		
APPROVED FOR MSC	W J Rhine 10/17/62	
BY DIRECTION	MIT Approval	
	W A Hopper 10/17/62	

INTERGIMBAL SUB-ASSY

ONE SPEED

OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000006

SHEET OF

1000006

REVISIONS TDRR 00065				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00088	7 Nov 62	agb	WK
B	TDR 00141	12 DEC 62	agb	WK

PART NO.	DESCRIPTION	REQD.
1000033	Resolver Assy, One Speed Trans. Pitch, Yaw	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000096	Shaft, Stub One Speed, Outer Axis	1
1000101	Housing, Bearing One Speed, Outer Axis	1
1000091	Retainer, Bearing Outer Axis	1
1000116	Connector, Elect, Recepticle 29 Contacts	2
1000118-3	Connector, Elect, Plug 32 Contacts	1
1000118-4	Connector, Elec, Plug 32 Contacts	1
1000153	Wire guide, Brg Mt	1
1000151	Wire guide Stub Shaft	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
WJ Rhine 10-17-62
BY DIRECTION MIT Approval
W A Copper 10/17/62

INTERGIMBAL SUB-ASSY
ONE SPEED
OUTER AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000006

SHEET OF

	1000006

REVISIONS TDRR 00065				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00088	7 Nov 62	agb	WK
B	TDR 00141	12 DEC 62	agb	WK
C	TDR 00203	27 DEC 62	agb	WK.

PART NO.	DESCRIPTION	REQD.
1000033	Resolver Assy, One Speed Trans. Pitch, Yaw	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000096	Shaft, Stub One Speed, Outer Axis	1
1000101	Housing, Bearing One Speed, Outer Axis	1
1000091	Retainer, Bearing Outer Axis	1
1000116	Connector, Elect, Recepticle 29 Contacts	2
1000118-3	Connector, Elect, Plug 32 Contacts	1
1000118-4	Connector, Elec, Plug 32 Contacts	1
1000153	Wire guide, Brg Mt	1
1000151	Wire guide Stub Shaft	1
1000100-1	Terminal, Insulated	16
1000100-2	Terminal, Insulated	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000202	DL1000201
1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10/17/62
BY DIRECTION MIT Approval
10/17/62

INTERGIMBAL SUB-ASSY
ONE SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000006
SHEET OF

1000006

REVISIONS	TDRR 00065			
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00088	7 Nov 62	agb	WK
B	TDR 00141	12 DEC 62	agb	WK
C	TDR 00203	27 DEC 62	agb	WK.
D	TDR 01067	1 MAY 63	agb	WK

PART NO.	DESCRIPTION	REQD.
1000033	Resolver Assy, One Speed Trans. Pitch, Yaw	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000096	Shaft, Stub One Speed, Outer Axis	1
1000101	Housing, Bearing One Speed, Outer Axis	1
1000091	Retainer, Bearing Outer Axis	1
1000116	Connector, Elect, Recepticle 29 Contacts	2
1000118-3	Connector, Elect, Plug 32 Contacts	1
1000118-4	Connector, Elec, Plug 32 Contacts	1
~~1000153~~	~~Wire guide, Brg Mt~~	~~1~~
1000151	Wire guide Stub Shaft	1
1000100-1	Terminal, Insulated	16
1000100-2	Terminal, Insulated	2
NAS608C440LL4	Screw Cap socket Hd Self Lock	6
1000250-2	Scr, But Hd Self lkg Spl Soc	2
1000269	Guide Wire, Assembly	1
1000254	Washer, Flat, Round	6

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
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MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED J Boyce 10/17/62
CHECKED
DRAWN
APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT Approval
W A [illegible] 10/17/62

INTERGIMBAL SUB-ASSY
ONE SPEED
OUTER AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
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CAMBRIDGE, MASS.
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NASA DRAWING NO.
1000006
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000006

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00088	7 Nov 62	agB	WK
B	TDR 00141	12 DEC 62	agB	WK
C	TDR 00203	27 DEC 62	agB	WK
D	TDR 01067	1 MAY 63	agB	WK
E	REPLACED BY REV F WITH CHANGES TDRR 01981	16 JULY 63	agB	WK

PART NO.	DESCRIPTION	REQD.
1000033	Resolver Assy, One Speed Trans. Pitch, Yaw	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000096	Shaft, Stub One Speed, Outer Axis	1
1000101	Housing, Bearing One Speed, Outer Axis	1
1000091	Retainer, Bearing Outer Axis	1
1000116	Connector, Elect, Recepticle 29 Contacts	2
1000118-3	Connector, Elect, Plug 32 Contacts	1
1000118-4	Connector, Elec, Plug 32 Contacts	1
~~1000133~~	~~Wire guide, Brg Mt~~	~~1~~
1000151	Wire guide Stub Shaft	1
1000100-1	Terminal, Insulated	16
1000100-2	Terminal, Insulated	2
NAS608C440LL4	Screw Cap socket Hd Self Lock	6
1000250-2	Scr, But Hd Self lkg Spl Soc	2
1000269	Guide Wire, Assembly	1
1000254	Washer, Flat, Round	6

REPLACED BY REV F WITH CHANGES

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL1000201
1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED A J Boyce 10/17/62
CHECKED
DRAWN
APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT Approval
W A Kupfer 10/17/62

INTERGIMBAL SUB-ASSY
ONE SPEED
OUTER AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
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CAMBRIDGE, MASS.
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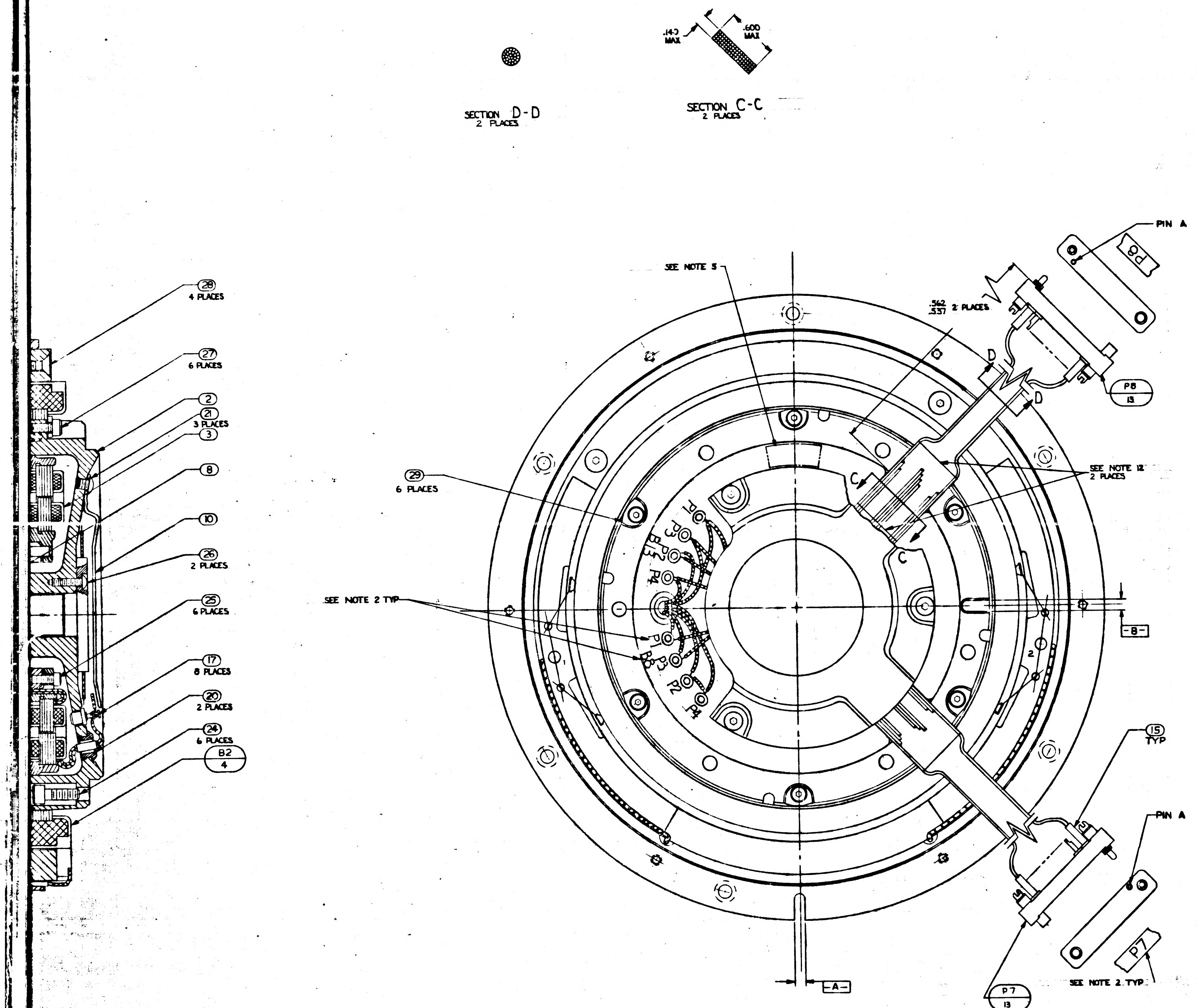
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPR
-	F	REPLACES REV E WITH CHANGES TDRR 01981	11 Jun 63	[illegible]



COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1	GY	44	J3-h	R4	
2	WHT/GY		E2-19	R4	
3	WHT/BLK/BRN		J3-j	E2-20	
4-1	WHT/BRN/VIO		J3-f	E2-33	8
4-2	WHT/BRN/GY		J3-g	E2-34	8
5-1	WHT/YEL/VIO		J3-a	E2-48	8
5-2	WHT/YEL/BLU		J3-Z	E2-47	8
6-1	WHT/ORN/BLU		J3-b	E2-43	8
6-2	WHT/ORN/VIO		J3-c	E2-44	8
7-1	WHT/RED/GRN		J3-d	E2-37	8
7-2	WHT/RED/BLU		J3-e	E2-38	8
8-1	WHT/BLK/BLU		J3-U	E2-25	8
8-2	WHT/BLK/VIO		J3-V	E2-26	8
8-3	WHT/RED/ORN		J3-W	E2-35	8
8-4	WHT/BLK/RED		J3-A	E2-21	8
8-5	WHT/BLK/ORN		J3-B	E2-22	8
8-6	WHT/RED/YEL		J3-C	E2-36	8
9-1	BLK	39	J3-X	B2-1	8
9-2	WHT	40	J3-Y	B2-2	8
10	BLK		B2-BLK	B2-1	
11	WHT		B2-WHT	B2-2	
12-1	BLK	39	J3-D	B8-S3	8
12-2	RED	41	J3-E	B8-S1	8
13	WHT/BLK		B8-WHT/BLK	B8-S3	
14	WHT/RED		B8-WHT/RED	B8-S1	
15-1	BLU	43	J3-F	B8-S4	8
15-2	YEL	42	J3-G	B8-S2	8
16	WHT/BLU		B8-WHT/BLU	B8-S4	
17	WHT/YEL		B8-WHT/YEL	B8-S2	
18-1	WHT/YEL/GRN		J3-K	E2-46	8
18-2	WHT/ORN/GY		J3-L	E2-45	8
19-1	WHT/ORN/YEL		J3-J	E2-41	8
19-2	WHT/ORN/GRN		J3-H	E2-42	8
20-1	BLK	39	J3-M	B13-S1	8
20-2	RED	41	J3-N	B13-S3	8
21	BLK		B13-BLK	B13-S3	
22	RED		B13-RED	B13-S1	
23-1	YEL	42	J3-P	B13-S2	8
23-2	BLU	43	J3-R	B13-S4	8
24	YEL		B13-YEL	B13-S2	
25	BLU		B13-BLU	B13-S4	
26-1	WHT/RED/GY		J4-f	E2-40	8
26-2	WHT/RED/VIO		J4-g	E2-39	8
26-3	WHT/BLK/YEL		J4-h	E2-23	8
26-4	WHT/BLK/GRN		J4-j	E2-24	8
27-1	WHT/BRN/YEL		J4-a	E2-30	8
27-2	WHT/BRN/ORN		J4-Z	E2-29	8
28-1	WHT/BRN/GRN		J4-b	E2-31	8
28-2	WHT/BRN/BLU		J4-c	E2-32	8
29	WHT/YEL/GY		J4-d	E2-49	
30	WHT/GRN/BLU		J4-e	E2-50	
31	WHT/GRN		J4-U	E2-16	
32	WHT/BLU		J4-V	E2-17	
33	WHT/VIO		J4-W	E2-18	
34-1	WHT/BLK/GY		J4-X	E2-27	8
34-2	WHT/BRN/RED		J4-Y	E2-28	8
35	BLK		J4-A	E2-1	
36	BRN		J4-B	E2-2	
37	RED		J4-C	E2-3	
38	ORN		J4-D	E2-4	
39	YEL		J4-E	E2-5	
40	GRN		J4-F	E2-6	
41	BLU		J4-G	E2-7	
42	VIO		J4-H	E2-8	
43	GY		J4-J	E2-9	
44	WHT		J4-K	E2-10	
45	WHT/BLK		J4-L	E2-11	
46	WHT/BRN		J4-M	E2-12	
47	WHT/RED		J4-N	E2-13	
48	WHT/ORN		J4-P	E2-14	
49	WHT/YEL		J4-R	E2-15	
50	WHT		P7-R	E2-11	
51	WHT/RED		P7-T	E2-13	
52	WHT/ORN		P7-U	E2-14	
53	WHT/BLU		P7-X	E2-17	
54	WHT/YEL		P7-V	E2-15	
55	WHT/GRN		P7-W	E2-16	
56	WHT/VIO		P7-Y	E2-18	
57-1	WHT/YEL/BLU		P7-c	E2-47	8
57-2	WHT/YEL/VIO		P7-e	E2-48	8
58	GY		P7-M	E2-9	
59	WHT		P7-P	E2-10	
60	WHT/BRN		P7-S	E2-12	
61	VIO		P7-J	E2-8	
62	YEL		P7-E	E2-5	
63	BRN		P7-B	E2-2	
64	BLU		P7-H	E2-7	
65	ORN		P7-D	E2-4	
66	GRN		P7-F	E2-6	
67	BLK		P7-A	E2-1	
68	RED		P7-C	E2-3	
69-1	WHT/BLK/VIO		P8-R	E2-26	8
69-2	WHT/BLK/ORN		P8-U	E2-22	8
69-3	WHT/BLK/BLU		P8-P	E2-25	8
69-4	WHT/BLK/RED		P8-T	E2-21	8
69-5	WHT/RED/ORN		P8-V	E2-35	8
69-6	WHT/RED/YEL		P8-Y	E2-36	8
70-1	WHT/BRN/RED		P8-X	E2-28	8
70-2	WHT/BLK/GY		P8-W	E2-27	8
71-1	WHT/BRN/YEL		P8-a	E2-30	8
71-2	WHT/BRN/ORN		P8-Z	E2-29	8
72-1	WHT/BRN/BLU		P8-d	E2-32	8
72-2	WHT/BRN/GRN		P8-c	E2-31	8
73-1	WHT/BLK/YEL		P8-b	E2-23	8
73-2	WHT/BLK/GRN		P8-e	E2-24	8
73-3	WHT/RED/GY		P8-h	E2-40	8
73-4	WHT/RED/VIO		P8-f	E2-39	8
74-1	WHT/RED/BLU		P8-M	E2-38	8
74-2	WHT/RED/GRN		P8-L	E2-37	8
75-1	WHT/ORN/VIO		P8-J	E2-44	8
75-2	WHT/ORN/BLU		P8-H	E2-43	8
76-1	WHT/BRN/GY		P8-E	E2-34	8
76-2	WHT/BRN/VIO		P8-D	E2-33	8
77-1	WHT/BLK/BRN		P8-N	E2-20	8
77-2	WHT/GY		P8-K	E2-19	8

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 8
78-1	RED	41	P8-F	B8-P1	8
78-2	BLK	39	P8-C	B8-P3	8
79	WHT/RED		B8-WHT/RED	B8-P1	
80	WHT/BLK		B8-WHT/BLK	B8-P3	
81	YEL	42	B8-P2	B8-P4	
82	WHT/YEL		B8-WHT/YEL	B8-P2	
83	WHT/BLU		B8-WHT/BLU	B8-P4	
84-1	WHT/ORN/GY		B13-P1	E2-45	8
84-2	WHT/YEL/GRN		B13-P3	E2-46	8
85-1	WHT/ORN/GRN		B13-P2	E2-42	8
85-2	WHT/ORN/YEL		B13-P4	E2-41	8
86	RED		B13-RED	B13-P1	
87	BLK		B13-BLK	B13-P3	
88	YEL		B13-YEL	B13-P2	
89	BLU		B13-BLU	B13-P4	
90	WHT/GRN/BLU		P8-B	E2-50	
91	WHT/YEL/GY		P8-A	E2-49	

REPLACES
REV E WITH
CHANGES

LIST OF PARTS AND MATERIALS

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
6	WASHER, FLAT, ROUND	1000254			46
1	RESISTOR, FIXED	1010498-300			45
1	WIRE, ELEC, TYPE E-28 GY		MIL-W-16878	20" LONG	44
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	28" LONG	43
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	30" LONG	42
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	42" LONG	41
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	18" LONG	40
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	56" LONG	39
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	38
A/R	GREASE, LUBRICATING		MIL-G-25760		37
A/R	GOODYEAR CPA923A		MIL-A-13883		36
A/R	SOLDER	SN60WARP2	QQ-S-571		35
A/R	SOLDER	SN60WARP2	QQ-S-571		34
3	CLAMP CABLE	1000220-4			33
2	CLAMP, CABLE	1000220-5			32
5	WASHER, CABLE CLAMP	1000223			31
5	SCREW, HEX SOC HD	1000110-1			30
6	CLAMP, TORQUE MOTOR	1000087			29
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			28
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS608C440L4			27
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-2			26
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS608C256L4			25
6	SCREW, CAP, SOC HD HEX	1000110-7			24
6	SCREW, BUT HD, SELF LKG, HEX SOC	1000093-25			23
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			22
9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			21
2	BUSHING, INSULATOR	1000036			20
60	INSULATION, SLEEVING, ELEC	1006776-18		3/8 LONG	19
2	SCREW, CAP, SOC HD, HEX	1000110-202			18
18	TERMINAL, INSULATED	1000100-1			7
2	INSULATION, SLEEVING, ELEC	1006776-15		3/4 LONG	16
48	INSULATION, SLEEVING, ELEC	1006776-18		5/16 LONG	15
2	INSULATION, SLEEVING, ELEC	1006776-9		5/16 LONG	14
2	CONN, ELEC, RECEP, 29 CONT.	1000116			13
1	CONN, ELEC, RECEP, 32 PINS	1000118-4			12
1	CONN, ELEC, RECEP, 32 PINS	1000118-3			11
1	GUIDE, WIRE, SHAFT STUB, O.A.	1000151			10
1	GUIDE, WIRE, BEARING HSG, I-X O.A.	1000269			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000096			7
1	SLIP RING ASSY, ELEC, 50 CONTACT	1000038			6
1	RETAINER, BEARING, OUTER AXIS	1000091			5
1	MOTOR, TORQUE, DC, FRAMELESS	1000075			4
1	RSVR ASSY, I-X XMTR & PITCH-YAW	1000033			3
1	SHAFT, STUB, I-X OUTER AXIS	1000096			2
1	HOUSING, BEARING, I-X OUTER AXIS	1000101			1

NEXT ASSY	USED ON
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED: J Hoyne — DATE: 7-16-63
CHECKED
DRAWN: RWC — 6-4-63
APPROVED FOR MSC: J.S. [illegible] 1963
MIT/IL APPROVAL — DATE: W [illegible] 17 [illegible] 63

INTERGIMBAL
SUB-ASSEMBLY
I-X OUTER AXIS

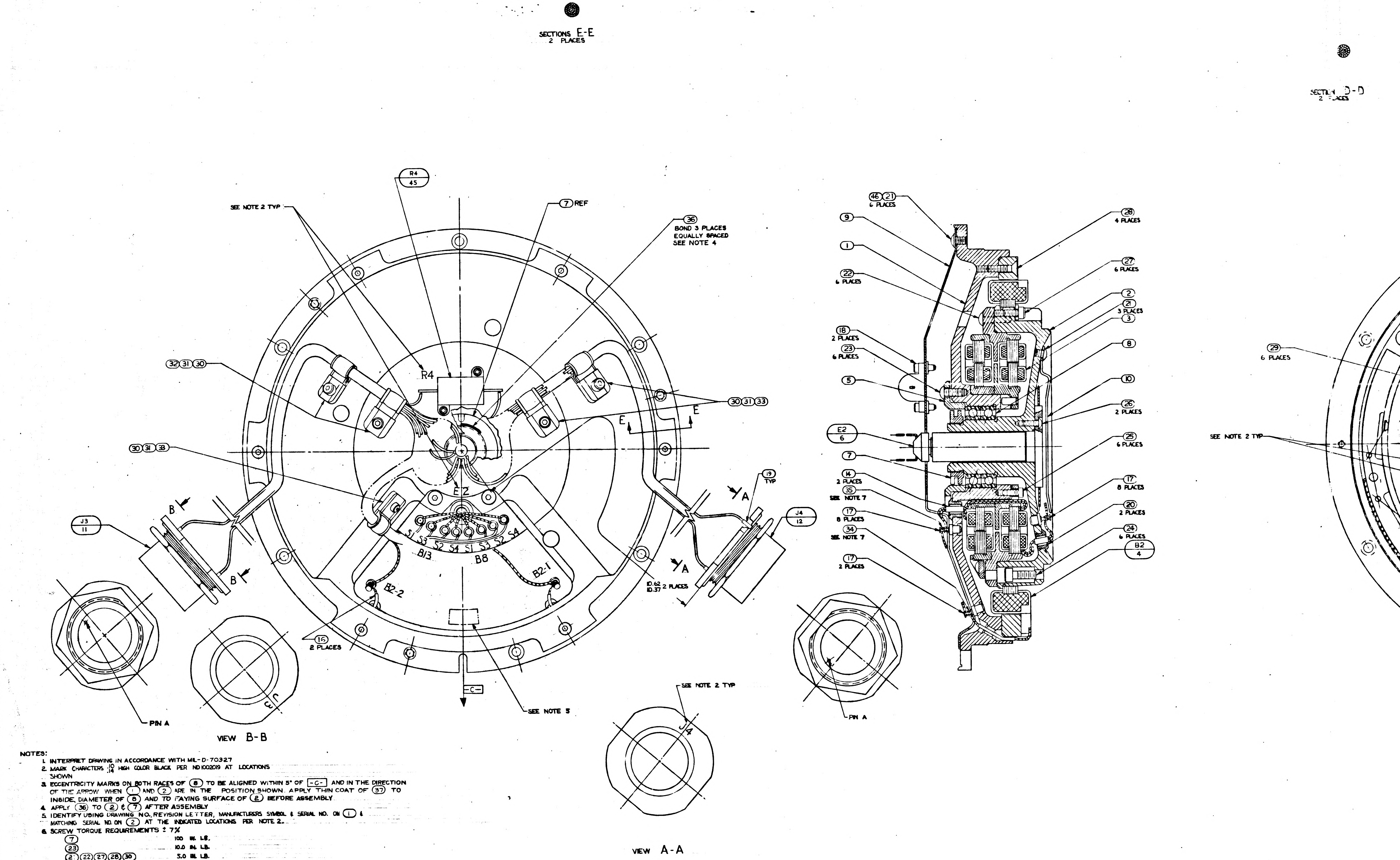
SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000006
SHEET 1 OF 1

	REV	SHEET
1000006	F	1

MASTER

F-2


SECTIONS E-E
2 PLACES
SECTION D-D
2 PLACES
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45
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SEE NOTE 4
R4
32 31 30
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SEE NOTE 5
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VIEW A-A
PIN A
46 21
6 PLACES
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1
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6 PLACES
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2 PLACES
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7
14
2 PLACES
35
SEE NOTE 7
17
8 PLACES
34
SEE NOTE 7
17
2 PLACES
28
4 PLACES
27
6 PLACES
2
21
3 PLACES
3
8
10
26
2 PLACES
25
6 PLACES
17
8 PLACES
20
2 PLACES
24
6 PLACES
B2
4
29
6 PLACES
SEE NOTE 2 TYP

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑧ TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW WHEN ① AND ② ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (37) TO INSIDE DIAMETER OF ⑧ AND TO FAYING SURFACE OF ② BEFORE ASSEMBLY
4. APPLY (36) TO ② & ⑦ AFTER ASSEMBLY
5. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ± 7%

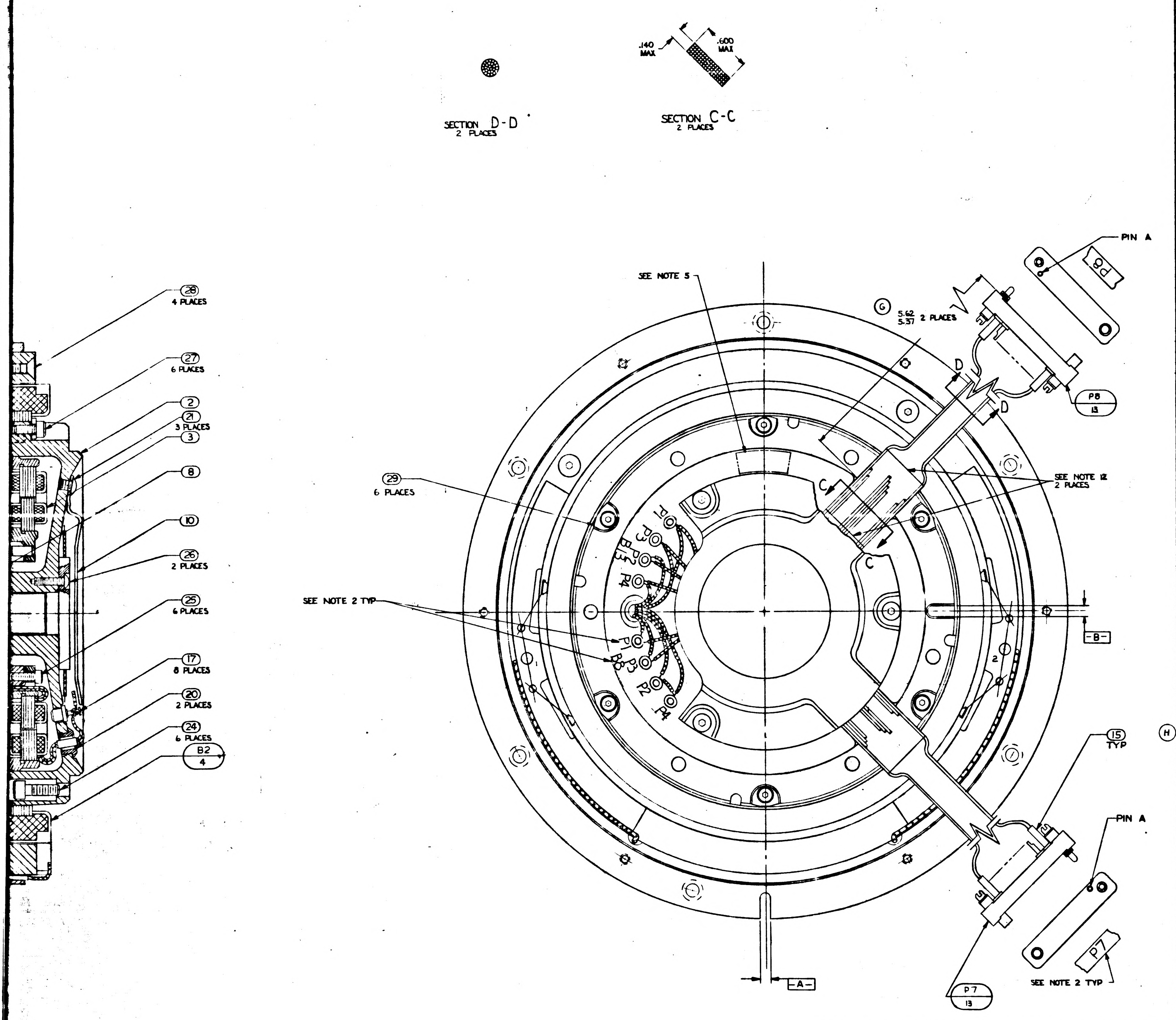
⑦	100 IN. LB.
㉓	10.0 IN. LB.
② ㉒ ㉗ ㉘ ㉚	5.0 IN. LB.
⑱ ㉕ ㉖	3.5 IN. LB

7. SOLDER ALL LEADS FROM ③ & ④ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉞. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑪, ⑫ & ⑬ PER MIL-STD-440 USING ㉟. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM HOUSING BEARING ① OR REMOVE TORQUE MOTOR ④ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ④.
10. MAXIMUM ALLOWABLE TORQUE 15 OZ.-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000006.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.

	REV	SHEET
1000006	F	1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
-	F	REPLACES REV E WITH CHANGES TDRR 01981	11 Jun 63	ags UK
	G	TDRR 03182	13 SEP 63	JGM UK
	H	TDRR 03477	1 OCT 63	JGM UK



WIRING LEGEND					
COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1	GY	44	J3-h	R4	
2	WHT/GY		E2-19	R4	
3	WHT/BLK/BRN		J3-j	E2-20	
4-1	WHT/BRN/VIO		J3-f	E2-33	8
4-2	WHT/BRN/GY		J3-g	E2-34	8
5-1	WHT/YEL/VIO		J3-a	E2-48	8
5-2	WHT/YEL/BLU		J3-Z	E2-47	8
6-1	WHT/ORN/BLU		J3-b	E2-43	8
6-2	WHT/ORN/VIO		J3-c	E2-44	8
7-1	WHT/RED/GRN		J3-d	E2-37	8
7-2	WHT/RED/BLU		J3-e	E2-38	8
8-1	WHT/BLK/BLU		J3-U	E2-25	8
8-2	WHT/BLK/VIO		J3-V	E2-26	8
8-3	WHT/RED/ORN		J3-W	E2-35	8
8-4	WHT/BLK/RED		J3-A	E2-21	8
8-5	WHT/BLK/ORN		J3-B	E2-22	8
8-6	WHT/RED/YEL		J3-C	E2-36	8
9-1	BLK	39	J3-X	B2-1	8
9-2	WHT	40	J3-Y	B2-2	8
10	BLK		B2-BLK	B2-1	
11	WHT		B2-WHT	B2-2	
12-1	BLK	39	J3-D	B8-S3	8
12-2	RED	41	J3-E	B8-S1	8
13	WHT/BLK		B8-WHT/BLK	B8-S3	
14	WHT/RED		B8-WHT/RED	B8-S1	
15-1	BLU	43	J3-F	B8-S4	8
15-2	YEL	42	J3-G	B8-S2	8
16	WHT/BLU		B8-WHT/BLU	B8-S4	
17	WHT/YEL		B8-WHT/YEL	B8-S2	
18-1	WHT/YEL/GRN		J3-K	E2-46	8
18-2	WHT/ORN/GY		J3-L	E2-45	8
19-1	WHT/ORN/YEL		J3-J	E2-41	8
19-2	WHT/ORN/GRN		J3-H	E2-42	8
20-1	BLK	39	J3-M	B13-S1	8
20-2	RED	41	J3-N	B13-S3	8
21	BLK		B13-BLK	B13-S3	
22	RED		B13-RED	B13-S1	
23-1	YEL	42	J3-P	B13-S2	8
23-2	BLU	43	J3-R	B13-S4	8
24	YEL		B13-YEL	B13-S2	
25	BLU		B13-BLU	B13-S4	
26-1	WHT/RED/GY		J4-f	E2-40	8
26-2	WHT/RED/VIO		J4-g	E2-39	8
26-3	WHT/BLK/YEL		J4-h	E2-23	8
26-4	WHT/BLK/GRN		J4-j	E2-24	8
27-1	WHT/BRN/YEL		J4-a	E2-30	8
27-2	WHT/BRN/ORN		J4-Z	E2-29	8
28-1	WHT/BRN/GRN		J4-b	E2-31	8
28-2	WHT/BRN/BLU		J4-c	E2-32	8
29	WHT/YEL/GY		J4-d	E2-49	
30	WHT/GRN/BLU		J4-e	E2-50	
31	WHT/GRN		J4-U	E2-16	
32	WHT/BLU		J4-V	E2-17	
33	WHT/VIO		J4-W	E2-18	
34-1	WHT/BLK/GY		J4-X	E2-27	8
34-2	WHT/BRN/RED		J4-Y	E2-28	8
35	BLK		J4-A	E2-1	
36	BRN		J4-B	E2-2	
37	RED		J4-C	E2-3	
38	ORN		J4-D	E2-4	
39	YEL		J4-E	E2-5	
40	GRN		J4-F	E2-6	
41	BLU		J4-G	E2-7	
42	VIO		J4-H	E2-8	
43	GY		J4-J	E2-9	
44	WHT		J4-K	E2-10	
45	WHT/BLK		J4-L	E2-11	
46	WHT/BRN		J4-M	E2-12	
47	WHT/RED		J4-N	E2-13	
48	WHT/ORN		J4-P	E2-14	
(H) 49	WHT/YEL		J4-R	E2-15	
50	WHT/BLK		P7-R	E2-11	
51	WHT/RED		P7-T	E2-13	
52	WHT/ORN		F7-U	E2-14	
53	WHT/BLU		P7-X	E2-17	
54	WHT/YEL		P7-V	E2-15	
55	WHT/GRN		P7-W	E2-16	
56	WHT/VIO		P7-Y	E2-18	
57-1	WHT/YEL/BLU		P7-c	E2-47	8
57-2	WHT/YEL/VIO		P7-e	E2-48	8
58	GY		P7-M	E2-9	
59	WHT		P7-P	E2-10	
60	WHT/BRN		P7-S	E2-12	
61	VIO		P7-J	E2-8	
62	YEL		P7-E	E2-5	
63	BRN		P7-B	E2-2	
64	BLU		P7-H	E2-7	
65	ORN		P7-D	E2-4	
66	GRN		P7-F	E2-6	
67	BLK		P7-A	E2-1	
68	RED		P7-C	E2-3	
69-1	WHT/BLK/VIO		P8-R	E2-26	8
69-2	WHT/BLK/ORN		P8-U	E2-22	8
69-3	WHT/BLK/BLU		P8-P	E2-25	8
69-4	WHT/BLK/RED		P8-T	E2-21	8
69-5	WHT/RED/ORN		P8-V	E2-35	8
69-6	WHT/RED/YEL		P8-Y	E2-36	8
70-1	WHT/BRN/RED		P8-X	E2-28	8
70-2	WHT/BLK/GY		P8-W	E2-27	8
71-1	WHT/BRN/YEL		P8-a	E2-30	8
71-2	WHT/BRN/ORN		P8-Z	E2-29	8
72-1	WHT/BRN/BLU		P8-d	E2-32	8
72-2	WHT/BRN/GRN		P8-c	E2-31	8
73-1	WHT/BLK/YEL		P8-b	E2-23	8
73-2	WHT/BLK/GRN		P8-e	E2-24	8
73-3	WHT/RED/GY		P8-h	E2-40	8
73-4	WHT/RED/VIO		P8-f	E2-39	8
74-1	WHT/RED/BLU		P8-M	E2-38	8
74-2	WHT/RED/GRN		P8-L	E2-37	8
75-1	WHT/ORN/VIO		P8-J	E2-44	8
75-2	WHT/ORN/BLU		P8-H	E2-43	8
76-1	WHT/BRN/GY		P8-E	E2-34	8
76-2	WHT/BRN/VIO		P8-D	E2-33	8
77-1	WHT/BLK/BRN		P8-N	E2-20	8
77-2	WHT/GY		P8-K	E2-19	8

WIRING LEGEND					
COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 8
78-1	RED	41	P8-F	B8-P1	8
78-2	BLK	39	P8-C	B8-P3	8
79	WHT/RED		B8-WHT/RED	B8-P1	
80	WHT/BLK		B8-WHT/BLK	B8-P3	
81	YEL	42	B8-P2	B8-P4	
82	WHT/YEL		B8-WHT/YEL	B8-P2	
83	WHT/BLU		B8-WHT/BLU	B8-P4	
84-1	WHT/ORN/GY		B13-P1	E2-45	8
84-2	WHT/YEL/GRN		B13-P3	E2-46	8
85-1	WHT/ORN/GRN		B13-P2	E2-42	8
85-2	WHT/ORN/YEL		B13-P4	E2-41	8
86	RED		B13-RED	B13-P1	
87	BLK		B13-BLK	B13-P3	
88	YEL		B13-YEL	B13-P2	
89	BLU		B13-BLU	B13-P4	
90	WHT/GRN/BLU		P8-B	E2-50	
91	WHT/YEL/GY		P8-A	E2-49	

REPLACES
REV E WITH
CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
6	WASHER, FLAT, ROUND	1000254			46
1	RESISTOR, FIXED	1010498-300			45
1	WIRE, ELEC, TYPE E-28 GY		MIL-W-16878	20" LONG	44
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	28" LONG	43
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	30" LONG	42
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	42" LONG	41
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	18" LONG	40
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	56" LONG	39
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	38
A/R	GREASE, LUBRICATING		MIL-G-25760		37
A/R	GOODYEAR CPA923A		MIL-A-13883		36
A/R	SOLDER	SN60WARP2	QQ-S-571		35
A/R	SOLDER	SN60WARP2	QQ-S-571		34
3	CLAMP, CABLE	1000220-4			33
2	CLAMP, CABLE	1000220-5			32
5	WASHER, CABLE CLAMP	1000223			31
5	SCREW, HEX SOC HD	1000110-1			30
3	CLAMP, TORQUE MOTOR	1000087			29
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			28
(G) 6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL4			27
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000280-2			26
(G) 6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C02LL4			25
6	SCREW, CAP, SOC HD HEX	1000110-7			24
6	SCREW, BUT HD, SELF LKG, HEX SOC	1000093-25			23
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			22
9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			21
2	BUSHING, INSULATOR	1000036			20
60	INSULATION, SLEEVING, ELEC	1006776-18		3/8 LONG	19
2	SCREW, CAP, SOC HD, HEX	1000110-202			18
18	TERMINAL, INSULATED	1000100-1			17
2	INSULATION, SLEEVING, ELEC	1006776-15		3/4 LONG	16
48	INSULATION, SLEEVING, ELEC	1006776-18		5/16 LONG	15
2	INSULATION, SLEEVING, ELEC	1006776-9		5/16 LONG	14
2	CONN, ELEC, RECEP, 29 CONT.	1000116			13
(G) 1	CONN, ELEC, RECEP, 32 PINS	1000118-4		SEE NOTE 13	12
1	CONN, ELEC, RECEP, 32 PINS	1000118-3		SEE NOTE 13	11
1	GUIDE, WIRE, SHAFT STUB, O.A.	1000151			10
1	GUIDE, WIRE, BEARING HSG, I-X O.A.	1000269			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASSY, ELEC, 50 CONTACT	1000038			6
1	RETAINER, BEARING, OUTER AXIS	1000091			5
1	MOTOR, TORQUE DC, FRAMELESS	1000075			4
1	RSVR ASSY, I-X XMTR & PITCH-YAW	1000033			3
1	SHAFT, STUB, I-X OUTER AXIS	1000096			2
1	HOUSING, BEARING, I-X OUTER AXIS	1000101			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED: A. Hopper DATE 7-16-63
CHECKED
DRAWN: RWC 6-4-63
APPROVED FOR MSC: J. S. Bu[illegible] 17 Jul 1963
MIT/IL APPROVAL DATE: W. [illegible] 17 Jul 63

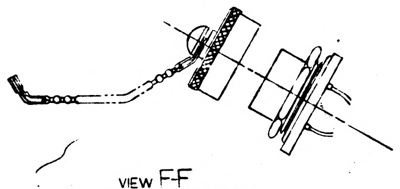
INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000006
SHEET 1 OF 1

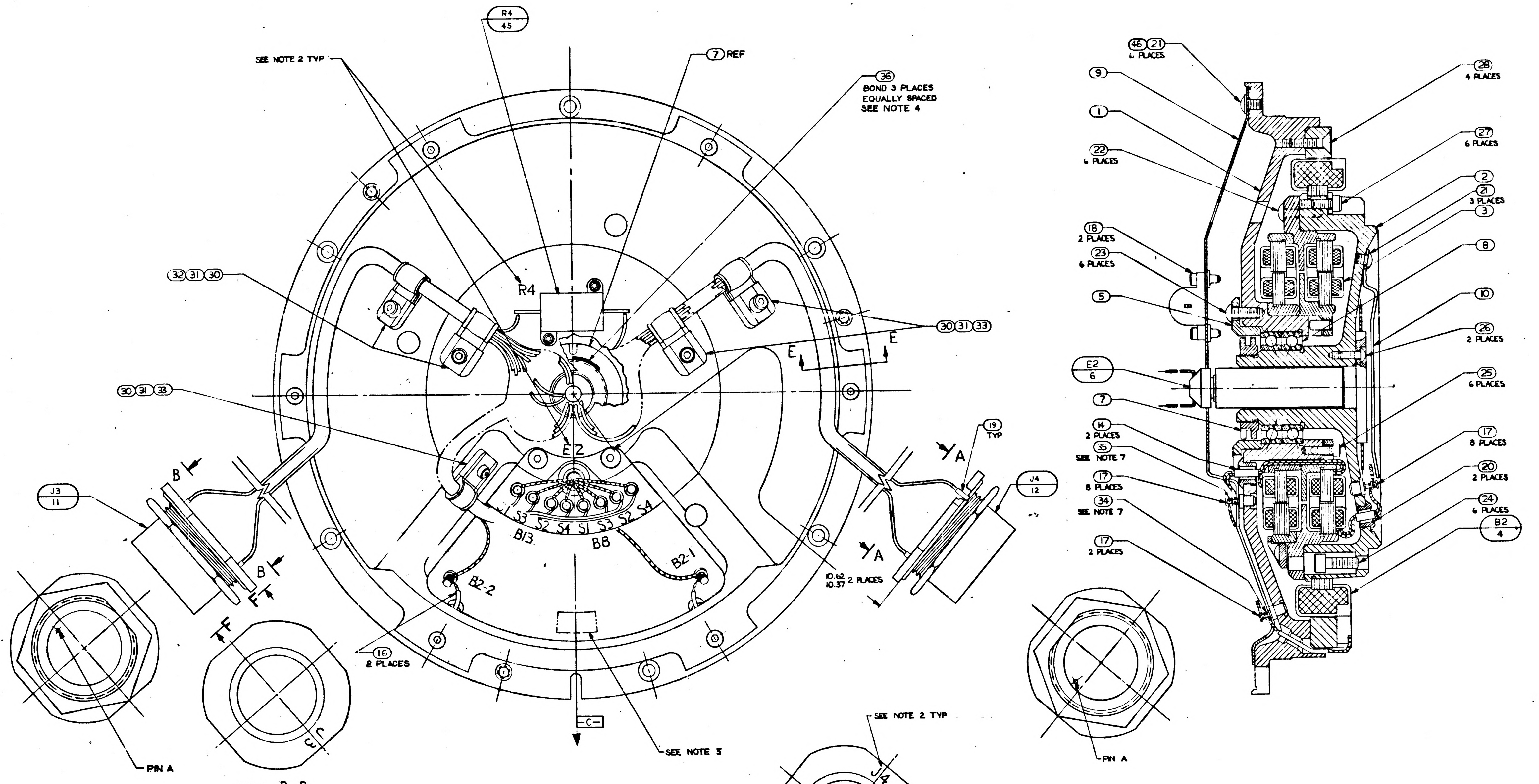
	REV	SHEET
1000006	H	1

MASTER

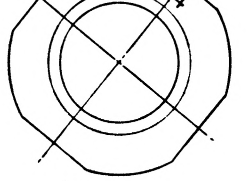


VIEW F-F
TYPICAL INSTALLATION
SEE NOTE 13

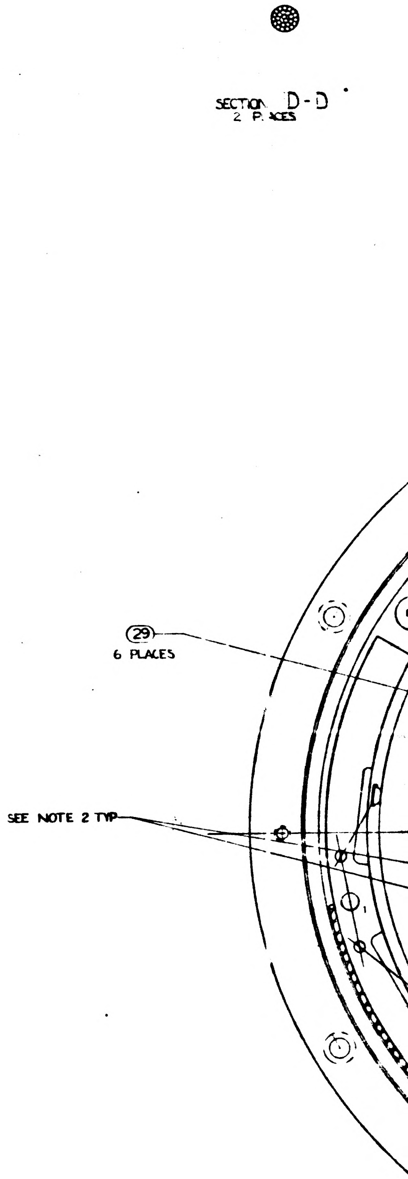
SECTIONS E-E
2 PLACES


SEE NOTE 2 TYP
R4
45
⑦ REF
㊱
BOND 3 PLACES
EQUALLY SPACED
SEE NOTE 4
㉜㉛㉚
R4
㉚㉛㉝
E
E
㉚㉛㉝
E2
J3
11
B
B
F
F
S1 S3 S2 S4 S1 S3 S2 S4
B13
B8
B2-1
B2-2
⑯
2 PLACES
-C-
SEE NOTE 5
J4
12
⑲
TYP
A
A
10.62
10.37 2 PLACES
PIN A
㊻㉑
6 PLACES
⑨
①
㉒
6 PLACES
⑱
2 PLACES
㉓
6 PLACES
⑤
E2
6
⑦
⑭
2 PLACES
㉟
SEE NOTE 7
⑰
8 PLACES
㉞
SEE NOTE 7
⑰
2 PLACES
㉘
4 PLACES
㉗
6 PLACES
②
㉑
3 PLACES
③
⑧
⑩
㉖
2 PLACES
㉕
6 PLACES
⑰
8 PLACES
⑳
2 PLACES
㉔
6 PLACES
B2
4
PIN A

VIEW B-B


SEE NOTE 2 TYP
J4

VIEW A-A


㉙
6 PLACES
SEE NOTE 2 TYP

SECTION D-D
2 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $^{.10}_{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑧ TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW WHEN ① AND ② ARE IN THE POSITION SHOWN. APPLY THIN COAT OF ㊲ TO INSIDE DIAMETER OF ⑧ AND TO FAYING SURFACE OF ② BEFORE ASSEMBLY
4. APPLY ㊱ TO ② & ⑦ AFTER ASSEMBLY
5. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ± 7%

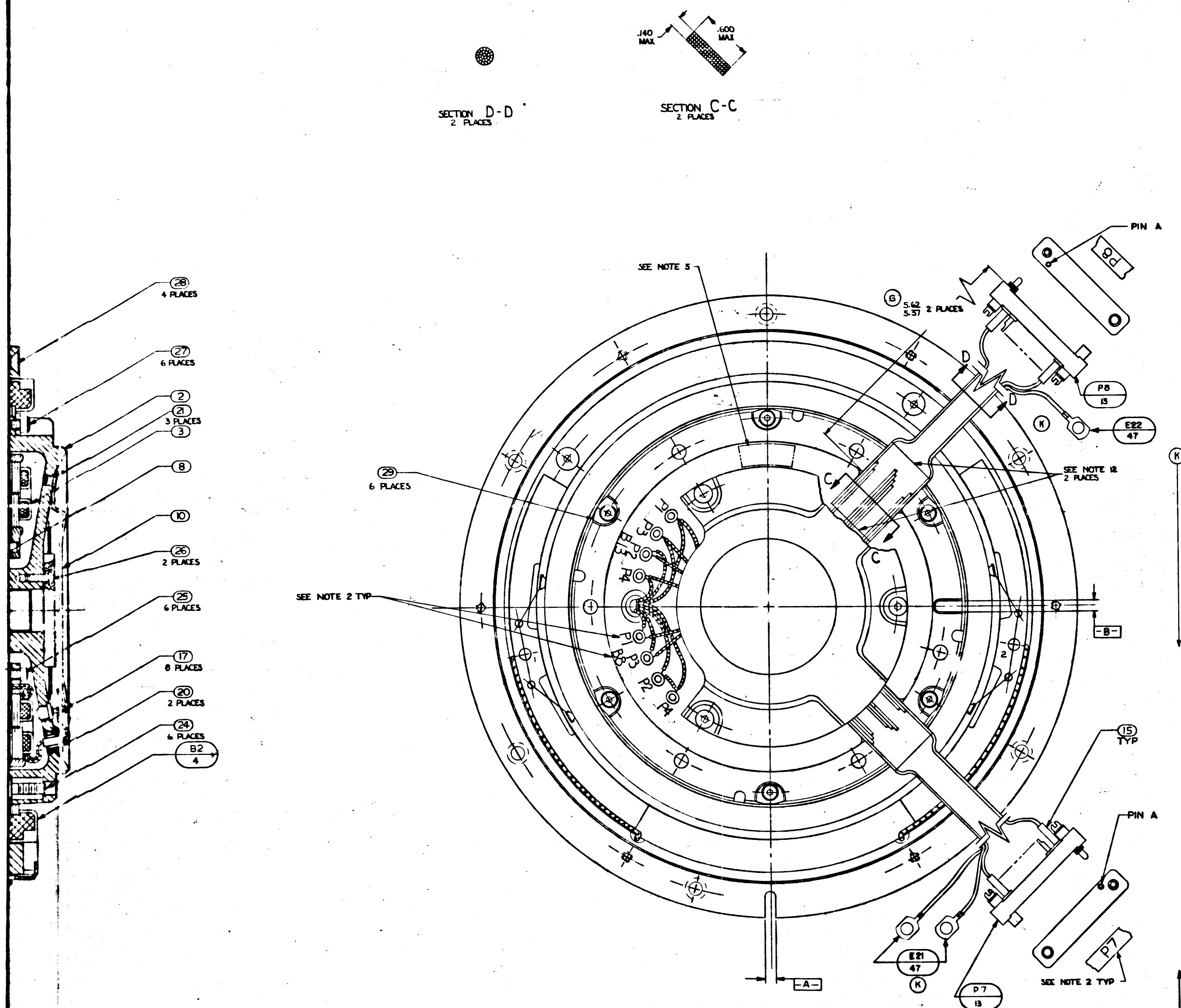
⑦	100 IN. LB.
㉓	10.0 IN. LB.
㉑㉒㉗㉘㉚	5.0 IN. LB.
⑱㉕㉖	3.5 IN. LB

7. SOLDER ALL LEADS FROM ③ & ④ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉞. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑪, ⑫ & ⑬ PER MIL-STD-440 USING ㉟. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM HOUSING BEARING ① OR REMOVE TORQUE MOTOR ④ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ④.
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000006.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

	REV	SHEET
1000006	H	1

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	F	REPLACE REV E WITH CHANGES TDRR 01861	[illegible] 63	
	G	TDRR 03182	13 SEP 63	
	H	TDRR 03477	1 OCT 63	
	J	TDRR 04559	6 NOV 63	
	K	TDRR 05166	19 NOV 63	



WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1	GY	44	J3-h	R4	
2	WHT/GY		E2-19	R4	
3	WHT/BLK/BRN		J3-j	E2-20	
4-1	WHT/BRN/VIO		J3-f	E2-33	○
4-2	WHT/BRN/GY		J3-g	E2-34	○
5-1	WHT/YEL/VIO		J3-a	E2-48	○
5-2	WHT/YEL/BLU		J3-Z	E2-47	○
6-1	WHT/ORN/BLU		J3-b	E2-43	○
6-2	WHT/ORN/VIO		J3-c	E2-44	○
7-1	WHT/RED/GRN		J3-d	E2-37	○
7-2	WHT/RED/BLU		J3-e	E2-38	○
8-1	WHT/BLK/BLU		J3-U	E2-25	○
8-2	WHT/BLK/VIO		J3-V	E2-26	○
8-3	WHT/RED/ORN		J3-W	E2-35	○
8-4	WHT/BLK/RED		J3-A	E2-21	○
8-5	WHT/BLK/ORN		J3-B	E2-22	○
8-6	WHT/RED/YEL		J3-C	E2-36	○
9-1	BLK	39	J3-X	B2-1	○
9-2	WHT	40	J3-Y	B2-2	○
10	BLK		B2-BLK	B2-1	
11	WHT		B2-WHT	B2-2	
12-1	BLK	39	J3-D	B8-S3	○
12-2	RED	41	J3-E	B8-S1	○
13	WHT/BLK		B8-WHT/BLK	B8-S3	
14	WHT/RED		B8-WHT/RED	B8-S1	
15-1	BLU	43	J3-F	B8-S4	○
15-2	YEL	42	J3-G	B8-S2	○
16	WHT/BLU		B8-WHT/BLU	B8-S4	
17	WHT/YEL		B8-WHT/YEL	B8-S2	
18-1	WHT/YEL/GRN		J3-K	E2-46	○
18-2	WHT/ORN/GY		J3-L	E2-45	○
19-1	WHT/ORN/YEL		J3-J	E2-41	○
19-2	WHT/ORN/GRN		J3-H	E2-42	○
20-1	BLK	39	J3-M	B13-S1	○
20-2	RED	41	J3-N	B13-S3	○
21	BLK		B13-BLK	B13-S3	
22	RED		B13-RED	B13-S1	
23-1	YEL	42	J3-P	B13-S2	○
23-2	BLU	43	J3-R	B13-S4	○
24	YEL		B13-YEL	B13-S2	
25	BLU		B13-BLU	B13-S4	
26-1	WHT/RED/GY		J4-f	E2-40	○
26-2	WHT/RED/VIO		J4-g	E2-39	○
26-3	WHT/BLK/YEL		J4-h	E2-23	○
26-4	WHT/BLK/GRN		J4-j	E2-24	○
27	WHT/BRN/YEL		J4-A	E2-30	
28-1	WHT/BRN/ORN		J4-V	E2-29	◌
29	WHT/BRN/GRN		J4-C	E2-31	
30	WHT/BRN/BLU		J4-B	E2-32	
31	WHT/YEL/GY		J4-d	E2-49	
32	WHT/GRN/BLU		J4-e	E2-50	
33	WHT/GRN		J4-G	E2-16	
34	WHT/BLU		J4-J	E2-17	
35	WHT/VIO		J4-H	E2-18	
28-2	WHT/BLK/GY		J4-U	E2-27	◌
28-3	WHT/BRN/RED		J4-W	E2-28	◌
36-1	BLK		J4-N	E2-1	◌
36-2	BRN		J4-R	E2-2	◌
36-3	RED		J4-P	E2-3	◌
37	ORN		J4-D	E2-4	
38	YEL		J4-F	E2-5	
39	GRN		J4-E	E2-6	
40-1	BLU		J4-X	E2-7	○
40-2	VIO		J4-Y	E2-8	○
41-1	GY		J4-Z	E2-9	○
41-2	WHT		J4-a	E2-10	○
42-1	WHT/BLK		J4-b	E2-11	○
42-2	WHT/BRN		J4-c	E2-12	○
43-1	WHT/RED		J4-K	E2-13	◌
43-2	WHT/ORN		J4-M	E2-14	◌
43-3	WHT/YEL		J4-L	E2-15	◌
44-1	WHT/BLK		P7-R	E2-11	○
45-1	WHT/RED		P7-T	E2-13	◌
45-2	WHT/ORN		P7-U	E2-14	◌
46	WHT/BLU		P7-X	E2-17	
45-3	WHT/YEL		P7-V	E2-15	◌
47	WHT/GRN		P7-W	E2-16	
48	WHT/VIO		P7-Y	E2-18	
49-1	WHT/YEL/BLU		P7-c	E2-47	○
49-2	WHT/YEL/VIO		P7-e	E2-48	○
50-1	GY		P7-M	E2-9	○
50-2	WHT		P7-P	E2-10	○
44-2	WHT/BRN		P7-S	E2-12	○
51-1	VIO		P7-J	E2-8	○
52	YEL		P7-E	E2-5	
53-1	BRN		P7-B	E2-2	◌
51-2	BLU		P7-H	E2-7	○
54	ORN		P7-D	E2-4	
55	GRN		P7-F	E2-6	
53-2	BLK		P7-A	E2-1	◌
53-3	RED		P7-C	E2-3	◌
56-1	WHT/BLK/VIO		P8-R	E2-26	○
56-2	WHT/BLK/ORN		P8-U	E2-22	○
56-3	WHT/BLK/BLU		P8-P	E2-25	○
56-4	WHT/BLK/RED		P8-T	E2-21	○
56-5	WHT/RED/ORN		P8-V	E2-35	○
56-6	WHT/RED/YEL		P8-Y	E2-36	○
57-1	WHT/BRN/RED		P8-X	E2-28	◌
57-2	WHT/BLK/GY		P8-W	E2-27	◌
58	WHT/BRN/YEL		P8-a	E2-30	
57-3	WHT/BRN/ORN		P8-Z	E2-29	◌
59	WHT/BRN/BLU		P8-d	E2-32	
60	WHT/BRN/GRN		P8-c	E2-31	
61-1	WHT/BLK/YEL		P8-b	E2-23	○
61-2	WHT/BLK/GRN		P8-e	E2-24	○
61-3	WHT/RED/GY		P8-h	E2-40	○
61-4	WHT/RED/VIO		P8-f	E2-39	○
62-1	WHT/RED/BLU		P8-M	E2-38	○
62-2	WHT/RED/GRN		P8-L	E2-37	○
63-1	WHT/ORN/VIO		P8-J	E2-44	○
63-2	WHT/ORN/BLU		P8-H	E2-43	○
64-1	WHT/BRN/GY		P8-E	E2-34	○
64-2	WHT/BRN/VIO		P8-D	E2-33	○
65-1	WHT/BLK/BRN		P8-N	E2-20	○
65-2	WHT/GY		P8-K	E2-19	○

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 8
66-1	RED	41	P8-F	B8-P1	○
66-2	BLK	39	P8-C	B8-P3	○
67	WHT/RED		B8-WHT/RED	B8-P1	
68	WHT/BLK		B8-WHT/BLK	B8-P3	
69	YEL	42	B8-P2	B8-P4	
70	WHT/YEL		B8-WHT/YEL	B8-P2	
71	WHT/BLU		B8-WHT/BLU	B8-P4	
72-1	WHT/ORN/GY		B13-P1	E2-45	○
72-2	WHT/YEL/GRN		B13-P3	E2-46	○
73-1	WHT/ORN/GRN		B13-P2	E2-42	○
73-2	WHT/ORN/YEL		B13-P4	E2-41	○
74	RED		B13-RED	B13-P1	
75	BLK		B13-BLK	B13-P3	
76	YEL		B13-YEL	B13-P2	
77	BLU		B13-BLU	B13-P4	
78	WHT/GRN/BLU		P8-B	E2-50	
79	WHT/YEL/GY		P8-A	E2-49	
28B	BLK	39	SHLD 28	E20	
36B	BLK	39	SHLD 36	E19	
43B	BLK	39	SHLD 43	E19	
45A	BLK	39	SHLD 45	E21	
53A	BLK	39	SHLD 53	E21	
57A	BLK	39	SHLD 57	E22	

REPLACES REV E WITH CHANGES

LIST OF PARTS AND MATERIALS

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	CLAMP, CABLE	1000220-7			49
3	SHIELD & GROUND ASSEMBLY	1000020-3			48
3	SHIELD & GROUND ASSEMBLY	1000020-2			47
6	WASHER, FLAT, ROUND	1000254			46
1	RESISTOR, FIXED	1010498-300			[illegible]
1	WIRE, ELEC, TYPE E-28 GY		MIL-W-16878	20" LONG	44
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	28" LONG	43
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	30" LONG	42
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	42" LONG	41
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	18" LONG	40
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	56" LONG	39
A/R	TAPE, NYLON, WAXED, BLK.		MIL-T-713 TYPE P CLASS 2		38
A/R	GREASE, LUBRICATING		MIL-G-25760		37
A/R	GOODYEAR CPA923A		MIL-A-13883		36
A/R	SOLDER	SN60WARP2	QQ-S-571		35
A/R	SOLDER	SN60WARP2	QQ-S-571		34
1	CLAMP, CABLE	1000220-4			33
2	CLAMP, CABLE	1000220-5			32
5	WASHER, CABLE CLAMP	1000223			31
5	SCREW, HEX SOC HD	1000110-1			30
6	CLAMP, TORQUE MOTOR	1000087			29
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			28
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL4			27
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000260-2			26
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C02LL4			25
6	SCREW, CAP, SOC HD HEX	1000110-7			24
6	SCREW, BUT HD, SELF LKG, HEX SOC	1000093-25			23
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			22
9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			21
2	BUSHING, INSULATOR	1000036			20
60	INSULATION, SLEEVING, ELEC	1006776-18		3/8 LONG	19
2	SCREW, CAP, SOC HD, HEX	1000110-202			18
18	TERMINAL, INSULATED	1000100-1			17
2	INSULATION, SLEEVING, ELEC	1006776-15		3/4 LONG	16
48	INSULATION, SLEEVING, ELEC	1006776-18		5/16 LONG	15
2	INSULATION, SLEEVING, ELEC	1006776-9		5/16 LONG	14
2	CONN, ELEC, RECEP, 29 CONT.	1000116			13
1	CONN, ELEC, RECEP, 32 PINS	1001492-4		SEE NOTE 13	12
1	CONN, ELEC, RECEP, 32 PINS	1001492-3		SEE NOTE 13	11
1	GUIDE, WIRE, SHAFT STUB, O.A.	1000161			10
1	GUIDE, WIRE, BEARING HSG, I-X O.A.	1000269			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASS'Y, ELEC, 50 CONTACT	1000038			6
1	RETAINER, BEARING, OUTER AXIS	1000091			5
1	MOTOR, TORQUE, DC, FRAMELESS	1000075			4
1	RSVR ASSY, I-X XMTR & PITCH-YAW	1000033			3
1	SHAFT, STUB, I-X OUTER AXIS	1000096			2
1	HOUSING, BEARING, I-X OUTER AXIS	1000101			1

NEXT ASSY	USED ON
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

APPROVED DATE 7-16-63
CHECKED
DRAWN RWC 6-4-63
APPROVED FOR MSC W J Rhine
NASA APPROVAL DATE

INTERGIMBAL
SUB-ASSEMBLY
I-X OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS.

DWG NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000006

SHEET

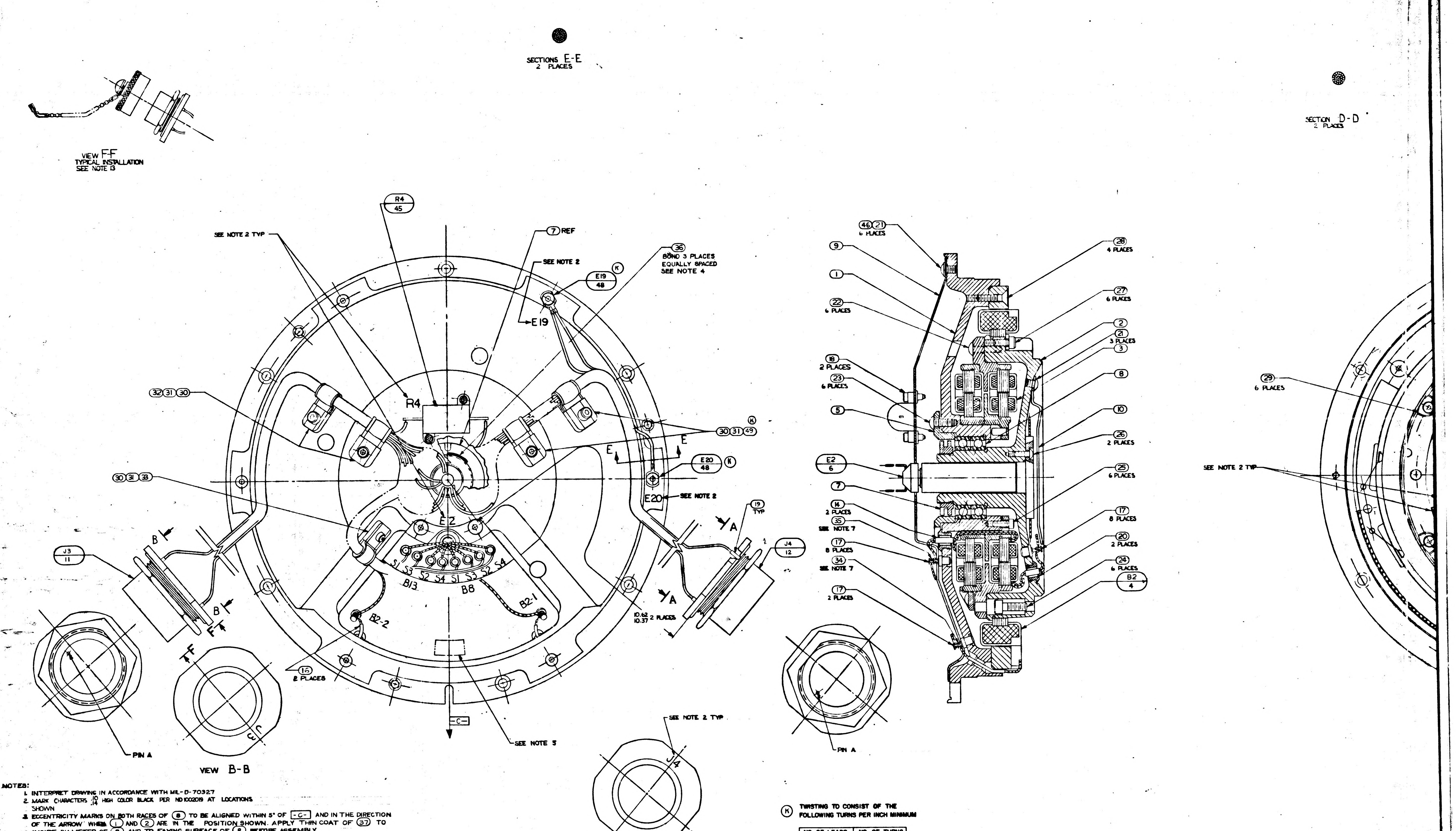
1000006 K

REV K 1

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

F2


7
6
5
4
D
C
B
A
SECTIONS E-E
2 PLACES
SECTION D-D
2 PLACES
VIEW F-F
TYPICAL INSTALLATION
SEE NOTE 13
R4
45
SEE NOTE 2 TYP
7 REF
SEE NOTE 2
E19
48
K
E19
36
BOND 3 PLACES
EQUALLY SPACED
SEE NOTE 4
32 31 30
R4
30 31 49
K
E
E
E20
48
K
30 31 33
E20
SEE NOTE 2
E2
19
TYP
J3
11
J4
12
B
B
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A
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F
S1 S3 S2 S4 S1 S3 S2 S4
B13
B8
B2-1
B2-2
16
2 PLACES
10.62
10.37 2 PLACES
C
SEE NOTE 5
PIN A
VIEW B-B
SEE NOTE 2 TYP
J4
VIEW A-A
46 21
6 PLACES
9
1
22
6 PLACES
18
2 PLACES
23
6 PLACES
5
E2
6
7
14
2 PLACES
35
SEE NOTE 7
17
8 PLACES
34
SEE NOTE 7
17
2 PLACES
28
4 PLACES
27
6 PLACES
2
21
3 PLACES
3
8
10
26
2 PLACES
25
6 PLACES
17
8 PLACES
20
2 PLACES
24
6 PLACES
B2
4
PIN A
29
6 PLACES
SEE NOTE 2 TYP

Ⓚ TWISTING TO CONSIST OF THE FOLLOWING TURNS PER INCH MINIMUM

NO. OF LEADS	NO. OF TURNS
2	4
4 OR MORE	2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑧ TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW WHEN ① AND ② ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (37) TO INSIDE DIAMETER OF ⑧ AND TO FAYING SURFACE OF ② BEFORE ASSEMBLY
4. APPLY (36) TO ② & ⑦ AFTER ASSEMBLY
5. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ± 7%

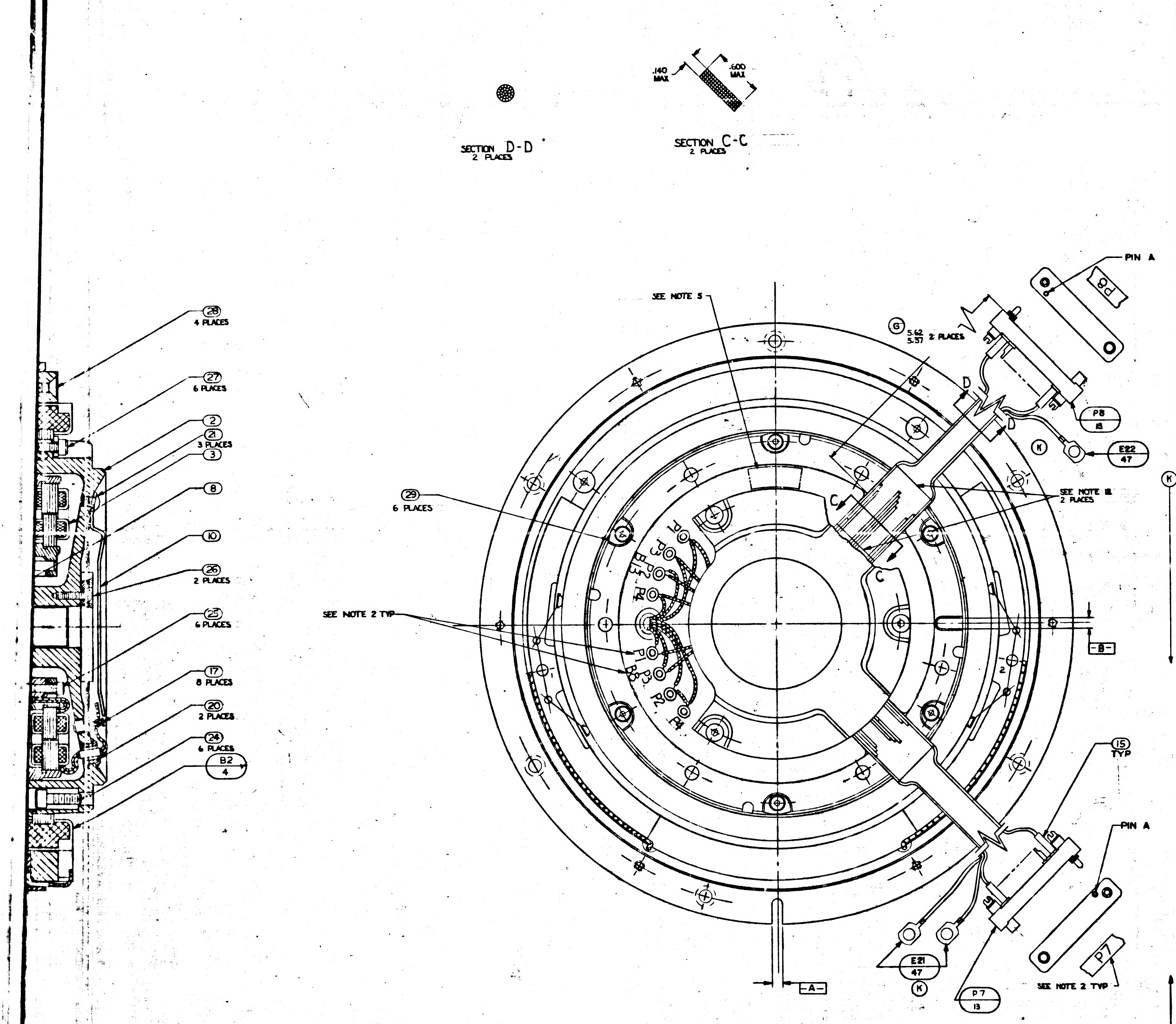
⑦	100 IN. LB.
㉓	10.0 IN. LB.
㉑ ㉒ ㉗ ㉘ ㉚	5.0 IN. LB.
⑱ ㉕ ㉖	3.5 IN. LB

7. SOLDER ALL LEADS FROM ③ & ④ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (34). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑪, ⑫ & ⑬ PER MIL-STD-440 USING (35). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. Ⓚ HEAT SHRINK SLEEVING ON ITEMS (47) & (48) AFTER ASSEMBLY
9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM HOUSING BEARING ① OR REMOVE TORQUE MOTOR ④ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ④.
10. MAXIMUM ALLOWABLE TORQUE 15 OZ.-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000006.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. Ⓖ PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

1000006	REV	SHEET
	K	1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	F	REPLACE REV E WITH CHANGES TDRR 01961	11 JUL 63	
	G	TDRR 03182	13 SEP 63	
	H	TDRR 03477	1 OCT 63	
	J	TDRR 04559	6 NOV 63	
	K	TDRR 05166	19 NOV 63	
	L	TDRR 06238	18 Feb 64	
	M	TDRR 06237	18 Feb 64	



WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1	GY	44	J3-h	R4	
2	WHT/GY		E2-19	R4	
3	WHT/BLK/BRN		J3-j	E2-20	
4-1	WHT/BRN/VIO		J3-f	E2-33	
4-2	WHT/BRN/GY		J3-g	E2-34	
5-1	WHT/YEL/VIO		J3-a	E2-48	
5-2	WHT/YEL/BLU		J3-Z	E2-47	
6-1	WHT/ORN/BLU		J3-b	E2-43	
6-2	WHT/ORN/VIO		J3-c	E2-44	
7-1	WHT/RED/GRN		J3-d	E2-37	
7-2	WHT/RED/BLU		J3-e	E2-38	
8-1	WHT/BLK/BLU		J3-U	E2-25	
8-2	WHT/BLK/VIO		J3-V	E2-26	
8-3	WHT/RED/ORN		J3-W	E2-35	
8-4	WHT/BLK/RED		J3-A	E2-21	
8-5	WHT/BLK/ORN		J3-B	E2-22	
8-6	WHT/RED/YEL		J3-C	E2-36	
9-1	BLK	39	J3-X	B2-1	
9-2	WHT	40	J3-Y	B2-2	
10	BLK		B2-BLK	B2-1	
11	WHT		B2-WHT	B2-2	
12-1	BLK	39	J3-D	B8-S3	
12-2	RED	41	J3-E	B8-S1	
13	WHT/BLK		B8-WHT/BLK	B8-S3	
14	WHT/RED		B8-WHT/RED	B8-S1	
15-1	BLU	43	J3-F	B8-S4	
15-2	YEL	42	J3-G	B8-S2	
16	WHT/BLU		B8-WHT/BLU	B8-S4	
17	WHT/YEL		B8-WHT/YEL	B8-S2	
18-1	WHT/YEL/GRN		J3-K	E2-46	
18-2	WHT/ORN/GY		J3-L	E2-45	
19-1	WHT/ORN/YEL		J3-J	E2-41	
19-2	WHT/ORN/GRN		J3-H	E2-42	
20-1	BLK	39	J3-M	B13-S1	
20-2	RED	41	J3-N	B13-S3	
21	BLK		B13-BLK	B13-S3	
22	RED		B13-RED	B13-S1	
23-1	YEL	42	J3-P	B13-S2	
23-2	BLU	43	J3-R	B13-S4	
24	YEL		B13-YEL	B13-S2	
25	BLU		B13-BLU	B13-S4	
26-1	WHT/RED/GY		J4-f	E2-40	
26-2	WHT/RED/VIO		J4-g	E2-39	
26-3	WHT/BLK/YEL		J4-h	E2-23	
26-4	WHT/BLK/GRN		J4-j	E2-24	
27	WHT/BRN/YEL		J4-A	E2-30	
28-1	WHT/BRN/ORN		J4-V	E2-29	
29	WHT/BRN/GRN		J4-C	E2-31	
30	WHT/BRN/BLU		J4-B	E2-32	
31	WHT/YEL/GY		J4-d	E2-49	
32	[illegible]		J4-e	E2-50	
33	WHT/GRN		J4-G	E2-16	
34	WHT/BLU		J4-J	E2-17	
35	WHT/VIO		J4-H	E2-18	
28-2	WHT/BLK/GY		J4-U	E2-27	
28-3	WHT/BRN/RED		J4-W	E2-28	
36-1	BLK		J4-N	E2-1	
36-2	BRN		J4-R	E2-2	
36-3	RED		J4-P	E2-3	
37	ORN		J4-D	E2-4	
38	YEL		J4-F	E2-5	
39	GRN		J4-E	E2-6	
40-1	BLU		J4-X	E2-7	
40-2	VIO		J4-Y	E2-8	
41-1	GY		J4-Z	E2-9	
41-2	WHT		J4-a	E2-10	
42-1	WHT/BLK		J4-b	E2-11	
42-2	WHT/BRN		J4-c	E2-12	
43-1	WHT/RED		J4-K	E2-13	
43-2	WHT/ORN		J4-M	E2-14	
43-3	WHT/YEL		J4-L	E2-15	
44-1	WHT/BLK		P7-R	E2-11	
45-1	WHT/RED		P7-T	E2-13	
45-2	WHT/ORN		P7-U	E2-14	
46	WHT/BLU		P7-X	E2-17	
45-3	WHT/YEL		P7-V	E2-15	
47	WHT/GRN		P7-W	E2-16	
48	WHT/VIO		P7-Y	E2-18	
49-1	WHT/YEL/BLU		P7-c	E2-47	
49-2	WHT/YEL/VIO		P7-e	E2-48	
50-1	GY		P7-M	E2-9	
50-2	WHT		P7-P	E2-10	
44-2	WHT/BRN		P7-S	E2-12	
51-1	VIO		P7-J	E2-8	
52	YEL		P7-E	E2-5	
53-1	BRN		P7-B	E2-2	
51-2	BLU		P7-H	E2-7	
54	ORN		P7-D	E2-4	
55	GRN		P7-F	E2-6	
53-2	BLK		P7-A	E2-1	
53-3	RED		P7-C	E2-3	
56-1	WHT/BLK/VIO		P8-R	E2-26	
56-2	WHT/BLK/ORN		P8-U	E2-22	
56-3	WHT/BLK/BLU		P8-P	E2-25	
56-4	WHT/BLK/RED		P8-T	E2-21	
56-5	WHT/RED/ORN		P8-V	E2-35	
56-6	WHT/RED/YEL		P8-Y	E2-36	
57-1	WHT/BRN/RED		P8-X	E2-28	
57-2	WHT/BLK/GY		P8-W	E2-27	
58	WHT/BRN/YEL		P8-a	E2-30	
57-3	WHT/BRN/ORN		P8-Z	E2-29	
59	WHT/BRN/BLU		P8-d	E2-32	
60	WHT/BRN/GRN		P8-c	E2-31	
61-1	[illegible]		P8-b	E2-23	
61-2	WHT/BLK/GRN		P8-e	E2-24	
61-3	WHT/RED/GY		P8-h	E2-40	
61-4	WHT/RED/VIO		P8-f	E2-39	
62-1	WHT/RED/BLU		P8-M	E2-38	
62-2	WHT/RED/GRN		P8-L	E2-37	
63-1	WHT/ORN/VIO		P8-J	E2-44	
63-2	WHT/ORN/BLU		P8-H	E2-43	
64-1	WHT/BRN/GY		P8-E	E2-34	
64-2	WHT/BRN/VIO		P8-D	E2-33	
65-1	WHT/BLK/BRN		P8-N	E2-20	
65-2	WHT/GY		P8-K	E2-19	

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 8
66-1	RED	41	P8-F	B8-P1	
66-2	BLK	39	P8-C	B8-P3	
67	WHT/RED		B8-WHT/RED	B8-P1	
68	WHT/BLK		B8-WHT/BLK	B8-P3	
69	YEL	42	B8-P2	B8-P4	
70	WHT/YEL		B8-WHT/YEL	B8-P2	
71	WHT/BLU		B8-WHT/BLU	B8-P4	
72-1	WHT/ORN/GY		B13-P1	E2-45	
72-2	WHT/YEL/GRN		B13-P3	E2-46	
73-1	WHT/ORN/GRN		B13-P2	E2-42	
73-2	WHT/ORN/YEL		B13-P4	E2-41	
74	RED		B13-RED	B13-P1	
75	BLK		B13-BLK	B13-P3	
76	YEL		B13-YEL	B13-P2	
77	BLU		B13-BLU	B13-P4	
78	WHT/GRN/BLU		P8-B	E2-50	
79	WHT/YEL/GY		P8-A	E2-49	
28B	BLK	39	SHLD 28	E20	
36B	BLK	39	SHLD 36	E19	
43B	BLK	39	SHLD 43	E19	
45A	BLK	39	SHLD 45	E21	
53A	BLK	39	SHLD 53	E21	
57A	BLK	39	SHLD 57	E22	

REPLACES
REV E WITH
CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NK NO	FIND NO.
2	CLAMP, CABLE	1000220-6			49
3	SHIELD & GROUND ASSEMBLY	1000020-3			48
3	SHIELD & GROUND ASSEMBLY	1000020-2			47
6	WASHER, FLAT, ROUND	1000254			46
1	RESISTOR, FIXED	1010498-300			45
1	WIRE, ELEC, TYPE E-28 GY		MIL-W-16878	20" LONG	44
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	28" LONG	43
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	30" LONG	42
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	42" LONG	41
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	18" LONG	40
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	56" LONG	39
A/R	TAPE, NYLON, WAXED, BLK.		MIL-T-713 TYPE P CLASS 2		38
A/R	GREASE, LUBRICATING		MIL-G-25760		37
A/R	GOODYEAR CPA923A		MIL-A-13883		36
A/R	SOLDER	SNGOWARP 2	QQ-S-571		35
A/R	SOLDER	SNGWARP 2	QQ-S-571		34
1	CLAMP, CABLE	1000220-4			33
2	CLAMP, CABLE	1000220-5			32
5	WASHER, CABLE CLAMP	1000223			31
5	SCREW, HEX SOC HD	1000110-1			30
6	CLAMP, TORQUE MOTOR	1000087			29
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			28
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL4			27
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000280-2			26
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C02LL4			25
6	SCREW, CAP, SOC HD HEX	1000110-7			24
6	SCREW, BUT HD, SELF LKG, HEX SOC	1000093-25			23
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			22
9	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			21
2	BUSHING, INSULATOR	1000036			20
60	INSULATION, SLEEVING, ELEC	1006776-18		¼ LONG	19
2	SCREW, CAP, SOC HD, HEX	1000110-202			18
18	TERMINAL, INSULATED	1000100-1			17
2	INSULATION, SLEEVING, ELEC	1006776-15		¾ LONG	16
48	INSULATION, SLEEVING, ELEC	1006776-18		5/16 LONG	15
2	INSULATION, SLEEVING, ELEC	1006776-9		5/16 LONG	14
2	CONN, ELEC, RECEP, 29 CONT.	1000116			13
1	CONN, ELEC, RECEP, 32 PINS	1001492-4		SEE NOTE 13	12
1	CONN, ELEC, RECEP, 32 PINS	1001492-3		SEE NOTE 13	11
1	GUIDE, WIRE, SHAFT STUB, O.A.	1000151			10
1	GUIDE, WIRE BEARING HSG I-X O.A.	1000269			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASS'Y, ELEC, 50 CONTACT	1000038			6
1	RETAINER, BEARING, OUTER AXIS	1000091			5
1	MOTOR, TORQUE, DC, FRAMELESS	1000075			4
1	RSVR ASSY, I-X XMTR & PITCH-YAW	1000033			3
1	SHAFT, STUB, I-X OUTER AXIS	1000096			2
1	HOUSING, BEARING, I-X OUTER AXIS	1000101			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	1000201
USED ON	DL1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153

		DATE
APPROVED	A. J. Wagner	7-16-63
CHECKED		
DRAWN	RWG	7-4-63
APPROVED FOR MSC	W J Rhine	
MIT APPROVAL		DATE

INTERGIMBAL
SUB-ASSEMBLY
I-X OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

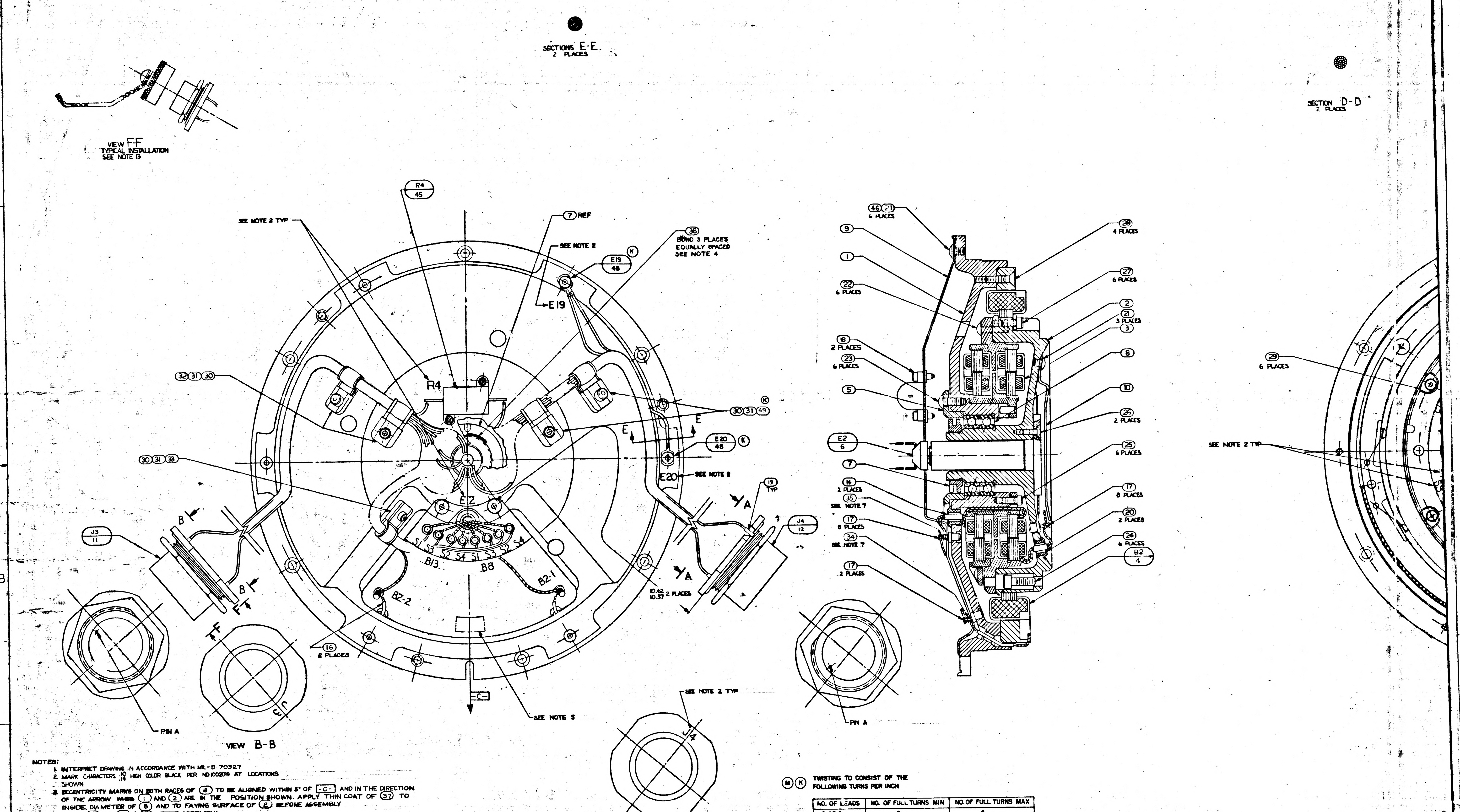
MIT
INSTRUMENTATION
LABORATORY
Cambridge Mass.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000006
SHEET 1 OF 1

1000006 M 1

MASTER

E2


SECTIONS E-E
2 PLACES
SECTION D-D
2 PLACES
VIEW F-F
TYPICAL INSTALLATION
SEE NOTE 13
R4
45
7 REF
SEE NOTE 2 TYP
SEE NOTE 2
E19
48
K
E19
36
BOND 3 PLACES
EQUALLY SPACED
SEE NOTE 4
32 31 30
R4
30 31 49
K
E
E
E20
48
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E20
SEE NOTE 2
30 31 33
E2
19
TYP
J3
11
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F
S1 S3 S2 S4 S1 S3 S2 S4
B13
B8
B2-1
B2-2
A
A
J4
12
10.62
10.37 2 PLACES
16
2 PLACES
C
SEE NOTE 3
PIN A
J3
VIEW B-B
SEE NOTE 2 TYP
J4
VIEW A-A
PIN A
46 21
6 PLACES
9
1
22
6 PLACES
18
2 PLACES
23
6 PLACES
5
E2
6
7
14
2 PLACES
35
SEE NOTE 7
17
8 PLACES
34
SEE NOTE 7
17
2 PLACES
28
4 PLACES
27
6 PLACES
2
21
3 PLACES
3
8
10
25
2 PLACES
25
6 PLACES
17
8 PLACES
20
2 PLACES
24
6 PLACES
B2
4
29
6 PLACES
SEE NOTE 2 TYP
19
7
6
5
4
D
C
B
A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $^{.10}_{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑧ TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW WHEN ① AND ② ARE IN THE POSITION SHOWN. APPLY THIN COAT OF ㊲ TO INSIDE DIAMETER OF ⑧ AND TO FAYING SURFACE OF ② BEFORE ASSEMBLY
4. APPLY ㊱ TO ② & ⑦ AFTER ASSEMBLY
5. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ± 7%

⑦	180 IN. LB.
㉓	10.0 IN. LB.
㉑ ㉒ ㉗ ㉘ ㉚	5.0 IN. LB.
⑱ ㉕ ㉖	3.5 IN. LB

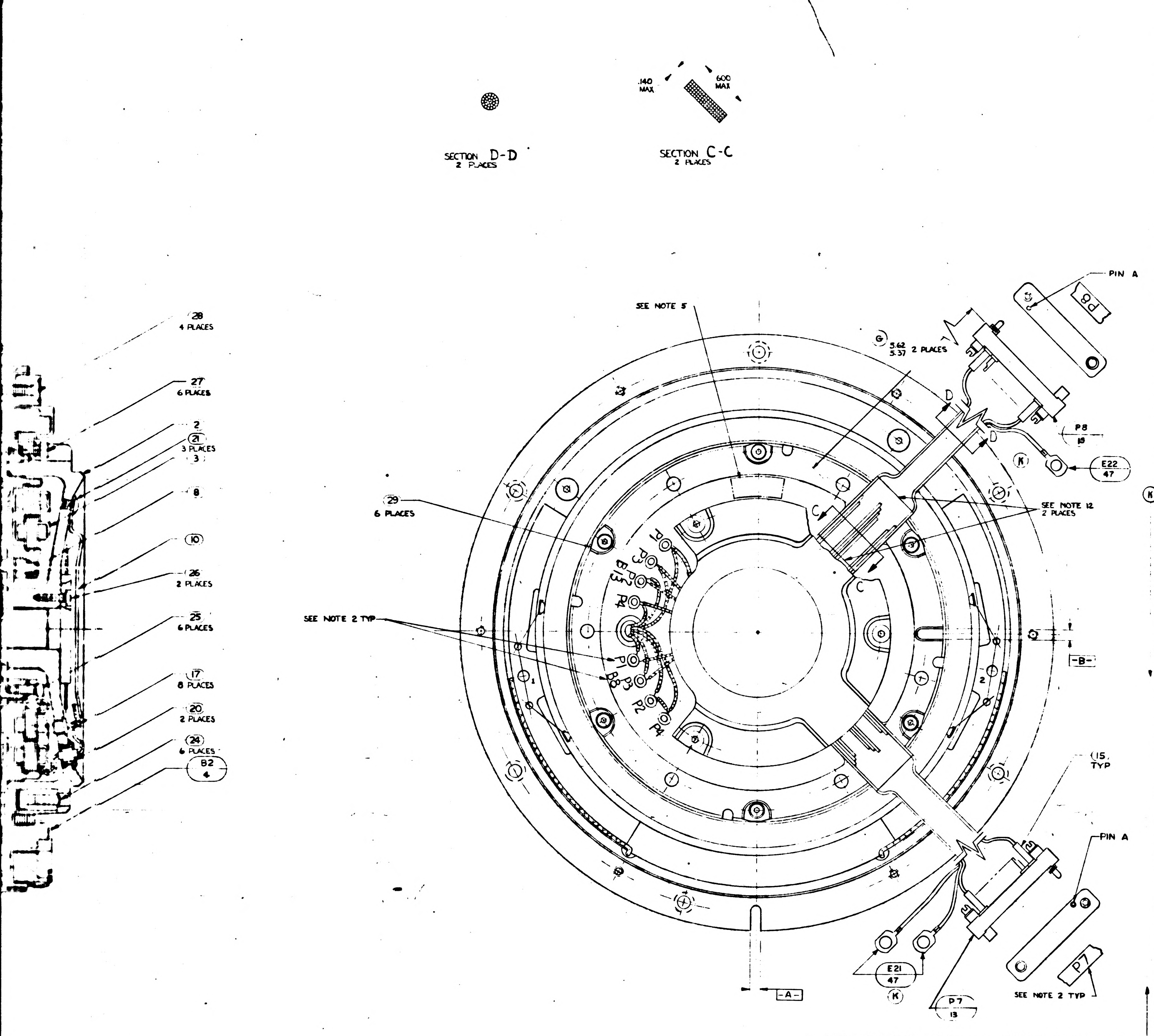
7. SOLDER ALL LEADS FROM ③ & ④ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉞. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑪, ⑫ & ⑬ PER MIL-STD-440 USING ㉟. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
Ⓚ 8. HEAT SHRINK SLEEVING ON ITEMS ㊼ & ㊽ AFTER ASSEMBLY
9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM HOUSING BEARING ① OR REMOVE TORQUE MOTOR ④ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ④.
10. MAXIMUM ALLOWABLE TORQUE 15 OZ.-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000006.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
Ⓖ 13. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ Ⓚ TWISTING TO CONSIST OF THE FOLLOWING TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000006	M	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY



ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACE REV E WITH CHANGE TDRR 01881	11 JUL 63		
	G	TDRR 03182	13 SEP 63		
	H	TDRR 03477	1 OCT 63	JAH	
	J	TDRR 04559	6 NOV 63	JAH	
	K	TDRR 05166	19 NOV 63	JAH	
	L	TDRR 06238	19 Feb 64	JAH	
	M	TDRR 06237	18 Feb 64	JAH	
	N	REVISED PER TDRR 07950	4 MAY 64		

WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO
1	GY	44	J3-h	R4
2	WHT/GY		E2-19	R4
3	WHT/BLK/BRN		J3-j	E2-20
4-1	WHT/BRN/VIO		J3-f	E2-33
4-2	WHT/BRN/GY		J3-g	E2-34
5-1	WHT/YEL/VIO		J3-a	E2-48
5-2	WHT/YEL/BLU		J3-Z	E2-47
6-1	WHT/ORN/BLU		J3-b	E2-43
6-2	WHT/ORN/VIO		J3-c	E2-44
7-1	WHT/RED/GRN		J3-d	E2-37
7-2	WHT/RED/BLU		J3-e	E2-38
8-1	WHT/BLK/BLU		J3-U	E2-25
8-2	WHT/BLK/VIO		J3-V	E2-26
8-3	WHT/RED/ORN		J3-W	E2-35
8-4	WHT/BLK/RED		J3-A	E2-21
8-5	WHT/BLK/ORN		J3-B	E2-22
8-6	WHT/RED/YEL		J3-C	E2-36
9-1	BLK	39	J3-X	B2-1
9-2	WHT	40	J3-Y	B2-2
10	BLK		B2-BLK	B2-1
11	WHT		B2-WHT	B2-2
12-1	BLK	39	J3-D	B8-S3
12-2	RED	41	J3-E	B8-S1
13	WHT/BLK		B8-WHT/BLK	B8-S3
14	WHT/RED		B8-WHT/RED	B8-S1
15-1	BLU	43	J3-F	B8-S4
15-2	YEL	42	J3-G	B8-S2
16	WHT/BLU		B8-WHT/BLU	B8-S4
17	WHT/YEL		B8-WHT/YEL	B8-S2
18-1	WHT/YEL/GRN		J3-K	E2-46
18-2	WHT/ORN/GY		J3-L	E2-45
19-1	WHT/ORN/YEL		J3-J	E2-41
19-2	WHT/ORN/GRN		J3-H	E2-42
20-1	BLK	39	J3-M	B13-S1
20-2	RED	41	J3-N	B13-S3
21	BLK		B13-BLK	B13-S3
22	RED		B13-RED	B13-S1
23-1	YEL	42	J3-P	B13-S2
23-2	BLU	43	J3-R	B13-S4
24	YEL		B13-YEL	B13-S2
25	BLU		B13-BLU	B13-S4
26-1	WHT/RED/GY		J4-f	E2-40
26-2	WHT/RED/VIO		J4-g	E2-39
26-3	WHT/BLK/YEL		J4-h	E2-23
26-4	WHT/BLK/GRN		J4-j	E2-24
27-1	WHT/BRN/YEL		J4-A	E2-30
28-1	WHT/BRN/ORN		J4-V	E2-29
27-2	WHT/BRN/GRN		J4-C	E2-31
27-3	WHT/BRN/BLU		J4-B	E2-32
31	WHT/YEL/GY		J4-d	E2-49
32	WHT/GRN/BLU		J4-e	E2-50
33-1	WHT/GRN		J4-G	E2-16
33-2	WHT/BLU		J4-J	E2-17
33-3	WHT/VIO		J4-H	E2-18
28-2	WHT/BLK/GY		J4-U	E2-27
28-3	WHT/BRN/RED		J4-W	E2-28
36-1	BLK		J4-N	E2-1
36-2	BRN		J4-R	E2-2
36-3	RED		J4-P	E2-3
37-1	ORN		J4-D	E2-4
37-2	YEL		J4-F	E2-5
37-3	GRN		J4-E	E2-6
40-1	BLU		J4-X	E2-7
40-2	VIO		J4-Y	E2-8
41-1	GY		J4-Z	E2-9
41-2	WHT		J4-a	E2-10
42-1	WHT/BLK		J4-b	E2-11
42-2	WHT/BRN		J4-c	E2-12
43-1	WHT/RED		J4-K	E2-13
43-2	WHT/ORN		J4-M	E2-14
43-3	WHT/YEL		J4-L	E2-15
44-1	WHT/BLK		P7-R	E2-11
45-1	WHT/RED		P7-T	E2-13
45-2	WHT/ORN		P7-U	E2-14
46-1	WHT/BLU		P7-X	E2-17
45-3	WHT/YEL		P7-V	E2-15
46-2	WHT/GRN		P7-W	E2-16
46-3	WHT/VIO		P7-Y	E2-18
49-1	WHT/YEL/BLU		P7-c	E2-47
49-2	WHT/YEL/VIO		P7-e	E2-48
50-1	GY		P7-M	E2-9
50-2	WHT		P7-P	E2-10
44-2	WHT/BRN		P7-S	E2-12
51-1	VIO		P7-J	E2-8
52-1	YEL		P7-E	E2-5
53-1	BRN		P7-B	E2-2
51-2	BLU		P7-H	E2-7
52-2	ORN		P7-D	E2-4
52-3	GRN		P7-F	E2-6
53-2	BLK		P7-A	E2-1
53-3	RED		P7-C	E2-3
56-1	WHT/BLK/VIO		P8-R	E2-26
56-2	WHT/BLK/ORN		P8-U	E2-22
56-3	WHT/BLK/BLU		P8-P	E2-25
56-4	WHT/BLK/RED		P8-T	E2-21
56-5	WHT/RED/ORN		P8-V	E2-35
56-6	WHT/RED/YEL		P8-Y	E2-36
57-1	WHT/BRN/RED		P8-X	E2-28
57-2	WHT/BLK/GY		P8-W	E2-27
58-1	WHT/BRN/YEL		P8-a	E2-30
57-3	WHT/BRN/ORN		P8-Z	E2-29
58-2	WHT/BRN/BLU		P8-d	E2-32
58-3	WHT/BRN/GRN		P8-c	E2-31
61-1	WHT/BLK/YEL		P8-b	E2-23
61-2	WHT/BLK/GRN		P8-e	E2-24
61-3	WHT/RED/GY		P8-h	E2-40
61-4	WHT/RED/VIO		P8-f	E2-39
62-1	WHT/RED/BLU		P8-M	E2-38
62-2	WHT/RED/GRN		P8-L	E2-37
63-1	WHT/ORN/VIO		P8-J	E2-44
63-2	WHT/ORN/BLU		P8-H	E2-43
64-1	WHT/BRN/GY		P8-E	E2-34
64-2	WHT/BRN/VIO		P8-D	E2-33
65-1	WHT/BLK/BRN		P8-N	E2-20
65-2	WHT/GY		P8-K	E2-19

REPLACES
REV E WITH
CHANGES

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO
66-1	RED	41	P8-F	B8-P1
66-2	BLK	39	P8-C	B8-P3
67	WHT/RED		B8-WHT/RED	B8-P1
68	WHT/BLK		B8-WHT/BLK	B8-P3
69	YEL	42	B8-P2	B8-P4
70	WHT/YEL		B8-WHT/YEL	B8-P2
71	WHT/BLU		B8-WHT/BLU	B8-P4
72-1	WHT/ORN/GY		B13-P1	E2-45
72-2	WHT/YEL/GRN		B13-P3	E2-46
73-1	WHT/ORN/GRN		B13-P2	E2-42
73-2	WHT/ORN/YEL		B13-P4	E2-41
74	RED		B13-RED	B13-P1
75	BLK		B13-BLK	B13-P3
76	YEL		B13-YEL	B13-P2
77	BLU		B13-BLU	B13-P4
78	WHT/GRN/BLU		P8-B	E2-50
79	WHT/YEL/GY		P8-A	E2-49
28B	BLK	39	SHLD 28	E 20
36B	BLK	39	SHLD 36	E 19
43B	BLK	39	SHLD 43	E 19
45A	BLK	39	SHLD 45	E21
53A	BLK	39	SHLD 53	E21
57A	BLK	39	SHLD 57	E22

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	CLAMP, CABLE	1000220-6			49
3	SHIELD & GROUND ASSEMBLY	1000020-3			48
3	SHIELD & GROUND ASSEMBLY	1000020-2			47
6	WASHER, FLAT, ROUND	1000254			46
1	RESISTOR, FIXED	100498-300			45
1	WIRE, ELEC, TYPE E-28 GY		MIL-W-16878	20" LONG	44
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	28" LONG	43
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	30" LONG	42
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	42" LONG	41
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	18" LONG	40
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	56" LONG	39
A/R	TAPE, NYLON, WAXED BLK		MIL-T-713 TYPE P CLASS 2		38
A/R	GREASE, LUBRICATING		MIL-G-25760		37
A/R	GOODYEAR CPA923A		MIL-A-13883		36
A/R	SOLDER	SN60WARP2	QQ-S-571		35
A/R	SOLDER	SN10WARP2	QQ-S-571		34
1	CLAMP, CABLE	1000220-4			33
2	CLAMP, CABLE	1000220-5			32
5	WASHER, CABLE CLAMP	1000223			31
5	SCREW, HEX SOC. HD.	1000110-1			30
6	CLAMP, TORQUE MOTOR	1000087			29
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			28
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL4			27
2	SCREW, BUT. HD, SELF LKG, SPL. SOC	1000250-2			26
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C02LL4			25
6	SCREW, CAP, SOC HD HEX.	1000110-7			24
6	SCREW, BUT. HD, SELF LKG, HEX SOC	1000093-25			23
6	SCREW, BUT. HD, SELF LKG, SPL. SOC	1000250-15			22
9	SCREW, BUT HD, SELF LKG, SPL. SOC	1000250-12			21
2	BUSHING, INSULATOR	1000036			20
60	INSULATION SLEEVING, ELEC	1006776-18		3/8 LONG	19
2	SCREW, CAP, SOC HD, HEX	1000110-202			18
18	TERMINAL, INSULATED	1000100-1			17
2	INSULATION, SLEEVING, ELEC	1006776-15		3/4 LONG	16
48	INSULATION, SLEEVING, ELEC	1006776-18		5/16 LONG	15
2	INSULATION, SLEEVING, ELEC.	1006776-9		5/16 LONG	14
2	CONN, ELEC, RECEP, 29 CONT.	1000116			13
1	CONN, ELEC, RECEP, 32 PINS	1001492-4		SEE NOTE 12	12
1	CONN, ELEC, RECEP, 32 PINS	1001492-3		SEE NOTE 12	11
1	GUIDE, WIRE, SHAFT STUB, O.A.	1000151			10
1	GUIDE, WIRE, BEARING HSG, I-X O.A.	1000269			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASS'Y, ELEC, 50 CONTACT	1000088			6
1	RETAINER, BEARING, OUTER AXIS	1000091			5
1	MOTOR, TORQUE, DC, FRAMELESS	1000075			4
1	RSVR ASS'Y, I-X XMTR & PITCH-YAW	1000033			3
1	SHAFT STUB, I-X OUTER AXIS	1000096			2
1	HOUSING, BEARING, I-X OUTER AXIS	1000101			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9 153

		DATE
APPROVED	J Bagar	7/16 63
CHECKED		
DRAWN	RWC	4 4 63
APPROVED FOR MSC	W J Rhine	
MIT APPROVAL	W Kapp	9 Aug 63

INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS

DWG NO

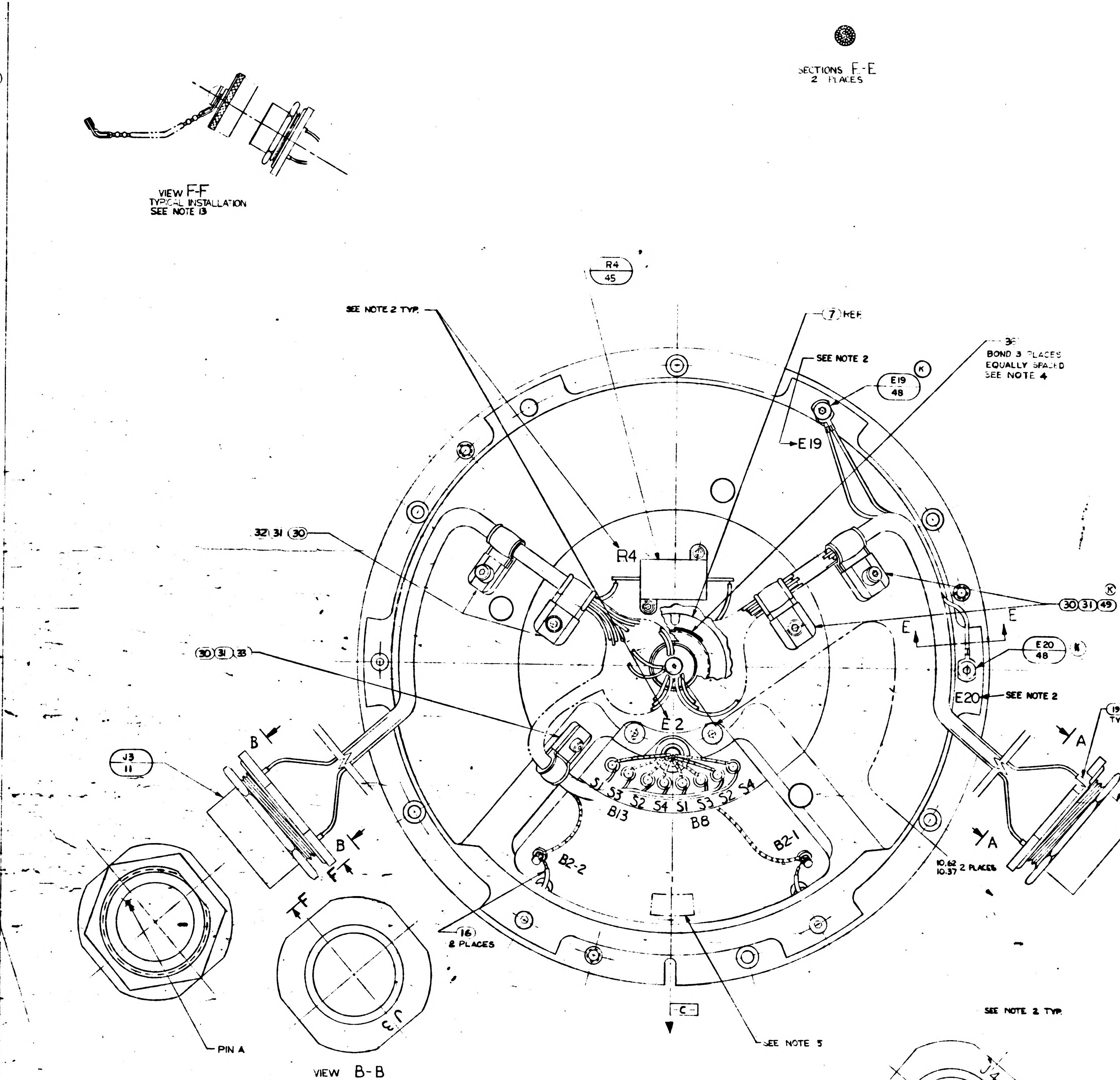
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCALE	UNIT WT.	CODE IDENT	NASA DRAWING NO
2/1			1000006

SHEET 1 OF 1

	REV	SHEET
1000006	N	1

271000006


SECTIONS F-E
2 PLACES
VIEW F-F
TYPICAL INSTALLATION
SEE NOTE 13
R4
45
SEE NOTE 2 TYP.
7 REF
SEE NOTE 2
38
BOND 3 PLACES
EQUALLY SPACED
SEE NOTE 4
E19
48
K
E19
R4
32 31 30
30 31 49
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30 31 33
E20
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S1 S3 S2 S4 S1 S3 S2 S4
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B2-2
19
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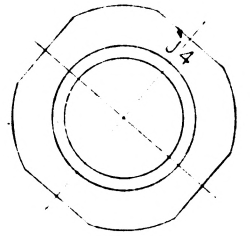
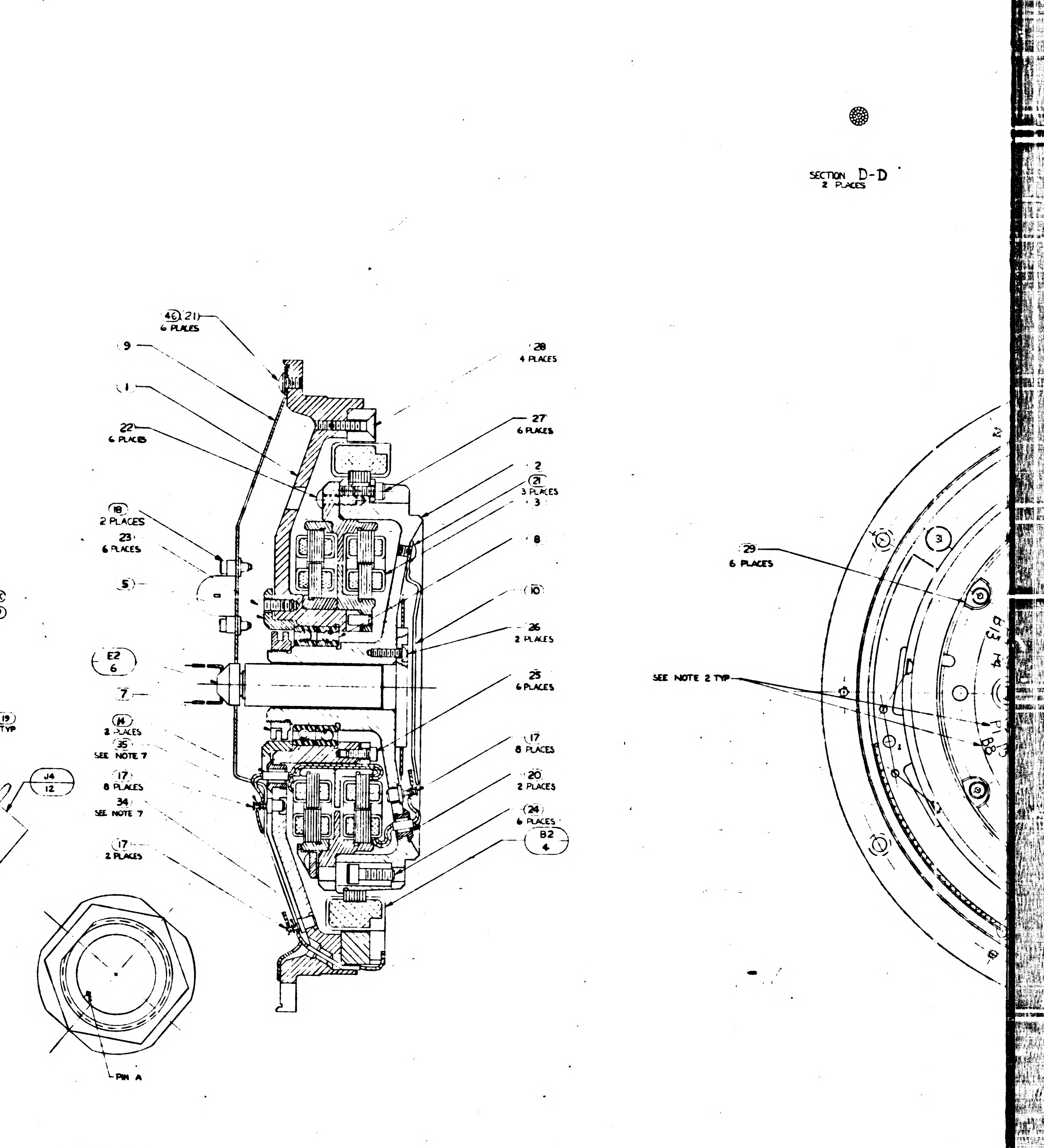
10.37 2 PLACES
F
F
16
8 PLACES
-C-
SEE NOTE 5
PIN A
J3

VIEW B-B


J4
SEE NOTE 2 TYP.


46 21
6 PLACES
9
1
22
6 PLACES
18
2 PLACES
23
6 PLACES
5
E2
6
7
14
2 PLACES
35
SEE NOTE 7
17
8 PLACES
34
SEE NOTE 7
17
2 PLACES
28
4 PLACES
27
6 PLACES
2
21
3 PLACES
3
8
10
26
2 PLACES
25
6 PLACES
17
8 PLACES
20
2 PLACES
24
6 PLACES
B2
4
PIN A
SECTION D-D
2 PLACES
29
6 PLACES
SEE NOTE 2 TYP
B13
B8

VIEW A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
3. ECCENTRICITY MARKS ON BOTH RACES OF (8) TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW WHEN (1) AND (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF 37) TO INSIDE DIAMETER OF 8 AND TO FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY 36 TO (2 & 7 AFTER ASSEMBLY.
5. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO ON (1) & MATCHING SERIAL NO ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ± 7%

(7)	100 IN. LB.
(23)	10.0 IN. LB.
(21) 22 (27) (28) (30)	5.0 IN. LB.
18 25 (26)	3.5 IN. LB

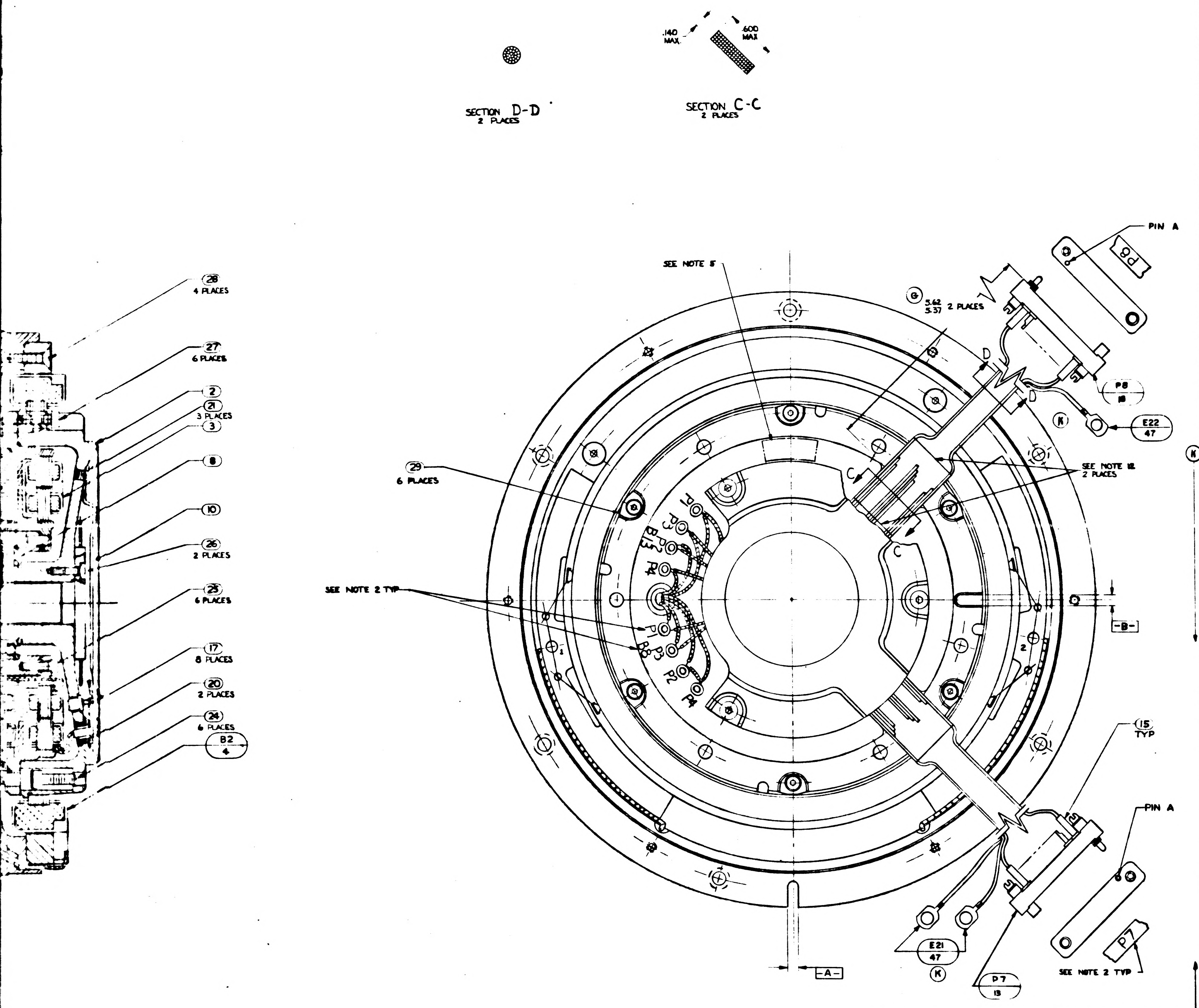
7. SOLDER ALL LEADS FROM 3 & (4) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (34). SOLDER ALL OTHER LEADS T EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR 11, 12 & 13 PER MIL-STD-440 USING (35). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. Ⓚ HEAT SHRINK SLEEVING ON ITEMS (47) & (48) AFTER ASSEMBLY
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM HOUSING BEARING (1) OR REMOVE TORQUE MOTOR (4) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (4).
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000006.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. Ⓖ PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION

Ⓜ Ⓚ TWISTING TO CONSIST OF THE FOLLOWING TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000006	N	1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACE REV E WITH CHANGES TDRR 01981	1 JUL 63		
	G	TDRR 03182	13 SEP 63		
	H	TDRR 03477	1 OCT 63		
	J	TDRR 04559	6 NOV 63		
	K	TDRR 05166	19 NOV 63		
	L	TDRR 06238	18 FEB 64		
	M	TDRR 06237	18 FEB 64		
	N	REVISED PER TDRR 07950	4 MAY 64		
	P	REVISED PER TDRR 07954			



WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO
1	GY	44	J3-h	R4
2	WHT/GY		E2-19	R4
3	WHT/BLK/BRN		J3-j	E2-20
4-1	WHT/BRN/VIO		J3-f	E2-33
4-2	WHT/BRN/GY		J3-g	E2-34
5-1	WHT/YEL/VIO		J3-a	E2-48
5-2	WHT/YEL/BLU		J3-Z	E2-47
6-1	WHT/ORN/BLU		J3-b	E2-43
6-2	WHT/ORN/VIO		J3-c	E2-44
7-1	WHT/RED/GRN		J3-d	E2-37
7-2	WHT/RED/BLU		J3-e	E2-38
8-1	WHT/BLK/BLU		J3-U	E2-25
8-2	WHT/BLK/VIO		J3-V	E2-26
8-3	WHT/RED/ORN		J3-W	E2-35
8-4	WHT/BLK/RED		J3-A	E2-21
8-5	WHT/BLK/ORN		J3-B	E2-22
8-6	WHT/RED/YEL		J3-C	E2-36
9-1	BLK	39	J3-X	B2-1
9-2	WHT	40	J3-Y	B2-2
10	BLK		B2-BLK	B2-1
11	WHT		B2-WHT	B2-2
12-1	BLK	39	J3-D	B8-S3
12-2	RED	41	J3-E	B8-S1
13	WHT/BLK		B8-WHT/BLK	B8-S3
14	WHT/RED		B8-WHT/RED	B8-S1
15-1	BLU	43	J3-F	B8-S4
15-2	YEL	42	J3-G	B8-S2
16	WHT/BLU		B8-WHT/BLU	B8-S4
17	WHT/YEL		B8-WHT/YEL	B8-S2
18-1	WHT/YEL/GRN		J3-K	E2-46
18-2	WHT/ORN/GY		J3-L	E2-45
19-1	WHT/ORN/YEL		J3-J	E2-41
19-2	WHT/ORN/GRN		J3-H	E2-42
20-1	BLK	39	J3-M	B13-S1
20-2	RED	41	J3-N	B13-S3
21	BLK		B13-BLK	B13-S3
22	RED		B13 RED	B13-S1
23-1	YEL	42	J3-P	B13-S2
23-2	BLU	43	J3-R	B13-S4
24	YEL		B13-YEL	B13-S2
25	BLU		B13-BLU	B13-S4
26-1	WHT/RED/GY		J4-f	E2-40
26-2	WHT/RED/VIO		J4-g	E2-39
26-3	WHT/BLK/YEL		J4-h	E2-23
26-4	WHT/BLK/GRN		J4-j	E2-24
27-1	WHT/BRN/YEL		J4-A	E2-30
28-1	WHT/BRN/ORN		J4-V	E2-29
27-2	WHT/BRN/GRN		J4-C	E2-31
27-3	WHT/BRN/BLU		J4-B	E2-32
31	WHT/YEL/GY		J4-d	E2-49
32	WHT/GRN/BLU		J4-e	E2-50
33-1	WHT/GRN		J4-G	E2-16
33-2	WHT/BLU		J4-J	E2-17
33-3	WHT/VIO		J4-H	E2-18
28-2	WHT/BLK/GY		J4-U	E2-27
28-3	WHT/BRN/RED		J4-W	E2-28
36-1	BLK		J4-N	E2-1
36-2	BRN		J4-R	E2-2
36-3	RED		J4-P	E2-3
37-1	ORN		J4-D	E2-4
37-2	YEL		J4-F	E2-5
37-3	GRN		J4-E	E2-6
40-1	BLU		J4-X	E2-7
40-2	VIO		J4-Y	E2-8
41-1	GY		J4-Z	E2-9
41-2	WHT		J4-a	E2-10
42-1	WHT/BLK		J4-b	E2-11
42-2	WHT/BRN		J4-c	E2-12
43-1	WHT/RED		J4-K	E2-13
43-2	WHT/ORN		J4-M	E2-14
43-3	WHT/YEL		J4-L	E2-15
44-1	WHT/BLK		P7-R	E2-11
45-1	WHT/RED		P7-T	E2-13
45-2	WHT/ORN		P7-U	E2-14
46-1	WHT/BLU		P7-X	E2-17
45-3	WHT/YEL		P7-V	E2-15
46-2	WHT/GRN		P7-W	E2-16
46-3	WHT/VIO		P7-Y	E2-18
49-1	WHT/YEL/BLU		P7-c	E2-47
49-2	WHT/YEL/VIO		P7-e	E2-48
50-1	GY		P7-M	E2-9
50-2	WHT		P7-P	E2-10
44-2	WHT/BRN		P7-S	E2-12
51-1	VIO		P7-J	E2-8
52-1	YEL		P7-E	E2-5
53-1	BRN		P7-B	E2-2
51-2	BLU		P7-H	E2-7
52-2	ORN		P7-D	E2-4
52-3	GRN		P7-F	E2-6
53-2	BLK		P7-A	E2-1
53-3	RED		P7-C	E2-3
56-1	WHT/BLK/VIO		P8-R	E2-26
56-2	WHT/BLK/ORN		P8-U	E2-22
56-3	WHT/BLK/BLU		P8-P	E2-25
56-4	WHT/BLK/RED		P8-T	E2-21
56-5	WHT/RED/ORN		P8-V	E2-35
56-6	WHT/RED/YEL		P8-Y	E2-36
57-1	WHT/BRN/RED		P8-X	E2-28
57-2	WHT/BLK/GY		P8-W	E2-27
58-1	WHT/BRN/YEL		P8-a	E2-30
57-3	WHT/BRN/ORN		P8-Z	E2-29
58-2	WHT/BRN/BLU		P8-d	E2-32
58-3	WHT/BRN/GRN		P8-c	E2-31
61-1	WHT/BLK/YEL		P8-b	E2-23
61-2	WHT/BLK/GRN		P8-e	E2-24
61-3	WHT/RED/GY		P8-h	E2-40
61-4	WHT/RED/VIO		P8-f	E2-39
62-1	WHT/RED/BLU		P8-M	E2-38
62-2	WHT/RED/GRN		P8-L	E2-37
63-1	WHT/ORN/VIO		P8-J	E2-44
63-2	WHT/ORN/BLU		P8-H	E2-43
64-1	WHT/BRN/GY		P8-E	E2-34
64-2	WHT/BRN/VIO		P8-D	E2-33
65-1	WHT/BLK/BRN		P8-N	E2-20
65-2	WHT/GY		P8-K	E2-19

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO
66-1	RED	41	P8-F	B8-P1
66-2	BLK	39	P8-C	B8-P3
67	WHT/RED		B8-WHT/RED	B8-P1
68	WHT/BLK		B8-WHT/BLK	B8-P3
69	YEL	42	B8 P2	B8-P4
70	WHT/YEL		B8-WHT/YEL	B8-P2
71	WHT/BLU		B8-WHT/BLU	B8-P4
72-1	WHT/ORN/GY		B13-P1	E2-45
72-2	WHT/YEL/GRN		B13-P3	E2-46
73-1	WHT/ORN/GRN		B13-P2	E2-42
73-2	WHT/ORN/YEL		B13-P4	E2-41
74	RED		B13-RED	B13-P1
75	BLK		B13-BLK	B13-P3
76	YEL		B13-YEL	B13-P2
77	BLU		B13-BLU	B13-P4
78	WHT/GRN/BLU		P8-B	E2-50
79	WHT/YEL/GY		P8-A	E2-49
28B	BLK	39	SHLD 28	E20
36B	BLK	39	SHLD 36	E19
43B	BLK	39	SHLD 43	E19
45A	BLK	39	SHLD 45	E21
53A	BLK	39	SHLD 53	E21
57A	BLK	39	SHLD 57	E22

REPLACES
REV E WITH
CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	INSULATION SLEEVING, ELEC, HEAT SHRINK	1010490-180		3/4 LONG	50
2	CLAMP, CABLE	1000220-6			49
3	SHIELD & GROUND ASSEMBLY	1000020-3			48
3	SHIELD & GROUND ASSEMBLY	1000020-2			47
6	WASHER, FLAT, ROUND	1000254			46
1	RESISTOR, FIXED	100498-300			45
1	WIRE, ELEC, TYPE E-28 GY		MIL-W-16878	20" LONG	44
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	28" LONG	43
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	30" LONG	42
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	42" LONG	41
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	18" LONG	40
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	56" LONG	39
A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713 TYPE P CLASS 2		38
A/R	GREASE, LUBRICATING		MIL-G-25760		37
A/R	GOODYEAR CPA923A		MIL-A-13883		36
A/R	SOLDER	SN60WRAP2	QQ-S-571		35
A/R	SOLDER	SN60WARP2	QQ-S-571		34
1	CLAMP, CABLE	1000220-4			33
2	CLAMP, CABLE	1000220-5			32
5	WASHER, CABLE CLAMP	1000223			31
5	SCREW, HEX SOC. HD.	1000110-1			30
6	CLAMP, TORQUE MOTOR	1000087			29
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			28
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04LL4			27
2	SCREW, BUT. HD, SELF LKG, SPL. SOC	1000250-2			26
6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C02LL4			25
6	SCREW, CAP, SOC HD HEX.	1000110-7			24
6	SCREW, BUT. HD, SELF LKG, HEX SOC	1000093-25			23
6	SCREW, BUT. HD, SELF LKG, SPL SOC	1000250-15			22
9	SCREW, BUT HD, SELF LKG, SPL. SOC	1000250-12			21
2	BUSHING, INSULATOR	1000036			20
60	INSULATION SLEEVING, ELEC	1006776-18		3/8 LONG	19
2	SCREW, CAP, SOC HD, HEX	1000110-202			18
18	TERMINAL, INSULATED	1000100-1			17
~~2~~	~~INSULATION, SLEEVING, ELEC~~	~~1006776-15~~		~~3/4 LONG~~	~~16~~
48	INSULATION, SLEEVING, ELEC	1006776-18		5/16 LONG	15
2	INSULATION, SLEEVING, ELEC.	1006776-9		5/16 LONG	14
2	CONN, ELEC, RECEP, 29 CONT.	1000116			13
1	CONN, ELEC, RECEP, 32 PINS	1001492-4		SEE NOTE 13	12
1	CONN, ELEC, RECEP, 32 PINS	1001492-3		SEE NOTE 13	11
1	GUIDE, WIRE, SHAFT STUB, O.A.	1000151			10
1	GUIDE, WIRE, BEARING HSG, I-X O.A.	1000269			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASS'Y, ELEC, 50 CONTACT	1000088			6
1	RETAINER, BEARING, OUTER AXIS	1000091			5
1	MOTOR, TORQUE, DC, FRAMELESS	1000075			4
1	RSVR ASS'Y, I-X XMTR & PITCH-YAW	1000033			3
1	SHAFT STUB, I-X OUTER AXIS	1000096			2
1	HOUSING, BEARING, I-X OUTER AXIS	1000101			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED 7/16/63
CHECKED
DRAWN RWC
APPROVED FOR MSC
W J Rhine
9 Jul 63

INTERGIMBAL
SUB-ASSEMBLY
I-X OUTER AXIS

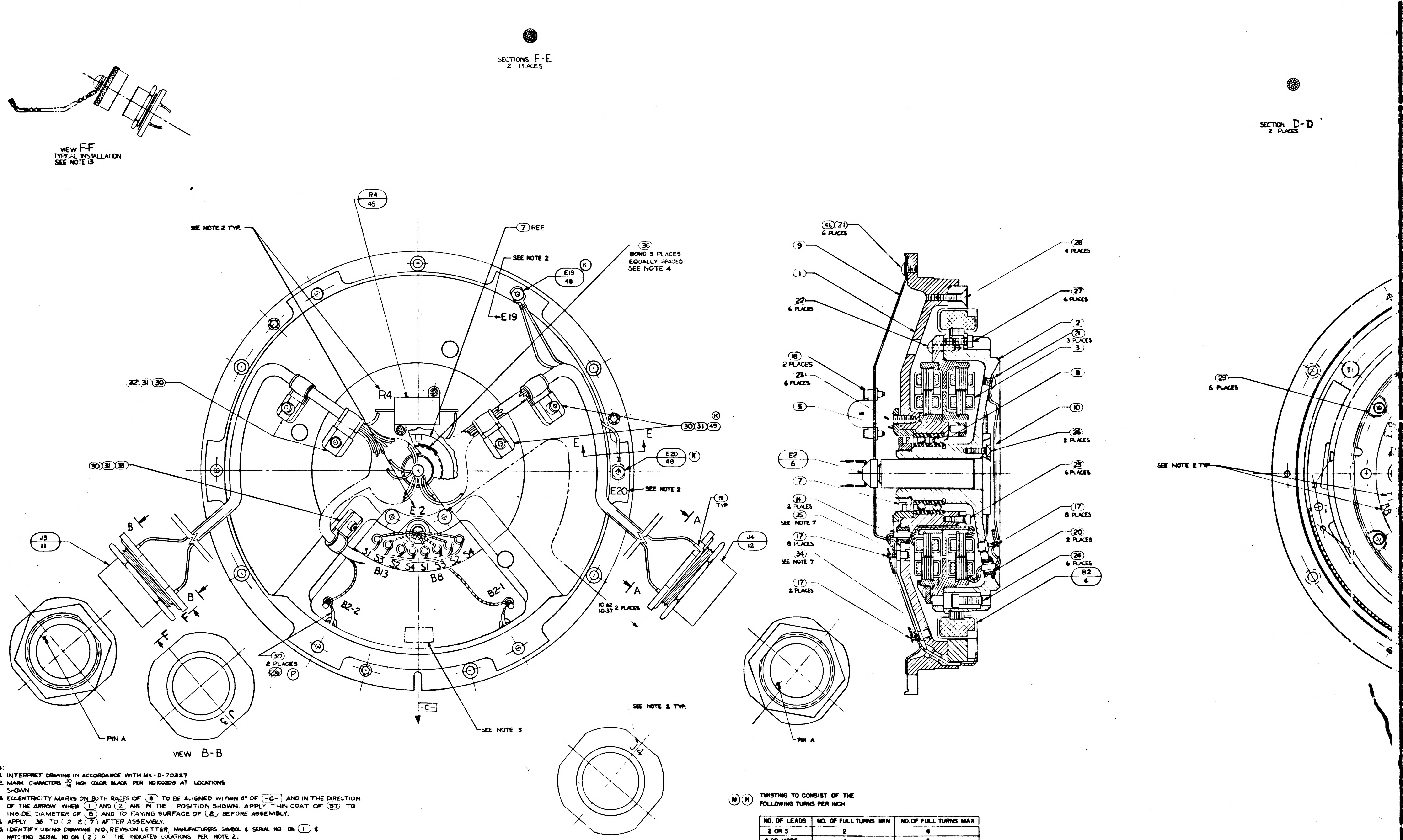
SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000006
SHEET

1000006 P

	REV	SHEET
1000006	F	1

2/1000006


SECTIONS E-E
2 PLACES
SECTION D-D
2 PLACES
VIEW F-F
TYPICAL INSTALLATION
SEE NOTE 13
SEE NOTE 2 TYP.
R4
45
7 REF.
SEE NOTE 2
E19
48
E19
36
BOND 3 PLACES
EQUALLY SPACED
SEE NOTE 4
32 31 30
30 31 49
30 31 33
E20
48
E20
SEE NOTE 2
E2
J3
11
J4
12
19
TYP
S1 S3 S2 S4 S1 S3 S2 S4
B13
B8
B2-2
B2-1
50
8 PLACES
10.62
10.37 2 PLACES
-C-
SEE NOTE 5
PIN A
VIEW B-B
SEE NOTE 2 TYP.
J4
46 21
6 PLACES
9
1
22
6 PLACES
18
2 PLACES
23
6 PLACES
5
E2
6
7
14
2 PLACES
35
SEE NOTE 7
17
8 PLACES
34
SEE NOTE 7
17
2 PLACES
28
4 PLACES
27
6 PLACES
2
21
3 PLACES
3
8
10
26
2 PLACES
25
6 PLACES
17
8 PLACES
20
2 PLACES
24
6 PLACES
B2
4
29
6 PLACES
VIEW A-A

NOTES:

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(23)	10.0 IN. LB.
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7. SOLDER ALL LEADS FROM (3) & (4) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (34). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (11), (12) & (13) PER MIL-STD-440 USING (35). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
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10. MAXIMUM ALLOWABLE TORQUE IS OZ-IN.
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12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
(G) 13. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

(M) (K) TWISTING TO CONSIST OF THE FOLLOWING TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
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	REV	SHEET
1000006	P	1

1/1000006

ZONE	SYM	DESCRIPTION	DATE		
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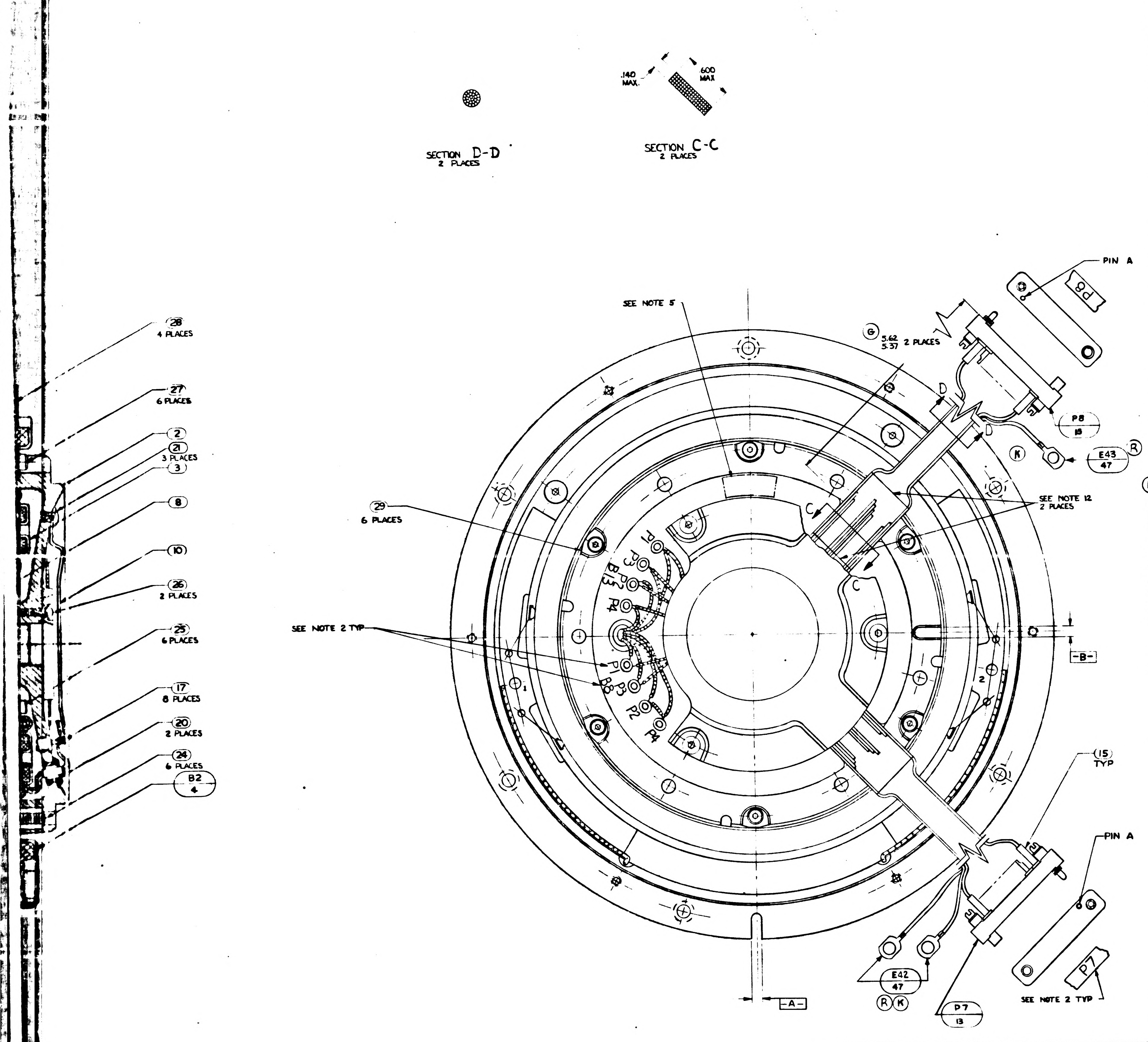
	L	TDRR 06238	18 FEB 64		
	M	TDRR 06237	18 FEB 64		
	N	REVISED PER TDRR 07950	4 MAY 64		
	P	REVISED PER TDRR 07954	22 MAY 64		
	R	REVISED PER TDRR 13099	7 OCT 64		



WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO
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4-2	WHT/BRN/GY		J3-g	E2-34
5-1	WHT/YEL/VIO		J3-a	E2-48
5-2	WHT/YEL/BLU		J3-Z	E2-47
6-1	WHT/ORN/BLU		J3-b	E2-43
6-2	WHT/ORN/VIO		J3-c	E2-44
7-1	WHT/RED/GRN		J3-d	E2-37
7-2	WHT/RED/BLU		J3-e	E2-38
8-1	WHT/BLK/BLU		J3-U	E2-25
8-2	WHT/BLK/VIO		J3-V	E2-26
8-3	WHT/RED/ORN		J3-W	E2-35
8-4	WHT/BLK/RED		J3-A	E2-21
8-5	WHT/BLK/ORN		J3-B	E2-22
8-6	WHT/RED/YEL		J3-C	E2-36
9-1	BLK	39	J3-X	B2-1
9-2	WHT	40	J3-Y	B2-2
10	BLK		B2-BLK	B2-1
11	WHT		B2-WHT	B2-2
12-1	BLK	39	J3-D	B8-S3
12-2	RED	41	J3-E	B8-S1
13	WHT/BLK		B8-WHT/BLK	B8-S3
14	WHT/RED		B8-WHT/RED	B8-S1
15-1	BLU	43	J3-F	B8-S4
15-2	YEL	42	J3-G	B8-S2
16	WHT/BLU		B8-WHT/BLU	B8-S4
17	WHT/YEL		B8-WHT/YEL	B8-S2
18-1	WHT/YEL/GRN		J3-K	E2-46
18-2	WHT/ORN/GY		J3-L	E2-45
19-1	WHT/ORN/YEL		J3-J	E2-41
19-2	WHT/ORN/GRN		J3-H	E2-42
20-1	BLK	39	J3-M	B13-S1
20-2	RED	41	J3-N	B13-S3
21	BLK		B13-BLK	B13-S3
22	RED		B13-RED	B13-S1
23-1	YEL	42	J3-P	B13-S2
23-2	BLU	43	J3-R	B13-S4
24	YEL		B13-YEL	B13-S2
25	BLU		B13-BLU	B13-S4
26-1	WHT/RED/GY		J4-f	E2-40
26-2	WHT/RED/VIO		J4-g	E2-39
26-3	WHT/BLK/YEL		J4-h	E2-23
26-4	WHT/BLK/GRN		J4-i	E2-24
27-1	WHT/BRN/YEL		J4-A	E2-30
28-1	WHT/BRN/ORN		J4-V	E2-29
27-2	WHT/BRN/GRN		J4-C	E2-31
27-3	WHT/BRN/BLU		J4-B	E2-32
31	WHT/YEL/GY		J4-d	E2-49
32	WHT/GRN/BLU		J4-e	E2-50
33-1	WHT/GRN		J4-G	E2-16
33-2	WHT/BLU		J4-J	E2-17
33-3	WHT/VIO		J4-H	E2-18
28-2	WHT/BLK/GY		J4-U	E2-27
28-3	WHT/BRN/RED		J4-W	E2-28
36-1	BLK		J4-N	E2-1
36-2	BRN		J4-R	E2-2
36-3	RED		J4-P	E2-3
37-1	ORN		J4-D	E2-4
37-2	YEL		J4-F	E2-5
37-3	GRN		J4-E	E2-6
40-1	BLU		J4-X	E2-7
40-2	VIO		J4-Y	E2-8
41-1	GY		J4-Z	E2-9
41-2	WHT		J4-a	E2-10
42-1	WHT/BLK		J4-b	E2-11
42-2	WHT/BRN		J4-c	E2-12
43-1	WHT/RED		J4-K	E2-13
43-2	WHT/ORN		J4-M	E2-14
43-3	WHT/YEL		J4-L	E2-15
44-1	WHT/BLK		P7-R	E2-11
45-1	WHT/RED		P7-T	E2-13
45-2	WHT/ORN		P7-U	E2-14
46-1	WHT/BLU		P7-X	E2-17
45-3	WHT/YEL		P7-V	E2-15
46-2	WHT/GRN		P7-W	E2-16
46-3	WHT/VIO		P7-Y	E2-18
49-1	WHT/YEL/BLU		P7-c	E2-47
49-2	WHT/YEL/VIO		P7-e	E2-48
50-1	GY		P7-M	E2-9
50-2	WHT		P7-P	E2-10
44-2	WHT/BRN		P7-S	E2-12
51-1	VIO		P7-J	E2-8
52-1	YEL		P7-E	E2-5
53-1	BRN		P7-B	E2-2
51-2	BLU		P7-H	E2-7
52-2	ORN		P7-D	E2-4
52-3	GRN		P7-F	E2-6
53-2	BLK		P7-A	E2-1
53-3	RED		P7-C	E2-3
56-1	WHT/BLK/VIO		P8-R	E2-26
56-2	WHT/BLK/ORN		P8-U	E2-22
56-3	WHT/BLK/BLU		P8-P	E2-25
56-4	WHT/BLK/RED		P8-T	E2-21
56-5	WHT/RED/ORN		P8-V	E2-35
56-6	WHT/RED/YEL		P8-Y	E2-36
57-1	WHT/BRN/RED		P8-X	E2-28
57-2	WHT/BLK/GY		P8-W	E2-27
58-1	WHT/BRN/YEL		P8-a	E2-30
57-3	WHT/BRN/ORN		P8-Z	E2-29
58-2	WHT/BRN/BLU		P8-d	E2-32
58-3	WHT/BRN/GRN		P8-c	E2-31
61-1	WHT/BLK/YEL		P8-b	E2-23
61-2	WHT/BLK/GRN		P8-e	E2-24
61-3	WHT/RED/GY		P8-h	E2-40
61-4	WHT/RED/VIO		P8-f	E2-39
62-1	WHT/RED/BLU		P8-M	E2-38
62-2	WHT/RED/GRN		P8-L	E2-37
63-1	WHT/ORN/VIO		P8-J	E2-44
63-2	WHT/ORN/BLU		P8-H	E2-43
64-1	WHT/BRN/GY		P8-E	E2-34
64-2	WHT/BRN/VIO		P8-D	E2-33
65-1	WHT/BLK/BRN		P8-N	E2-20
65-2	WHT/GY		P8-K	E2-19

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO
66-1	RED	41	P8-F	B8-P1
66-2	BLK	39	P8-C	B8-P3
67	WHT/RED		B8-WHT/RED	B8-P1
68	WHT/BLK		B8-WHT/BLK	B8-P3
69	YEL	42	B8 P2	B8-P4
70	WHT/YEL		B8-WHT/YEL	B8-P2
71	WHT/BLU		B8-WHT/BLU	B8-P4
72-1	WHT/ORN/GY		B13-P1	E2-45
72-2	WHT/YEL/GRN		B13-P3	E2-46
73-1	WHT/ORN/GRN		B13-P2	E2-42
73-2	WHT/ORN/YEL		B13-P4	E2-41
74	RED		B13-RED	B13-P1
75	BLK		B13-BLK	B13-P3
76	YEL		B13-YEL	B13-P2
77	BLU		B13-BLU	B13-P4
78	WHT/GRN/BLU		P8-B	E2-50
79	WHT/YEL/GY		P8-A	E2-49
28B	BLK	39	SHLD 28	E41
36B	BLK	39	SHLD 36	E40
43B	BLK	39	SHLD 43	E40
45A	BLK	39	SHLD 45	E42
53A	BLK	39	SHLD 53	E42
57A	BLK	39	SHLD 57	E43

REPLACES
REV E WITH
CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
P	2	INSULATION SLEEVING, ELEC, HEAT SHRINK	1010490-180		3/4 LONG	50
L K	2	CLAMP, CABLE	1000220-6			49
	3	SHIELD & GROUND ASSEMBLY	1000020-3			48
	3	SHIELD & GROUND ASSEMBLY	1000020-2			47
	6	WASHER, FLAT, ROUND	1000254			46
	1	RESISTOR, FIXED	100498-300			45
	1	WIRE, ELEC, TYPE E-28 GY		MIL-W-16878	20" LONG	44
	1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	28" LONG	43
	1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	30" LONG	42
	1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	42" LONG	41
	1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	18" LONG	40
	1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	56" LONG	39
K	A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713 TYPE P CLASS 2		38
	A/R	GREASE, LUBRICATING		MIL-G-25760		37
	A/R	GOODYEAR CPA923A		MIL-A-13883		36
	A/R	SOLDER	SN60WARP2	QQ-S-571		35
	A/R	SOLDER	SN10WARP2	QQ-S-571		34
K	1	CLAMP, CABLE	1000220-4			33
	2	CLAMP, CABLE	1000220-5			32
	5	WASHER, CABLE CLAMP	1000223			31
	5	SCREW, HEX SOC. HD.	1000110-1			30
G	6	CLAMP, TORQUE MOTOR	1000087			29
	4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			28
	6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C04L14			27
G	2	SCREW, BUT. HD, SELF LKG, SPL. SOC	1000250-2			26
	6	SCREW, CAP, SELF LKG, SOC HD HEX	NAS1352C02L14			25
	6	SCREW, CAP, SOC HD HEX.	1000110-7			24
	6	SCREW, BUT. HD, SELF LKG, HEX SOC	1000093-25			23
	6	SCREW, BUT. HD, SELF LKG, SPL. SOC	1000250-15			22
	9	SCREW, BUT HD, SELF LKG, SPL. SOC	1000250-12			21
	2	BUSHING, INSULATOR	1000036			20
	60	INSULATION SLEEVING, ELEC	1006776-18		3/8 LONG	19
	2	SCREW, CAP, SOC HD, HEX	1000110-202			18
	18	TERMINAL, INSULATED	1000100-1			17
	~~2~~	~~INSULATION, SLEEVING, ELEC~~	~~1006776-15~~		~~3/4 LONG~~	~~16~~
P	48	INSULATION, SLEEVING, ELEC	1006776-18		5/16 LONG	15
	2	INSULATION, SLEEVING, ELEC.	1006776-9		5/16 LONG	14
	2	CONN, ELEC, RECEP, 29 CONT.	1000116			13
J G	1	CONN, ELEC, RECEP, 32 PINS	1001492-4		SEE NOTE 12	12
	1	CONN, ELEC, RECEP, 32 PINS	1001492-3		SEE NOTE 12	11
	1	GUIDE, WIRE, SHAFT STUB, O.A.	1000151			10
	1	GUIDE, WIRE, BEARING HSG, I-X O.A.	1000269			9
	1	BEARING, BALL, DUPLEX	1000029			8
	1	NUT, BEARING RETAINER	1000086			7
	1	SLIP RING ASS'Y, ELEC, 50 CONTACT	1000038			6
	1	RETAINER, BEARING, OUTER AXIS	1000091			5
	1	MOTOR, TORQUE, DC, FRAMELESS	1000075			4
	1	RSVR ASS'Y, I-X XMTR & PITCH-YAW	1000033			3
	1	SHAFT STUB, I-X OUTER AXIS	1000096			2
	1	HOUSING, BEARING, I-X OUTER AXIS	1000101			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Boyce DATE 7/16/63
CHECKED
DRAWN RWC
APPROVED W J Rhine

INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS

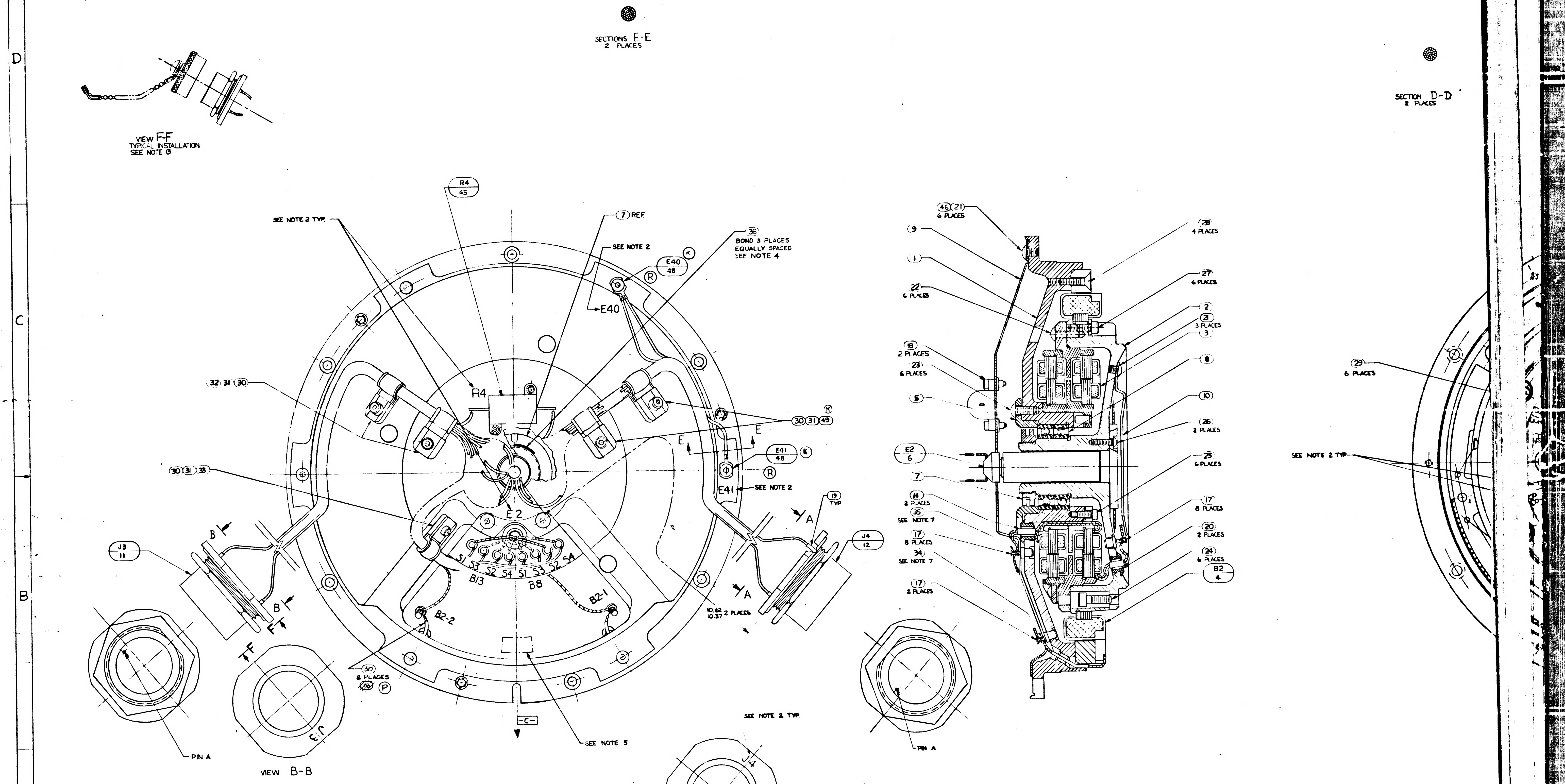
SCALE 2/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DWG NO
1000006
SHEET 1 OF 1

1000006 R

1006 | REV R | SHEET 1

2/1000006


SECTIONS E-E
2 PLACES
SECTION D-D
2 PLACES
VIEW F-F
TYPICAL INSTALLATION
SEE NOTE 13
R4
45
SEE NOTE 2 TYP.
7 REF.
SEE NOTE 2
36
BOND 3 PLACES
EQUALLY SPACED
SEE NOTE 4
E40
48
K
R
E40
32 31 30
R4
30 31 49
K
E41
48
K
R
E41
SEE NOTE 2
30 31 33
E
E
E2
S1 S3 S2 S4 S1 S3 S2 S4
B13
B8
B2-1
B2-2
J3
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19
TYP
J4
12
A
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10.62
10.37 2 PLACES
50
2 PLACES
P
-C-
SEE NOTE 5
PIN A
J3
VIEW B-B
SEE NOTE 2 TYP
J4
VIEW A-A
46 21
6 PLACES
9
1
22
6 PLACES
18
2 PLACES
23
6 PLACES
5
E2
6
7
14
2 PLACES
35
SEE NOTE 7
17
8 PLACES
34
SEE NOTE 7
17
2 PLACES
28
4 PLACES
27
6 PLACES
2
21
3 PLACES
3
8
10
26
2 PLACES
25
6 PLACES
17
8 PLACES
20
2 PLACES
24
6 PLACES
B2
4
PIN A
29
6 PLACES
SEE NOTE 2 TYP

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
3. ECCENTRICITY MARKS ON BOTH RACES OF (8) TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW WHEN (1) AND (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (37) TO INSIDE DIAMETER OF (8) AND TO FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (36) TO (2) & (7) AFTER ASSEMBLY.
5. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. ON (1) & MATCHING SERIAL NO ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ± 7%

(7)	100 IN. LB.
(23)	10.0 IN. LB.
(21) (22) (27) (28) (30)	5.0 IN. LB.
(18) (25) (26)	3.5 IN. LB

7. SOLDER ALL LEADS FROM (3) & (4) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (34). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (11), (12) & (13) PER MIL-STD-440 USING (35). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. (K) HEAT SHRINK SLEEVING ON ITEMS (47) & (48) AFTER ASSEMBLY
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM HOUSING BEARING (1) OR REMOVE TORQUE MOTOR (4) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (4).
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000006.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. (G) PROTECTIVE CAP, NASA DWG NO 100495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

(M) (K) TWISTING TO CONSIST OF THE FOLLOWING TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000006	R	1

1/1000006

1000006

REVISIONS	TDRR 00065		
SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000033	Resolver Assy, One Speed Trans. Pitch, Yaw	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000096	Shaft, Stub One Speed, Outer Axis	1
1000101	Housing, Bearing One Speed, Outer Axis	1
1000091	Retainer, Bearing Outer Axis	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10/17/62
BY DIRECTION MIT Approval
10/17/62

INTERGIMBAL SUB-ASSY
ONE SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000006

SHEET OF

1000007 (M)

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00089	7NOV62	ajB WK

PART NO.	DESCRIPTION	REQD.
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000014	15 Speed Resolver Sub-Assy, Outer Axis	1
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY,
15 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000007
SHEET OF

1000007

REVISIONS TDRR 00065			
SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000014	15 Speed Resolver Sub-Assy, Outer Axis	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Royce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY,
15 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000007

SHEET OF

	1000008	

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00090	7 Nov 62	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT Approval
W A Hoffman 10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000008

SHEET OF

1000008

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00090	7 Nov 62	agB	WK
B	TDR 00142	12 DEC 62	agB	WK

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	8
1000100-2	Terminal, Insulated	2
1000152	Guide Wire Stub Shaft	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED A J Boyce 10/17/62
CHECKED
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APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
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HOUSTON TEXAS
NASA DRAWING NO.
1000008
SHEET OF

1000008

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00090	7 Nov 62	ajB	WK
B	TDR 00142	12 DEC 62	ajB	WK
C	TDR 00198	27 DEC 62	ajB	WK.

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	8
1000100-2	Terminal, Insulated	2
1000152	Guide Wire Stub Shaft	1
1000177	Ring, Spacer	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION.	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000203	DL 1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED

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NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
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W J Rhine 10/17/62
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10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00065				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00090	7 Nov 62	ajB	WK
B	TDR 00142	12 DEC 62	ajB	WK
C	TDR 00198	27 DEC 62	ajB	WK.
D	TDR 00458	26 FEB 63	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	10
1000100-2	Terminal, Insulated	2
1000152	Guide Wire Stub Shaft	1
1000211	Limit Switch	1
1000208	Contact Assembly, Limit Switch	1
NAS608C440LL4	Screw, Soc Hd Cap Self Lock	6
NAS608C256LL4	Screw, Soc Hd Cap Self Lock	6
1000110-7	Screw, Soc Hd Cap	6
1000093-15	Screw, But Hd, Hex Soc Self Lock	6
1000093-25	Screw, But Hd, Hex Soc Self Lock	6
1000093-3	Screw, But Hd, Hex Soc Self Lock	2
1000104-4	Screw, F.H. Hex Soc Self Lock	4
1000104-17	Screw, F.H. Hex Soc Self Lock	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
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PHOTOGRAPHIC SCALE ONLY

1000203	DL 1000201
1000003	DL 1000001
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APPLICATION	

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INTERGIMBAL SUB-ASSEMBLY

ONE SPEED

MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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M	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00065			
M	A	TDR 00090	7 Nov 62	ajB	WK
M	B	TDR 00142	12 DEC 62	ajB	WK
M	C	TDR 00198	27 DEC 62	ajB	WK.
M	D	TDR 00458	26 FEB 63	ajB	WK
	E	TDR 00641	26 MAR 63	ajB	WK.

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	10
1000100-2	Terminal, Insulated	2
1000152	Guide Wire Stub Shaft	1
1000211	Limit Switch	1
1000208	Contact Assembly, Limit Switch	1
NAS608C440LL4	Screw, Soc Hd Cap Self Lock	6
NAS608C256LL4	Screw, Soc Hd Cap Self Lock	6
1000110-7	Screw, Soc Hd Cap	6
1000093-15	Screw, But Hd, Hex Soc Self Lock	6
1000093-25	Screw, But Hd, Hex Soc Self Lock	6
1000093-3	Screw, But Hd, Hex Soc Self Lock	2
1000104-4	Screw, F.H. Hex Soc Self Lock	4
1000104-17	Screw, F.H. Hex Soc Self Lock	4
1000112	Guide wire bearing mt.	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
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PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000203	DL 1000201
1000003	DL 1000001

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W J Rhine 10/17/62
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W A Kupfer 10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ A	TDR 00090	7 Nov62	agB	WK
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Ⓜ C	TDR 00198	27 DEC 62	agB	WK.
Ⓜ D	TDR 00458	26 FEB 63	agB	WK
Ⓜ E	TDR 00641	26 MAR 63	agB	WK.
F	TDR 00770	10 APR 63	agB	WK

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	10
1000100-2	Terminal, Insulated	2
1000152	Guide Wire Stub Shaft	1
1000211	Limit Switch	1
1000208	Contact Assembly, Limit Switch	1
NAS608C440LL4	Screw, Soc Hd Cap Self Lock	6
NAS608C256LL4	Screw, Soc Hd Cap Self Lock	6
1000110-7	Screw, Soc Hd Cap	6
1000093-15	Screw, But Hd, Hex Soc Self Lock	6
1000093-25	Screw, But Hd, Hex Soc Self Lock	6
1000093-3	Screw, But Hd, Hex Soc Self Lock	2
1000104-4	Screw, F.H. Hex Soc Self Lock	4
1000104-17	Screw, F.H. Hex Soc Self Lock	4
1000112	Guide wire bearing mt.	1
1000125	Bracket, Connector	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201
1000003	DL 1000001

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W J Rhine 10/17/62
BY DIRECTION MIT APPROVAL
W [illegible] 10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00090	7 Nov 62	agB	WK
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E	TDR 00641	26 MAR 63	agB	WK.
F	TDR 00770	10 APR 63	agB	WK
G	TDR 01066	1 MAY 63	agB	WK.

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	10
1000100-2	Terminal, Insulated	2
1000152	Guide Wire Stub Shaft	1
1000211	Limit Switch	1
1000208	Contact Assembly, Limit Switch	1
NAS608C440LL4	Screw, Soc Hd Cap Self Lock	6
NAS608C256LL4	Screw, Soc Hd Cap Self Lock	6
1000110-7	Screw, Soc Hd Cap	6
~~1000093-13~~	~~Screw, But Hd, Hex Soc Self Lock~~	~~6~~
1000093-25	Screw, But Hd, Hex Soc Self Lock	6
~~1000093-3~~	~~Screw, But Hd, Hex Soc Self Lock~~	~~2~~
~~1000104-4~~	~~Screw, F. H. Hex Soc Self Lock~~	~~4~~
1000104-17	Screw, F. H. Hex Soc Self Lock	4
1000112	Guide wire bearing mt.	1
1000125	Bracket, Connector	2
MS25036-48	Terminal Lug	1
1006776-9	Insulation Sleeving Elect	2 inches
1006776-15	Insulation Sleeving Elect.	5 inches
1006776-18	Insulation Sleeving Elect.	30 inches
1000250-15	Scr, But Hd Self lkg Spl Soc	6
1000250-12	Scr, But Hd Self lkg Spl Soc	7
1000250-13	Scr But Hd Self lkg Spl Soc	3
1000250-3	Scr But Hd Self lkg Spl Soc	2
1000254	Washer, Flat, Round	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

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W J Rhine 10/17/62
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W K [illegible] 10/17/62

INTERGIMBAL SUB-ASSEMBLY

ONE SPEED

MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00090	7 Nov 62	agb	WK
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E	TDR 00641	26 MAR 63	agb	WK
F	TDR 00770	10 APR 63	agb	WK
G	TDR 01066	1 MAY 63	agb	WK
H	TDR 01145	8 MAY 63	[illegible]	WK

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	~~10~~ 6
1000100-2	Terminal, Insulated	~~7~~ 6
1000152	Guide Wire Stub Shaft	1
1000211	Limit Switch	1
1000208	Contact Assembly, Limit Switch	1
NAS608C440LL4	Screw, Soc Hd Cap Self Lock	6
NAS608C256LL4	Screw, Soc Hd Cap Self Lock	6
1000110-7	Screw, Soc Hd Cap	6
~~[illegible]~~	~~Screw, But Hd, Hex Soc Self Lock~~	~~[illegible]~~
1000093-25	Screw, But Hd, Hex Soc Self Lock	6
~~[illegible]~~	~~Screw, But Hd, Hex Soc Self Lock~~	~~[illegible]~~
~~[illegible]~~	~~Screw, F.H. Hex Soc Self Lock~~	~~4~~
1000104-17	Screw, F.H. Hex Soc Self Lock	4
1000112	Guide wire bearing mt.	1
1000125	Bracket, Connector	2
MS25036-48	Terminal Lug	1
1006776-9	Insulation Sleeving Elect	2 inches
1006776-15	Insulation Sleeving Elect.	5 inches
1006776-18	Insulation Sleeving Elect.	30 inches
1000250-15	Scr, But Hd Self lkg Spl Soc	6
1000250-12	Scr, But Hd Self lkg Spl Soc	7
1000250-13	Scr But Hd Self lkg Spl Soc	3
1000250-2	Scr But Hd Self lkg Spl Soc	2
1000254	Washer, Flat, Round	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
1000003	DL 1000001
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APPLICATION	

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W J Rhine 10/17/62
BY DIRECTION MIT Approval
W K 10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00090	7 Nov62	ajB	WK
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H	TDR 01145	8 MAY63	[illegible]	WK

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	~~10~~ 6
1000100-2	Terminal, Insulated	~~2~~ 6
1000152	Guide Wire Stub Shaft	1
1000211	Limit Switch	1
1000208	Contact Assembly, Limit Switch	1
NAS608C440LL4	Screw, Soc Hd Cap Self Lock	6
NAS608C256LL4	Screw, Soc Hd Cap Self Lock	6
1000110-7	Screw, Soc Hd Cap	6
~~1000093-15~~	~~Screw, But Hd, Hex Soc Self Lock~~	~~6~~
1000093-25	Screw, But Hd, Hex Soc Self Lock	6
~~1000093-3~~	~~Screw, But Hd, Hex Soc Self Lock~~	[illegible]
~~1000104-4~~	~~Screw, F.H. Hex Soc Self Lock~~	~~4~~
1000104-17	Screw, F.H. Hex Soc Self Lock	4
1000112	Guide wire bearing mt.	1
1000125	Bracket, Connector	2
MS25036-48	Terminal Lug	1
1006776-9	Insulation Sleeving Elect	2 inches
1006776-15	Insulation Sleeving Elect.	5 inches
1006776-18	Insulation Sleeving Elect.	30 inches
1000250-15	Scr, But Hd Self lkg Spl Soc	6
1000250-12	Scr, But Hd Self lkg Spl Soc	7
1000250-13	Scr But Hd Self lkg Spl Soc	3
1000250-3	Scr But Hd Self lkg Spl Soc	2
1000254	Washer, Flat, Round	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
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1000203	DL 1000201
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WJ Rhine 10/17/62
BY DIRECTION MIT Approval
W.K. 10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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F	TDR 00770	10 APR 63	ajb	WK
G	TDR 01066	1 MAY 63	ajb	WK.
H	TDR 01145	8 MAY 63		WK
J	REPLACED BY REV K WITH CHANGES TDRR 01927	9 JULY 63	ajb	

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000116	Connector, Elect, Recept 29 CONT	2
1000117	Connector Elect, Plug 29 Contacts	2
1000105	Shaft. Stub 1X Middle Axis	1
1000106	Housing Bearing 1X Middle Axis	1
1000100-1	Terminal, Insulated	~~10~~ 6
1000100-2	Terminal, Insulated	~~2~~ 6
1000152	Guide Wire Stub Shaft	1
1000211	Limit Switch	1
1000208	Contact Assembly, Limit Switch	1
NAS608C440LL4	Screw, Soc Hd Cap Self Lock	6
NAS608C256LL4	Screw, Soc Hd Cap Self Lock	6
1000110-7	Screw, Soc Hd Cap	6
~~1000093-13~~	~~Screw, But Hd, Hex Soc Self Lock~~	~~6~~
1000093-25	Screw, But Hd, Hex Soc Self Lock	6
~~1000093-3~~	~~Screw, But Hd, Hex Soc Self Lock~~	~~2~~
~~1000104-4~~	~~Screw, F.H. Hex Soc Self Lock~~	~~4~~
1000104-17	Screw, F.H. Hex Soc Self Lock	4
1000112	Guide wire bearing mt.	1
1000125	Bracket, Connector	2
MS25036-48	Terminal Lug	1
1006776-9	Insulation Sleeving Elect	2 inches
1006776-15	Insulation Sleeving Elect.	5 inches
1006776-18	Insulation Sleeving Elect.	30 inches
1000250-15	Scr, But Hd Self lkg Spl Soc	6
1000250-12	Scr, But Hd Self lkg Spl Soc	7
1000250-13	Scr But Hd Self lkg Spl Soc	3
1000250-2	Scr But Hd Self lkg Spl Soc	2
1000254	Washer, Flat, Round	4

REPLACED BY REV K WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
1000003	DL 1000001
NEXT ASSY	USED ON
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MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED J Boyce 10/3/62
CHECKED
DRAWN
APPROVED FOR MSC W.J. Rhine 10/7/62
BY DIRECTION MIT Apollo
W.K. 10/3/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

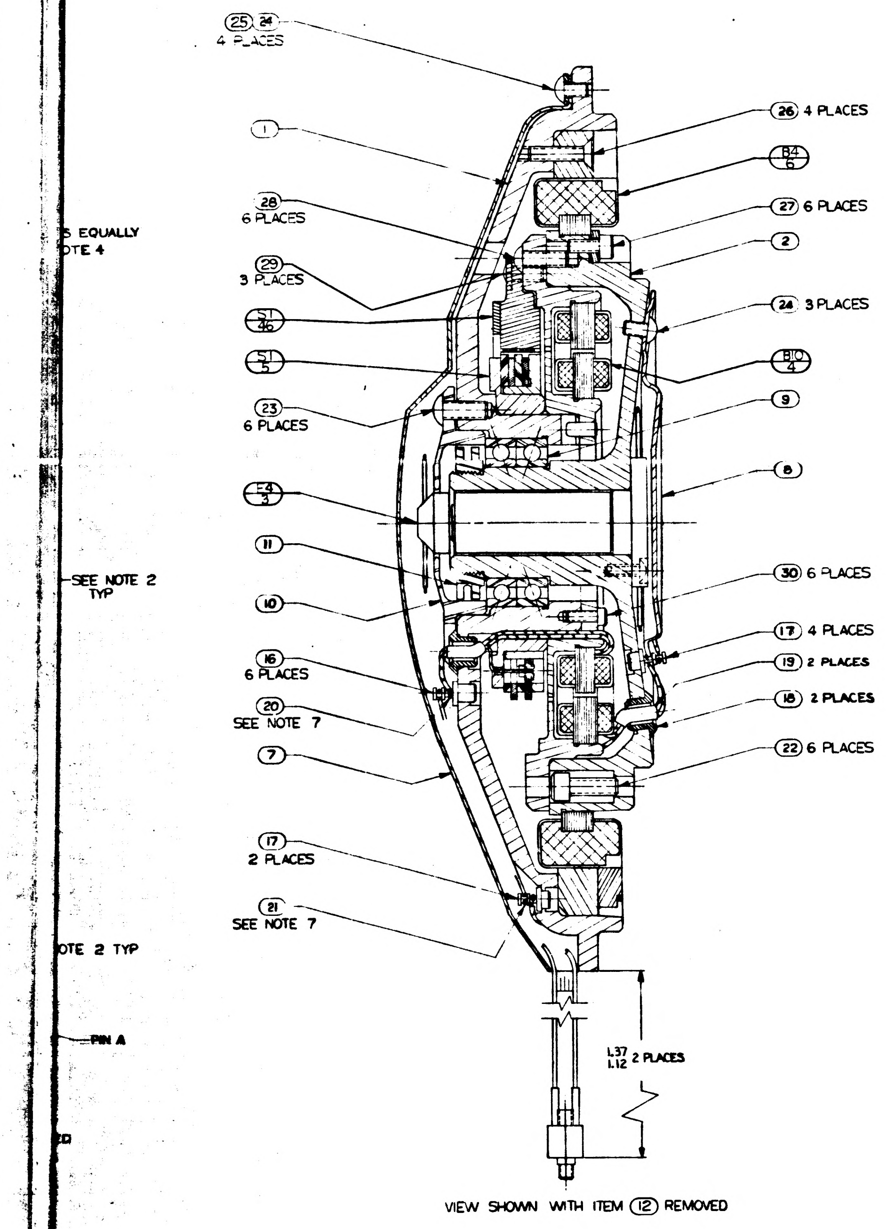
SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000008
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

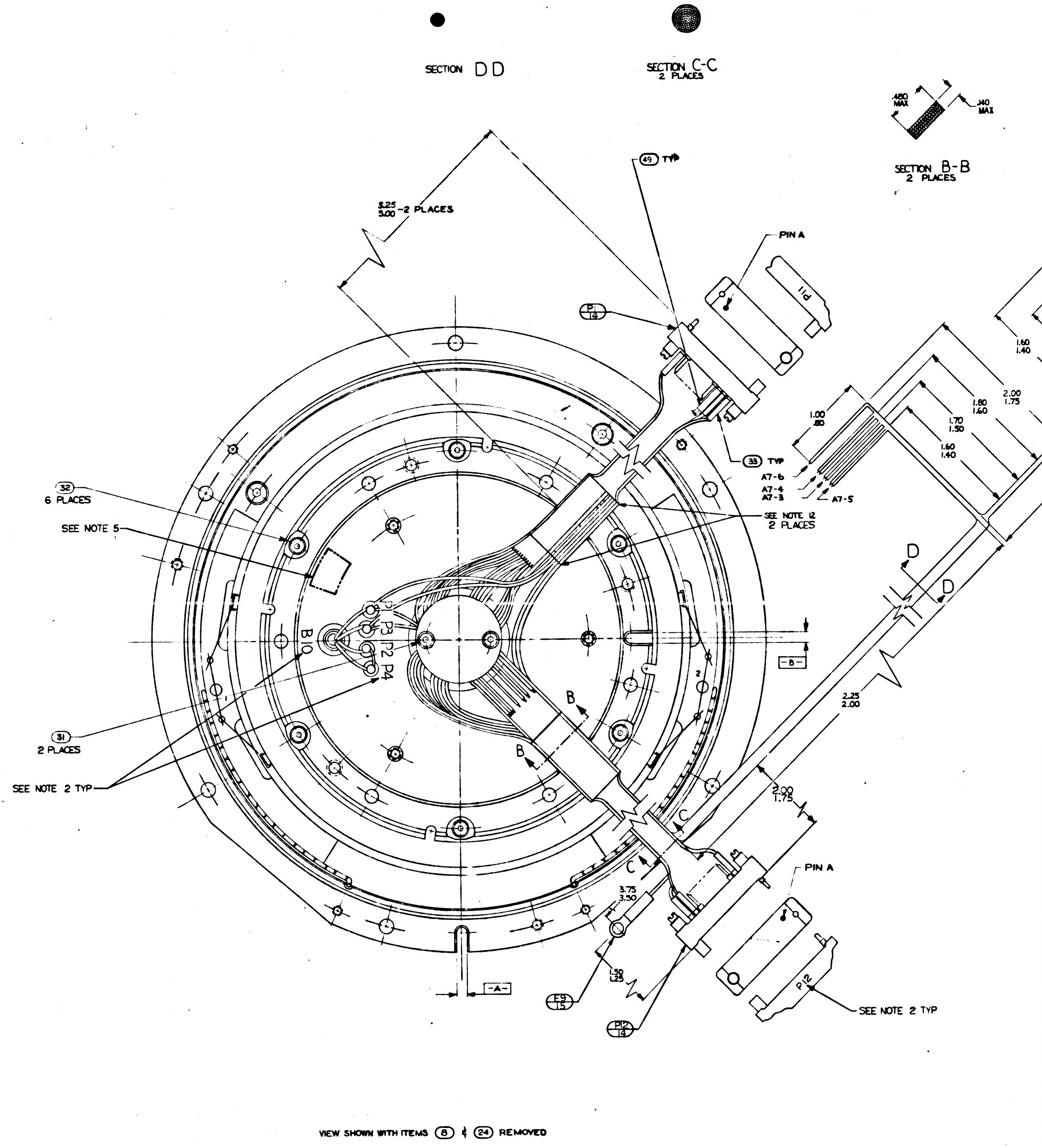
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 01927	7/9/63	ajb



25 24
4 PLACES
1
28
6 PLACES
29
3 PLACES
S1 4b
S1 5
23
6 PLACES
4 2
11
10
16
6 PLACES
20
SEE NOTE 7
7
17
2 PLACES
21
SEE NOTE 7
26 4 PLACES
B4 6
27 6 PLACES
2
24 3 PLACES
B10 4
9
8
30 6 PLACES
17 4 PLACES
19 2 PLACES
18 2 PLACES
22 6 PLACES
L37 L12 2 PLACES
S EQUALLY
OTE 4
SEE NOTE 2 TYP
OTE 2 TYP
PIN A

VIEW SHOWN WITH ITEM (12) REMOVED



SECTION DD
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
.480 MAX
.140 MAX
5.25 5.00 -2 PLACES
49 TYP
PIN A
P1
P 14
33 TYP
A7-6
A7-4
A7-3
A7-5
A10-5
A10-3
A10-4
A10-6
1.00 .80
1.10 .90
.80 .60
1.60 1.40
1.30 1.10
1.80 1.60
2.00 1.75
1.70 1.50
1.00 .80
1.60 1.40
3.00 2.75
SEE NOTE 12
2 PLACES
32
6 PLACES
SEE NOTE 5
B10
P3
P2
P4
D
D
-B-
B
B
2.25 2.00
31
2 PLACES
SEE NOTE 2 TYP
2.00 1.75
C
C
PIN A
3.75 3.50
1.50 1.25
-A-
E9 15
P2 14
P2
SEE NOTE 2 TYP

VIEW SHOWN WITH ITEMS (8) & (24) REMOVED

REPLACES REV J WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
13	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LG	49
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	48
A/R	GREASE, LUBRICATING		MIL-G-25760		47
1	CONTACT ASSY, LIMIT SWITCH	1000208			46
1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
1	WIRE ELEC, TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	12" TOTAL LG	36
A/R	ADHESIVE, GOODYEAR CPA923A		MIL-A-13883		35
2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LG	34
81	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
6	CLAMP, TORQUE MOTOR	1000087			32
2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS608C256LL4			30
3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
6	SCR, CAP, SELF LKG, HEX HD, SOC	NAS608C440LL4			27
4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-17			26
4	WASHER, FLAT, ROUND	1000254			25
7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
6	SCR, CAP, SOC HD, HEX	100110-7			22
A/R	SOLDER	SN60WARP2	QQ-S-571		21
A/R	SOLDER	SN10WARP2	QQ-S-571		20
2	INSULATION SLEEVING, ELEC	1006776-9		5/16 LG	19
2	BUSHING, INSULATED	1000036			18
6	TERMINAL, INSULATED	1000100-2			17
6	TERMINAL, INSULATED	1000100-1			16
1	TERMINAL-LUG	MS25036-48			15
2	CONNECTOR, ELEC, RECP 29 CONT	1000116			14
2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
2	BRACKET, CONNECTOR	1000125			12
1	NUT, BEARING RETAINER	1000086			11
1	RETAINER, BEARING I.A. & M.A.	1000090			10
1	BEARING, BALL, DUPLEX	1000029			9
1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
1	GUIDE, WIRE, BRG HSG. M.A.	1000092			7
1	MOTOR, TORQUE, DC, FRAMLESS	1000075			6
1	LIMIT SWITCH, M.A.	1000211			5
1	RESOLVER, 1X TRANSMITTER	1000030			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	SHAFT, STUB 1X M.A.	1000105			2
1	HOUSING, BEARING 1X M.A.	1000106			1

LIST OF PARTS AND MATERIALS

1000008 K

1000203	DL 1000201
1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED ajb DATE 7/9/63
CHECKED
DRAWN DMWHITE 1-11-63
APPROVED FOR MSC
Jack Barnard
MIT/11 APPROVAL DATE

INTER GIMBAL SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000008
SHEET 1 OF 1

1000008 K 1

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

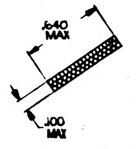
F-2

WIRING LEGEND

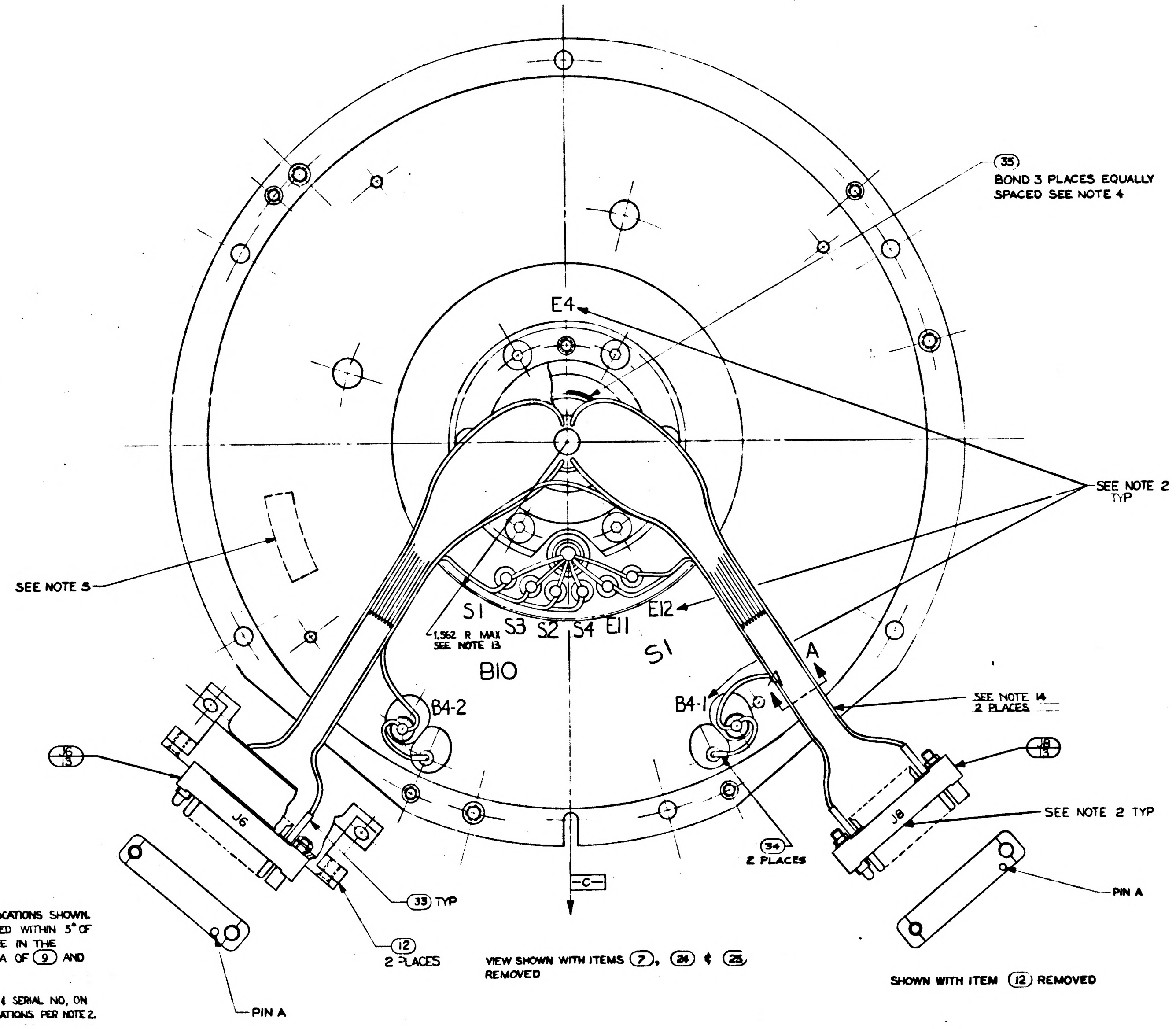
COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1-1	BLU		J6-R	E4-7	∞
1-2	VIO		J6-S	E4-8	
2	WHT/VIO		J6-T	E4-18	
3	BLK		J6-V	E4-1	
4-1	YEL	39	J6-W	B10-S2	∞
4-2	BLU	41	J6-Z	B10-S4	
5	WHT/YEL		B10-WHT/YEL	B10-S2	
6	WHT/BLU		B10-WHT/BLU	B10-S4	
7-1	BLK	36	J6-a	B10-S3	∞
7-2	RED	38	J6-b	B10-S1	
8	WHT/BLK		B10-WHT/BLK	B10-S3	
9	WHT/RED		B10-WHT/RED	B10-S1	
10-1	YEL		J6-c	E4-5	∞
10-2	GRN		J6-d	E4-6	
11-1	WHT/BLU		J6-M	E4-17	∞
11-2	WHT/GRN		J6-L	E4-16	
12-1	WHT/YEL		J6-J	E4-15	∞
12-2	WHT/ORN		J6-H	E4-14	
13-1	WHT/BRN		J6-N	E4-12	∞
13-2	WHT/RED		J6-K	E4-13	
14-1	BRN	43	J6-N	J8-F	∞
14-2	RED	38	J6-K	J8-C	
15-1	BRN		J6-E	E4-2	∞
15-2	RED		J6-D	E4-3	
15-3	ORN		J6-F	E4-4	
16-1	WHT		J6-B	E4-10	∞
16-2	GY		J6-A	E4-9	
16-3	WHT/BLK		J6-C	E4-11	
17-1	WHT/BLK/VIO		J8-R	E4-26	∞
17-2	WHT/BLK/ORN		J8-U	E4-22	
17-3	WHT/BLK/RED		J8-T	E4-21	
17-4	WHT/RED/ORN		J8-V	E4-35	
17-5	WHT/RED/YEL		J8-Y	E4-36	
17-6	WHT/BLK/BLU		J8-P	E4-25	
18-1	WHT/BRN/RED		J8-X	E4-28	∞
18-2	WHT/BLK/GY		J8-W	E4-27	
19-1	WHT/BRN/YEL		J8-a	E4-30	∞
19-2	WHT/BRN/ORN		J8-Z	E4-29	
20-1	WHT/BRN/BLU		J8-d	E4-32	∞
20-2	WHT/BRN/GRN		J8-c	E4-31	
21-1	WHT/BLK/YEL		J8-b	E4-23	∞
21-2	WHT/BLK/GRN		J8-e	E4-24	
21-3	WHT/RED/GY		J8-h	E4-40	
21-4	WHT/RED/VIO		J8-f	E4-39	
22-1	WHT/RED/BLU		J8-M	E4-38	∞
22-2	WHT/RED/GRN		J8-L	E4-37	
23-1	WHT	37	J8-J	B4-2	∞
23-2	BLK	36	J8-H	B4-1	
24	WHT		B4-WHT	B4-2	
25	BLK		B4-BLK	B4-1	
26-1	BRN	43	J8-N	E-12	∞
26-2	GY	40	J8-K	E-11	
27	BRN		S1 BRN	E-12	
28	GY		S1-GY	E-11	
29-1	WHT/BRN/GY		J8-E	E4-34	∞
29-2	WHT/BRN/VIO		J8-D	E4-33	
30	WHT/BLK/BRN		J8-B	E4-20	
31	WHT/GY		J8-A	E4-19	
32-1	WHT/BLK/VIO		P11-R	E4-26	∞
32-2	WHT/BLK/ORN		P11-U	E4-22	
32-3	WHT/BLK/BLU		P11-P	E4-25	
32-4	WHT/BLK/RED		P11-T	E4-21	
32-5	WHT/RED/ORN		P11-V	E4-35	
32-6	WHT/RED/YEL		P11-Y	E4-36	
33-1	WHT/BRN/RED		P11-X	E4-28	∞
33-2	WHT/BLK/GY		P11-W	E4-27	
34-1	WHT/BRN/YEL		P11-a	E4-30	∞
34-2	WHT/BRN/ORN		P11-Z	E4-29	
35-1	WHT/BRN/BLU		P11-d	E4-32	∞
35-2	WHT/BRN/GRN		P11-c	E4-31	
36-1	WHT/BLK/GRN		P11-e	E4-24	∞
36-2	WHT/BLK/YEL		P11-b	E4-23	
37	GRN	42	P11-e	A7-5	
38-1	WHT/BLU		P11-M	E4-17	∞
38-2	WHT/GRN		P11-L	E4-16	
39-1	WHT/YEL		P11-J	E4-15	∞
39-2	WHT/ORN		P11-H	E4-14	
40-1	BRN	43	P11-N	P12-N	∞
40-2	RED	38	P11-K	P12-K	
41-1	BRN	43	P11-N	B10-P1	∞
41-2	RED	38	P11-K	B10-P3	
42-1	WHT/BRN		B10-P1	E4-12	∞
42-2	WHT/RED		B10-P3	E4-13	
43	WHT/RED		B10-WHT/RED	B10-P1	
44	WHT/BLK		B10-WHT/BLK	B10-P3	
45	YEL	39	B10-P2	B10-P4	
46	WHT/YEL		B10-WHT/YEL	B10-P2	
47	WHT/BLU		B10-WHT/BLU	B10-P4	
48-1	WHT/BRN/GY		P11-E	E4-34	∞
48-2	WHT/BRN/VIO		P11-D	E4-33	
49	WHT/BLK/BRN		P11-B	E4-20	
50	WHT/GY		P11-C	E4-19	
51-1	GRN		P12-d	E4-6	∞
51-2	YEL		P12-c	E4-5	
52-1	BLU		P12-R	E4-7	∞
52-2	VIO		P12-S	E4-8	
53	WHT/VIO		P12-T	E4-18	
54	BLK		P12-V	E4-1	
55	BLK	36	P12-V	E9	
56-1	WHT/RED/BLU		P12-M	E4-38	∞
56-2	WHT/RED/GRN		P12-L	E4-37	
57-1	BRN		P12-E	E4-2	∞
57-2	RED		P12-D	E4-3	
57-3	ORN		P12-F	E4-4	
58-1	RED	38	P12-D	A7-4	∞
58-2	ORN	45	P12-F	A7-3	
59-1	WHT		P12-B	E4-10	∞
59-2	GY		P12-A	E4-9	
59-3	WHT/BLK		P12-C	E4-11	
60-1	WHT/RED/VIO		P12-f	E4-39	∞
60-2	WHT/RED/GY		P12-h	E4-40	
61	VIO	44	P12-f	A7-6	
62	GY	40	P12-h	A10-6	
63	GRN	42	A7-5	A10-5	
64-1	RED	36	A7-4	A10-4	∞
64-2	ORN	45	A7-3	A10-3	

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS $\frac{.14}{.10}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (9) TO BE ALIGNED WITHIN 5° OF -C- ℄ IN DIRECTION OF THE ARROW WHEN (1) & (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (47) TO INSIDE DIA OF (9) AND FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (35) TO (2) & (11) AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER, MANUFACTURERS SYMBOL & SERIAL NO, ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%
   - (11) 100 IN-LB
   - (23) 10.0 IN-LB
   - (24)(26)(27)(28)(29) 5.0 IN-LB
   - (30)(31) 3.5 IN-LB
7. SOLDER ALL LEADS FROM (4) (5) & (6) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (14) PER MIL-STD-440 USING (21). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM BEARING HOUSING (1) OR REMOVE TORQUE MOTOR (6) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (6).
10. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000008.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

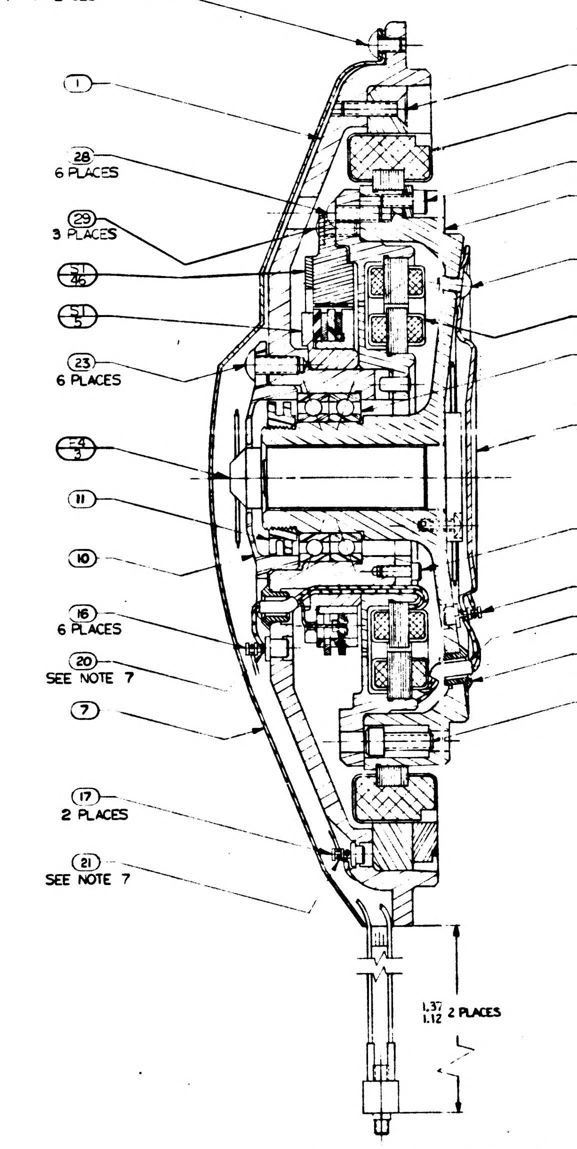


SECTION A-A
2 PLACES



VIEW SHOWN WITH ITEMS (7), (24) & (25) REMOVED

SHOWN WITH ITEM (12) REMOVED



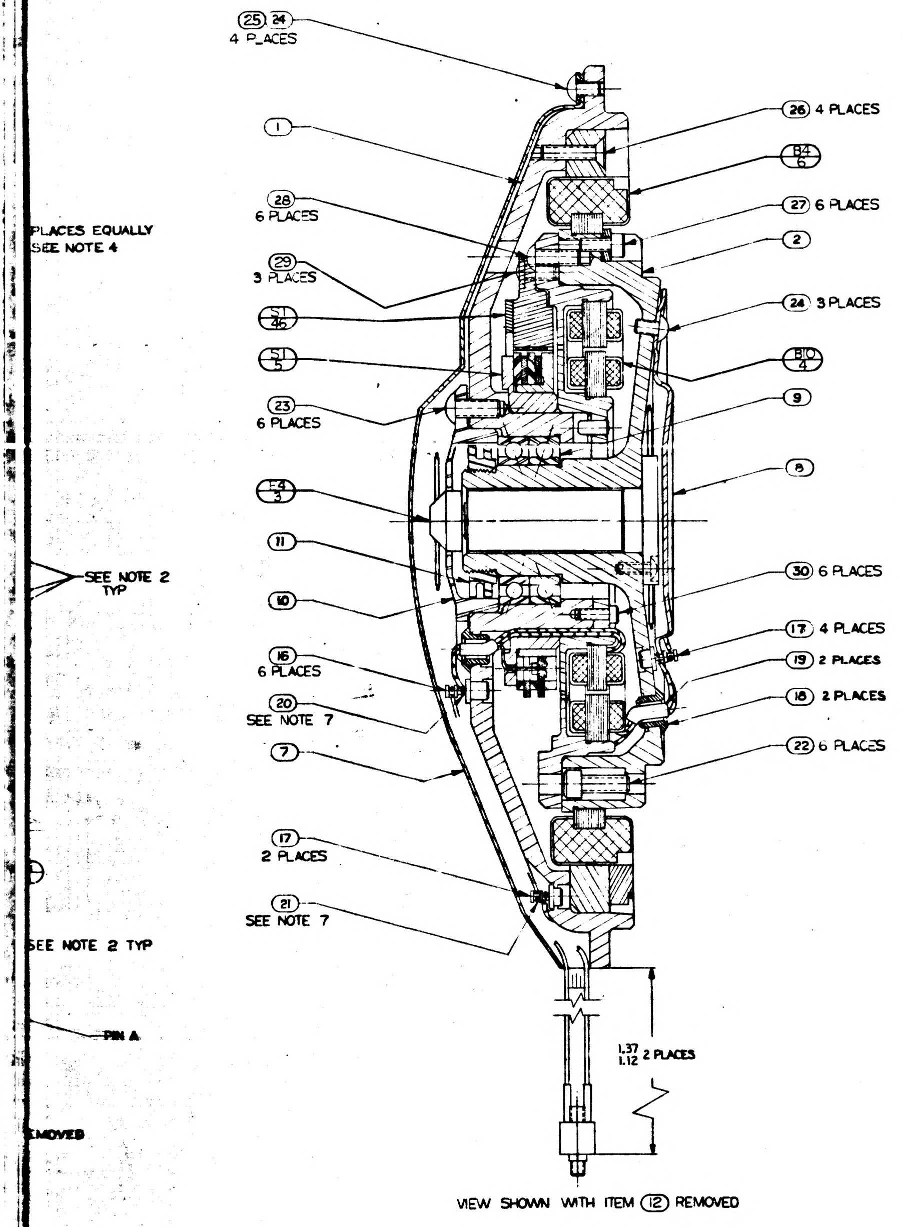
VIEW SHOWN WITH ITEM (2) REMOVED

1000008 K 1

INCHES
PHOTOGRAPHIC SCALE ONLY

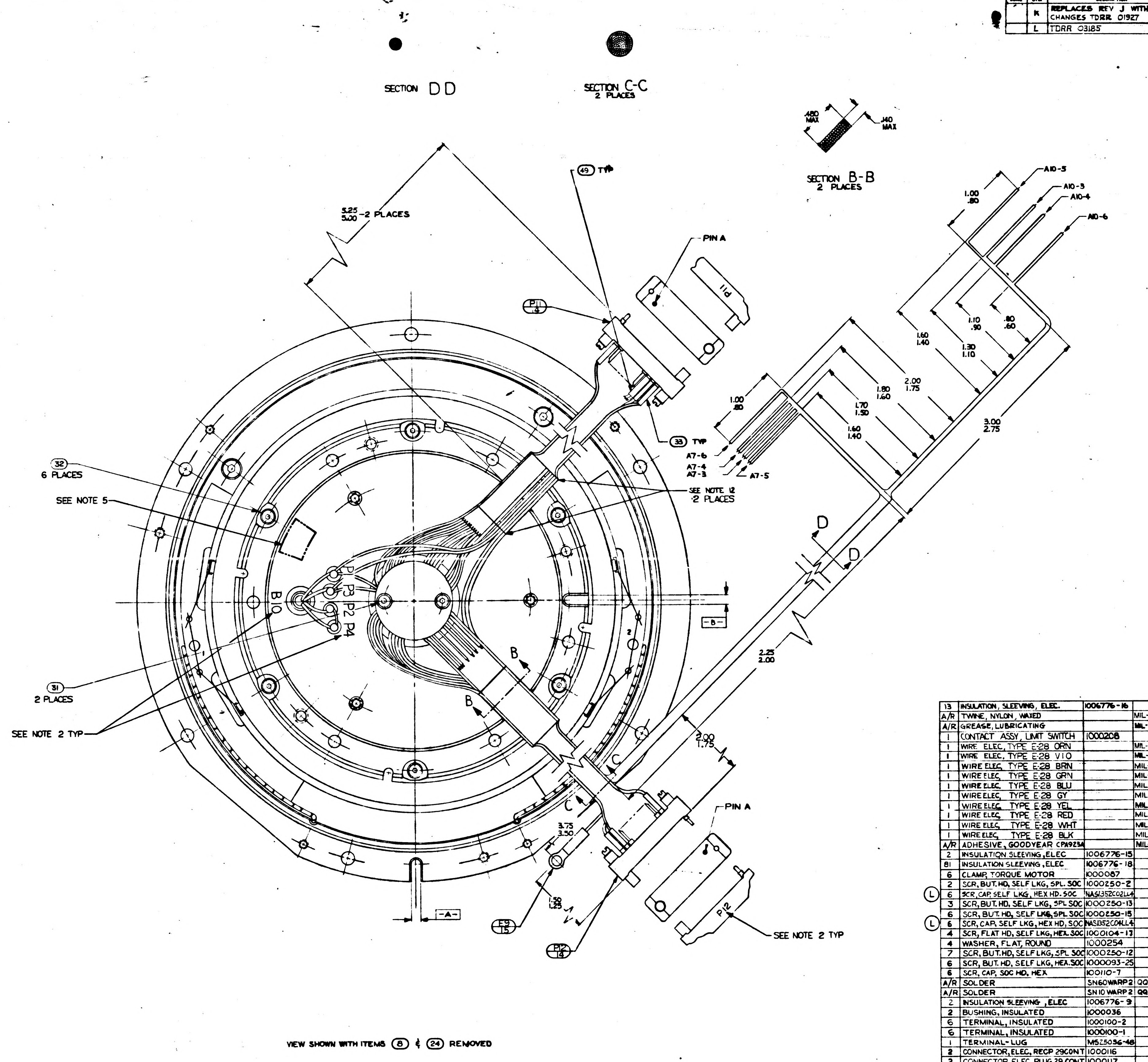
F-1

		REVISIONS			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 01927	7/13/63		
	L	TDRR 03185	7-26-63		



(25) (24) 4 PLACES
(1)
(26) 4 PLACES
(B4 6)
(28) 6 PLACES
(27) 6 PLACES
(2)
PLACES EQUALLY SEE NOTE 4
(29) 3 PLACES
(24) 3 PLACES
(S1 3)
(B10 4)
(S1 5)
(9)
(23) 6 PLACES
(8)
(E4 3)
(11)
SEE NOTE 2 TYP
(10)
(30) 6 PLACES
(17) 4 PLACES
(19) 2 PLACES
(16) 6 PLACES
(18) 2 PLACES
(20) SEE NOTE 7
(22) 6 PLACES
(7)
(17) 2 PLACES
(21) SEE NOTE 7
SEE NOTE 2 TYP
PIN A
1.37 1.12 2 PLACES
MOVED

VIEW SHOWN WITH ITEM (12) REMOVED



SECTION DD
SECTION C-C 2 PLACES
.480 MAX
.140 MAX
SECTION B-B 2 PLACES
5.25 5.00 -2 PLACES
(49) TYP
A10-5
A10-3
A10-4
A10-6
1.00 .80
PIN A
(P11 4)
1.10 .90
.80 .60
1.60 1.40
1.30 1.10
2.00 1.75
1.80 1.60
1.70 1.50
1.00 .80
1.60 1.40
3.00 2.75
(33) TYP
A7-6
A7-4
A7-3
A7-5
(32) 6 PLACES
SEE NOTE 12 2 PLACES
SEE NOTE 5
D
D
B10
P3
P2
P4
-B-
B
B
2.25 2.00
(31) 2 PLACES
SEE NOTE 2 TYP
2.00 1.75
C
C
PIN A
3.75 3.50
-A-
(E3 15)
1.30 1.25
(P12 14)
SEE NOTE 2 TYP

VIEW SHOWN WITH ITEMS (8) & (24) REMOVED

REPLACES REV J WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	13	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LG	49
	A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	48
	A/R	GREASE, LUBRICATING		MIL-G-25760		47
	1	CONTACT ASSY, LIMIT SWITCH	1000208			46
	1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
	1	WIRE ELEC, TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
	1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
	1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
	1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
	1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
	1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
	1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
	1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
	1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	12" TOTAL LG	36
	A/R	ADHESIVE, GOODYEAR CPA923A		MIL-A-13883		35
	2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LG	34
	81	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
	6	CLAMP, TORQUE MOTOR	1000087			32
	2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
(L)	6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS1352C02LL4			30
	3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
	6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
(L)	6	SCR, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			27
	4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-17			26
	4	WASHER, FLAT, ROUND	1000254			25
	7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
	6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
	6	SCR, CAP, SOC HD, HEX	100110-7			22
	A/R	SOLDER	SN60WARP2	QQ-S-571		21
	A/R	SOLDER	SN10 WARP2	QQ-S-571		20
	2	INSULATION SLEEVING, ELEC	1006776-9		5/16 LG	19
	2	BUSHING, INSULATED	1000036			18
	6	TERMINAL, INSULATED	1000100-2			17
	6	TERMINAL, INSULATED	1000100-1			16
	1	TERMINAL-LUG	MS25036-48			15
	2	CONNECTOR, ELEC, RECP 29CONT	1000116			14
	2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
	2	BRACKET, CONNECTOR	1000125			12
	1	NUT, BEARING RETAINER	1000086			11
	1	RETAINER, BEARING I.A. & M.A.	1000090			10
	1	BEARING, BALL, DUPLEX	1000029			9
	1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
	1	GUIDE, WIRE, BRG HSG. M.A.	1000092			7
	1	MOTOR, TORQUE, DC, FRAMLESS	1000075			6
	1	LIMIT SWITCH, M.A.	1000211			5
	1	RESOLVER, 1X TRANSMITTER	1000030			4
	1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
	1	SHAFT, STUB 1X M.A.	1000105			2
	1	HOUSING, BEARING 1X M.A.	1000106			1

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED: DATE 7/6/63
CHECKED
DRAWN D.M.WHITE
APPROVED FOR MSC
MIT/IL APPROVAL DATE

INTER GIMBAL SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000008
SHEET 1 OF 1

1000008 | REV L

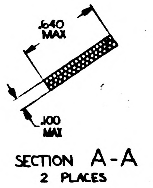
1000008 L

MASTER

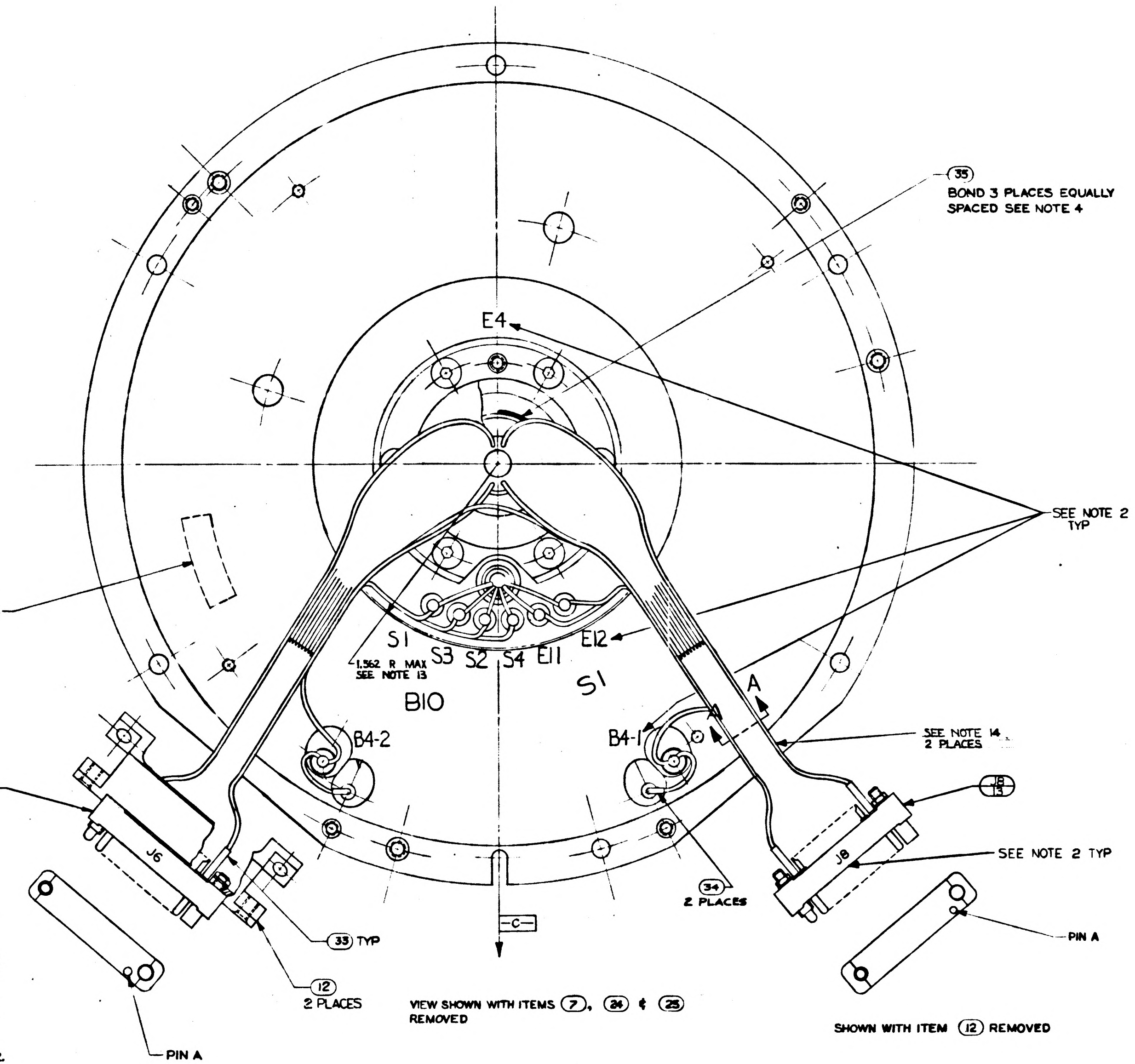
INCHES
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1-1	BLU		J6-R	E4-7	8
1-2	VIO		J6-S	E4-8	
2	WHT/VIO		J6-T	E4-18	
3	BLK		J6-V	E4-1	
4-1	YEL	39	J6-W	B10-S2	8
4-2	BLU	41	J6-Z	B10-S4	
5	WHT/YEL		B10-WHT/YEL	B10-S2	
6	WHT/BLU		B10-WHT/BLU	B10-S4	
7-1	BLK	36	J6-a	B10-S3	8
7-2	RED	38	J6-b	B10-S1	
8	WHT/BLK		B10-WHT/BLK	B10-S3	
9	WHT/RED		B10-WHT/RED	B10-S1	
10-1	YEL		J6-c	E4-5	8
10-2	GRN		J6-d	E4-6	
11-1	WHT/BLU		J6-M	E4-17	8
11-2	WHT/GRN		J6-L	E4-16	
12-1	WHT/YEL		J6-J	E4-15	8
12-2	WHT/ORN		J6-H	E4-14	
13-1	WHT/BRN		J6-N	E4-12	8
13-2	WHT/RED		J6-K	E4-13	
14-1	BRN	43	J6-N	J8-F	8
14-2	RED	38	J6-K	J8-C	
15-1	BRN		J6-E	E4-2	8
15-2	RED		J6-D	E4-3	
15-3	ORN		J6-F	E4-4	
16-1	WHT		J6-B	E4-10	8
16-2	GY		J6-A	E4-9	
16-3	WHT/BLK		J6-C	E4-11	
17-1	WHT/BLK/VIO		J8-R	E4-26	8
17-2	WHT/BLK/ORN		J8-U	E4-22	
17-3	WHT/BLK/RED		J8-T	E4-21	
17-4	WHT/RED/ORN		J8-V	E4-35	
17-5	WHT/RED/YEL		J8-Y	E4-36	
17-6	WHT/BLK/BLU		J8-P	E4-25	
18-1	WHT/BRN/RED		J8-X	E4-28	8
18-2	WHT/BLK/GY		J8-W	E4-27	
19-1	WHT/BRN/YEL		J8-a	E4-30	8
19-2	WHT/BRN/ORN		J8-Z	E4-29	
20-1	WHT/BRN/BLU		J8-d	E4-32	8
20-2	WHT/BRN/GRN		J8-c	E4-31	
21-1	WHT/BLK/YEL		J8-b	E4-23	8
21-2	WHT/BLK/GRN		J8-e	E4-24	
21-3	WHT/RED/GY		J8-h	E4-40	
21-4	WHT/RED/VIO		J8-f	E4-39	
22-1	WHT/RED/BLU		J8-M	E4-38	8
22-2	WHT/RED/GRN		J8-L	E4-37	
23-1	WHT	37	J8-J	B4-2	8
23-2	BLK	36	J8-H	B4-1	
24	WHT		B4-WHT	B4-2	
25	BLK		B4-BLK	B4-1	
26-1	BRN	43	J8-N	E-12	8
26-2	GY	40	J8-K	E-11	
27	BRN		S1-BRN	E-12	
28	GY		S1-GY	E-11	
29-1	WHT/BRN/GY		J8-E	E4-34	8
29-2	WHT/BRN/VIO		J8-D	E4-33	
30	WHT/BLK/BRN		J8-B	E4-20	
31	WHT/GY		J8-A	E4-19	
32-1	WHT/BLK/VIO		P11-R	E4-26	8
32-2	WHT/BLK/ORN		P11-U	E4-22	
32-3	WHT/BLK/BLU		P11-P	E4-25	
32-4	WHT/BLK/RED		P11-T	E4-21	
32-5	WHT/RED/ORN		P11-V	E4-35	
32-6	WHT/RED/YEL		P11-Y	E4-36	
33-1	WHT/BRN/RED		P11-X	E4-28	8
33-2	WHT/BLK/GY		P11-W	E4-27	
34-1	WHT/BRN/YEL		P11-a	E4-30	8
34-2	WHT/BRN/ORN		P11-Z	E4-29	
35-1	WHT/BRN/BLU		P11-d	E4-32	8
35-2	WHT/BRN/GRN		P11-c	E4-31	
36-1	WHT/BLK/GRN		P11-e	E4-24	8
36-2	WHT/BLK/YEL		P11-b	E4-23	
37	GRN	42	P11-e	A7-5	
38-1	WHT/BLU		P11-M	E4-17	8
38-2	WHT/GRN		P11-L	E4-16	
39-1	WHT/YEL		P11-J	E4-15	8
39-2	WHT/ORN		P11-H	E4-14	
40-1	BRN	43	P11-N	P12-N	8
40-2	RED	38	P11-K	P12-K	
41-1	BRN	43	P11-N	B10-P1	8
41-2	RED	38	P11-K	B10-P3	
42-1	WHT/BRN		B10-P1	E4-12	8
42-2	WHT/RED		B10-P3	E4-13	
43	WHT/RED		B10-WHT/RED	B10-P1	
44	WHT/BLK		B10-WHT/BLK	B10-P3	
45	YEL	39	B10-P2	B10-P4	
46	WHT/YEL		B10-WHT/YEL	B10-P2	
47	WHT/BLU		B10-WHT/BLU	B10-P4	
48-1	WHT/BRN/GY		P11-E	E4-34	8
48-2	WHT/BRN/VIO		P11-D	E4-33	
49	WHT/BLK/BRN		P11-B	E4-20	
50	WHT/GY		P11-C	E4-19	
51-1	GRN		P12-d	E4-6	8
51-2	YEL		P12-c	E4-5	
52-1	BLU		P12-R	E4-7	8
52-2	VIO		P12-S	E4-8	
53	WHT/VIO		P12-T	E4-18	
54	BLK		P12-V	E4-1	
55	BLK	36	P12-V	E9	
56-1	WHT/RED/BLU		P12-M	E4-38	8
56-2	WHT/RED/GRN		P12-L	E4-37	
57-1	BRN		P12-E	E4-2	8
57-2	RED		P12-D	E4-3	
57-3	ORN		P12-F	E4-4	
58-1	RED	38	P12-D	A7-4	8
58-2	ORN	45	P12-F	A7-3	
59-1	WHT		P12-B	E4-10	8
59-2	GY		P12-A	E4-9	
59-3	WHT/BLK		P12-C	E4-11	
60-1	WHT/RED/VIO		P12-f	E4-39	8
60-2	WHT/RED/GY		P12-h	E4-40	
61	VIO	44	P12-f	A7-6	
62	GY	40	P12-h	A10-6	
63	GRN	42	A7-5	A10-5	
64-1	RED	36	A7-4	A10-4	8
64-2	ORN	45	A7-3	A10-3	

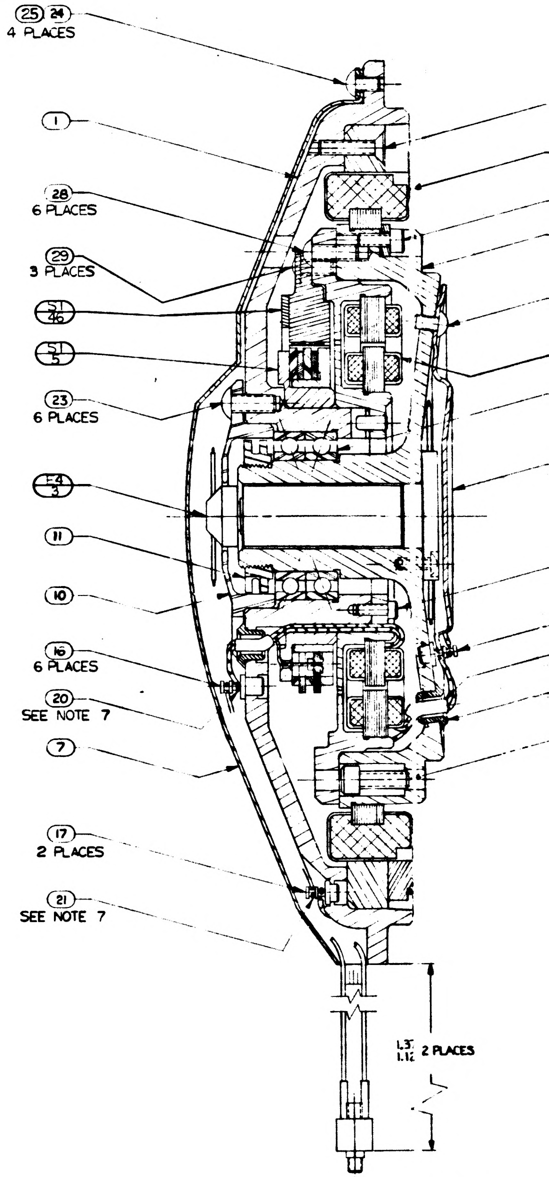


SECTION A-A
2 PLACES



VIEW SHOWN WITH ITEMS (7), (24) & (25) REMOVED

SHOWN WITH ITEM (12) REMOVED



VIEW SHOWN WITH ITEM (12) REMOVED

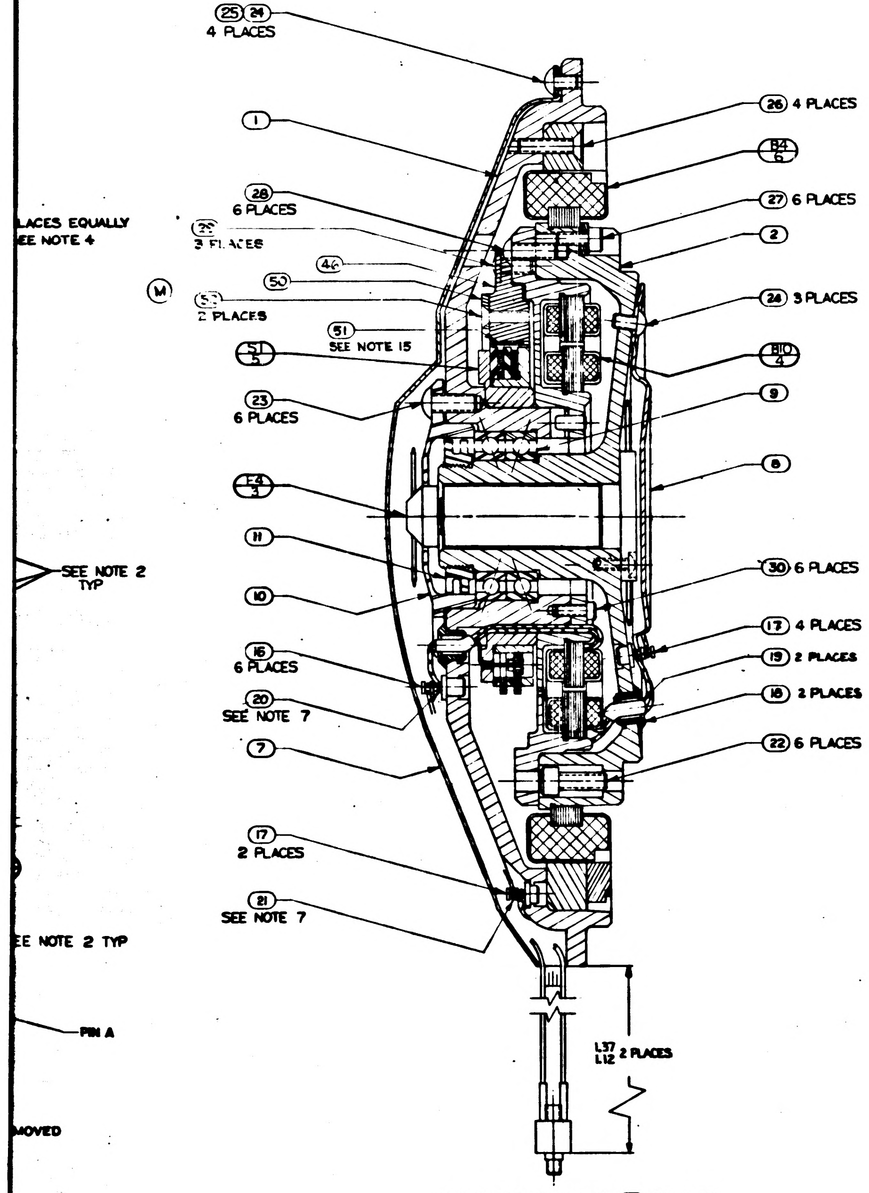
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS $\frac{.14}{.10}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (9) TO BE ALIGNED WITHIN 5° OF -C- ℄ IN DIRECTION OF THE ARROW WHEN (1) & (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (47) TO INSIDE DIA OF (9) AND FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (35) TO (2) & (11) AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER, MANUFACTURERS SYMBOL & SERIAL NO, ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%
   - (11) 100 IN-LB
   - (23) 10.0 IN-LB
   - (24)(26)(27)(28)(29) 5.0 IN-LB
   - (30)(31) 3.5 IN-LB
7. SOLDER ALL LEADS FROM (4) (5) & (6) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (14) PER MIL-STD-440 USING (21). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM BEARING HOUSING (1) OR REMOVE TORQUE MOTOR (6) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (6).
10. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000008.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

1000008 L 1

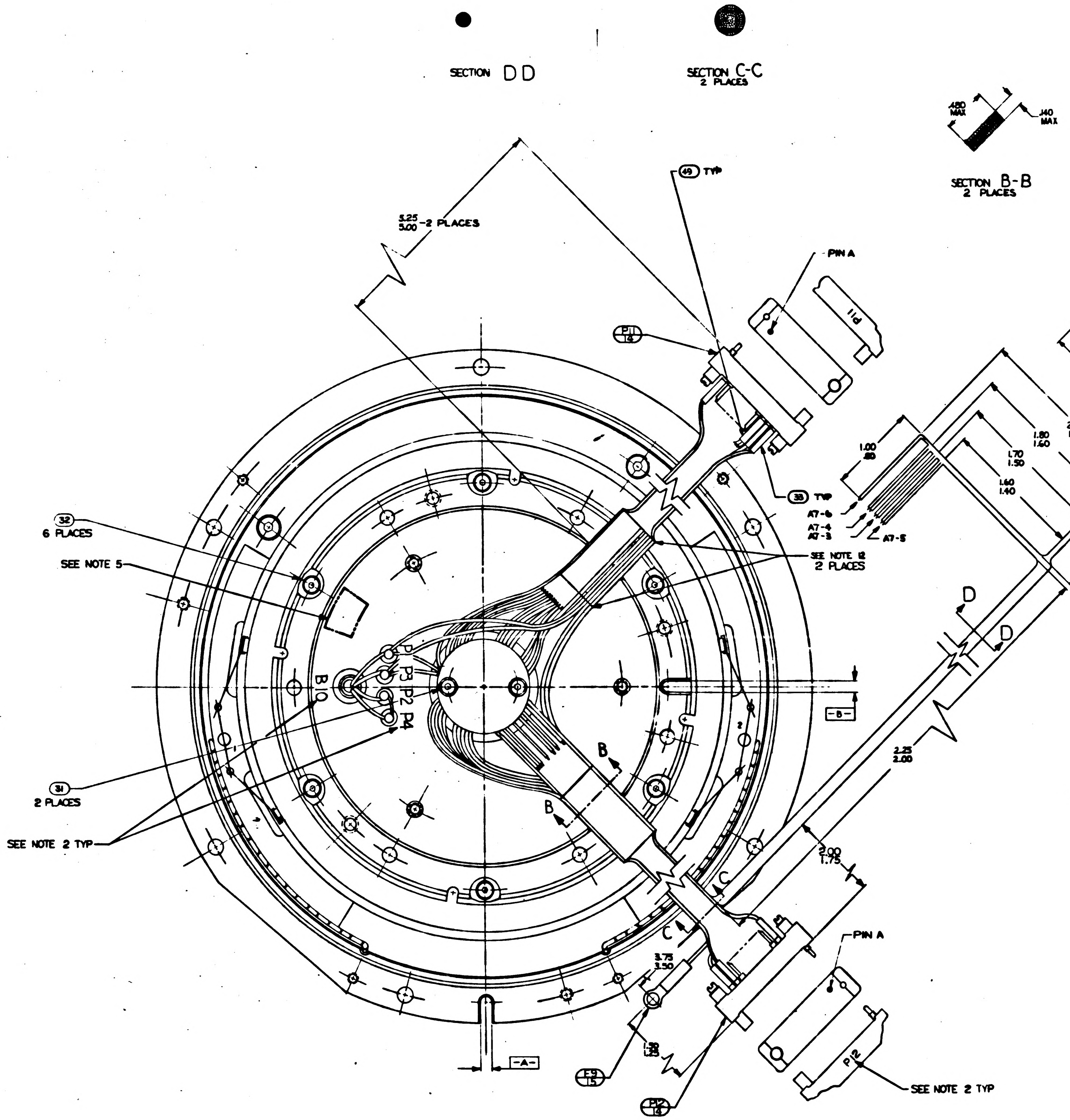
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	K	REPLACES REV J WITH CHANGES TDRR 01927	7/3/63	AJB	
	L	TDRR 03185	7-26-63		
	M	TDRR 03857	10-14-63		

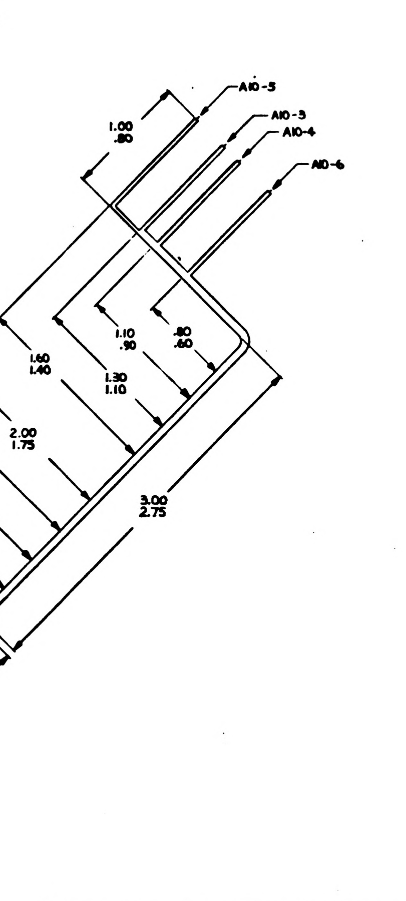


25 24 4 PLACES
1
28 6 PLACES
LACES EQUALLY EE NOTE 4
2? 3 PLACES
42
50
M
52 2 PLACES
51 SEE NOTE 15
S1 5
23 6 PLACES
E4 3
11
10
SEE NOTE 2 TYP
16 6 PLACES
20 SEE NOTE 7
7
17 2 PLACES
21 SEE NOTE 7
EE NOTE 2 TYP
PIN A
MOVED
26 4 PLACES
R4 6
27 6 PLACES
2
24 3 PLACES
R10 4
9
8
30 6 PLACES
17 4 PLACES
19 2 PLACES
18 2 PLACES
22 6 PLACES
1.37 1.12 2 PLACES

VIEW SHOWN WITH ITEM (12) REMOVED



SECTION DD
SECTION C-C 2 PLACES
5.25 5.00 -2 PLACES
49 TYP
PIN A
P11 18
P1
32 6 PLACES
SEE NOTE 5
38 TYP
A7-6
A7-4
A7-3
A7-5
SEE NOTE 12 2 PLACES
B1
P3
P2
P4
31 2 PLACES
SEE NOTE 2 TYP
B
B
C
C
-B-
-A-
3.75 3.50
.50 .35
E3 15
P12 14
P2
PIN A
SEE NOTE 2 TYP



.480 MAX
.140 MAX
SECTION B-B 2 PLACES
A10-5
A10-3
A10-4
A10-6
1.00 .80
1.10 .90
.80 .60
1.60 1.40
1.30 1.10
2.00 1.75
1.80 1.60
1.70 1.50
1.60 1.40
1.00 .80
3.00 2.75
D
D
2.25 2.00
2.00 1.75

VIEW SHOWN WITH ITEMS (8) & (24) REMOVED

REPLACES REV J WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(M)	2	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-3			52
(M)	1	CONTACT	1000199		SEE NOTE 15	51
(M)	1	CLIP, RETAINING	1000198			50
	13	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LG	49
	A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	48
	A/R	GREASE, LUBRICATING		MIL-G-25760		47
(M)	1	BRACKET, RETAINING	1000200			46
	1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
	1	WIRE ELEC, TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
	1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
	1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
	1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
	1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
	1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
	1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
	1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
	1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	12" TOTAL LG	36
	A/R	ADHESIVE, GOODYEAR CPA923A		MIL-A-13883		35
	2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LG	34
	81	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
	6	CLAMP, TORQUE MOTOR	1000087			32
	2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
(L)	6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS1352C02LL4			30
	3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
	6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
(L)	6	SCR, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			27
	4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-17			26
	4	WASHER, FLAT, ROUND	1000254			25
	7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
	6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
	6	SCR, CAP, SOC HD, HEX	100110-7			22
	A/R	SOLDER	SN60WARP2	QQ-S-571		21
	A/R	SOLDER	SN10WARP2	QQ-S-571		20
	2	INSULATION SLEEVING, ELEC	1006776-9		5/16 LG	19
	2	BUSHING, INSULATED	1000036			18
	6	TERMINAL, INSULATED	1000100-2			17
	6	TERMINAL, INSULATED	1000100-1			16
	1	TERMINAL-LUG	MS25036-48			15
	2	CONNECTOR, ELEC, RECP 29 CONT	1000116			14
	2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
	2	BRACKET, CONNECTOR	1000125			12
	1	NUT, BEARING RETAINER	1000086			11
	1	RETAINER, BEARING I.A. & M.A.	1000090			10
	1	BEARING, BALL, DUPLEX	1000029			9
	1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
	1	GUIDE, WIRE, BRG HSG M.A.	1000092			7
	1	MOTOR, TORQUE, DC, FRAMLESS	1000075			6
	1	LIMIT SWITCH, M.A.	1000211			5
	1	RESOLVER, 1X TRANSMITTER	1000030			4
	1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
	1	SHAFT, STUB 1X M.A.	1000105			2
	1	HOUSING, BEARING 1X M.A.	1000106			1

LIST OF PARTS AND MATERIALS

1000008 M

NEXT ASSY	USED ON
1000203	DL1000201
1000003	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED AJBoyce DATE 7/10/63
CHECKED
DRAWN D.M.WHITE 12-13-63
APPROVED FOR MSC Jack Barnard
MIT/IL APPROVAL John Emery DATE

INTER GIMBAL SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000008
SHEET 1 OF 1

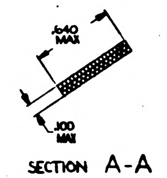
1000008	REV	SHEET
		1

MASTER

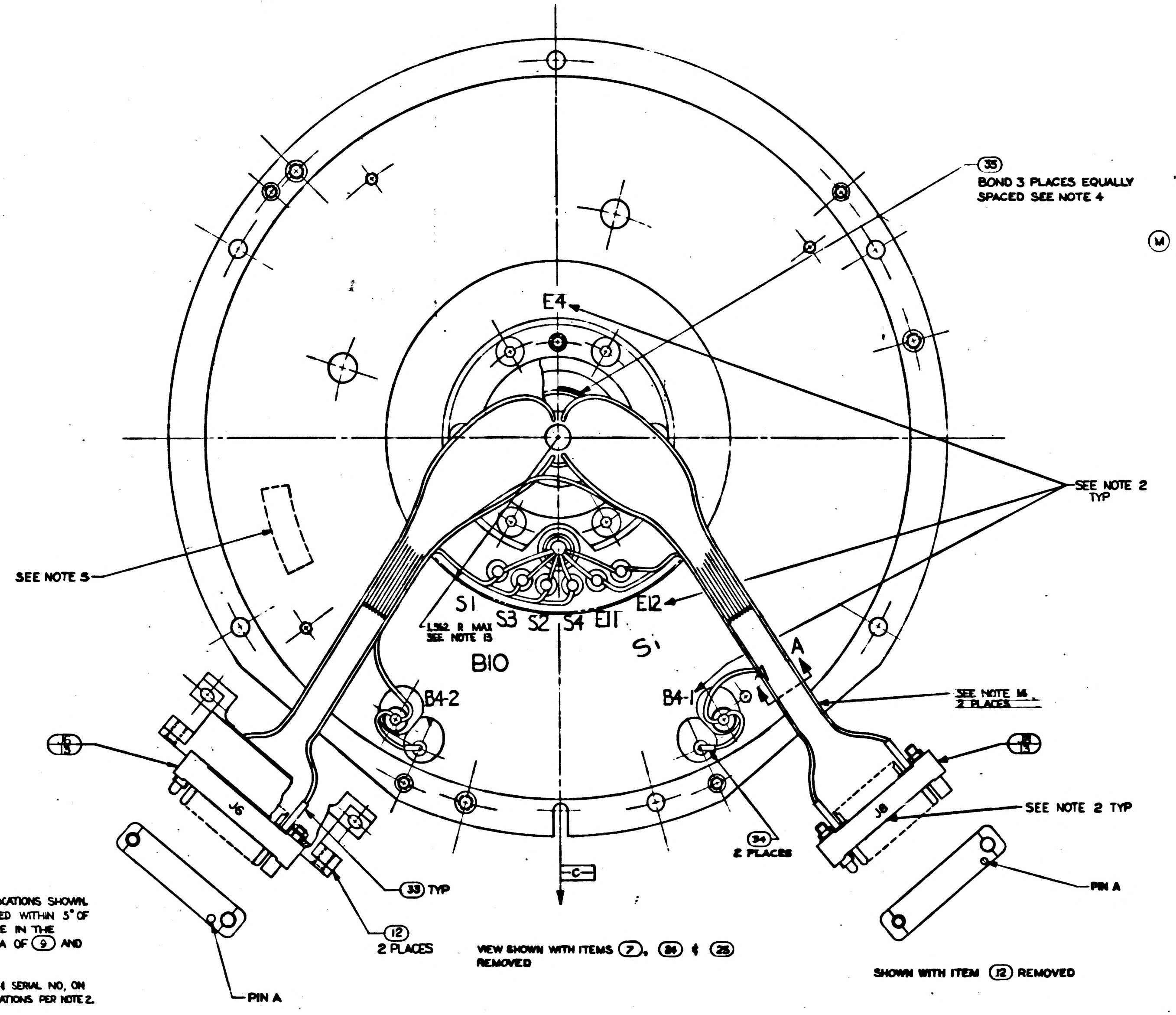
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1-1	BLU		J6-R	E4-7	∞
1-2	VIO		J6-S	E4-8	∞
2	WHT/VIO		J6-T	E4-18	
3	BLK		J6-V	E4-1	
4-1	YEL	39	J6-W	B10-S2	∞
4-2	BLU	41	J6-Z	B10-S4	∞
5	WHT/YEL		B10-WHT/YEL	B10-S2	
6	WHT/BLU		B10-WHT/BLU	B10-S4	
7-1	BLK	36	J6-a	B10-S3	∞
7-2	RED	38	J6-b	B10-S1	∞
8	WHT/BLK		B10-WHT/BLK	B10-S3	
9	WHT/RED		B10-WHT/RED	B10-S1	
10-1	YEL		J6-c	E4-5	∞
10-2	GRN		J6-d	E4-6	∞
11-1	WHT/BLU		J6-M	E4-17	∞
11-2	WHT/GRN		J6-L	E4-16	∞
12-1	WHT/YEL		J6-J	E4-15	∞
12-2	WHT/ORN		J6-H	E4-14	∞
13-1	WHT/BRN		J6-N	E4-12	∞
13-2	WHT/RED		J6-K	E4-13	∞
14-1	BRN	43	J6-N	J8-F	∞
14-2	RED	38	J6-K	J8-C	∞
15-1	BRN		J6-E	E4-2	∞
15-2	RED		J6-D	E4-3	∞
15-3	ORN		J6-F	E4-4	∞
16-1	WHT		J6-B	E4-10	∞
16-2	GY		J6-A	E4-9	∞
16-3	WHT/BLK		J6-C	E4-11	∞
17-1	WHT/BLK/VIO		J8-R	E4-26	∞
17-2	WHT/BLK/ORN		J8-U	E4-22	∞
17-3	WHT/BLK/RED		J8-T	E4-21	∞
17-4	WHT/RED/ORN		J8-V	E4-35	∞
7-5	WHT/RED/YEL		J8-Y	E4-36	∞
17-6	WHT/BLK/BLU		J8-P	E4-25	∞
18-1	WHT/BRN/RED		J8-X	E4-28	∞
18-2	WHT/BLK/GY		J8-W	E4-27	∞
19-1	WHT/BRN/YEL		J8-a	E4-30	∞
19-2	WHT/BRN/ORN		J8-Z	E4-29	∞
20-1	WHT/BRN/BLU		J8-d	E4-32	∞
20-2	WHT/BRN/GRN		J8-c	E4-31	∞
21-1	WHT/BLK/YEL		J8-b	E4-23	∞
21-2	WHT/BLK/GRN		J8-e	E4-24	∞
21-3	WHT/RED/GY		J8-h	E4-40	∞
21-4	WHT/RED/VIO		J8-f	E4-39	∞
22-1	WHT/RED/BLU		J8-M	E4-38	∞
22-2	WHT/RED/GRN		J8-L	E4-37	∞
23-1	WHT	37	J8-J	B4-2	∞
23-2	BLK	36	J8-H	B4-1	∞
24	WHT		B4-WHT	B4-2	
25	BLK		B4-BLK	B4-1	
26-1	BRN	43	J8-N	E-12	∞
26-2	GY	40	J8-K	E-11	∞
27	BRN		S1-BRN	E-12	
28	GY		S1-GY	E-11	
29-1	WHT/BRN/GY		J8-E	E4-34	∞
29-2	WHT/BRN/VIO		J8-D	E4-33	∞
30	WHT/BLK/BRN		J8-B	E4-20	
31	WHT/GY		J8-A	E4-19	
32-1	WHT/BLK/VIO		P11-R	E4-26	∞
32-2	WHT/BLK/ORN		P11-U	E4-22	∞
32-3	WHT/BLK/BLU		P11-P	E4-25	∞
32-4	WHT/BLK/RED		P11-T	E4-21	∞
32-5	WHT/RED/ORN		P11-V	E4-35	∞
32-6	WHT/RED/YEL		P11-Y	E4-36	∞
33-1	WHT/BRN/RED		P11-X	E4-28	∞
33-2	WHT/BLK/GY		P11-W	E4-27	∞
34-1	WHT/BRN/YEL		P11-a	E4-30	∞
34-2	WHT/BRN/ORN		P11-Z	E4-29	∞
35-1	WHT/BRN/BLU		P11-d	E4-32	∞
35-2	WHT/BRN/GRN		P11-c	E4-31	∞
36-1	WHT/BLK/GRN		P11-e	E4-24	∞
36-2	WHT/BLK/YEL		P11-b	E4-23	∞
37	GRN	42	P11-e	A7-5	
38-1	WHT/BLU		P11-M	E4-17	∞
38-2	WHT/GRN		P11-L	E4-16	∞
39-1	WHT/YEL		P11-J	E4-15	∞
39-2	WHT/ORN		P11-H	E4-14	∞
40-1	BRN	43	P11-N	P12-N	∞
40-2	RED	38	P11-K	P12-K	∞
41-1	BRN	43	P11-N	B10-P1	∞
41-2	RED	38	P11-K	B10-P3	∞
42-1	WHT/BRN		B10-P1	E4-12	∞
42-2	WHT/RED		B10-P3	E4-13	∞
43	WHT/RED		B10-WHT/RED	B10-P1	
44	WHT/BLK		B10-WHT/BLK	B10-P3	
45	YEL	39	B10-P2	B10-P4	
46	WHT/YEL		B10-WHT/YEL	B10-P2	
47	WHT/BLU		B10-WHT/BLU	B10-P4	
48-1	WHT/BRN/GY		P11-E	E4-34	∞
48-2	WHT/BRN/VIO		P11-D	E4-33	∞
49	WHT/BLK/BRN		P11-B	E4-20	
50	WHT/GY		P11-C	E4-19	
51-1	GRN		P12-d	E4-6	∞
51-2	YEL		P12-c	E4-5	∞
52-1	BLU		P12-R	E4-7	∞
52-2	VIO		P12-S	E4-8	∞
53	WHT/VIO		P12-T	E4-18	
54	BLK		P12-V	E4-1	
55	BLK	36	P12-V	E9	
56-1	WHT/RED/BLU		P12-M	E4-38	∞
56-2	WHT/RED/GRN		P12-L	E4-37	∞
57-1	BRN		P12-E	E4-2	∞
57-2	RED		P12-D	E4-3	∞
57-3	ORN		P12-F	E4-4	∞
58-1	RED	38	P12-D	A7-4	∞
58-2	ORN	45	P12-F	A7-3	∞
59-1	WHT		P12-B	E4-10	∞
59-2	GY		P12-A	E4-9	∞
59-3	WHT/BLK		P12-C	E4-11	∞
60-1	WHT/RED/VIO		P12-f	E4-39	∞
60-2	WHT/RED/GY		P12-h	E4-40	∞
61	VIO	44	P12-f	A7-6	
62	GY	40	P12-h	A10-6	
63	GRN	42	A7-5	A10-5	
64-1	RED	36	A7-4	A10-4	∞
64-2	ORN	45	A7-3	A10-3	∞

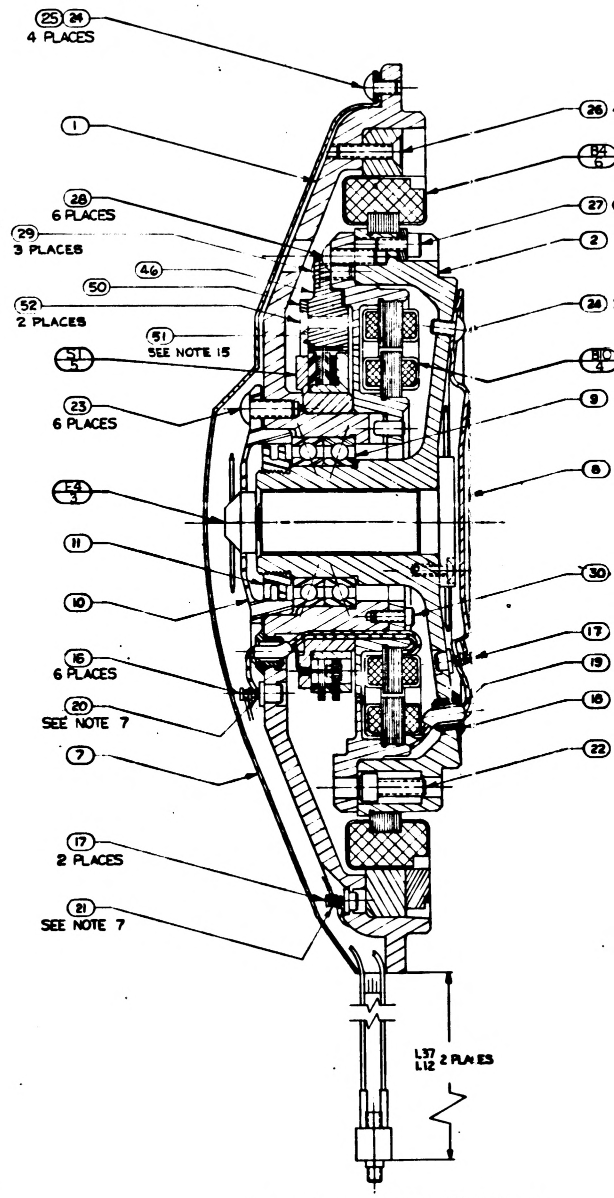


SECTION A-A
2 PLACES



VIEW SHOWN WITH ITEMS ⑦, ㉔ & ㉕ REMOVED

SHOWN WITH ITEM ⑫ REMOVED



VIEW SHOWN WITH ITEM ⑫ REMOVED

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS $\frac{.14}{.10}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑨ TO BE ALIGNED WITHIN 5° OF $\boxed{-C-}$ & IN DIRECTION OF THE ARROW WHEN ① & ② ARE IN THE POSITION SHOWN. APPLY THIN COAT OF ㊼ TO INSIDE DIA OF ⑨ AND FAYING SURFACE OF ② BEFORE ASSEMBLY.
4. APPLY ㉟ TO ② & ⑪ AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER, MANUFACTURERS SYMBOL & SERIAL NO, ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%
   - ⑪ 100 IN-LB
   - ㉓ 10.0 IN-LB
   - ㉔㉖㉗㉘㉙ 5.0 IN-LB
   - (52)㉚㉛ 3.5 IN-LB

Ⓜ

7. SOLDER ALL LEADS FROM ④⑤ & ⑥ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ⑳. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑬ & ⑭ PER MIL-STD-440 USING ㉑. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.
9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM BEARING HOUSING ① OR REMOVE TORQUE MOTOR ⑥ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ⑥.
10. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000008.
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
15. Ⓜ SELECT ITEM (51) TO MEET TORQUE REQUIREMENTS OF ATP 1000008

1000008 REV M SHEET 1

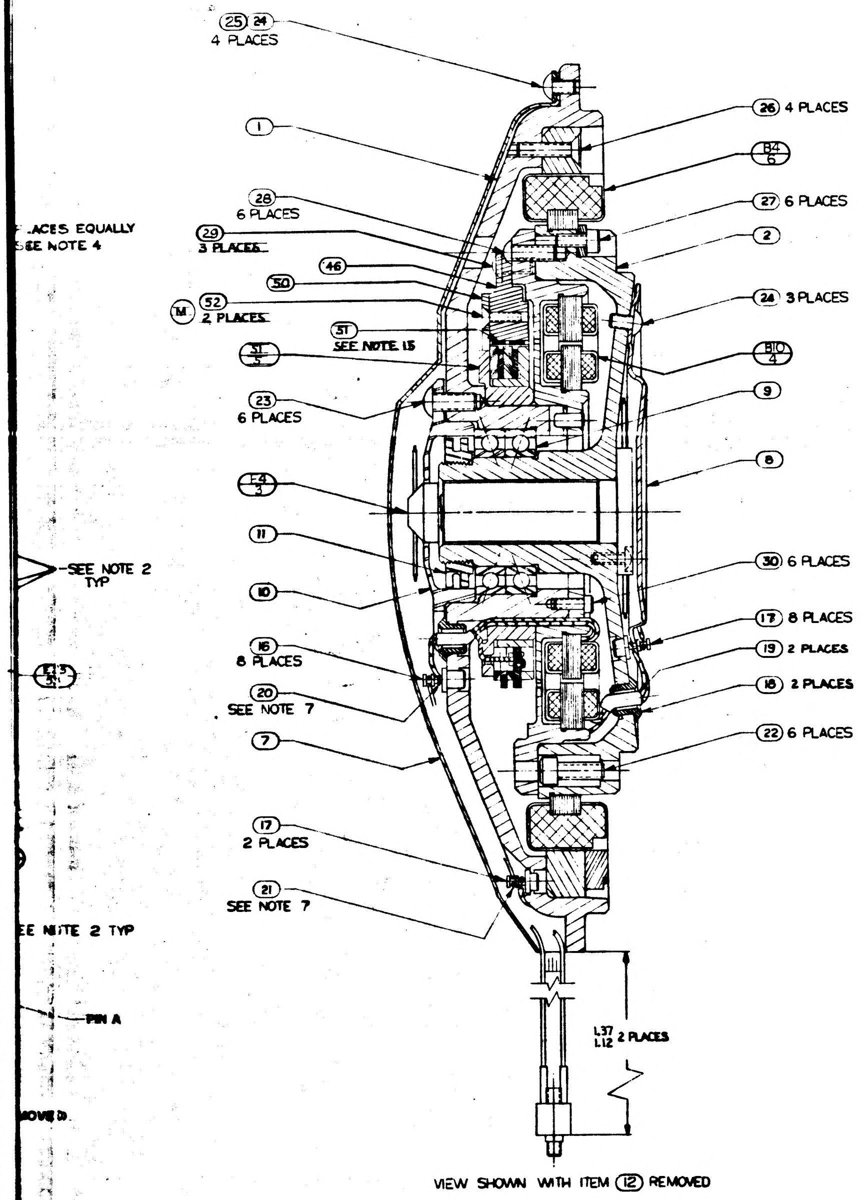
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 01927	7/9/63	
	L	TDRR 03185	7/26/63	
	M	TDRR 03857	10/14/63	
	N	TDRR 05169	1/7/64	

SECTION DD

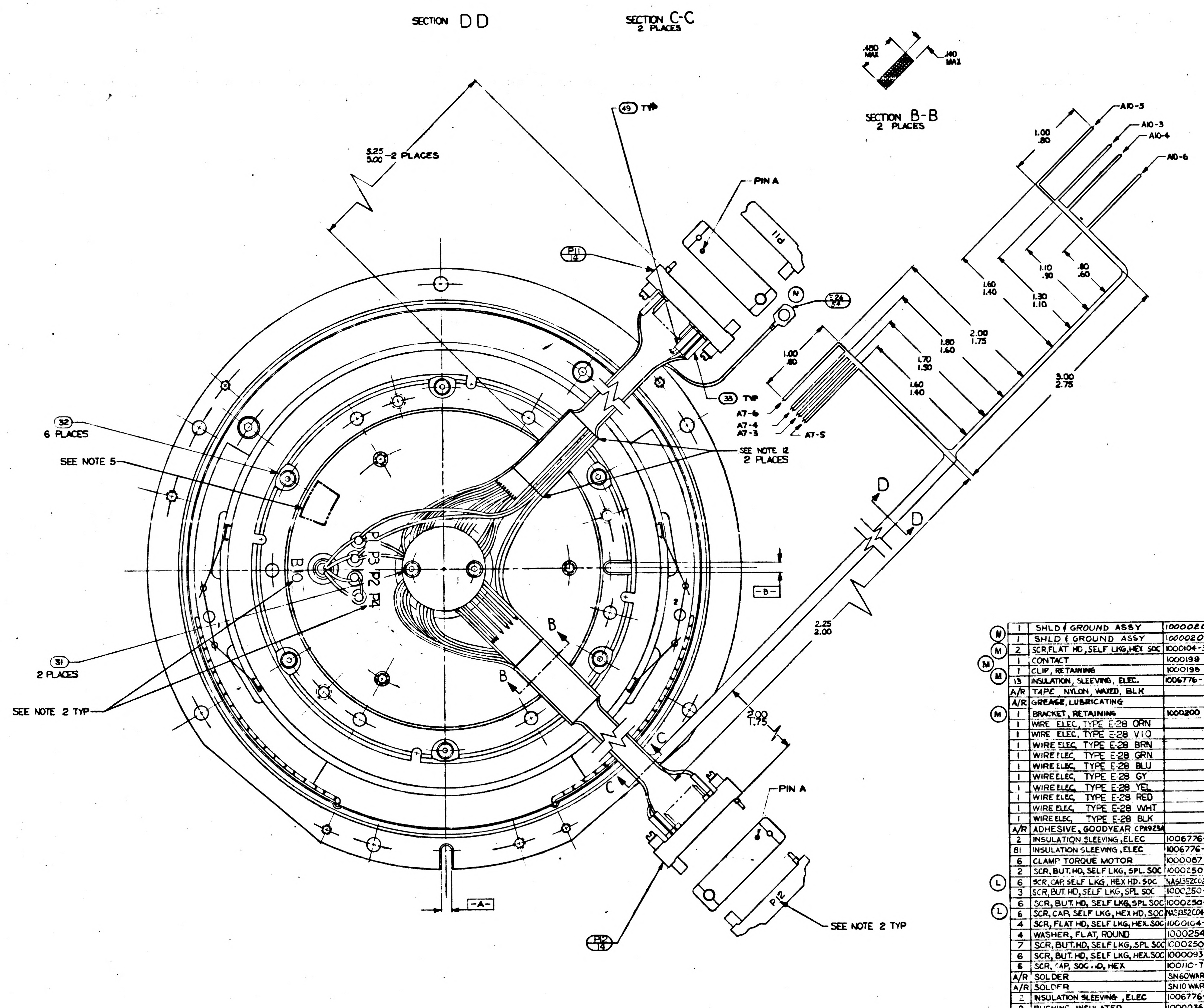
SECTION C-C
2 PLACES

SECTION B-B
2 PLACES



(25) (24) 4 PLACES
(1)
(28) 6 PLACES
(29) 3 PLACES
(46)
(50)
(M) (52) 2 PLACES
(31) SEE NOTE 13
(23) 6 PLACES
(11)
(10)
(16) 8 PLACES
(20) SEE NOTE 7
(7)
(17) 2 PLACES
(21) SEE NOTE 7
(26) 4 PLACES
(27) 6 PLACES
(2)
(24) 3 PLACES
(9)
(8)
(30) 6 PLACES
(17) 8 PLACES
(19) 2 PLACES
(18) 2 PLACES
(22) 6 PLACES
PLACES EQUALLY SEE NOTE 4
SEE NOTE 2 TYP
SEE NOTE 2 TYP
PIN A
1.37 1.12 2 PLACES

VIEW SHOWN WITH ITEM (12) REMOVED



5.25 5.00 -2 PLACES
(49) TYP
PIN A
(P11) (13)
(N)
(33) TYP
A10-5
A10-3
A10-4
A10-6
1.00 .80
1.10 .90
.80 .60
1.60 1.40
1.30 1.10
2.00 1.75
1.80 1.60
1.70 1.50
1.60 1.40
1.00 .80
3.00 2.75
A7-6
A7-4
A7-3
A7-5
(32) 6 PLACES
SEE NOTE 5
SEE NOTE 12 2 PLACES
J1 P3 P2 P4
B10
D
D
-B-
B
B
2.25 2.00
(31) 2 PLACES
SEE NOTE 2 TYP
2.00 1.75
C
C
PIN A
-A-
(P12) (13)
P12
SEE NOTE 2 TYP

VIEW SHOWN WITH ITEMS (8) & (24) REMOVED

REPLACES REV J WITH CHANGES

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓝ	1	SHLD & GROUND ASSY	1000020-2			54
	1	SHLD & GROUND ASSY	1000020-1			53
Ⓜ	2	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-3			52
Ⓜ	1	CONTACT	1000199		SEE NOTE 15	51
Ⓜ	1	CLIP, RETAINING	1000198			50
	13	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LG	49
	A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2	48
	A/R	GREASE, LUBRICATING		MIL-G-25760		47
Ⓜ	1	BRACKET, RETAINING	1000200			46
	1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
	1	WIRE ELEC, TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
	1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
	1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
	1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
	1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
	1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
	1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
	1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
	1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	7" TOTAL LG	36
	A/R	ADHESIVE, GOODYEAR CPA923A		MIL-A-13883		35
	2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LG	34
	81	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
	6	CLAMP TORQUE MOTOR	1000087			32
	2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
Ⓛ	6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS1352C02LL4			30
	3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
	6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
Ⓛ	6	SCR, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			27
	4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-13			26
	4	WASHER, FLAT, ROUND	1000254			25
	7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
	6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
	6	SCR, CAP, SOC HD, HEX	100110-7			22
	A/R	SOLDER	SN60WARP2	QQ-S-571		21
	A/R	SOLDER	SN10WARP2	QQ-S-571		20
	2	INSULATION SLEEVING, ELEC	1006776-9		5/16 LG	19
	2	BUSHING, INSULATED	1000036			18
	6	TERMINAL, INSULATED	1000100-2			17
	6	TERMINAL, INSULATED	1000100-1			16
	~~1~~	~~TERMINAL-LUG~~	~~MS25036-~~ [illegible]			~~15~~
	2	CONNECTOR, ELEC, RECP 29 CONT	1000116			14
	2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
	2	BRACKET, CONNECTOR	1000125			12
	1	NUT, BEARING RETAINER	1000086			11
	1	RETAINER, BEARING I.A. & M.A.	1000090			10
	1	BEARING, BALL, DUPLEX	1000029			9
	1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
	1	GUIDE, WIRE, BRG. HSG. M.A.	1000092			7
	1	MOTOR, TORQUE, DC, FRAMLESS	1000075			6
	1	LIMIT SWITCH, MA.	1000211			5
	1	RESOLVER, 1X TRANSMITTER	1000030			4
	1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
	1	SHAFT, STUB, 1X M.A.	1000105			2
	1	HOUSING, BEARING, 1X M.A.	1000106			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	BL1000201
1000003	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A. J. Boyce DATE
CHECKED
DRAWN D.M. WHITE 2-13-62
APPROVED FOR MSC W J Rhine
NASA APPROVAL DATE
W Kupfer 8/14/63

INTER GIMBAL
SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000008
SHEET 1 OF 1

1000008 N

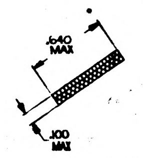
1000008 REV N SHEET 1

MASTER

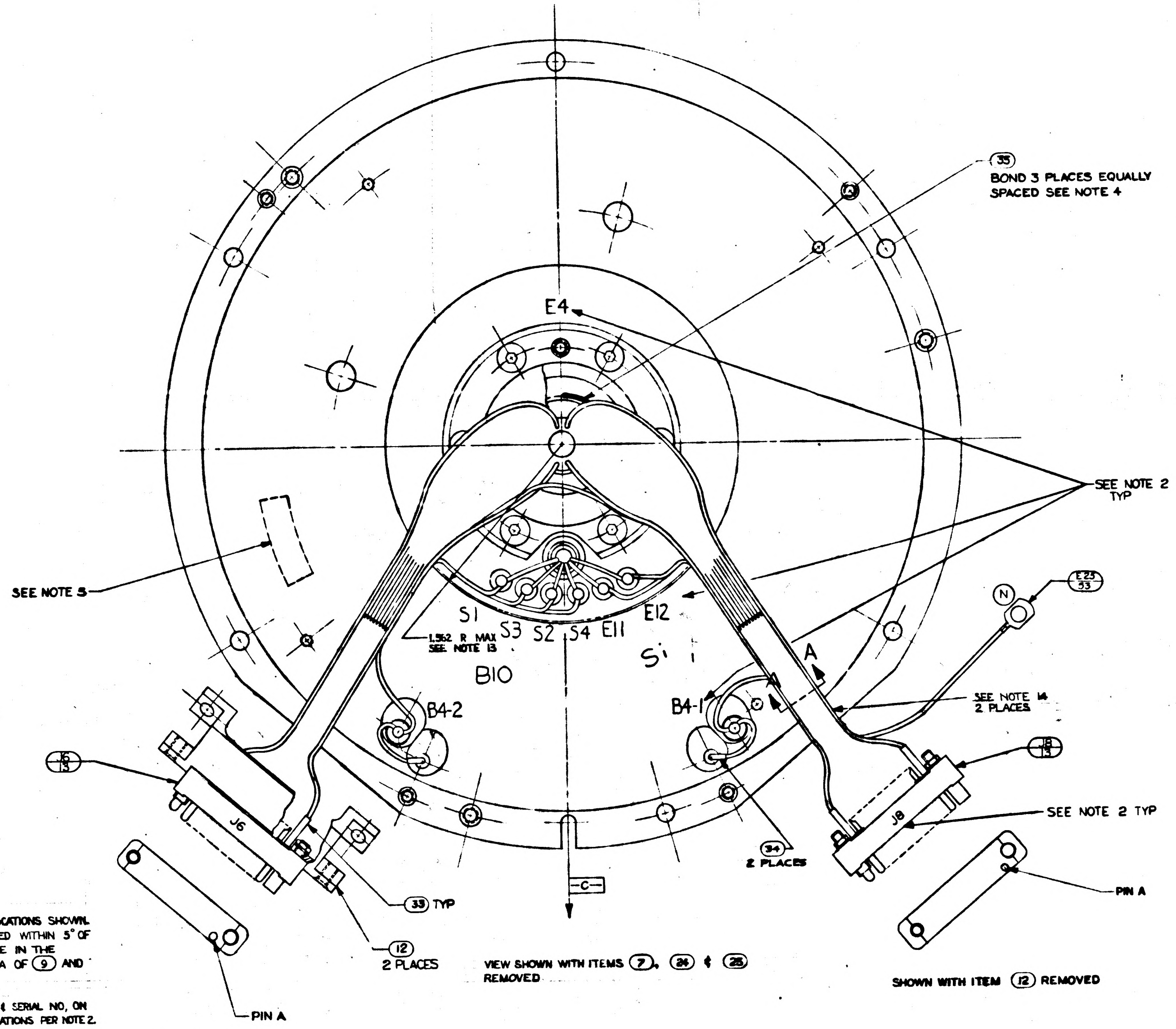
F-2

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	
1-1	BLU		J6-R	E4-7	8
1-2	VIO		J6-S	E4-8	
2	WHT/VIO		J6-T	E4-18	
3	BLK		J6-V	E4-1	
4-1	YEL	39	J6-W	B10-S2	8
4-2	BLU	41	J6-Z	B10-S4	
5	WHT/YEL		B10-WHT/YEL	B10-S2	
6	WHT/BLU		B10-WHT/BLU	B10-S4	
7-1	BLK	36	J6-a	B10-S3	8
7-2	RED	38	J6-b	B10-S1	
8	WHT/BLK		B10-WHT/BLK	B10-S3	
9	WHT/RED		B10-WHT/RED	B10-S1	
10-1	YEL		J6-e	E4-5	8
10-2	GRN		J6-d	E4-6	
11-1	WHT/BLU		J6-M	E4-17	8
11-2	WHT/GRN		J6-L	E4-16	
12-1	WHT/YEL		J6-J	E4-15	8
12-2	WHT/ORN		J6-H	E4-14	
13-1	WHT/BRN		J6-N	E4-12	8
13-2	WHT/RED		J6-K	E4-13	
14-1	BRN	43	J6-N	J8-F	8
14-2	RED	38	J6-K	J8-C	
15-1	BRN		J6-E	E4-2	8
15-2	RED		J6-D	E4-3	
15-3	ORN		J6-F	E4-4	
16-1	WHT		J6-B	E4-10	8
16-2	GY		J6-A	E4-9	
16-3	WHT/BLK		J6-C	E4-11	
17-1	WHT/BLK/VIO		J8-R	E4-26	8
17-2	WHT/BLK/ORN		J8-U	E4-22	
17-3	WHT/BLK/RED		J8-T	E4-21	
17-4	WHT/RED/ORN		J8-V	E4-35	
17-5	WHT/RED/YEL		J8-Y	E4-36	
17-6	WHT/BLK/BLU		J8-P	E4-25	
18-1	WHT/BRN/RED		J8-X	E4-28	8
18-2	WHT/BLK/GY		J8-W	E4-27	
19	WHT/BRN/YEL		J8-a	E4-30	
18-3	WHT/BRN/ORN		J8-Z	E4-29	
20	WHT/BRN/BLU		J8-d	E4-32	
21	WHT/BRN/GRN		J8-e	E4-31	
22-1	WHT/BLK/YEL		J8-b	E4-23	8
22-2	WHT/BLK/GRN		J8-e	E4-24	
22-3	WHT/RED/GY		J8-h	E4-40	
22-4	WHT/RED/VIO		J8-f	E4-39	
23-1	WHT/RED/BLU		J8-M	E4-38	8
23-2	WHT/RED/GRN		J8-L	E4-37	
24-1	WHT	37	J8-J	B4-2	8
24-2	BLK	36	J8-H	B4-1	
25	WHT		B4-WHT	B4-2	
26	BLK		B4-BLK	B4-1	
27-1	BRN	43	J8-N	E12	8
27-2	GY	40	J8-K	E11	
28	BRN		S1-BRN	E12	
29	GY		S1-GY	E11	
30-1	WHT/BRN/GY		J8-E	E4-34	8
30-2	WHT/BRN/VIO		J8-D	E4-33	
31	WHT/BLK/BRN		J8-B	E4-20	
32	WHT/GY		J8-A	E4-19	
33-1	WHT/BLK/VIO		P11-R	E4-26	8
33-2	WHT/BLK/ORN		P11-U	E4-22	
33-3	WHT/BLK/BLU		P11-P	E4-25	
33-4	WHT/BLK/RED		P11-T	E4-21	
33-5	WHT/RED/ORN		P11-V	E4-35	
33-6	WHT/RED/YEL		P11-Y	E4-36	
34-1	WHT/BRN/RED		P11-X	E4-28	8
34-2	WHT/BLK/GY		P11-W	E4-27	
35	WHT/BRN/YEL		P11-a	E4-30	
34-3	WHT/BRN/ORN		P11-Z	E4-29	
36	WHT/BRN/BLU		P11-d	E4-32	
37	WHT/BRN/GRN		P11-e	E4-31	
38-1	WHT/BLK/GRN		P11-e	E4-24	8
38-2	WHT/BLK/YEL		P11-b	E4-23	
39	GRN	42	P11-c	A7-5	
40-1	WHT/BLU		P11-M	E4-17	8
40-2	WHT/GRN		P11-L	E4-16	
41-1	WHT/YEL		P11-J	E4-15	8
41-2	WHT/ORN		P11-H	E4-14	
42-1	BRN	43	P11-N	P12-N	8
42-2	RED	38	P11-K	P12-K	
43-1	BRN	43	P11-N	B10-P1	8
43-2	RED	38	P11-K	B10-P3	
44-1	WHT/BRN		B10-P1	E4-12	8
44-2	WHT/RED		B10-P3	E4-13	
45	WHT/RED		B10-WHT/RED	B10-P1	
46	WHT/BLK		B10-WHT/BLK	B10-P3	
47	YEL	39	B10-P2	B10-P4	
48	WHT/YEL		B10-WHT/YEL	B10-P2	
49	WHT/BLU		B10-WHT/BLU	B10-P4	
50-1	WHT/BRN/GY		P11-E	E4-34	8
50-2	WHT/BRN/VIO		P11-D	E4-33	
51	WHT/BLK/BRN		P11-B	E4-20	
52	WHT/GY		P11-C	E4-19	
53-1	GRN		P12-d	E4-6	8
53-2	YEL		P12-e	E4-5	
54-1	BLU		P12-R	E4-7	8
54-2	VIO		P12-S	E4-8	
55	WHT/VIO		P12-T	E4-18	
56	BLK		P12-V	E4-1	
18-A	BLK	36	SHLD-18	E25	
57-1	WHT/RED/BLU		P12-M	E4-38	8
57-2	WHT/RED/GRN		P12-L	E4-37	
58-1	BRN		P12-E	E4-2	8
58-2	RED		P12-D	E4-3	
58-3	ORN		P12-F	E4-4	
59-1	RED	38	P12-D	A7-4	8
59-2	ORN	45	P12-F	A7-3	
60-1	WHT		P12-B	E4-10	8
60-2	GY		P12-A	E4-9	
60-3	WHT/BLK		P12-C	E4-11	
61-1	WHT/RED/VIO		P12-f	E4-39	8
61-2	WHT/RED/GY		P12-h	E4-40	
62	VIO	44	P12-f	A7-6	
63	GY	40	P12-h	A10-6	
64	GRN	42	A7-5	A10-5	
65-1	RED	36	A7-4	A10-4	8
65-2	ORN	45	A7-3	A10-3	
Ⓝ 34-A	BLK	36	SHLD-34	E26	

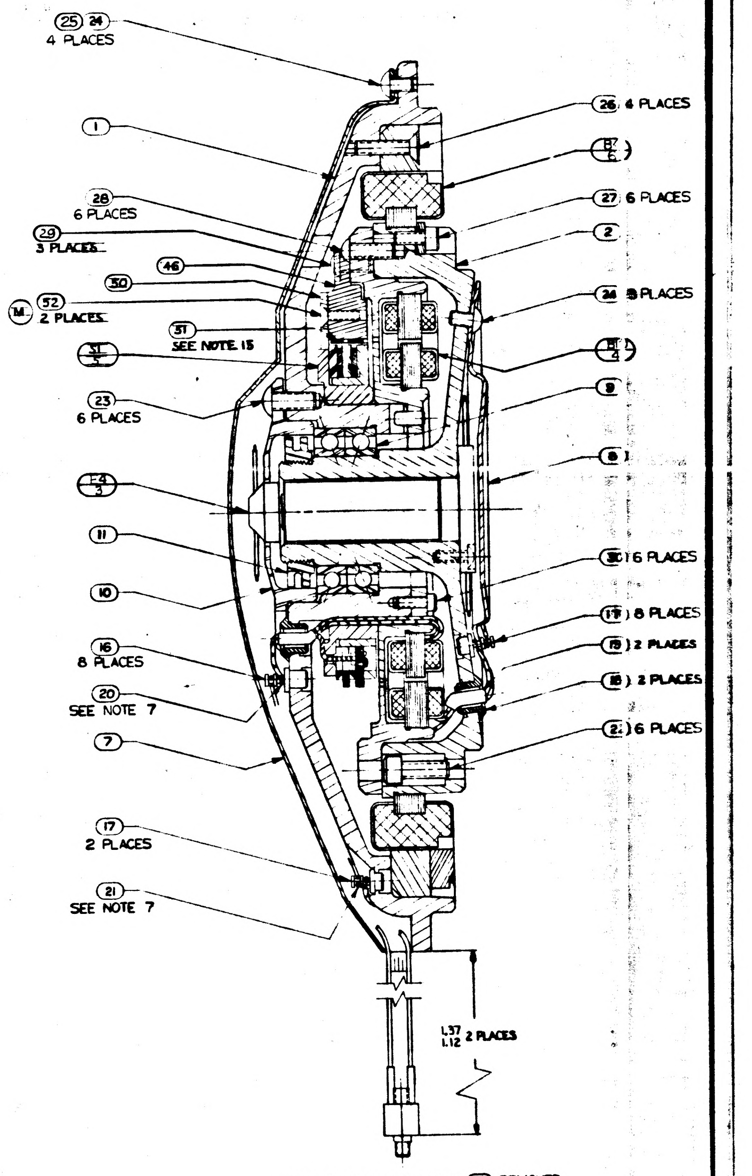


SECTION A-A
2 PLACES



VIEW SHOWN WITH ITEMS ⑦, ㉔ & ㉕ REMOVED

SHOWN WITH ITEM ⑫ REMOVED



VIEW SHOWN WITH ITEM ⑫ REMOVED

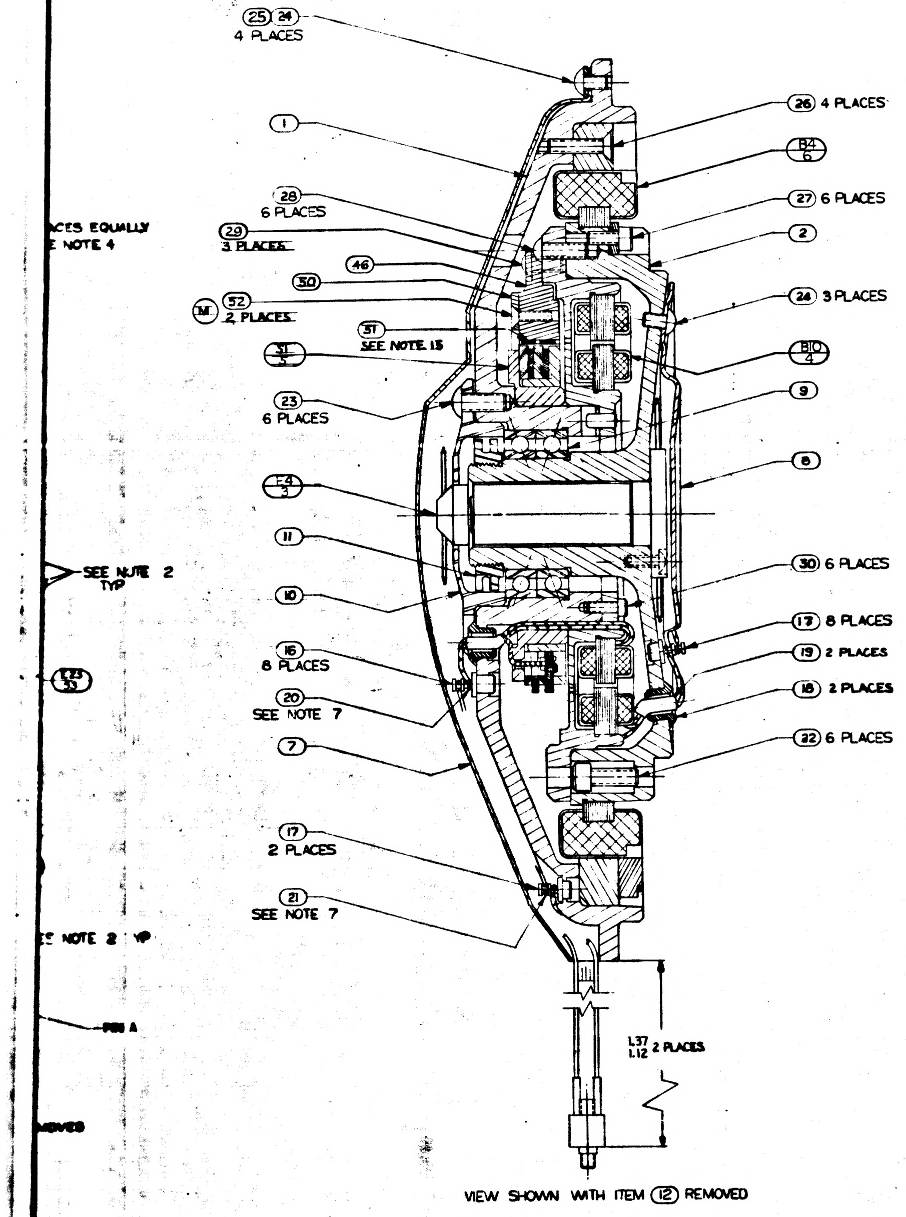
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS .14/.10 HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑨ TO BE ALIGNED WITHIN 5° OF -C- & IN DIRECTION OF THE ARROW WHEN ① & ② ARE IN THE POSITION SHOWN. APPLY THIN COAT OF ㊼ TO INSIDE DIA OF ⑨ AND FAYING SURFACE OF ② BEFORE ASSEMBLY.
4. APPLY ㉟ TO ② & ⑪ AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER, MANUFACTURERS SYMBOL & SERIAL NO, ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%
   - ⑪ 100 IN-LB
   - ㉓ 10.0 IN-LB
   - ㉔ ㉖ ㉗ ㉘ ㉙ 5.0 IN-LB
   - (52) ㉚ ㉛ 3.5 IN-LB
7. Ⓜ SOLDER ALL LEADS FROM ④ ⑤ & ⑥ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ⑳. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑬ & ⑭ PER MIL-STD-440 USING ㉑. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER IN. MINIMUM.~~
9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM BEARING HOUSING ① OR REMOVE TORQUE MOTOR ⑥ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ⑥.
10. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1001508
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
15. Ⓜ SELECT ITEM (51) TO MEET TORQUE REQUIREMENTS OF ATP 1000008
16. Ⓝ HEAT SHRINK SLEEVING ON ITEMS (53) & (54) AFTER ASSY

Ⓝ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH MINIMUM

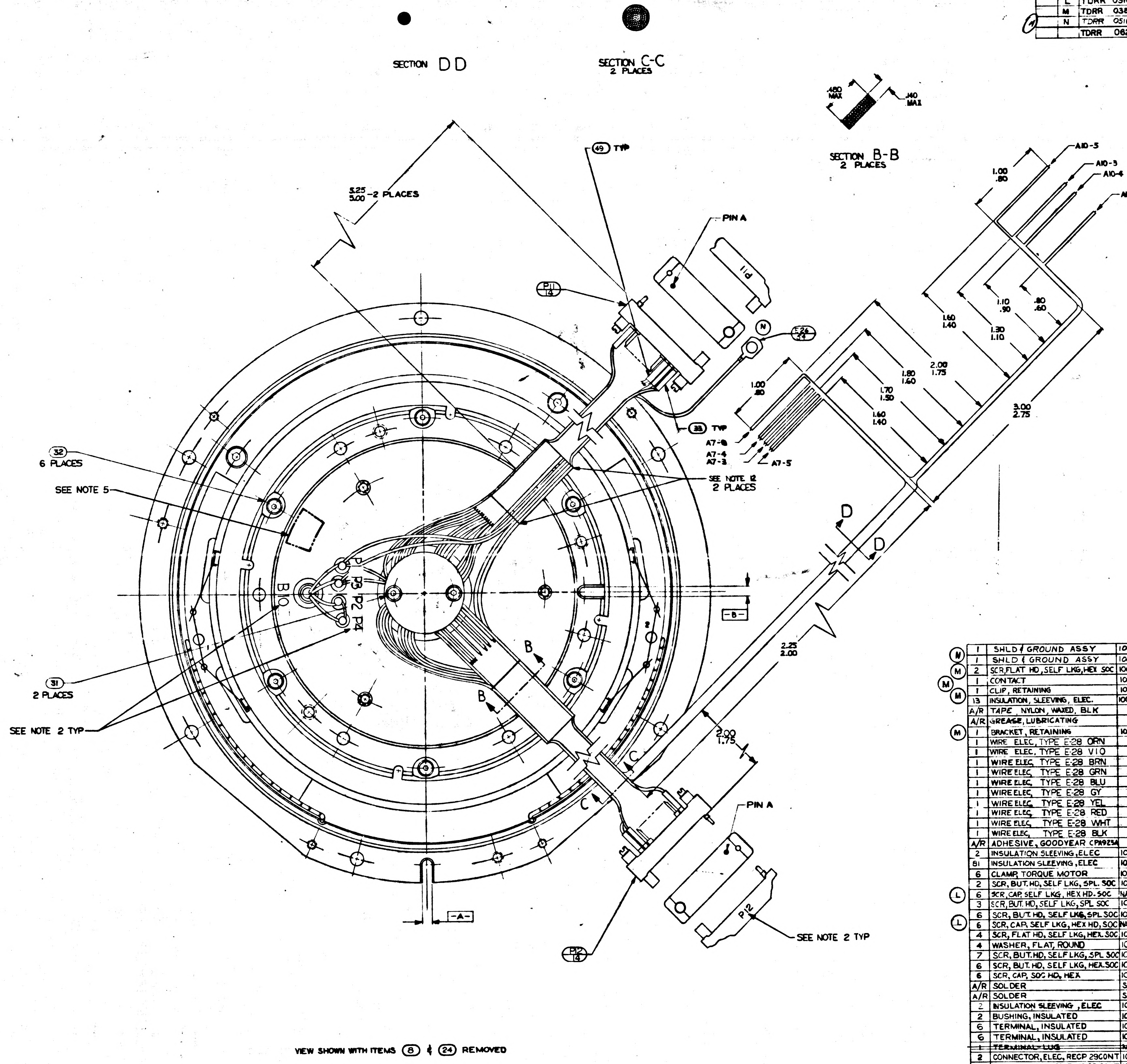
NO. OF LEADS	NO. OF TURNS
2	4
3	3
4 OR MORE	2

ZONE	SYM	REVISIONS TDRR DESCRIPTION	DATE	APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 01927	7/8/63	WR
	L	TDRR 03185	7/26/63	WR
	M	TDRR 03857	10/14/63	WR
	N	TDRR 05169	1/7/64	WR
		TDRR 06237	2-11-64	



(25) (24) 4 PLACES
(1)
(28) 6 PLACES
(29) 3 PLACES
(46)
(50)
(52) 2 PLACES
(51) SEE NOTE 15
(31) 2
(23) 6 PLACES
(E4)
(11)
(10)
(16) 8 PLACES
(20) SEE NOTE 7
(7)
(17) 2 PLACES
(21) SEE NOTE 7
(26) 4 PLACES
(B4)
(27) 6 PLACES
(2)
(24) 3 PLACES
(B0) 4
(9)
(8)
(30) 6 PLACES
(13) 8 PLACES
(19) 2 PLACES
(18) 2 PLACES
(22) 6 PLACES
ACES EQUALLY
E NOTE 4
SEE NOTE 2 TYP
E NOTE 2 YP
PIN A
1.37 1.12 2 PLACES

VIEW SHOWN WITH ITEM (12) REMOVED



SECTION DD
SECTION C-C 2 PLACES
SECTION B-B 2 PLACES
.180 MAX
.140 MAX
3.25 3.00 -2 PLACES
(49) TYP
PIN A
P11
(P11) 13
(N)
(33) TYP
A7-8
A7-6
A7-3
A7-5
SEE NOTE 12 2 PLACES
A10-3
A10-5
A10-4
A10-6
1.00 .80
1.10 .90
.80 .60
1.30 1.10
1.60 1.40
1.80 1.60
2.00 1.75
1.70 1.50
1.60 1.40
1.00 .80
3.00 2.75
D
D
(32) 6 PLACES
SEE NOTE 5
P3 P2 P1
B10
-B-
B
B
C
C
2.25 2.00
2.00 1.75
(31) 2 PLACES
SEE NOTE 2 TYP
-A-
PIN A
P12
(P12) 14
SEE NOTE 2 TYP

VIEW SHOWN WITH ITEMS (8) & (24) REMOVED

REPLACES REV J WITH CHANGES

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	1	SHLD & GROUND ASSY	1000020-2			54
(N)	1	SHLD & GROUND ASSY	1000020-1			53
(M)	2	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-3			52
(M)	1	CONTACT	1000199		SEE NOTE 15	51
(M)	1	CLIP, RETAINING	1000198			50
	13	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LG	49
	A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2	48
	A/R	GREASE, LUBRICATING		MIL-G-25760		47
(M)	1	BRACKET, RETAINING	1000200			46
	1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
	1	WIRE ELEC, TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
	1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
	1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
	1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
	1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
	1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
	1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
	1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
	1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	7" TOTAL LG	36
	A/R	ADHESIVE, GOODYEAR CPA925A		MIL-A-13883		35
	2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LG	34
	81	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
	6	CLAMP, TORQUE MOTOR	1000087			32
	2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
(L)	6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS1352C02LL4			30
	3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
	6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
(L)	6	SCR, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			27
	4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-17			26
	4	WASHER, FLAT, ROUND	1000254			25
	7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
	6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
	6	SCR, CAP, SOC HD, HEX	100110-7			22
	A/R	SOLDER	SN60WARP2	QQ-S-571		21
	A/R	SOLDER	SN10WARP2	QQ-S-571		20
	2	INSULATION SLEEVING, ELEC	1006776-9		5/16 LG	19
	2	BUSHING, INSULATED	1000036			18
	6	TERMINAL, INSULATED	1000100-2			17
	6	TERMINAL, INSULATED	1000100-1			16
	~~1~~	~~TERMINAL LUG~~	~~MS25036-10~~			~~15~~
	2	CONNECTOR, ELEC, RECP 29CONT	1000116			14
	2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
	2	BRACKET, CONNECTOR	1000125			12
	1	NUT, BEARING RETAINER	1000086			11
	1	RETAINER, BEARING I.A. & M.A.	1000090			10
	1	BEARING, BALL, DUPLEX	1000029			9
	1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
	1	GUIDE, WIRE, BRG. HSG. M.A.	1000092			7
	1	MOTOR, TORQUE, DC, FRAMLESS	1000075			6
	1	LIMIT SWITCH, MA.	1000211			5
	1	RESOLVER, 1X TRANSMITTER	1000030			4
	1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
	1	SHAFT, STUB, 1X M.A.	1000105			2
	1	HOUSING, BEARING, 1X M.A.	1000106			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	BL1000201
1000003	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED A J Boyce DATE
CHECKED
DRAWN D.M. WHITE 2-13-63
APPROVED FOR MSC W J Rhine
MIT APPROVAL W Cuffee DATE

INTER GIMBAL
SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1 | UNIT WT. | CODE IDENT

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000008
SHEET 1 OF 1

1000008

MASTER

1000008 F1

INCHES
PHOTOGRAPHIC SCALE ONLY

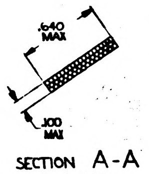
F-2

WIRING LEGEND

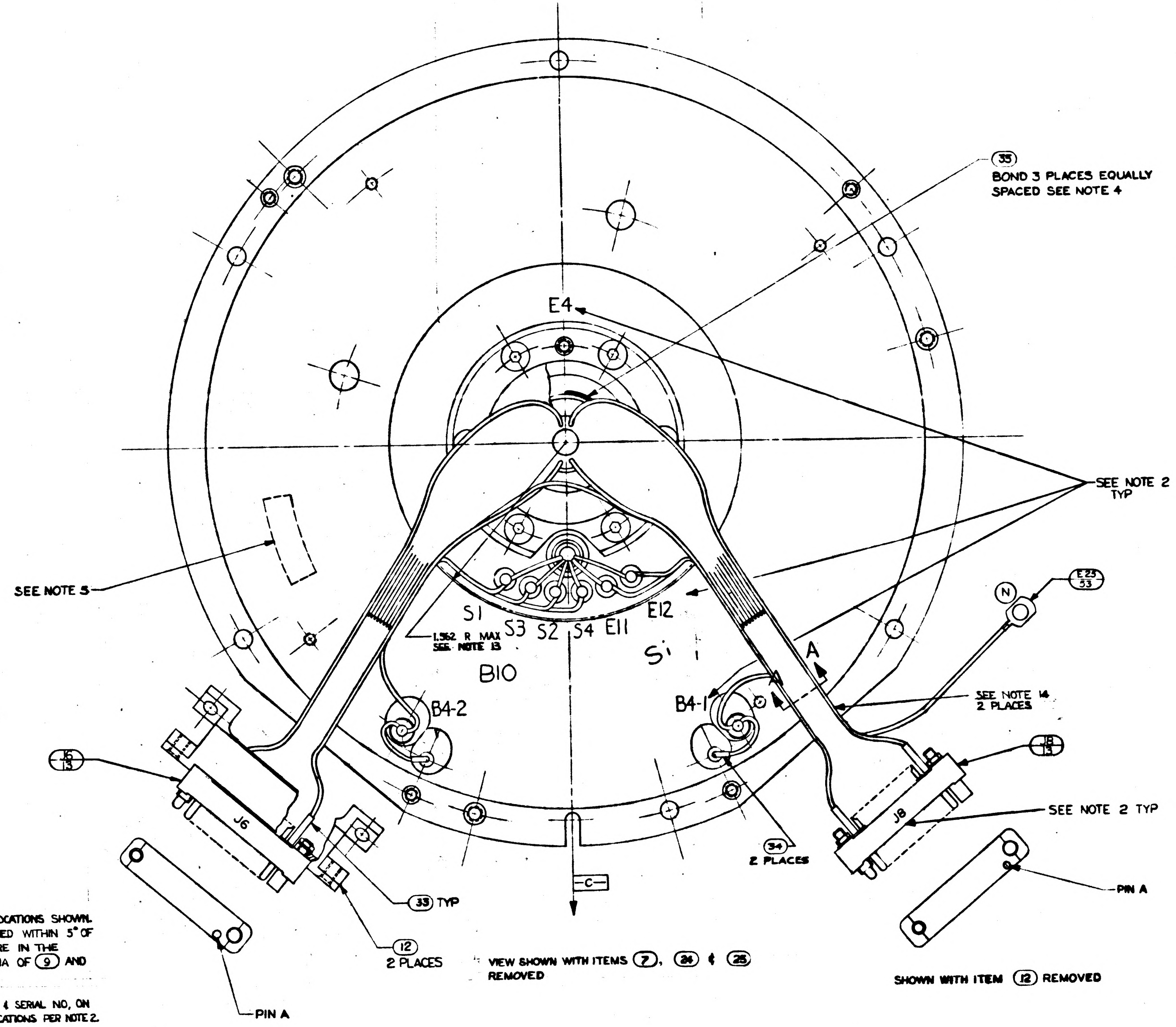
COND NO.	COLOR	FIND NO.	FROM	TO	
1-1	BLU		J6-R	E4-7	
1-2	VIO		J6-S	E4-8	
2	WHT/VIO		J6-T	E4-18	
3	BLK		J6-V	E4-1	
4-1	YEL	39	J6-W	B10-S2	
4-2	BLU	41	J6-Z	B10-S4	
5	WHT/YEL		B10-WHT/YEL	B10-S2	
6	WHT/BLU		B10-WHT/BLU	B10-S4	
7-1	BLK	36	J6-a	B10-S3	
7-2	RED	38	J6-b	B10-S1	
8	WHT/BLK		B10-WHT/BLK	B10-S3	
9	WHT/RED		B10-WHT/RED	B10-S1	
10-1	YEL		J6-c	E4-5	
10-2	GRN		J6-d	E4-6	
11-1	WHT/BLU		J6-M	E4-17	
11-2	WHT/GRN		J6-L	E4-16	
12-1	WHT/YEL		J6-J	E4-15	
12-2	WHT/ORN		J6-H	E4-14	
13-1	WHT/BRN		J6-N	E4-12	
13-2	WHT/RED		J6-K	E4-13	
14-1	BRN	43	J6-N	J8-F	
14-2	RED	38	J6-K	J8-C	
15-1	BRN		J6-E	E4-2	
15-2	RED		J6-D	E4-3	
15-3	ORN		J6-F	E4-4	
16-1	WHT		J6-B	E4-10	
16-2	GY		J6-A	E4-9	
16-3	WHT/BLK		J6-C	E4-11	
17-1	WHT/BLK/VIO		J8-R	E4-26	
17-2	WHT/BLK/ORN		J8-U	E4-22	
17-3	WHT/BLK/RED		J8-T	E4-21	
17-4	WHT/RED/ORN		J8-V	E4-35	
17-5	WHT/RED/YEL		J8-Y	E4-36	
17-6	WHT/BLK/BLU		J8-P	E4-25	
18-1	WHT/BRN/RED		J8-X	E4-28	(N)
18-2	WHT/BLK/GY		J8-W	E4-27	
(N) 19	WHT/BRN/YEL		J8-a	E4-30	
18-3	WHT/BRN/ORN		J8-Z	E4-29	(N)
20	WHT/BRN/BLU		J8-d	E4-32	
21	WHT/BRN/GRN		J8-c	E4-31	
22-1	WHT/BLK/YEL		J8-b	E4-23	
22-2	WHT/BLK/GRN		J8-e	E4-24	
22-3	WHT/RED/GY		J8-h	E4-40	
22-4	WHT/RED/VIO		J8-f	E4-39	
23-1	WHT/RED/BLU		J8-M	E4-38	
23-2	WHT/RED/GRN		J8-L	E4-37	
24-1	WHT	37	J8-J	B4-2	
24-2	BLK	36	J8-H	B4-1	
25	WHT		B4-WHT	B4-2	
26	BLK		B4-BLK	B4-1	
27-1	BRN	43	J8-N	E12	
27-2	GY	40	J8-K	E11	
28	BRN		S1-BRN	E12	
29	GY		S1-GY	E11	
30-1	WHT/BRN/GY		J8-E	E4-34	
30-2	WHT/BRN/VIO		J8-D	E4-33	
31	WHT/BLK/BRN		J8-B	E4-20	
32	WHT/GY		J8-A	E4-19	
33-1	WHT/BLK/VIO		P11-R	E4-26	
33-2	WHT/BLK/ORN		P11-U	E4-22	
33-3	WHT/BLK/BLU		P11-P	E4-25	
33-4	WHT/BLK/RED		P11-T	E4-21	
33-5	WHT/RED/ORN		P11-V	E4-35	
33-6	WHT/RED/YEL		P11-Y	E4-36	
34-1	WHT/BRN/RED		P11-X	E4-28	(N)
34-2	WHT/BLK/GY		P11-W	E4-27	
35	WHT/BRN/YEL		P11-a	E4-30	
34-3	WHT/BRN/ORN		P11-Z	E4-29	(N)
36	WHT/BRN/BLU		P11-d	E4-32	
37	WHT/BRN/GRN		P11-c	E4-31	
38-1	WHT/BLK/GRN		P11-e	E4-24	
38-2	WHT/BLK/YEL		P11-b	E4-23	
39	GRN	42	P11-c	A7-5	
40-1	WHT/BLU		P11-M	E4-17	
40-2	WHT/GRN		P11-L	E4-16	
41-1	WHT/YEL		P11-J	E4-15	
41-2	WHT/ORN		P11-H	E4-14	
42-1	BRN	43	P11-N	P12-N	
42-2	RED	38	P11-K	P12-K	
43-1	BRN	43	P11-N	B10-P1	
43-2	RED	38	P11-K	B10-P3	
44-1	WHT/BRN		B10-P1	E4-12	
44-2	WHT/RED		B10-P3	E4-13	
45	WHT/RED		B10-WHT/RED	B10-P1	
46	WHT/BLK		B10-WHT/BLK	B10-P3	
47	YEL	39	B10-P2	B10-P4	
48	WHT/YEL		B10-WHT/YEL	B10-P2	
49	WHT/BLU		B10-WHT/BLU	B10-P4	
50-1	WHT/BRN/GY		P11-E	E4-34	
50-2	WHT/BRN/VIO		P11-D	E4-33	
51	WHT/BLK/BRN		P11-B	E4-20	
52	WHT/GY		P11-C	E4-19	
53-1	GRN		P12-d	E4-6	
53-2	YEL		P12-c	E4-5	
54-1	BLU		P12-R	E4-7	
54-2	VIO		P12-S	E4-8	
55	WHT/VIO		P12-T	E4-18	
56	BLK		P12-V	E4-1	
18-A	BLK	36	SHLD-18	E25	
57-1	WHT/RED/BLU		P12-M	E4-38	
57-2	WHT/RED/GRN		P12-L	E4-37	
58-1	BRN		P12-E	E4-2	
58-2	RED		P12-D	E4-3	
58-3	ORN		P12-F	E4-4	
59-1	RED	38	P12-D	A7-4	
59-2	ORN	45	P12-F	A7-3	
60-1	WHT		P12-B	E4-10	
60-2	GY		P12-A	E4-9	
60-3	WHT/BLK		P12-C	E4-11	
61-1	WHT/RED/VIO		P12-f	E4-39	
61-2	WHT/RED/GY		P12-h	E4-40	
62	VIO	44	P12-f	A7-6	
63	GY	40	P12-h	A10-6	
64	GRN	42	A7-5	A10-5	
65-1	RED	36	A7-4	A10-4	
65-2	ORN	45	A7-3	A10-3	
(N) 34-A	BLK	36	SHLD-34	E26	

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS $\frac{.14}{.10}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (9) TO BE ALIGNED WITHIN 5° OF $\boxed{-C-}$ & IN DIRECTION OF THE ARROW WHEN (1) & (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (47) TO INSIDE DIA OF (9) AND FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (35) TO (2) & (11) AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER, MANUFACTURERS SYMBOL & SERIAL NO, ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%
   - (11) 100 IN-LB
   - (23) 10.0 IN-LB
   - (24)(26)(27)(28)(29) 5.0 IN-LB
   - (M) (52)(30)(31) 3.5 IN-LB
7. SOLDER ALL LEADS FROM (4) (5) & (6) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER ~~UPPER~~ SECTION OF APPROPRIATE TERMINAL OR (13) & (14) PER MIL-STD-440 USING (21). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.~~
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM BEARING HOUSING (1) OR REMOVE TORQUE MOTOR (6) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (6).
10. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1001508
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
15. (M) SELECT ITEM (51) TO MEET TORQUE REQUIREMENTS OF ATP 1000008
16. (N) HEAT SHRINK SLEEVING ON ITEMS (53) & (54) AFTER ASSY

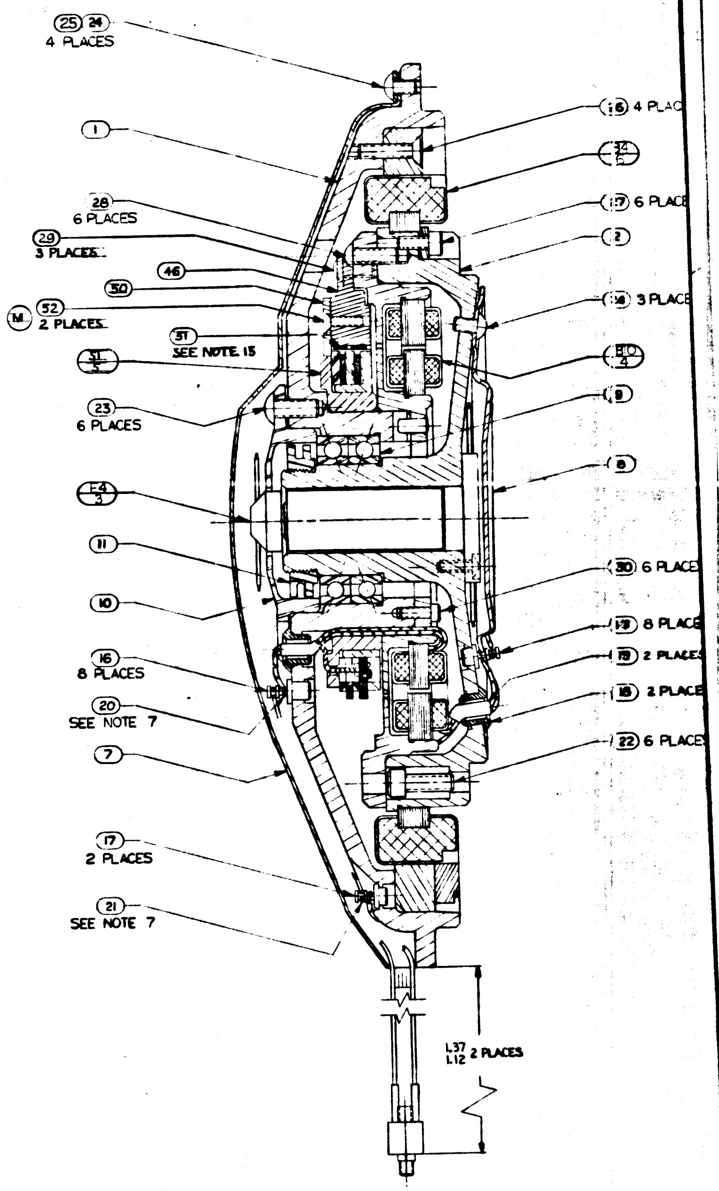


SECTION A-A
2 PLACES



VIEW SHOWN WITH ITEMS (7), (34) & (25) REMOVED

SHOWN WITH ITEM (12) REMOVED



VIEW SHOWN WITH ITEM (12) REMOVED

(N) TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

(P)

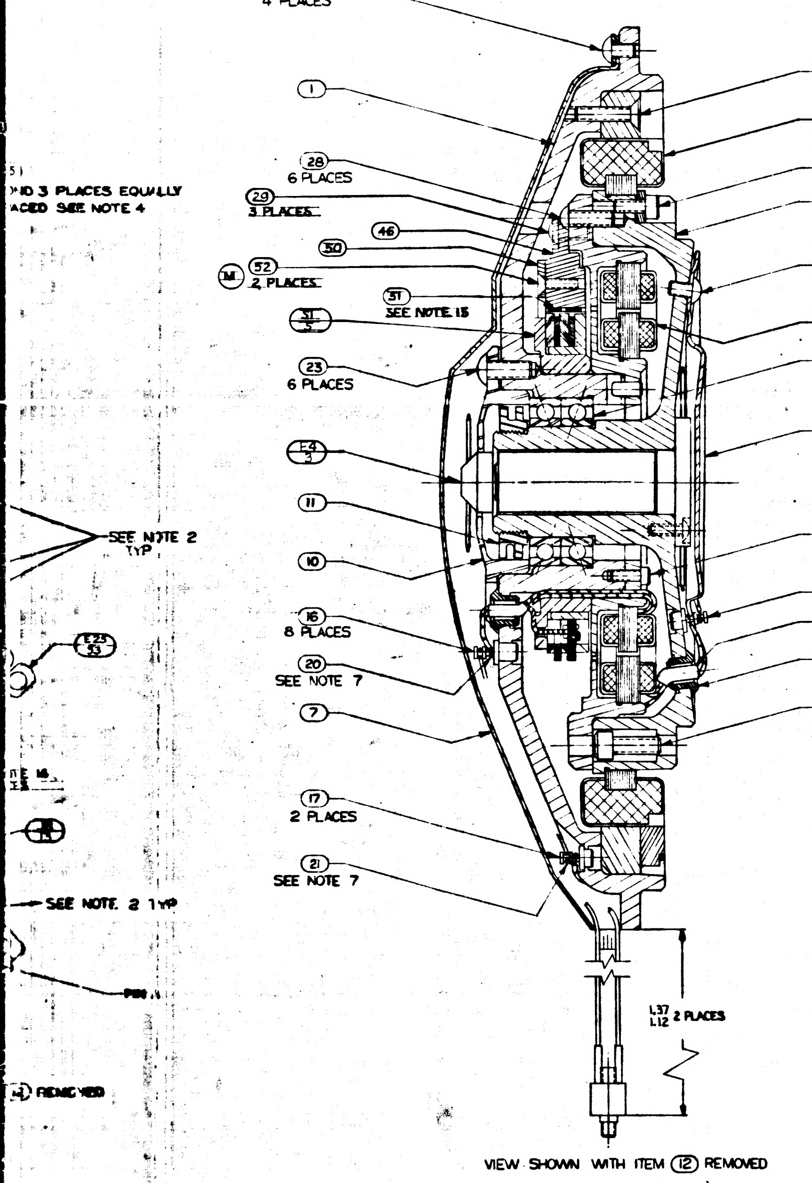
NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000008 | P | 1

INCHES
PHOTOGRAPHIC SCALE ONLY

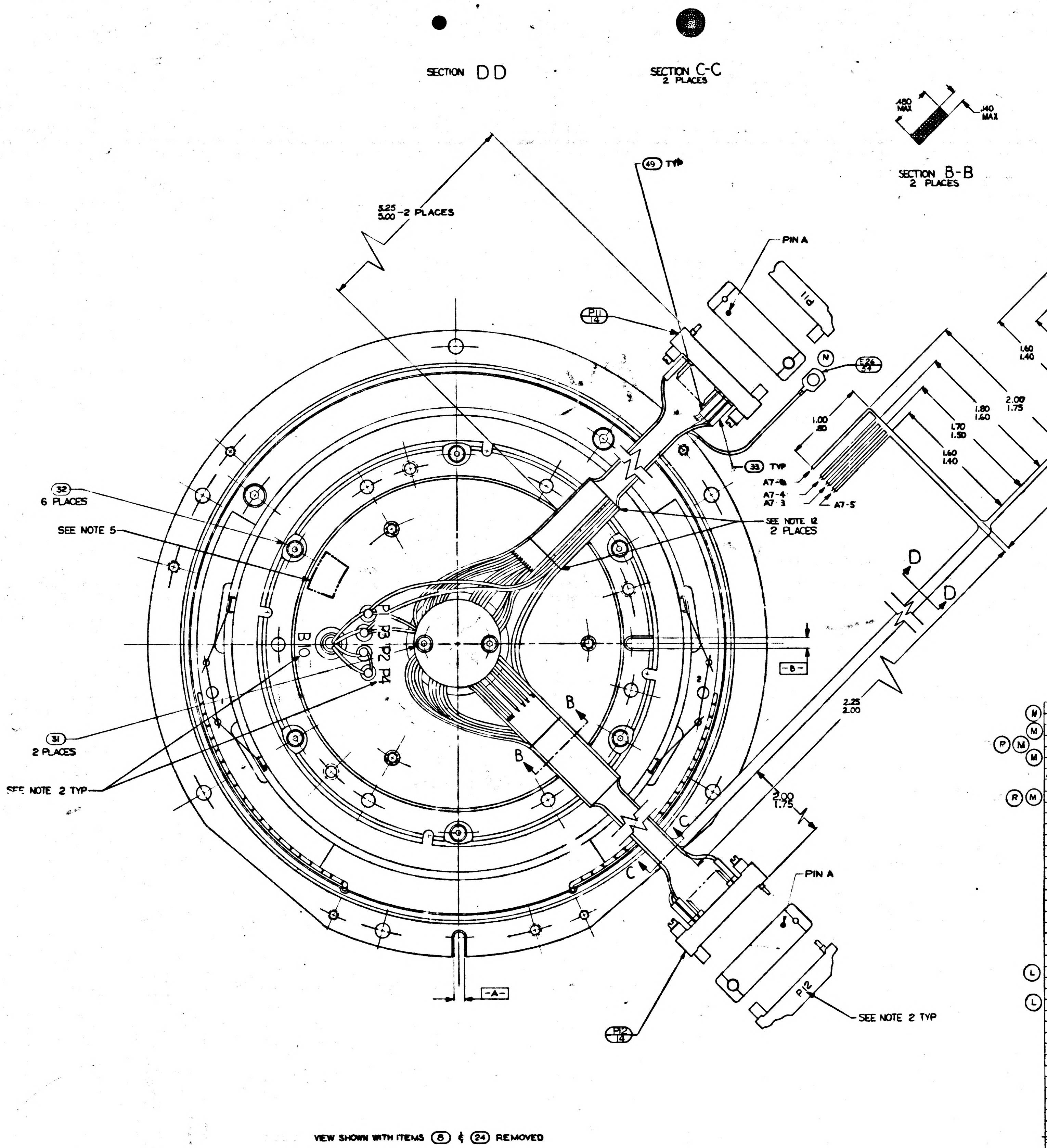
F1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR			
	K	REPLACES REV J WITH CHANGES TDRR 01927	7/9/63		
	L	TDRR 03185	7/23/63		
	M	TDRR 03857	10/14/63		
	N	TDRR 05169	1/7/64		
	P	TDRR 06237	2-11-64		
	R	TDRR 06526	2-25-64		



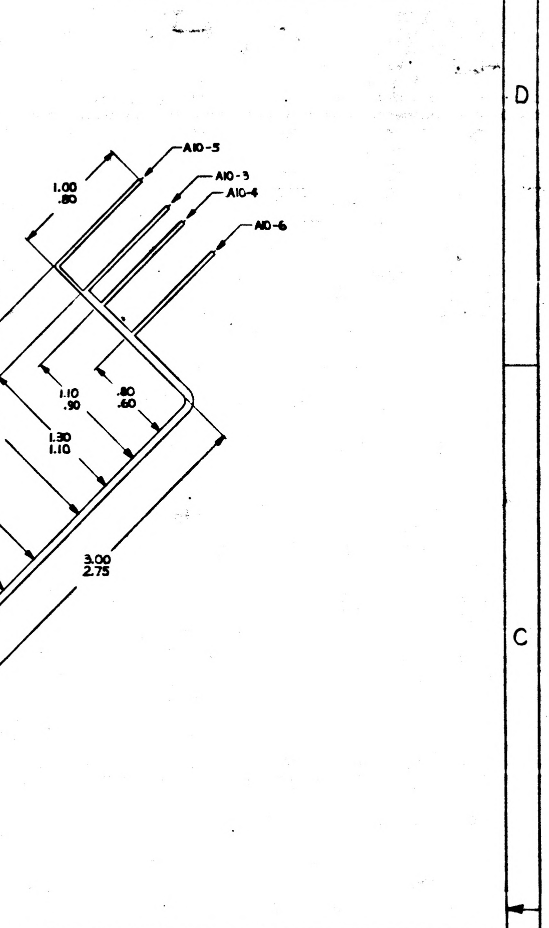
(25) (24) 4 PLACES
(1)
(28) 6 PLACES
(29) 3 PLACES
(46)
(50)
(M) (52) 2 PLACES
(51) SEE NOTE 15
(31)
(23) 6 PLACES
(54) (53)
(11)
(10)
(16) 8 PLACES
(20) SEE NOTE 7
(7)
(17) 2 PLACES
(21) SEE NOTE 7
(26) 4 PLACES
(B4) (6)
(27) 6 PLACES
(2)
(24) 3 PLACES
(B10) (4)
(9)
(8)
(30) 6 PLACES
(17) 8 PLACES
(19) 2 PLACES
(18) 2 PLACES
(22) 6 PLACES
SEE NOTE 2 TYP
(5.26) (3)
3 PLACES EQUALLY SPACED SEE NOTE 4
1.37 1.12 2 PLACES

VIEW SHOWN WITH ITEM (12) REMOVED



SECTION DD
SECTION C-C 2 PLACES
SECTION B-B 2 PLACES
.480 MAX
.140 MAX
5.25 5.00 -2 PLACES
(49) TYP
PIN A
P11
(P11) (13)
(N)
(5.26) (24)
(38) TYP
A7-6
A7-4
A7-3
A7-5
SEE NOTE 12 2 PLACES
(32) 6 PLACES
SEE NOTE 5
(31) 2 PLACES
SEE NOTE 2 TYP
P1 P3 P2 P4
B1
-B-
-A-
B
C
D
(P12) (14)
P12
SEE NOTE 2 TYP
1.00 .80
2.25 2.00
2.00 1.75

VIEW SHOWN WITH ITEMS (8) & (24) REMOVED



A10-5
A10-3
A10-4
A10-6
1.00 .80
1.10 .90
.80 .60
1.60 1.40
1.30 1.10
2.00 1.75
1.80 1.60
1.70 1.50
1.60 1.40
3.00 2.75

REPLACES REV J WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	SHLD & GROUND ASSY	1000020-2			54
1	SHLD & GROUND ASSY	1000020-1			53
2	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-3			52
1	CONTACT	1001583		SEE NOTE 15	51
1	CLIP, RETAINING	1000198			50
13	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LG	49
A/R	TAPE NYLON, WAXED, BLK		MIL-T-713	CLASS 2	48
A/R	GREASE, LUBRICATING		MIL-G-25760		47
1	BRACKET, RETAINING	1001589			46
1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
1	WIRE ELEC, TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	7" TOTAL LG	36
A/R	ADHESIVE, GOODYEAR CPA923A		MIL-A-13883		35
2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LG	34
81	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
6	CLAMP, TORQUE MOTOR	1000087			32
2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS1352C02LL4			30
3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
6	SCR, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			27
4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-17			26
4	WASHER, FLAT, ROUND	1000254			25
7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
6	SCR, CAP, SOC HD, HEX	100110-7			22
A/R	SOLDER	SN60WARP2	QQ-S-571		21
A/R	SOLDER	SN10WARP2	QQ-S-571		20
2	INSULATION SLEEVING, ELEC	1006776-9		5/16 LG	19
2	BUSHING, INSULATED	1000036			18
6	TERMINAL, INSULATED	1000100-2			17
6	TERMINAL, INSULATED	1000100-1			16
~~1~~	~~TERMINAL-LUG~~	~~[illegible]~~			~~15~~
2	CONNECTOR, ELEC, RECP 29CONT	1000116			14
2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
2	BRACKET, CONNECTOR	1000125			12
1	NUT, BEARING RETAINER	1000086			11
1	RETAINER, BEARING I.A. & M.A.	1000090			10
1	BEARING, BALL, DUPLEX	1000029			9
1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
1	GUIDE, WIRE, BRG. HSG. M.A.	1000092			7
1	MOTOR, TORQUE, DC, FRAMLESS	1000075			6
1	LIMIT SWITCH, MA.	1001590			5
1	RESOLVER, 1X TRANSMITTER	1000030			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	SHAFT, STUB, 1X M.A.	1000 05			2
1	HOUSING, BEARING, 1X M.A.	1000 06			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	BL1000201
1000003	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN D.M. WHITE 2-13-63
APPROVED FOR MSC
W J Rhine
APPROVAL DATE
W Kupfer 8 Mar 63

INTER GIMBAL
SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000008
SHEET 1 OF 1

1000008 R

MASTER

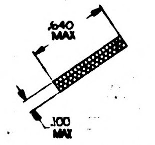
WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO
1-1	BLU		J6-R	E4-7
1-2	VIO		J6-S	E4-8
2	WHT/VIO		J6-T	E4-18
3	BLK		J6-V	E4-1
4-1	YEL	39	J6-W	B10-S2
4-2	BLU	41	J6-Z	B10-S4
5	WHT/YEL		B10-WHT/YEL	B10-S2
6	WHT/BLU		B10-WHT/BLU	B10-S4
7-1	BLK	36	J6-a	B10-S3
7-2	RED	38	J6-b	B10-S1
8	WHT/BLK		B10-WHT/BLK	B10-S3
9	WHT/RED		B10-WHT/RED	B10-S1
10-1	YEL		J6-c	E4-5
10-2	GRN		J6-d	E4-6
11-1	WHT/BLU		J6-M	E4-17
11-2	WHT/GRN		J6-L	E4-16
12-1	WHT/YEL		J6-J	E4-15
12-2	WHT/ORN		J6-H	E4-14
13-1	WHT/BRN		J6-N	E4-12
13-2	WHT/RED		J6-K	E4-13
14-1	BRN	43	J6-N	J8-F
14-2	RED	38	J6-K	J8-C
15-1	BRN		J6-E	E4-2
15-2	RED		J6-D	E4-3
15-3	ORN		J6-F	E4-4
16-1	WHT		J6-B	E4-10
16-2	GY		J6-A	E4-9
16-3	WHT/BLK		J6-C	E4-11
17-	WHT/BLK/VIO		J8-R	E4-26
17-2	WHT/BLK/ORN		J8-U	E4-22
17-3	WHT/BLK/RED		J8-T	E4-21
17-4	WHT/RED/ORN		J8-V	E4-35
17-5	WHT/RED/YEL		J8-Y	E4-36
17-6	WHT/BLK/BLU		J8-P	E4-25
18-1	WHT/BRN/RED		J8-X	E4-28
18-2	WHT/BLK/GY		J8-W	E4-27
19	WHT/BRN/YEL		J8-a	E4-30
18-3	WHT/BRN/ORN		J8-Z	E4-29
20	WHT/BRN/BLU		J8-d	E4-32
21	WHT/BRN/GRN		J8-c	E4-31
22-1	WHT/BLK/YEL		J8-b	E4-23
22-2	WHT/BLK/GRN		J8-e	E4-24
22-3	WHT/RED/GY		J8-h	E4-40
22-4	WHT/RED/VIO		J8-f	E4-39
23-1	WHT/RED/BLU		J8-M	E4-38
23-2	WHT/RED/GRN		J8-L	E4-37
24-1	WHT	37	J8-J	B4-2
24-2	BLK	36	J8-H	B4-1
25	WHT		B4-WHT	B4-2
26	BLK		B4-BLK	B4-1
27-1	BRN	43	J8-N	E12
27-2	GY	40	J8-K	E11
28	BRN		S1-BRN	E12
29	GY		S1-GY	E11
30-1	WHT/BRN/GY		J8-E	E4-34
30-2	WHT/BRN/VIO		J8-D	E4-33
31	WHT/BLK/BRN		J8-B	E4-20
32	WHT/GY		J8-A	E4-19
33-1	WHT/BLK/VIO		P11-R	E4-26
33-2	WHT/BLK/ORN		P11-U	E4-22
33-3	WHT/BLK/BLU		P11-P	E4-25
33-4	WHT/BLK/RED		P11-T	E4-21
33-5	WHT/RED/ORN		P11-V	E4-35
33-6	WHT/RED/YEL		P11-Y	E4-36
34-1	WHT/BRN/RED		P11-X	E4-28
34-2	WHT/BLK/GY		P11-W	E4-27
35	WHT/BRN/YEL		P11-a	E4-30
34-3	WHT/BRN/ORN		P11-Z	E4-29
36	WHT/BRN/BLU		P11-d	E4-32
37	WHT/BRN/GRN		P11-c	E4-31
38-1	WHT/BLK/GRN		P11-e	E4-24
38-2	WHT/BLK/YEL		P11-b	E4-23
39	GRN	42	P11-e	A7-5
40-1	WHT/BLU		P11-M	E4-17
40-2	WHT/GRN		P11-L	E4-16
41-1	WHT/YEL		P11-J	E4-15
41-2	WHT/ORN		P11-H	E4-14
42-1	BRN	43	P11-N	P12-N
42-2	RED	38	P11-K	P12-K
43-1	BRN	43	P11-N	B10-P1
43-2	RED	38	P11-K	B10-P3
44-1	WHT/BRN		B10-P1	E4-12
44-2	WHT/RED		B10-P3	E4-13
45	WHT/RED		B10-WHT/RED	B10-P1
46	WHT/BLK		B10-WHT/BLK	B10-P3
47	YEL	39	B10-P2	B10-P4
48	WHT/YEL		B10-WHT/YEL	B10-P2
49	WHT/BLU		B10-WHT/BLU	B10-P4
50-1	WHT/BRN/GY		P11-E	E4-34
50-2	WHT/BRN/VIO		P11-D	E4-33
51	WHT/BLK/BRN		P11-B	E4-20
52	WHT/GY		P11-C	E4-19
53-1	GRN		P12-d	E4-6
53-2	YEL		P12-c	E4-5
54-1	BLU		P12-R	E4-7
54-2	VIO		P12-S	E4-8
55	WHT/VIO		P12-T	E4-18
56	BLK		P12-V	E4-1
18-A	BLK	36	SHLD-18	E25
57-1	WHT/RED/BLU		P12-M	E4-38
57-2	WHT/RED/GRN		P12-L	E4-37
58-1	BRN		P12-E	E4-2
58-2	RED		P12-D	E4-3
58-3	ORN		P12-F	E4-4
59-1	RED	38	P12-D	A7-4
59-2	ORN	45	P12-F	A7-3
60-1	WHT		P12-B	E4-10
60-2	GY		P12-A	E4-9
60-3	WHT/BLK		P12-C	E4-11
61-1	WHT/RED/VIO		P12-f	E4-39
61-2	WHT/RED/GY		P12-h	E4-40
62	VIO	44	P12-f	A7-6
63	GY	40	P12-h	A10-6
64	GRN	42	A7-5	A10-5
65-1	RED	36	A7-4	A10-4
65-2	ORN	45	A7-3	A10-3
34-A	BLK	36	SHLD-34	E26

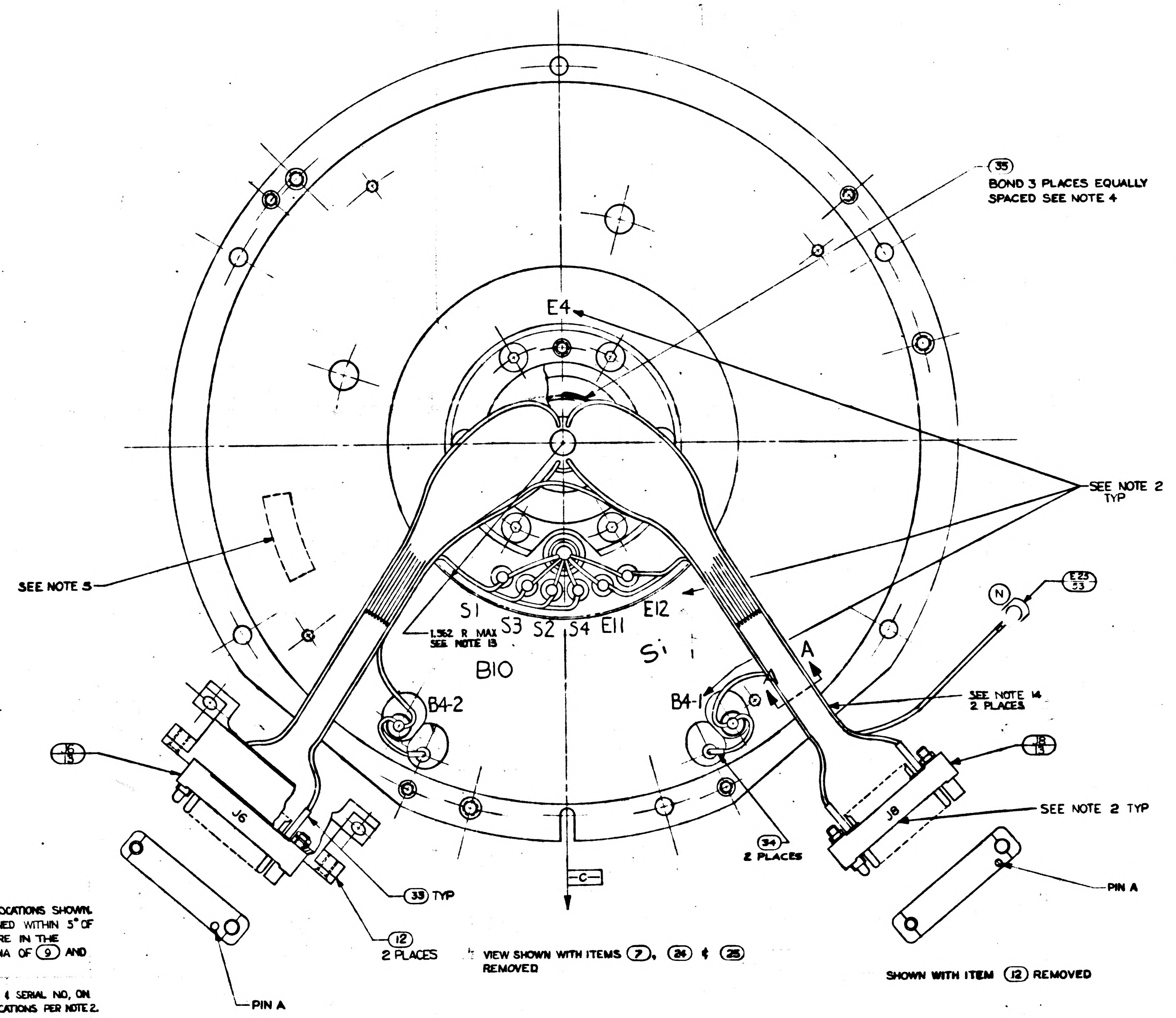
(N)

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS $\frac{.14}{.10}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (9) TO BE ALIGNED WITHIN 5° OF $\boxed{-C-}$ & IN DIRECTION OF THE ARROW WHEN (1) & (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (47) TO INSIDE DIA OF (9) AND FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (35) TO (2) & (11) AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER, MANUFACTURERS SYMBOL & SERIAL NO, ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%
   - (11) 100 IN-LB
   - (23) 10.0 IN-LB
   - (24)(26)(27)(28)(29) 5.0 IN-LB
   - (52)(30)(31) 3.5 IN-LB
7. (M) SOLDER ALL LEADS FROM (4) (5) & (6) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (14) PER MIL-STD-440 USING (21). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.~~
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM BEARING HOUSING (1) OR REMOVE TORQUE MOTOR (6) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (6).
10. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1001508
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
15. (M) SELECT ITEM (51) TO MEET TORQUE REQUIREMENTS OF ATP 1000008
16. (N) HEAT SHRINK SLEEVING ON ITEMS (53) & (54) AFTER ASSY

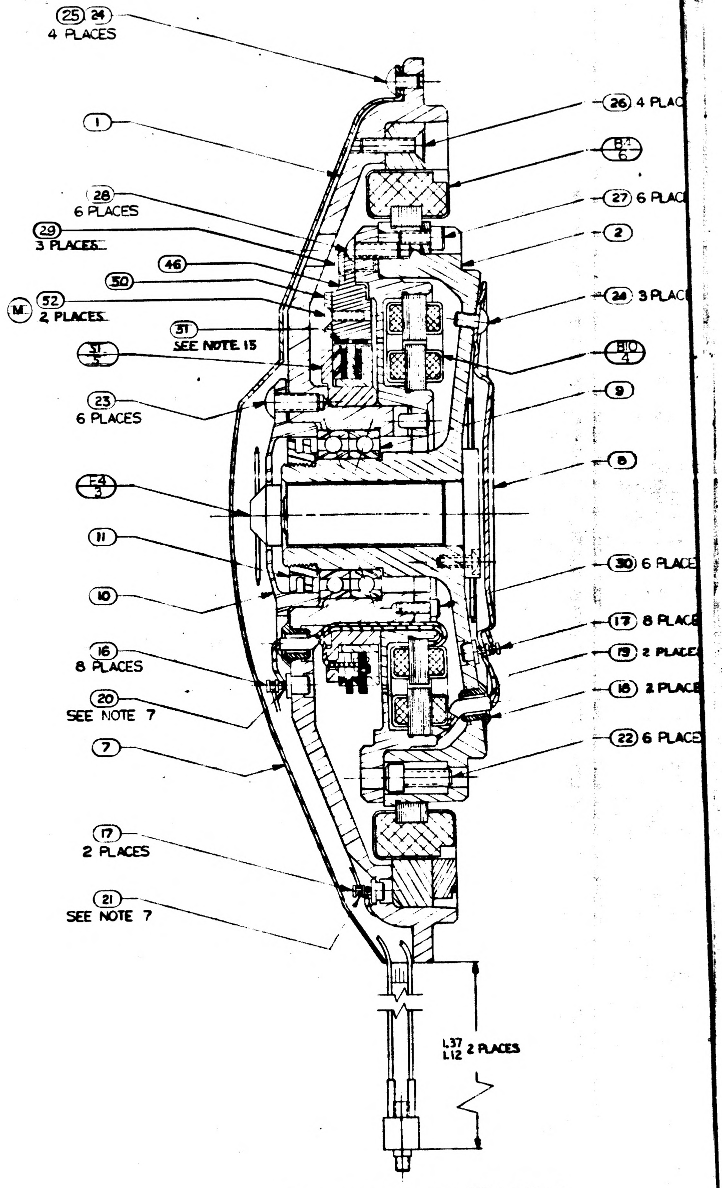

.440 MAX
.100 MAX

SECTION A-A
2 PLACES


E4
(35)
BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
SEE NOTE 2 TYP
SEE NOTE 5
S1
S3 S2 S4 E11
E12
1.562 R MAX SEE NOTE 13
B10
B4-2
B4-1
A
(N)
E25/53
SEE NOTE 14 2 PLACES
J6/13
J8/13
J6
J8
SEE NOTE 2 TYP
(33) TYP
(34) 2 PLACES
(12) 2 PLACES
-C-
PIN A
PIN A

VIEW SHOWN WITH ITEMS (7), (24) & (25) REMOVED

SHOWN WITH ITEM (12) REMOVED


(25)(24) 4 PLACES
(26) 4 PLAC
(1)
B4/6
(28) 6 PLACES
(27) 6 PLAC
(29) 3 PLACES
(2)
(46)
(50)
(M) (52) 2 PLACES
(24) 3 PLAC
(51) SEE NOTE 15
(51/5)
B10/4
(23) 6 PLACES
(9)
(8)
E4/3
(11)
(30) 6 PLACE
(10)
(17) 8 PLACE
(16) 8 PLACES
(19) 2 PLACE
(20) SEE NOTE 7
(18) 2 PLACE
(7)
(22) 6 PLACE
(17) 2 PLACES
(21) SEE NOTE 7
1.37/1.12 2 PLACES

VIEW SHOWN WITH ITEM (12) REMOVED

(N) TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

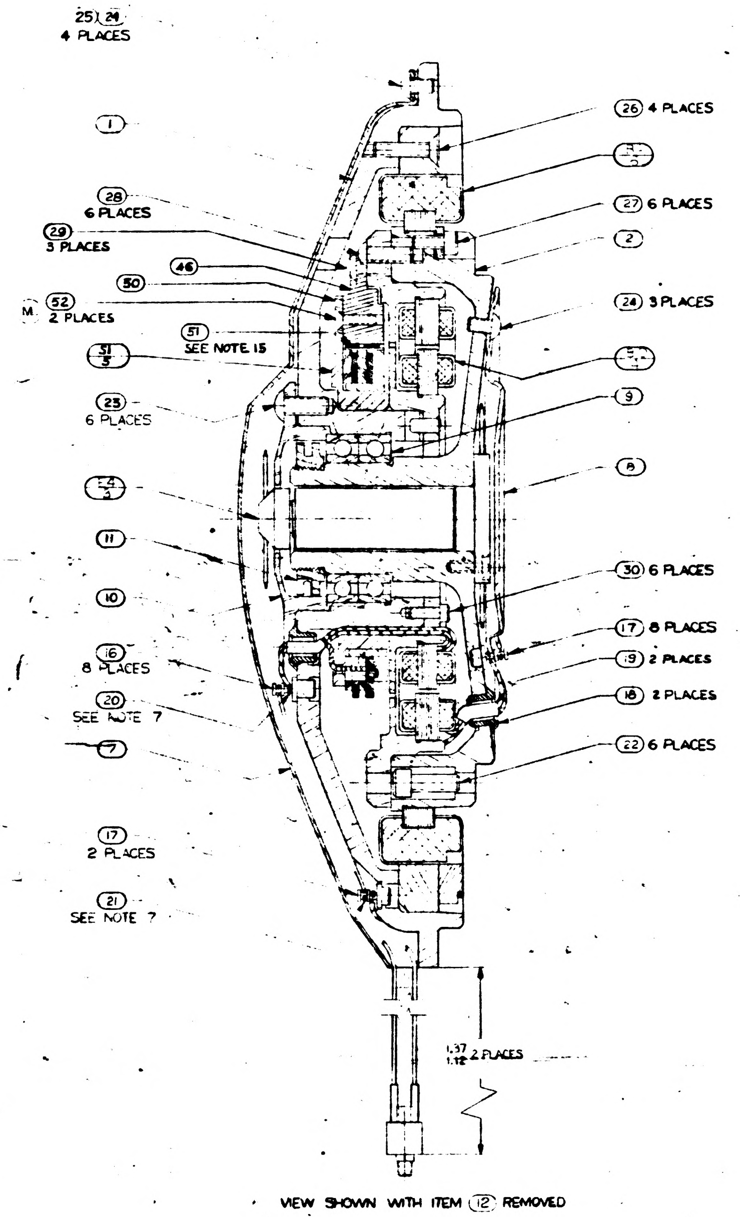
(P)

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

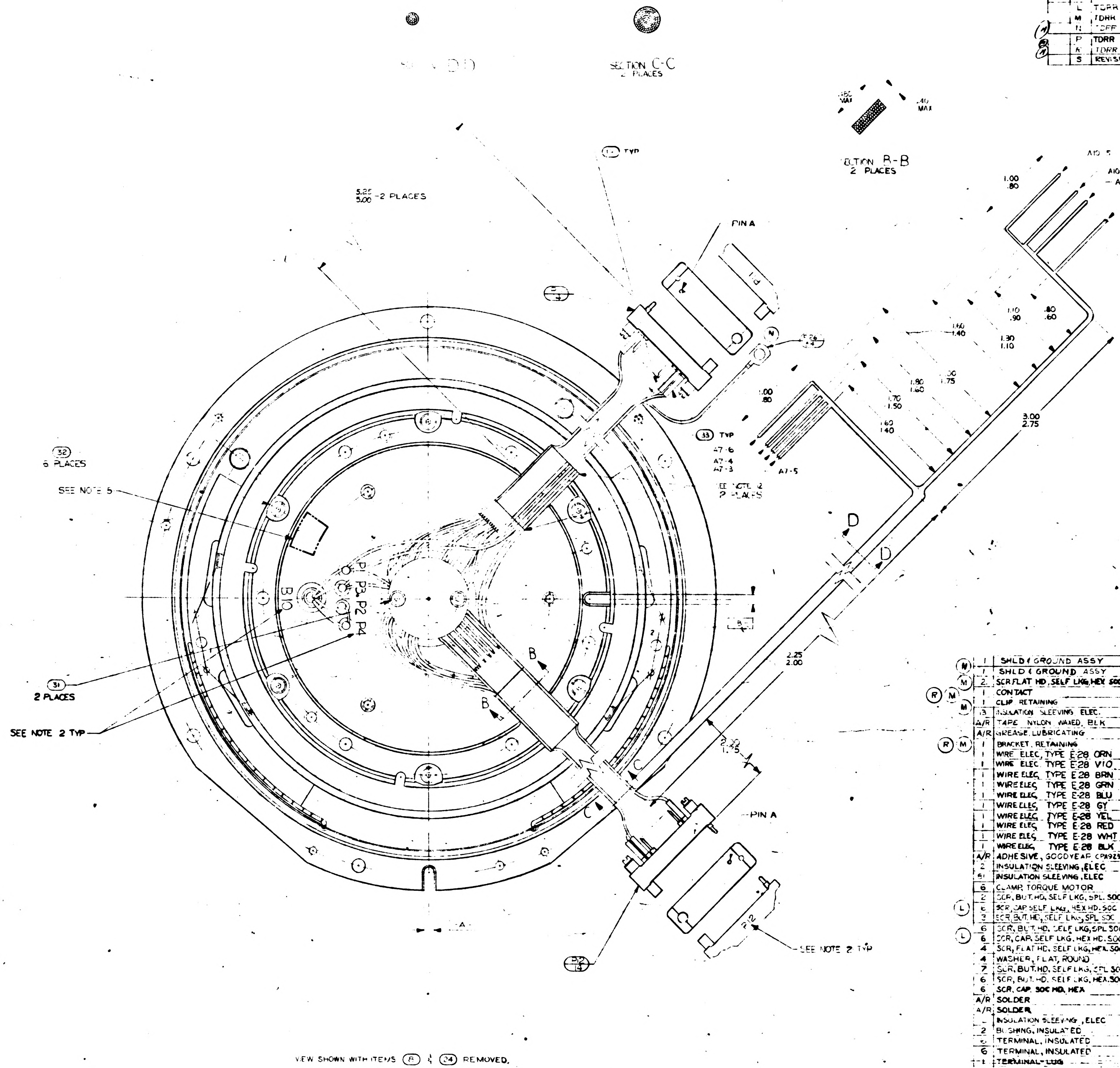
1000008 REV R SHEET 1

INCHES
PHOTOGRAPHING SCALE ONLY

REVISIONS TDRR				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 01327	7/3/63	
	L	TDRR 03155	7/26/63	
	M	TDRR 03857	[illegible]	
	N	TDRR 05169	1/7/64	
	P	TDRR 06237	2-11-64	
	R	TDRR 06526	2 25 64	
	S	REVISED PER TDRR 07951	5MAY64	


25|24
4 PLACES
(1)
(28)
6 PLACES
(29)
3 PLACES
(46)
(50)
M (52)
2 PLACES
(51)
SEE NOTE 15
(23)
6 PLACES
(11)
(10)
(16)
8 PLACES
(20)
SEE NOTE 7
(7)
(17)
2 PLACES
(21)
SEE NOTE 7
(26) 4 PLACES
(27) 6 PLACES
(2)
(24) 3 PLACES
(9)
(8)
(30) 6 PLACES
(17) 8 PLACES
(19) 2 PLACES
(18) 2 PLACES
(22) 6 PLACES
1.37
1.12 2 PLACES
3 PLACES EQUALLY
SEE NOTE 4
SEE NOTE 2
TYP
SEE NOTE 2 TYP
PIN A
REMOVED

VIEW SHOWN WITH ITEM (12) REMOVED


SECTION D-D
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
.40
MAX
5.25
5.00 2 PLACES
(12) TYP
PIN A
P1
P2
A10-5
A10-3
A10-4
A10-6
1.00
.80
1.10
.90
.80
.60
1.30
1.10
1.60
1.40
1.80
1.60
2.00
1.75
1.70
1.50
1.62
1.40
3.00
2.75
1.00
.80
(33) TYP
A7-6
A7-4
A7-3
A7-5
SEE NOTE 12
2 PLACES
(32)
6 PLACES
SEE NOTE 5
(31)
2 PLACES
SEE NOTE 2 TYP
P1 P3 P2 P4
B1
J1
D
D
B
B
C
C
2.25
2.00
PIN A
SEE NOTE 2 TYP
A

VIEW SHOWN WITH ITEMS (6) & (24) REMOVED.

REPLACES REV J WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(N)	1	SHLD & GROUND ASSY	1000020-2			54
	1	SHLD & GROUND ASSY	1000020-1			53
(M)	2	SCR FLAT HD, SELF LKG, HEX SOC	1000104-3			52
(R) (M)	1	CONTACT	1001583		SEE NOTE 15	51
(M)	1	CLIP RETAINING	1000198			50
	13	INSULATION SLEEVING ELEC.	1006776-16		5/16 LG	49
	A/R	TAPE NYLON WAXED, BLK		MIL-T-713	CLASS 2	48
	A/R	GREASE, LUBRICATING		MIL-G-25760		47
(R) (M)	1	BRACKET, RETAINING	1001585			46
	1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
	1	WIRE ELEC TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
	1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
	1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
	1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
	1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
	1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
	1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
	1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
	1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	7" TOTAL LG	36
	A/R	ADHESIVE, GOODYEAR CPA923A		MIL-A-13883		35
	2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LG	34
	51	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
	6	CLAMP, TORQUE MOTOR	1000087			32
	2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
(L)	6	SCR, CAP SELF LKG, HEX HD. SOC	NAS1352C02L4			30
	3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
	6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
(L)	6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS1352C04LL4			27
	4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-17			26
	4	WASHER, FLAT, ROUND	1000254			25
	7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
	6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
	6	SCR, CAP, SOC HD, HEX	1000110-7			22
	A/R	SOLDER	SN60WARP2	QQ-S-571		21
	A/R	SOLDER	SN10WARP2	QQ-S-571		20
	[illegible]	INSULATION SLEEVING, ELEC	1006776-3		5/16 LG	19
	2	BUSHING, INSULATED	1000036			18
	6	TERMINAL, INSULATED	1000100-2			17
	6	TERMINAL, INSULATED	1000100-1			16
	~~1~~	~~TERMINAL-LUG~~	~~MS25036-48~~			~~15~~
	2	CONNECTOR, ELEC, RECP 29 CONT	1000116			14
	2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
	2	BRACKET, CONNECTOR	1000125			12
	1	NUT, BEARING RETAINER	1000086			11
	1	RETAINER, BEARING I.A. & M.A.	1000090			10
	1	BEARING, BALL, DUPLEX	1000029			9
	1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
	1	GUIDE, WIRE BRG HSG M.A.	1000092			7
	1	MOTOR, TORQUE, DC FRAMLESS	1000075			6
(R)	1	LIMIT SWITCH, MA	1001590-011			5
	1	RESOLVER 1X TRANSMITTER	1000030			4
	1	SLIP RING ASSY, ELEC. 40 CONT	1000037			3
	1	SHAFT, STUB 1X MA	1000105			2
	1	HOUSING, BEARING 1X M.A	1000 [illegible]			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL1000201
1000003	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC W J Rhine
MIT/IL APPROVAL
DATE

INTER GIMBAL
SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000008
SHEET 1 OF 1

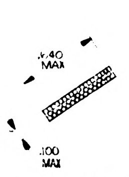
1000008 S

1000008 S1

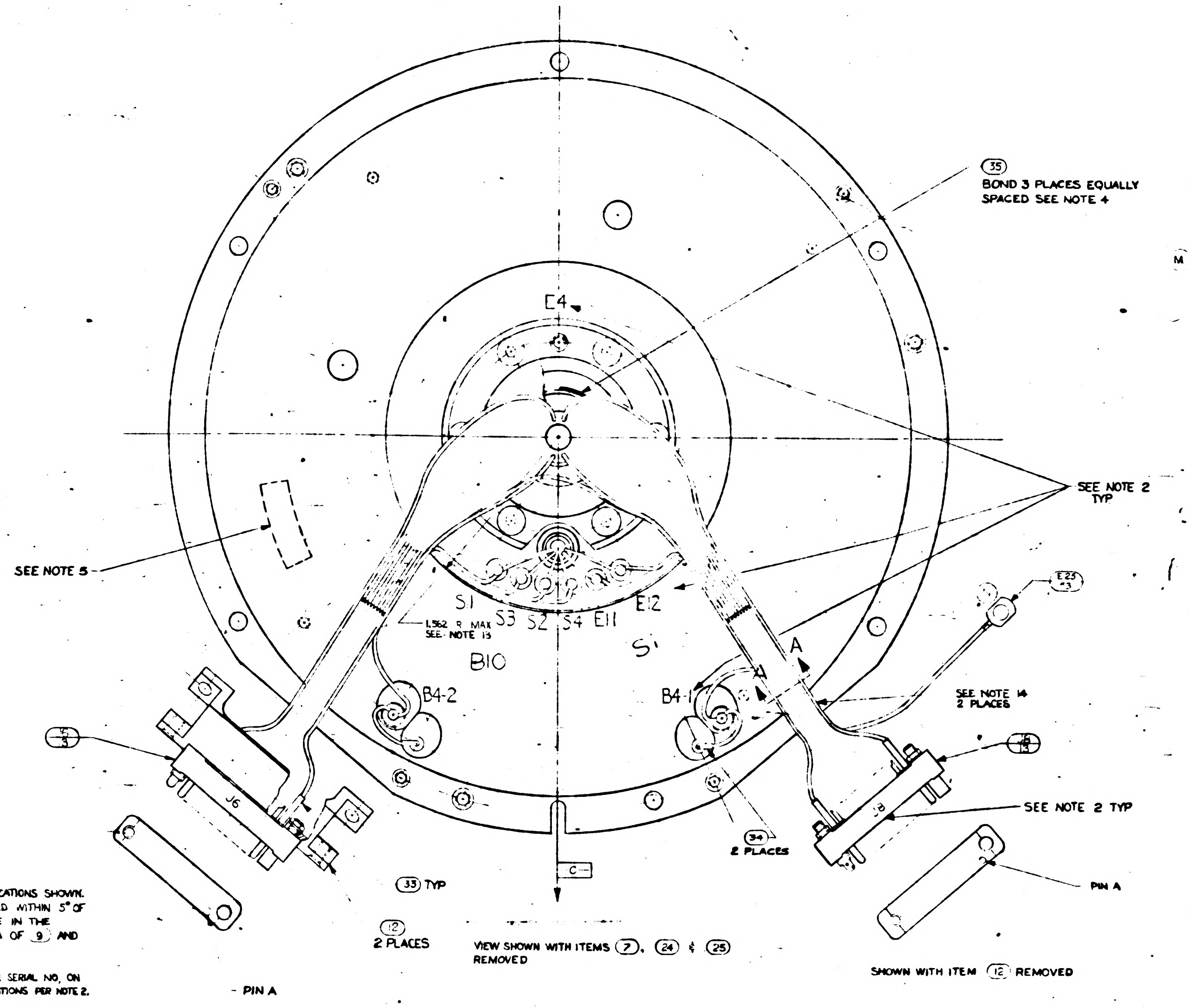
2/1000008

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO
1-1	BLU		J6-R	E4-7
1-2	VIO		J6-S	E4 8
10-3	WHT/VIO		J6-c	E4-18
3	BLK		J6-V	E4-1
4-1	YEL	39	J6-W	B10-S2
4-2	BLU	41	J6-Z	B10-S4
5	WHT/YEL		B10-WHT/YEL	B10-S2
6	WHT/BLU		B10-WHT/BLU	B10-S4
7-1	BLK	36	J6-a	B10-S3
7-2	RED	38	J6-b	B10-S1
8	WHT/BLK		B10-WHT/BLK	B10-S3
9	WHT/RED		B10 WHT/RED	B10-S1
10-1	YEL		J6-c	E4-5
10-2	GRN		J6-d	E4-6
11-1	WHT BLU		J6-M	E4-17
11-2	WHT GRN		J6-L	E4-16
12-1	WHT YEL		J6-J	E4-15
12-2	WHT/GRN		J6-H	E4-14
13-1	WHT/BRN		J6-N	E4-12
13-2	WHT/RED		J6-K	E4-13
14-1	BRN	43	J6-N	J8-F
14-2	RED	38	J6-K	J8-C
15-1	BRN		J6-E	E4-2
15-2	RED		J6-D	E4-3
15-3	ORN		J6-F	E4-4
16-1	WHT		J6-B	E4-10
16-2	GY		J6-A	E4-9
16-3	WHT/BLK		J6-C	E4-11
17-1	WHT/BLK/VIO		J8-R	E4-26
17-2	WHT/BLK/ORN		J8-U	E4-22
17-3	WHT/BLK/RED		J8-T	E4-21
17-4	WHT/RED/ORN		J8-V	E4-35
17-5	WHT/RED/YEL		J8-Y	E4-36
17-6	WHT/BLK/BLU		J8-P	E4-25
18-1	WHT/BRN/RED		J8-X	E4-28
18-2	WHT/BLK/GY		J8-W	E4-27
19-1	WHT/BRN/YEL		J8-a	E4-30
18-3	WHT/BRN/ORN		J8-Z	E4-29
19-2	WHT/BRN/BLU		J8-d	E4-32
19-3	WHT/BRN/GRN		J8-c	E4-31
22-1	WHT/BLK/YEL		J8-b	E4-23
22-2	WHT/BLK/GRN		J8-e	E4-24
22-3	WHT/RED/GY		J8-h	E4-40
22-4	WHT/RED/VIO		J8-f	E4-39
23-1	WHT/RED/BLU		J8-M	E4 38
23-2	WHT/RED/GRN		J8-L	E4-37
24-1	WHT	37	J8-J	B4-2
24-2	BLK	36	J8-H	B4 1
25	WHT		B4-WHT	B4 2
26	BLK		B4-BLK	B4-1
27-1	BRN	43	J8-N	E12
27-2	GY	40	J8-K	E11
28	BRN		S1-BRN	E12
29	GY		S1-GY	E11
30-1	WHT/BRN/GY		J8-E	E4-34
30-2	WHT/BRN/VIO		J8-D	E4-33
31	WHT/BLK/BRN		J8-B	E4-20
10-4	WHT/GY		J6-d	E4-19
33-1	WHT/BLK/VIO		P11-R	E4-26
33-2	WHT/BLK/ORN		P11-U	E4-22
33-3	WHT/BLK/BLU		P11-P	E4-25
33-4	WHT/BLK/RED		P11-T	E4-21
33-5	WHT/RED/ORN		P11-V	E4-35
33-6	WHT/RED/YEL		P11-Y	E4-36
34-1	WHT/BRN/RED		P11-X	E4-28
34-2	WHT/BLK/GY		P11-W	E4 27
35-1	WHT/BRN/YEL		P11-a	E4 30
34-3	WHT/BRN/ORN		P11-Z	E4-29
35-2	WHT/BRN/BLU		P11-d	E4-32
35-3	WHT/BRN/GRN		P11-c	E4-31
38-1	WHT/BLK/GRN		P11-e	E4-24
38-2	WHT/BLK/YEL		P11-b	E4-23
39	GRN	42	P11-e	A7-5
40-1	WHT/BLU		P11-M	E4-17
40-2	WHT/GRN		P11-L	E4-16
41-1	WHT/YEL		P11-J	E4-15
41-2	WHT/BRN		P11-H	E4-14
42-1	BRN	43	P11-N	P12-N
42-2	RED	38	P11-K	P12-K
43-1	BRN	43	P11-N	B10-P1
43-2	RED	38	P11-K	B10-P3
44-1	WHT/BRN		B10-P1	E4 12
44-2	WHT/RED		B10-P3	E4-13
45	WHT/RED		B10-WHT/RED	B10-P1
46	WHT/BLK		B10-WHT/BLK	B10-P3
47	YEL	39	B10-P2	B10-P4
48	WHT/YEL		B10-WHT/YEL	B10-P2
49	WHT/BLU		B10-WHT/BLU	B10-P4
50-1	WHT/BRN/GY		P11-E	E4 34
50-2	WHT/BRN/VIO		P11-D	E4-33
51	WHT/BLK/BRN		P11-B	E4 20
53-3	WHT/GY		P12-d	E4 19
53-1	GRN		P12-d	E4-6
53-2	YEL		P12-c	E4-5
54-1	BLU		P12-R	E4-7
54-2	VIO		P12-S	E4-8
55-4	WHT/VIO		P12-c	E4-18
56	BLK		P12-V	E4 1
18-A	BLK	36	SHLD-18	E25
57-1	WHT/RED/BLU		P12-M	E4-38
57-2	WHT/RED/GRN		P12-L	E4-37
58-1	BRN		P12-E	E4-2
58-2	RED		P12-D	E4-3
58-3	ORN		P12-F	E4-4
59-1	RED	38	P12-D	A7-4
59-2	ORN	45	P12-F	A7-3
60-1	WHT		P12 B	E4-10
60-2	GY		P12-A	E4-9
60-3	WHT/BLK		P12-C	E4-11
61-1	WHT/RED/VIO		P12-f	E4-39
61-2	WHT/RED/GY		P12-h	E4-40
62	VIO	44	P12-f	A7-6
63	GY	40	P12-h	A10-6
64	GRN	42	A7-5	A10-5
65-1	RED	36	A7-4	A10-4
65-2	ORN	45	A7-3	A10-3
34-A	BLK	36	SHLD-34	E26

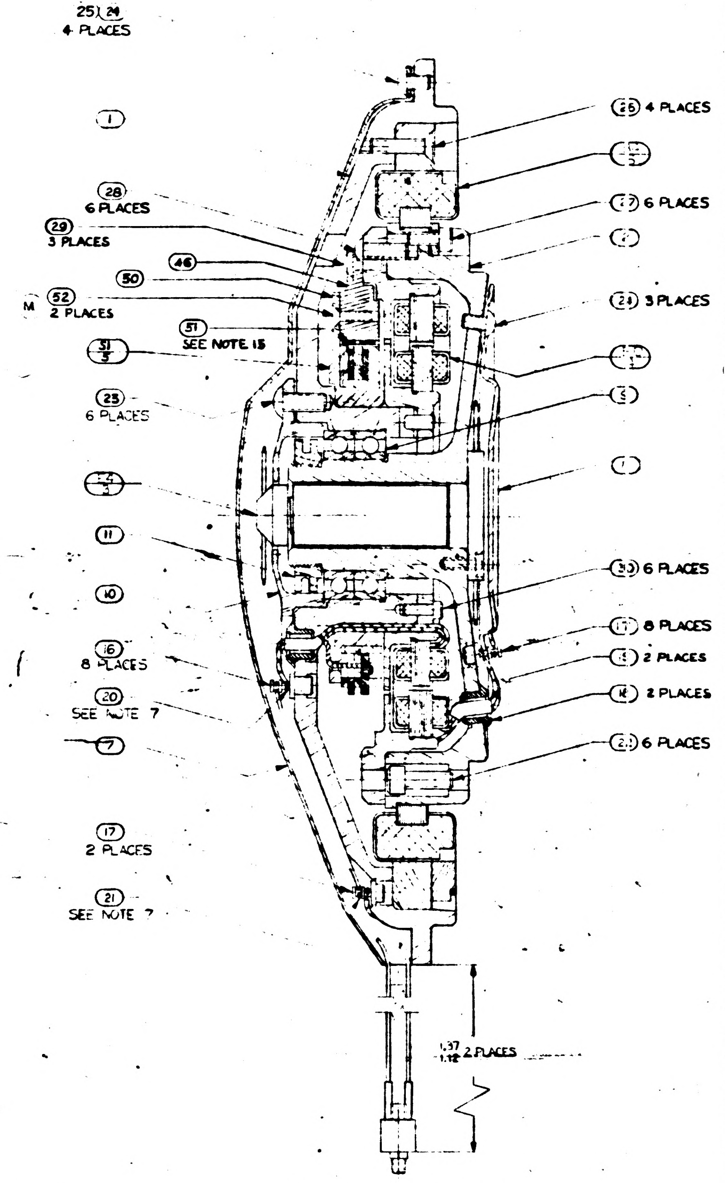


SECTION A-A
2 PLACES



VIEW SHOWN WITH ITEMS (7), (24) & (25) REMOVED

SHOWN WITH ITEM (12) REMOVED



VIEW SHOWN WITH ITEM (12) REMOVED

NOTES:

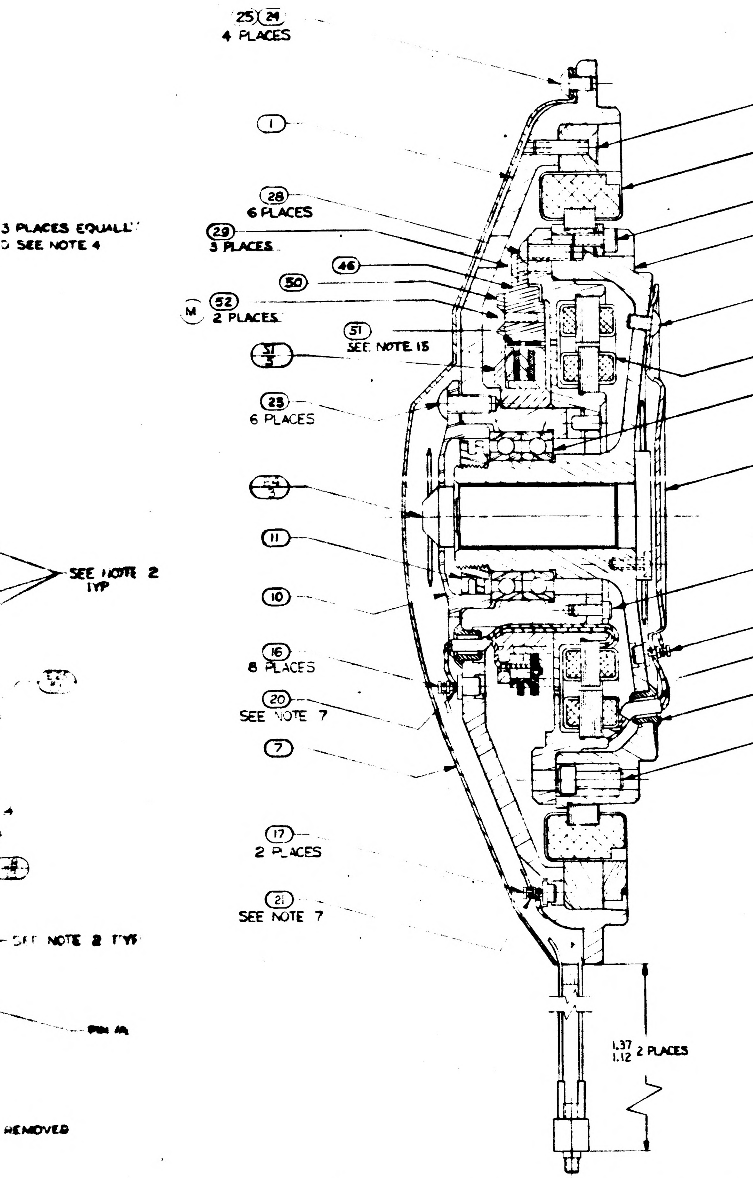
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS $\frac{14}{10}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (9) TO BE ALIGNED WITHIN 5° OF [-C-] & IN DIRECTION OF THE ARROW WHEN (1) & (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (47) TO INSIDE DIA OF (9) AND FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (35) TO (2) & (11) AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER MANUFACTURERS SYMBOL & SERIAL NO, ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%
   - (11) 100 IN-LB
   - (23) 10.0 IN-LB
   - (24)(26)(27)(28)(29) 5.0 IN LB
   - (M) (52)(30)(31) 3.5 IN-LB
7. SOLDER ALL LEADS FROM (4) (5) & (6) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (14) PER MIL-STD-440 USING (21). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM BEARING HOUSING (1) OR REMOVE TORQUE MOTOR (6) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (6).
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1001508
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
15. (M) SELECT ITEM 51 TO MEET TORQUE REQUIREMENTS OF ATP 1000008
16. (N) HEAT SHRINK SLEEVING ON ITEMS (53) & (54) AFTER ASSY

(N) TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

(P)

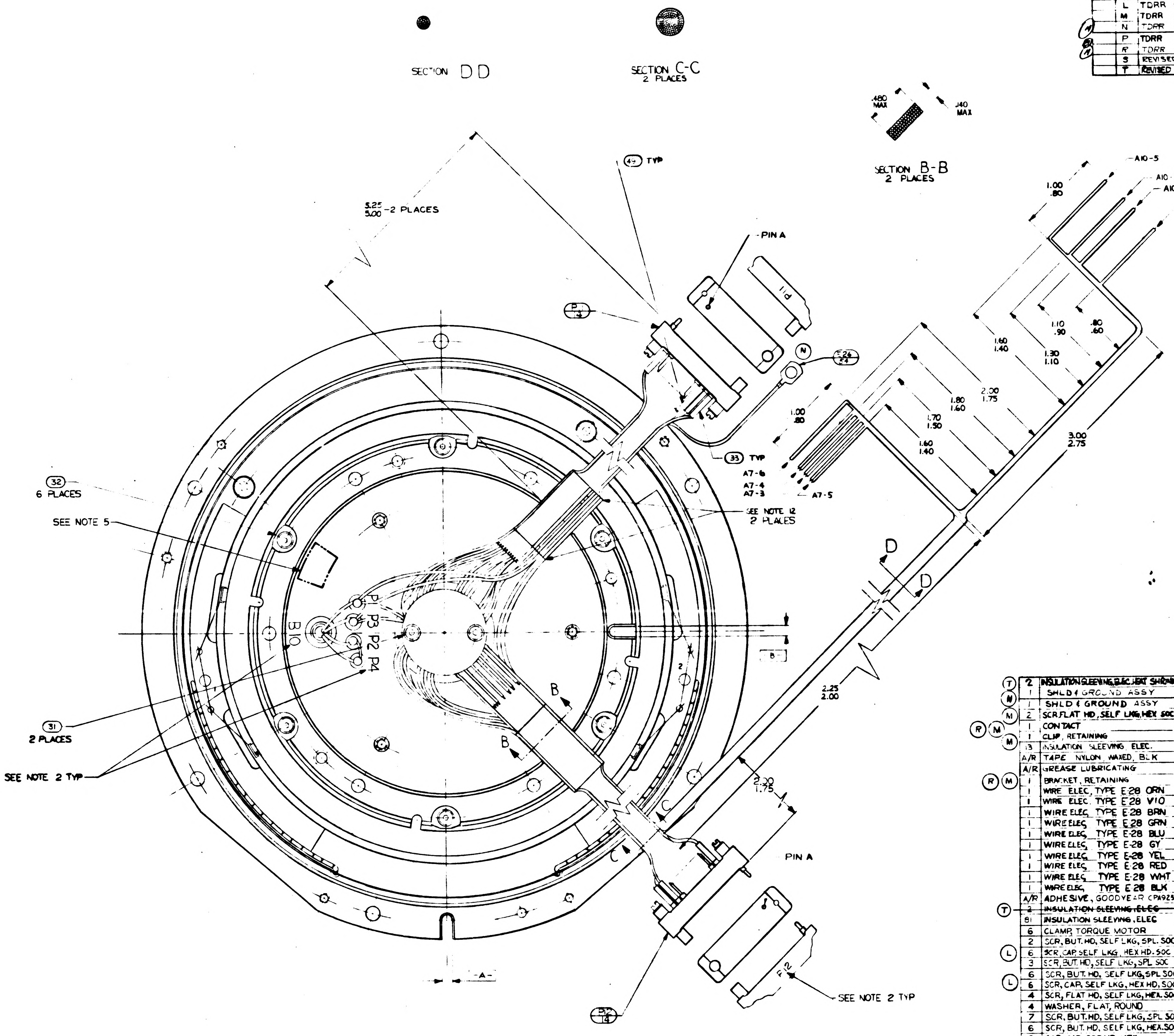
NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

REVISIONS TDRR				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	K	REPLACES REV J WITH CHANGES TDRR 01927	7/9/63	ajB wff
	L	TDRR 03185	7/26/63	ajB wff
	M	TDRR 03857	10/14/63	ajB wff
	N	TDRR 05169	1/7/64	wff
	P	TDRR 06237	2-11-64	wff
	R	TDRR 06526	2-25-64	
	S	REVISED PER TDRR 07951	5 MAY 64	
	T	REVISED PER TDRR 07954		



25 (24) 4 PLACES
(1)
(28) 6 PLACES
(29) 3 PLACES
3 PLACES EQUALLY
SEE NOTE 4
(46)
(50)
(M) (52) 2 PLACES
(51) SEE NOTE 15
(23) 6 PLACES
(11)
(10)
SEE NOTE 2 TYP
(16) 8 PLACES
(20) SEE NOTE 7
(7)
(17) 2 PLACES
(21) SEE NOTE 7
SEE NOTE 2 TYP
PIN A
(26) 4 PLACES
(27) 6 PLACES
(2)
(24) 3 PLACES
(9)
(8)
(30) 6 PLACES
(17) 8 PLACES
(19) 2 PLACES
(18) 2 PLACES
(22) 6 PLACES
1.37 1.12 2 PLACES
REMOVED

VIEW SHOWN WITH ITEM (12) REMOVED



SECTION D-D
SECTION C-C 2 PLACES
SECTION B-B 2 PLACES
.480 MAX
.140 MAX
5.25 5.00 2 PLACES
(4) TYP
PIN A
(N)
A10-5
A10-3
A10-4
A10-6
1.00 .80
1.10 .90
.80 .60
1.60 1.40
1.30 1.10
2.00 1.75
1.80 1.60
1.70 1.50
1.60 1.40
1.00 .80
3.00 2.75
(33) TYP
A7-6
A7-4
A7-3
A7-5
SEE NOTE 12 2 PLACES
(32) 6 PLACES
SEE NOTE 5
B10
P1 P3 P2 P4
(31) 2 PLACES
SEE NOTE 2 TYP
B
C
D
2.25 2.00
2.00 1.75
PIN A
SEE NOTE 2 TYP
A

VIEW SHOWN WITH ITEMS (8) & (24) REMOVED

REPLACES REV J WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(T)	2	INSULATION SLEEVING, ELEC, HEAT SHRINK	1010490-180		3/4 LONG	55
(N)	1	SHLD & GROUND ASSY	1000020-2			54
	1	SHLD & GROUND ASSY	1000020-1			53
(M)	2	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-3			52
(R) (M)	1	CONTACT	1001583		SEE NOTE 15	51
(M)	1	CLIP, RETAINING	1000198			50
	13	INSULATION SLEEVING ELEC.	1006776-16		5/16 LG	49
	A/R	TAPE NYLON WAXED, BLK		MIL-T-713	CLASS 2	48
	A/R	GREASE LUBRICATING		MIL-G-25760		47
(R) (M)	1	BRACKET, RETAINING	1001589			46
	1	WIRE ELEC, TYPE E-28 ORN		MIL-W-16878	20" TOTAL LG	45
	1	WIRE ELEC, TYPE E-28 VIO		MIL-W-16878	12" TOTAL LG	44
	1	WIRE ELEC, TYPE E-28 BRN		MIL-W-16878	30" TOTAL LG	43
	1	WIRE ELEC, TYPE E-28 GRN		MIL-W-16878	20" TOTAL LG	42
	1	WIRE ELEC, TYPE E-28 BLU		MIL-W-16878	5" TOTAL LG	41
	1	WIRE ELEC, TYPE E-28 GY		MIL-W-16878	15" TOTAL LG	40
	1	WIRE ELEC, TYPE E-28 YEL		MIL-W-16878	5" TOTAL LG	39
	1	WIRE ELEC, TYPE E-28 RED		MIL-W-16878	38" TOTAL LG	38
	1	WIRE ELEC, TYPE E-28 WHT		MIL-W-16878	10" TOTAL LG	37
	1	WIRE ELEC, TYPE E-28 BLK		MIL-W-16878	7" TOTAL LG	36
	A/R	ADHESIVE, GOODYEAR CPA923A		MIL-A-13883		35
(T)	~~2~~	~~INSULATION SLEEVING, ELEC~~	~~1006776-15~~		~~3/16 LG~~	~~34~~
	81	INSULATION SLEEVING, ELEC	1006776-18		5/16 LG	33
	6	CLAMP, TORQUE MOTOR	1000087			32
	2	SCR, BUT. HD, SELF LKG, SPL. SOC	1000250-2			31
(L)	6	SCR, CAP, SELF LKG, HEX HD. SOC	NAS1352C02LL4			30
	3	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-13			29
	6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-15			28
(L)	6	SCR, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			27
	4	SCR, FLAT HD, SELF LKG, HEX. SOC	1000104-17			26
	4	WASHER, FLAT, ROUND	1000254			25
	7	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-12			24
	6	SCR, BUT. HD, SELF LKG, HEX. SOC	1000093-25			23
	6	SCR, CAP, SOC HD, HEX	100110-7			22
	A/R	SOLDER	SN60WARP2	QQ-S-571		21
	A/R	SOLDER	SN10WARP2	QQ-S-571		20
	2	INSULATION SLEEVING, ELEC	1006776-9		5/16 LG	19
	2	BUSHING, INSULATED	1000036			18
	6	TERMINAL, INSULATED	1000100-2			17
	6	TERMINAL, INSULATED	1000100-1			16
	~~1~~	~~TERMINAL-LUG~~	~~MS25036-[illegible]~~			~~15~~
	2	CONNECTOR, ELEC, RECP 29 CONT	1000116			14
	2	CONNECTOR, ELEC, PLUG 29 CONT	1000117			13
	2	BRACKET, CONNECTOR	1000125			12
	1	NUT, BEARING RETAINER	1000086			11
	1	RETAINER, BEARING I.A. & M.A.	1000090			10
	1	BEARING, BALL, DUPLEX	1000029			9
	1	GUIDE, WIRE, STUB SHAFT M.A.	1000152			8
	1	GUIDE, WIRE, BRG HSG. M.A.	1000092			7
	1	MOTOR, TORQUE, DC FRAMLESS	1000075			6
(R)	1	LIMIT SWITCH, MA.	1001590-011			5
	1	RESOLVER 1X TRANSMITTER	1000030			4
	1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
	1	SHAFT, STUB 1X M.A.	1000105			2
	1	HOUSING, BEARING 1X M.A.	1000106			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL1000201
1000003	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED DATE
CHECKED
DRAWN C M WHITE 2-13-63
APPROVED FOR MSC
W J Rhine
APPROVAL DATE
W Kupfer 8 Nov 63

INTER GIMBAL
SUB-ASSEMBLY
ONE SPEED MIDDLE AXIS

SCALE 2/1
UNIT WT
CODE IDENT

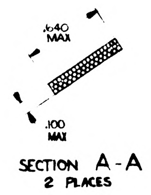
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000008
SHEET 1 OF 1

1000008

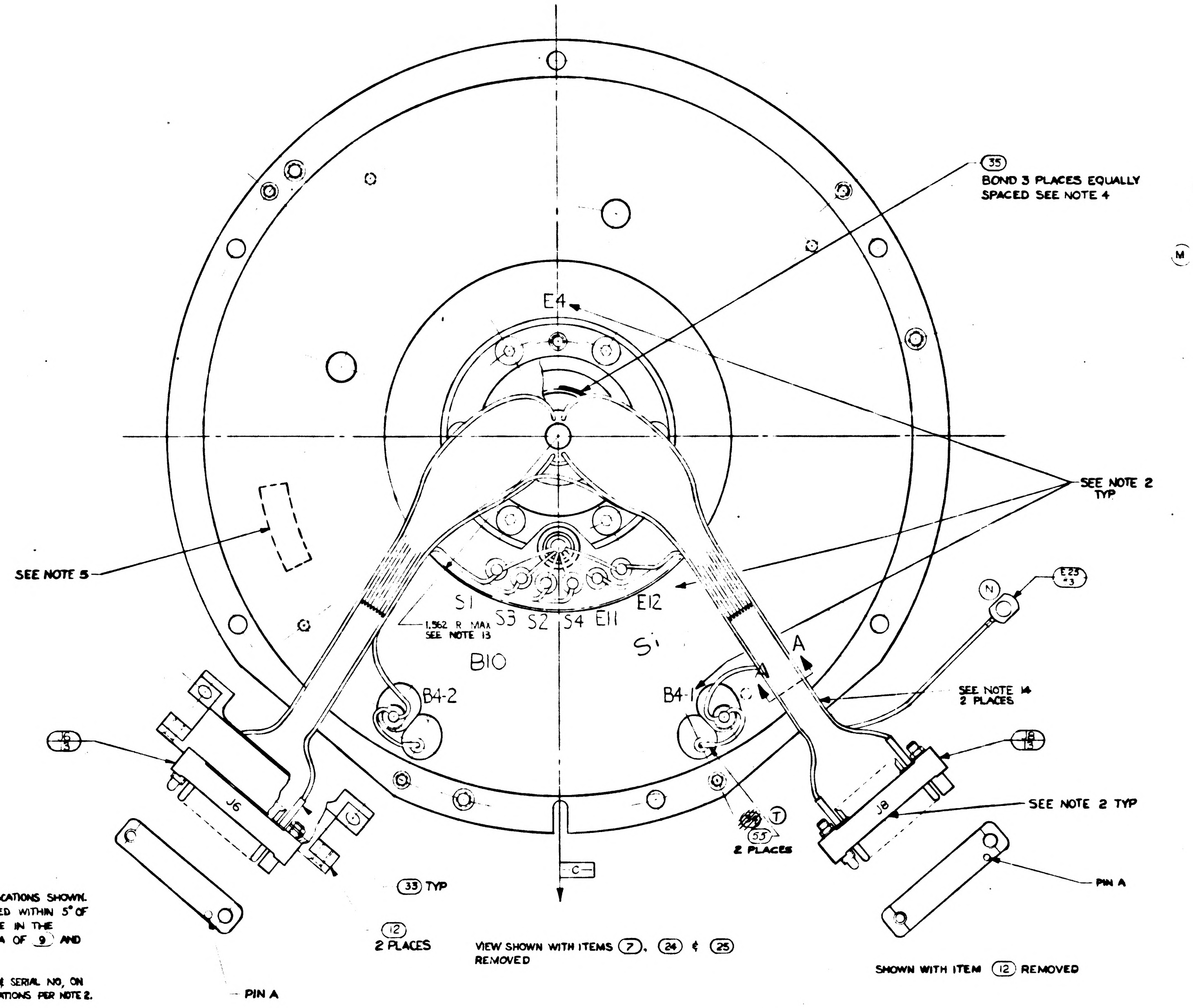
2/1000008

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO
1-1	BLU		J6-R	E4-7
1-2	VIO		J6-S	E4-8
10-3	WHT/VIO		J6-c	E4-18
3	BLK		J6-V	E4-1
4-1	YEL	39	J6-W	B10-S2
4-2	BLU	41	J6-Z	B10-S4
5	WHT/YEL		B10-WHT/YEL	B10-S2
6	WHT/BLU		B10-WHT/BLU	B10-S4
7-1	BLK	36	J6-a	B10-S3
7-2	RED	38	J6-b	B10-S1
8	WHT/BLK		B10-WHT/BLK	B10-S3
9	WHT/RED		B10 WHT/RED	B10-S1
10-1	YEL		J6-c	E4-5
10-2	GRN		J6-d	E4-6
11-1	WHT, BLU		J6-M	E4-17
11-2	WHT GRN		J6-L	E4-16
12-1	WHT YEL		J6-J	E4-15
12-2	WHT/GRN		J6-H	E4-14
13-1	WHT/BRN		J6-N	E4-12
13-2	WHT/RED		J6-K	E4-13
14-1	BRN	43	J6-N	J8-F
14-2	RED	38	J6-K	J8-C
15-1	BRN		J6-E	E4-2
15-2	RED		J6-D	E4-3
15-3	ORN		J6-F	E4-4
16-1	WHT		J6-B	E4-10
16-2	GY		J6-A	E4-9
16-3	WHT/BLK		J6-C	E4-11
17-1	WHT/BLK/VIO		J8-R	E4-26
17-2	WHT/BLK/ORN		J8-U	E4-22
17-3	WHT/BLK/RED		J8-T	E4-21
17-4	WHT/RED/ORN		J8-V	E4-35
17-5	WHT/RED/YEL		J8-Y	E4-36
17-6	WHT/BLK/BLU		J8-P	E4-25
18-1	WHT/BRN/RED		J8-X	E4-28
18-2	WHT/BLK/GY		J8-W	E4-27
19-1	WHT/BRN/YEL		J8-a	E4-30
18-3	WHT/BRN/ORN		J8-Z	E4-29
19-2	WHT/BRN/BLU		J8-d	E4-32
19-3	WHT/BRN/GRN		J8-c	E4-31
22-1	WHT/BLK/YEL		J8-b	E4-23
22-2	WHT/BLK/GRN		J8-e	E4-24
22-3	WHT/RED/GY		J8-h	E4-40
22-4	WHT/RED/VIO		J8-f	E4-39
23-1	WHT/RED/BLU		J8-M	E4-38
23-2	WHT/RED/GRN		J8-L	E4-37
24-1	WHT	37	J8-J	B4-2
24-2	BLK	36	J8-H	B4-1
25	WHT		B4-WHT	B4-2
26	BLK		B4 BLK	B4-1
27-1	BRN	43	J8-N	E12
27-2	GY	40	J8-K	E11
28	BRN		S1-BRN	E12
29	GY		S1-GY	E11
30-1	WHT/BRN/GY		J8-E	E4-34
30-2	WHT/BRN/VIO		J8-D	E4-33
31	WHT BLK/BRN		J8-B	E4-20
10-4	WHT/GY		J6-d	E4-19
33-1	WHT/BLK/VIO		P11-R	E4-26
33-2	WHT/BLK/ORN		P11-U	E4-22
33-3	WHT/BLK/BLU		P11-P	E4-25
38-4	WHT/BLK/RED		P11-T	E4-21
33-5	WHT/RED/ORN		P11-V	E4-35
33-6	WHT/RED/YEL		P11-Y	E4-36
34-1	WHT/BRN/RED		P11-X	E4-28
34-2	WHT/BLK/GY		P11-W	E4-27
35-1	WHT/BRN/YEL		P11-a	E4-30
34-3	WHT/BRN/ORN		P11-Z	E4-29
35-2	WHT/BRN/BLU		P11-d	E4-32
35-3	WHT/BRN/GRN		P11-c	E4-31
38-1	WHT/BLK/GRN		P11-e	E4-24
38-2	WHT/BLK/YEL		P11-b	E4-23
39	GRN	42	P11-e	A7-5
40-1	WHT/BLU		P11-M	E4-17
40-2	WHT/GRN		P11-L	E4-16
41-1	WHT/YEL		P11-J	E4-15
41-2	WHT/BRN		P11-H	E4-14
42-1	BRN	43	P11-N	P12-N
42-2	RED	38	P11-K	P12-K
43-1	BRN	43	P11-N	B10-P1
43-2	RED	38	P11-K	B10-P3
44-1	WHT/BRN		B10-P1	E4-12
44-2	WHT/RED		B10-P3	E4-13
45	WHT/RED		B10-WHT/RED	B10-P1
46	WHT/BLK		B10-WHT/BLK	B10-P3
47	YEL	39	B10-P2	B10-P4
48	WHT/YEL		B10-WHT/YEL	B10-P2
49	WHT/BLU		B10-WHT/BLU	B10-P4
50-1	WHT/BRN/GY		P11-E	E4-34
50-2	WHT/BRN/VIO		P11-D	E4-33
51	WHT/BLK/BRN		P11-B	E4-20
53-3	WHT/GY		P12-d	E4-19
53-1	GRN		P12-d	E4-6
53-2	YEL		P12-c	E4-5
54-1	BLU		P12-R	E4-7
54-2	VIO		P12-S	E4-8
55-4	WHT/VIO		P12-c	E4-18
56	BLK		P12-V	E4-1
18-A	BLK	36	SHLD-18	E25
57-1	WHT/RED/BLU		P12-M	E4-38
57-2	WHT/RED/GRN		P12-L	E4-37
58-1	BRN		P12-E	E4-2
58-2	RED		P12-D	E4-3
58-3	ORN		P12-F	E4-4
59-1	RED	38	P12-D	A7-4
59-2	ORN	45	P12-F	A7-3
60-1	WHT		P12-B	E4-10
60-2	GY		P12-A	E4-9
60-3	WHT/BLK		P12-C	E4-11
61-1	WHT/RED/VIO		P12-f	E4-39
61-2	WHT/RED/GY		P12-h	E4-40
62	VIO	44	P12-f	A7-6
63	GY	40	P12-h	A10-6
64	GRN	42	A7-5	A10-5
65-1	RED	36	A7-4	A10-4
65-2	ORN	45	A7-3	A10-3
34-A	BLK	36	SHLD-34	E26

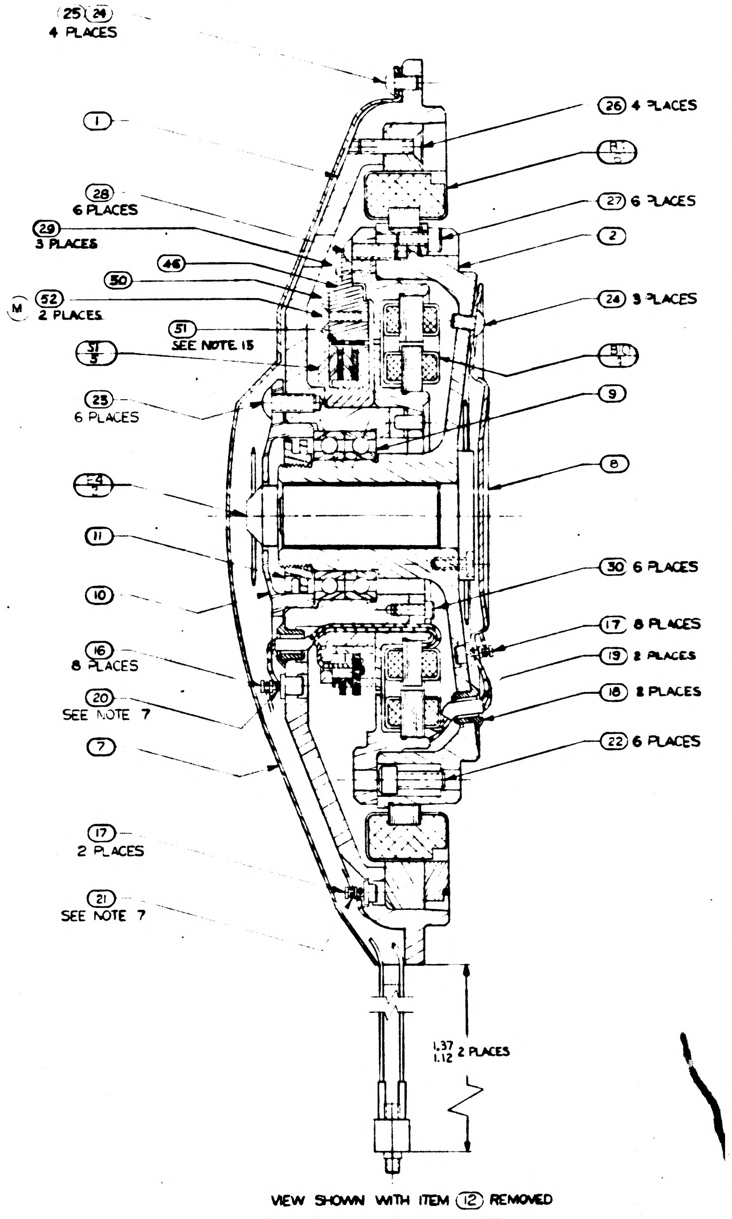

.040 MAX
.100 MAX

SECTION A-A
2 PLACES


35
BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
E4
SEE NOTE 2 TYP
SEE NOTE 5
S1
S3
S2
S4
E11
E12
1.562 R MAX SEE NOTE 13
B10
S1
A
B4-2
B4-1
SEE NOTE 14 2 PLACES
E23
N
J6
J8
SEE NOTE 2 TYP
55
T
2 PLACES
PIN A
33 TYP
C
12
2 PLACES
PIN A

VIEW SHOWN WITH ITEMS (7), (24) & (25) REMOVED

SHOWN WITH ITEM (12) REMOVED


25 24
4 PLACES
1
28
6 PLACES
29
3 PLACES
46
30
M
52
2 PLACES
51
SEE NOTE 15
31
25
6 PLACES
E4
11
10
16
8 PLACES
20
SEE NOTE 7
7
17
2 PLACES
21
SEE NOTE 7
26 4 PLACES
27 6 PLACES
2
24 3 PLACES
9
8
30 6 PLACES
17 8 PLACES
19 8 PLACES
18 8 PLACES
22 6 PLACES
1.37
1.12 2 PLACES

VIEW SHOWN WITH ITEM (12) REMOVED

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MARK CHARACTERS $\frac{.14}{.10}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (9) TO BE ALIGNED WITHIN 5° OF [-C-] & IN DIRECTION OF THE ARROW WHEN (1) & (2) ARE IN THE POSITION SHOWN. APPLY THIN COAT OF (47) TO INSIDE DIA OF (9) AND FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (35) TO (2) & (11) AFTER ASSEMBLY.
5. IDENTIFY USING DWG NO, REV LETTER MANUFACTURERS SYMBOL & SERIAL NO, ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATIONS PER NOTE 2.
6. SCREW TORQUE REQUIREMENTS ±7%

(11)	100 IN-LB
(23)	10.0 IN LB
(24) (26) (27) (28) (29)	5.0 IN LB
(52) (30) (31)	3.5 IN-LB

Ⓜ 7. SOLDER ALL LEADS FROM (4) (5) & (6) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (14) PER MIL-STD-440 USING (21). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.

~~8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~

9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM BEARING HOUSING (1) OR REMOVE TORQUE MOTOR (6) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (6).
10. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
11. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1001508
12. USE CHICAGO STITCH LACING IN AREAS INDICATED.
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

Ⓜ 15. SELECT ITEM (51) TO MEET TORQUE REQUIREMENTS OF ATP 1000008

Ⓝ 16. HEAT SHRINK SLEEVING ON ITEMS (53) & (54) AFTER ASSY

Ⓝ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

Ⓟ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000008	T	1

	1000008

REVISIONS	TDRR 00065		
SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000030	Resolver, One Speed Transmitter	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/13/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10/17/62
BY DIRECTION MIT Approval
10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

M I T
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LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000008
SHEET OF

1000009

(M) SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00091	7Nov62	ajB	WK

REVISIONS TDRR 00065

PART NO.	DESCRIPTION	REQD.
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000015	15 Speed Resolver Sub-Assy	1
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000003	DL 1000001

APPLICATION

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MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C.J. Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W.J. Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W.K. for 10/17/62

INTERGIMBAL SUB-ASSEMBLY
15 SPEED
MIDDLE AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
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HOUSTON TEXAS
NASA DRAWING NO.
1000009
SHEET OF

1000009

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000015	15 Speed Resolver Sub-Assy	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000003	DL 1000001

APPLICATION

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MATERIAL:

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CONTRACT NAS 9-153
APPROVED C J Boyce DATE 9/17/62
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APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY
15 SPEED
MIDDLE AXIS

SCALE
UNIT WT.
CODE IDENT.

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SHEET OF

1000010

REVISIONS TDRR 00065			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00092	8 Nov 62	WK

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 Cont	2
1000119	Connector, Elect, Recept 34 Contact	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
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NEXT ASSY	USED ON
1000004	DL 1000001

APPLICATION

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FRACTIONS DECIMALS ANGLES

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MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000010

SHEET OF

	1000010

REVISIONS TDRR 00065				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00092	8 Nov 62	ajB	WK
B	TDRR 00143	12 Dec 62	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 Cont.	2
1000119	Connector, Elect, Recept 34 Contact	1
1000100-1	Terminal Insulated	16
1000100-2	Terminal Insulated	2
1000112	Guide, Wire Brg Mt	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
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NEXT ASSY	USED ON
1000204	DL 1000201
1000004	DL 1000001

APPLICATION

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FRACTIONS DECIMALS ANGLES

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MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
WJ Rhine 10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
INNER AXIS.

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

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SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000010

SHEET OF

	1000010

REVISIONS TDRR 00065				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00092	8 Nov 62	ajB	WK
B	TDRR 00143	12 Dec 62	ajB	WK
C	TDRR 00242	7 Jan 63	JBh	WK

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 Cont	2
1000119	Connector, Elect, Recept 34 Contact	1
1000100-1	Terminal Insulated	16
1000100-2	Terminal Insulated	2
1000112	Guide, Wire Brg Mt	1
1000093-25	Screw But Hd. Self lock Hex Soc	6
1000093-6	Screw But Hd. Self Lock Hex Soc	2
1000093-10	Screw But Hd. Self Lock Hex Soc	10
1000093-15	Screw But Hd. Self Lock Hex Soc	6
1000104-16	Screw Flat Hd Self Lock Hex Soc	4
1000110-7	Screw, Cap. Soc. Hd. Hex	6

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000204	DL 1000201
1000004	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W A Kupfer 10/17/62

INTERGIMBAL SUB-ASSEMBLY

ONE SPEED

INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000010

SHEET OF

	1000010

REVISIONS	TDRR 00065			
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00092	8 Nov 62	ajB	WK
B	TDRR 00143	12 Dec 62	ajB	WK
C	TDRR 00242	7 Jan 63		WK
D	TDRR 00769	10 Apr 63	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 Cont	2
1000119	Connector, Elect, Recept 34 Contact	1
1000100-1	Terminal Insulated	16
1000100-2	Terminal Insulated	2
1000112	Guide, Wire Brg Mt	1
1000093-25	Screw But Hd. Self lock Hex Soc	6
~~1000093-8~~	~~Screw But Hd. Self Lock Hex Soc~~	~~2~~
~~1000093-10~~	~~Screw But Hd. Self Lock Hex Soc~~	~~10~~
~~1000093-15~~	~~Screw But Hd. Self Lock Hex Soc~~	~~4~~
1000104-17	Screw Flat Hd Self Lock Hex Soc	4
1000110-7	Screw, Cap. Soc. Hd. Hex	6
1000250-6	Screw But Hd Self Lock Spl Soc	2
1000250-13	Screw But Hd Self Lock Spl Soc	10
1000250-15	Screw But Hd Self Lock Spl Soc	6
1006776-15	Insulation Sleeving Elect	A/R
1006776-20	Insulation Sleeving Elect	A/R
1006776-10	Insulation Sleeving Elect	A/R
NAS608C 440LL4	Screw Cap Soc Hd Self Lock	6
1000125	Bracket, Connector	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL 1000201
1000004	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
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MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
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APPROVED FOR MSC
10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
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CAMBRIDGE, MASS.

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REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00092	8 Nov 62	ajB	WK
B	TDRR 00143	12 Dec 62	ajB	WK
C	TDRR 00242	7 Jan 63		WK
D	TDRR 00769	10 Apr 63	ajB	WK
E	TDRR 01065	1 May 63	ajB	WK

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 Cont	2
1000119	Connector, Elect, Recept 34 Contact	1
1000100-1	Terminal Insulated	16
1000100-2	Terminal Insulated	2
1000112	Guide, Wire Brg Mt	1
1000093-25	Screw But Hd. Self lock Hex Soc	6
~~1000093-8~~	~~Screw But Hd. Self Lock Hex Soc~~	~~2~~
~~1000093-10~~	~~Screw But Hd. Self Lock Hex Soc~~	~~10~~
~~1000093-15~~	~~Screw But Hd. Self Lock Hex Soc~~	~~4~~
1000104-17	Screw Flat Hd Self Lock Hex Soc	4
1000110-7	Screw, Cap. Soc. Hd. Hex	6
1000250-3	Screw But Hd Self Lock Spl Soc	2
1000250-12	Screw But Hd Self Lock Spl Soc	~~10~~ 4
1000250-15	Screw But Hd Self Lock Spl Soc	6
1006776-15	Insulation Sleeving Elect	~~A/R~~ 5 inches
1006776-18	Insulation Sleeving Elect	~~A/R~~ 30 inches
1006776-9	Insulation Sleeving Elect	~~A/R~~ 2 inches
NAS608C440LL4	Screw Cap Soc Hd Self Lock	6
1000125	Bracket, Connector	2
NAS608C256LL4	Scr Cap Soc Hd Self lock	6
1000254	Washer, Flat, Round	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL 1000201
1000004	DL 1000001

APPLICATION

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W J Rhine 10-17-62
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10/17/62

INTERGIMBAL SUB-ASSEMBLY
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PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 Cont	2
1000119	Connector, Elect, Recept 34 Contact	1
1000100-1	Terminal Insulated	~~16~~ 8
1000100-2	Terminal Insulated	~~2~~ 10
1000112	Guide, Wire Brg Mt	1
1000093-25	Screw But Hd. Self lock Hex Soc	6
~~1000093-8~~	~~Screw But Hd. Self Lock Hex Soc~~	~~2~~
~~1000093-10~~	~~Screw But Hd. Self Lock Hex Soc~~	~~10~~
~~1000093-15~~	~~Screw But Hd. Self Lock Hex Soc~~	~~4~~
1000104-17	Screw Flat Hd Self Lock Hex Soc	4
1000110-7	Screw, Cap. Soc. Hd. Hex	6
1000250-3	Screw But Hd Self Lock Spl Soc	2
1000250-12	Screw But Hd Self Lock Spl Soc	~~10~~ 4
1000250-15	Screw But Hd Self Lock Spl Soc	6
1006776-15	Insulation Sleeving Elect	~~A/R~~ 5 inches
1006776-18	Insulation Sleeving Elect	~~A/R~~ 30 inches
1006776-9	Insulation Sleeving Elect	~~A/R~~ 2 inches
NAS608C 440LL4	Screw Cap Soc Hd Self Lock	6
1000125	Bracket, Connector	2
NAS608C256LL4	Scr Cap Soc Hd Self lock	6
1000254	Washer, Flat, Round	4

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00092	8 Nov 62	ajb	WK
B	TDRR 00143	12 Dec 62	ajb	WK
C	TDRR 00242	7 Jan 63		wk
D	TDRR 00769	10 Apr 63	ajB	wK
E	TDRR 01065	1 MAY 63	ajb	wK
F	TDRR 01144	8 MAY 63		wK

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL 1000201
1000004	DL 1000001

APPLICATION

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W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
INNER AXIS

SCALE
UNIT WT.
CODE IDENT.

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SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00092	8 Nov 62	ajB	WK
B	TDRR 00143	12 Dec 62	ajB	WK
C	TDRR 00242	7 JAN 63	JBh	wK
D	TDRR 00769	10 APR 63	ajB	wK
E	TDRR 01065	1 MAY 63	ajB	wK
F	TDRR 01144	8 MAY 63	sam	wK

Ⓜ Ⓜ Ⓜ Ⓜ Ⓜ Ⓜ Ⓜ

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 CONT	2
1000119	Connector, Elect, Recept 34 Contact	1
1000100-4	Terminal Insulated	~~16~~ 8
1000100-2	Terminal Insulated	~~8~~ 10
1000112	Guide, Wire Brg Mt	1
1000093-25	Screw But Hd. Self lock Hex Soc	6
~~1000093-6~~	~~Screw But Hd. Self Lock Hex Soc~~	~~2~~
~~1000093-10~~	~~Screw But Hd. Self Lock Hex Soc~~	~~10~~
~~1000093-15~~	~~Screw But Hd. Self Lock Hex Soc~~	~~2~~
1000104-17	Screw Flat Hd Self Lock Hex Soc	4
1000110-7	Screw, Cap. Soc. Hd. Hex	6
1000250-2	Screw But Hd Self Lock Spl Soc	2
1000250-12	Screw But Hd Self Lock Spl Soc	~~10~~ 4
1000250-15	Screw But Hd Self Lock Spl Soc	6
1006776-15	Insulation Sleeving Elect	~~A/R~~ 5 inches
1006776-18	Insulation Sleeving Elect	~~A/R~~ 30 inches
1006776-9	Insulation Sleeving Elect	~~A/R~~ 2 inches
NAS608C 440LL4	Screw Cap Soc Hd Self Lock	6
1000125	Bracket, Connector	2
NAS608C256LL4	Scr Cap Soc Hd Self lock	6
1000254	Washer, Flat, Round	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000204	DL 1000201
1000004	DL 1000001
NEXT ASSY	USED ON
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W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W A Kupfer 10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
INNER AXIS

SCALE
UNIT WT.
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SYM	DESCRIPTION	DATE	APPROVAL	
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C	TDRR 00242	7 JAN 63	Jsh	wK
D	TDRR 00769	10 APR 63	agB	wK
E	TDRR 01065	1 MAY 63	agb	wK
F	TDRR 01144	8 MAY 63	sam	wK
G	REPLACED BY REV H WITH CHANGES TDRR 01696	6/26/63	agb	RKB

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1
1000117	Connector, Elect, Plug 29 CONT	2
1000119	Connector, Elect, Recept 34 Contact	1
1000100-1	Terminal Insulated	~~[illegible]~~ 8
1000100-2	Terminal Insulated	~~[illegible]~~ 10
1000112	Guide, Wire Brg Mt	1
1000093-25	Screw But Hd. Self lock Hex Soc	6
~~1000093-[illegible]~~	~~Screw But Hd. Self Lock Hex Soc~~	~~[illegible]~~
~~1000093-[illegible]~~	~~Screw But Hd. Self Lock Hex Soc~~	~~[illegible]~~
~~1000093-15~~	~~Screw But Hd. Self Lock Hex Soc~~	~~[illegible]~~
1000104-17	Screw Flat Hd Self Lock Hex Soc	4
1000110-7	Screw, Cap. Soc. Hd. Hex	6
1000250-2	Screw But Hd Self Lock Spl Soc	2
1000250-12	Screw But Hd Self Lock Spl Soc	~~[illegible]~~ 4
1000250-15	Screw But Hd Self Lock Spl Soc	6
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NAS608C 440LL4	Screw Cap Soc Hd Self Lock	6
1000125	Bracket, Connector	2
NAS608C256LL4	Scr Cap Soc Hd Self lock	6
1000254	Washer, Flat, Round	4

Ⓖ REPLACED BY REV H WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

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		DATE
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APPROVED FOR MSC
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W A Kupfer 10/17/62

INTERGIMBAL SUB-ASSEMBLY

ONE SPEED

INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

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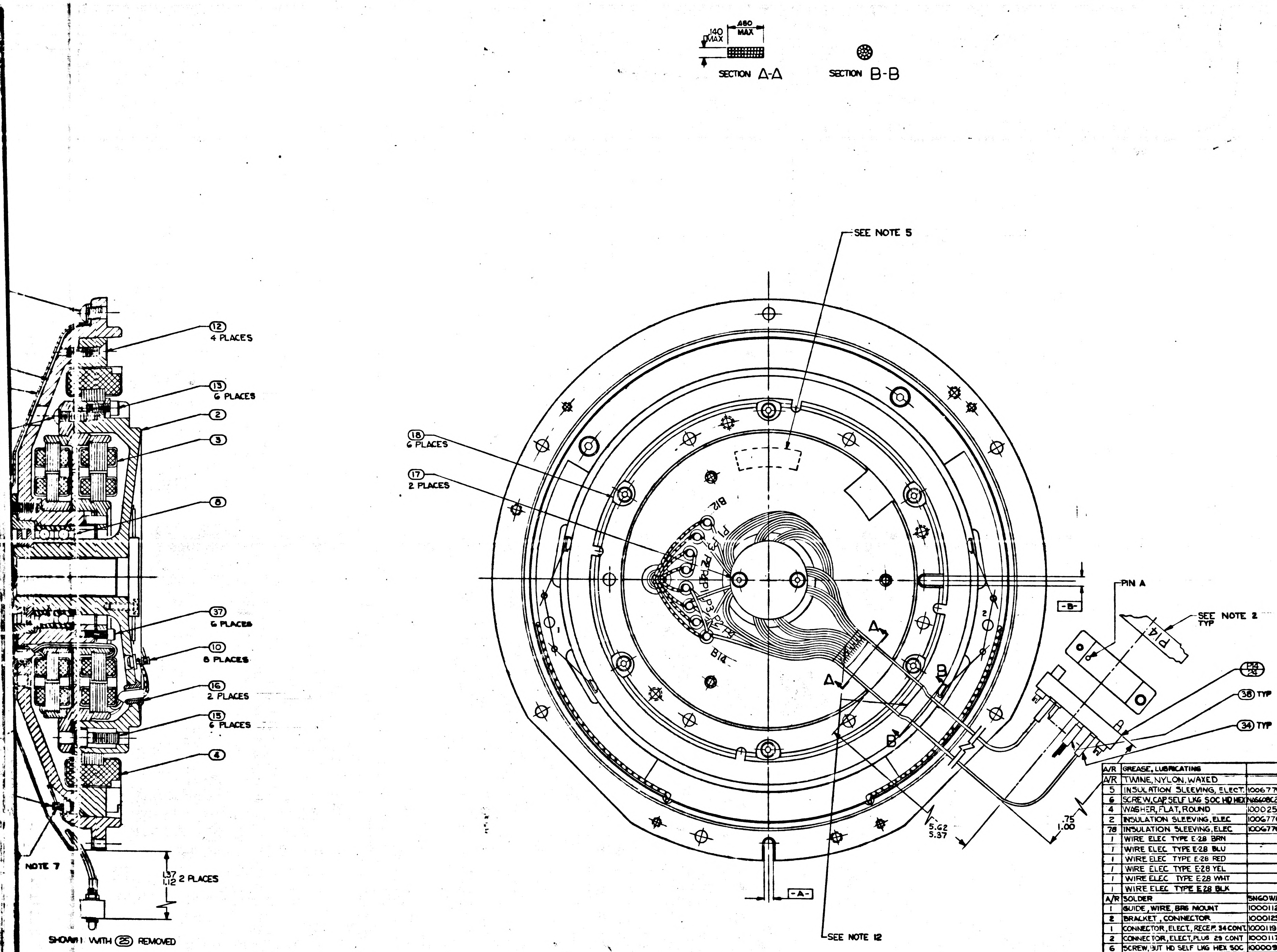
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES THRU [illegible]	[illegible]	[illegible]



REPLACES REV G WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	GREASE, LUBRICATING		MIL-G-25760		40
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	39
5	INSULATION SLEEVING, ELECT.	1006776-16		5/16 LONG	38
6	SCREW, CAP SELF LKG SOC HD HEX	NAS608C256LL4			37
4	WASHER, FLAT, ROUND	1000254			36
2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LONG	35
78	INSULATION SLEEVING, ELEC	1006776-18		5/16 LONG	34
1	WIRE ELEC TYPE E-28 BRN		MIL-W-16878	9" LONG	33
1	WIRE ELEC TYPE E-28 BLU		MIL-W-16878	12" LONG	32
1	WIRE ELEC TYPE E-28 RED		MIL-W-16878	36" LONG	31
1	WIRE ELEC TYPE E-28 YEL		MIL-W-16878	26" LONG	30
1	WIRE ELEC TYPE E-28 WHT		MIL-W-16878	10" LONG	29
1	WIRE ELEC TYPE E-28 BLK		MIL-W-16878	30" LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
1	GUIDE, WIRE, BRG MOUNT	1000112			26
2	BRACKET, CONNECTOR	1000125			25
1	CONNECTOR, ELECT, RECEP. 34 CONT	1000119			24
2	CONNECTOR, ELECT, PLUG 29 CONT	1000117			23
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			22
A/R	GOODYEAR CPA923A		MIL-A-13883		21
A/R	SOLDER	SN10WARP2	QQ-S-571		20
2	INSULATION SLEEVING, ELEC	1006776-9		3/16 LONG	19
6	CLAMP, TORQUE MOTOR	1000087			18
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-2			17
2	BUSHING, INSULATOR	1000036			16
6	SCREW, CAP SOC HD, HEX	1000110-7			15
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			14
6	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS608C440LL4			13
4	SCREW FLAT HD, SELF LKG, HEX SOC	1000104-17			12
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			11
10	TERMINAL, INSULATED	1000100-2			10
8	TERMINAL, INSULATED	1000100-1			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASSY, ELEC, 40 CONTACT	1000037			6
1	RETAINER, BEARING, I.A.	1000090			5
1	MOTOR, TORQUE DC, FRAMELESS	1000075			4
1	RSVR ASSY, 1X XMTR & GYRO ERROR	1000032			3
1	SHAFT, STUB 1X INNER AXIS	1000057			2
1	HOUSING, BEARING 1X INNER AXIS	1000095			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
1000004	DL1000001
NEXT ASSY	USED ON
APPLICATION	

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W. J. Rhine 6-26-63
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INTERGIMBAL
SUBASSEMBLY
ONE SPEED INNER AXIS

SCALE 2/1
UNIT WT.
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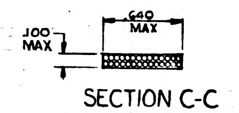
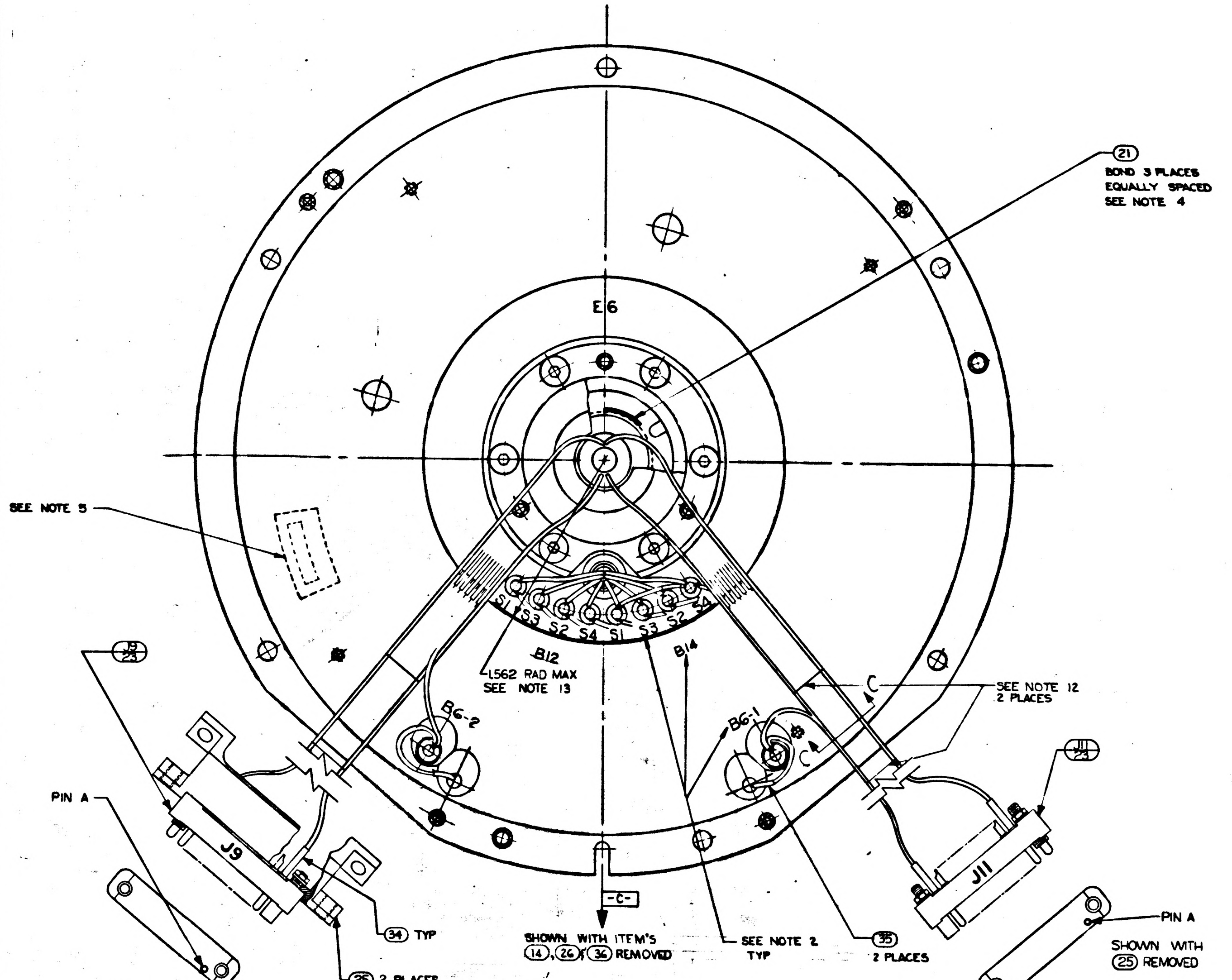
WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1	BLK		J9-A	E6-1	
2	BRN		J9-B	E6-2	
3	RED		J9-C	E6-3	
4	ORN		J9-D	E6-4	
5	YEL		J9-E	E6-5	
6	GRN		J9-F	E6-6	
7	BLU		J9-H	E6-7	
8	VIO		J9-J	E6-8	
9	GY		J9-M	E6-9	
10-1	WHT/RED/VIO		J9-K	E6-39	∞
10-2	WHT/RED/GY		J9-N	E6-40	
11-1	RED	31	J9-K	J11-K	∞
11-2	BRN	33	J9-N	J11-N	
12	WHT/BRN/VIO		J9-L	E6-33	
13	WHT		J9-P	E6-10	
14	WHT/BLK		J9-R	E6-11	
15	WHT/BRN		J9-S	E6-12	
16	WHT/RED		J9-T	E6-13	
17	WHT/ORN		J9-U	E6-14	
18	WHT/YEL		J9-V	E6-15	
19	WHT/GRN		J9-W	E6-16	
20	WHT/BLU		J9-X	E6-17	
21	WHT/VIO		J9-Y	E6-18	
22	WHT/BRN/GY		J9-Z	E6-34	
23	WHT/RED/ORN		J9-a	E6-35	
24	WHT/RED/YEL		J9-b	E6-36	
25	WHT/RED/GRN		J9-Z	E6-37	
26	WHT/RED/BLU		J9-d	E6-38	
27	WHT/BLK/BRN		J11-B	E6-20	
28	WHT/GY		J11-C	E6-19	
29-1	BLK	28	J11-D	B6-1	∞
29-2	WHT	29	J11-E	B6-2	
30	BLK		B6-BLK	B6-1	
31	WHT		B6-WHT	B6-2	
32-1	RED	31	J11-J	B12-S1	∞
32-2	BLK	28	J11-H	B12-S3	
33-1	YEL	30	J11-L	B12-S2	∞
33-2	BLU	32	J11-M	B12-S4	
34	WHT/BLK		B12-WHT/BLK	B12-S3	
35	WHT/RED		B12-WHT/RED	B12-S1	
36	WHT/YEL		B12-WHT/YEL	B12-S2	
37	WHT/BLU		B12-WHT/BLU	B12-S4	
38-1	WHT/BLK/BLU		J11-P	E6-25	
38-2	WHT/BLK/VIO		J11-R	E6-26	∞
38-3	RED	31	J11-R	B14-S1	
38-4	WHT/BLK/RED		J11-T	E6-21	
38-5	WHT/BLK/ORN		J11-U	E6-22	
38-6	BLK	28	J11-V	B14-S3	
38-7	YEL	30	J11-Y	B14-S2	
39	BLK		B14-BLK	B14-S3	
40	RED		B14-RED	B14-S1	
41	YEL		B14-YEL	B14-S2	
42	BLU		B14-BLU	B14-S4	
43	RED	31	B14-S1	B14-S4	
44-1	WHT/BLK/GY		J11-W	E6-27	∞
44-2	WHT/BRN/RED		J11-X	E6-28	
45-1	WHT/BRN/ORN		J11-Z	E6-29	∞
45-2	WHT/BRN/YEL		J11-a	E6-30	
46-1	WHT/BRN/GRN		J11-Z	E6-31	∞
46-2	WHT/BRN/BLU		J11-d	E6-32	
47-1	WHT/BLK/YEL		J11-b	E6-23	∞
47-2	WHT/BLK/GRN		J11-e	E6-24	
48-1	YEL	30	P14-A	B14-P2	∞
48-2	BLK	28	P14-B	B14-P3	
48-3	BLU	32	P14-D	B14-P4	
48-4	RED	31	P14-F	B14-P1	
49	WHT/BLK/ORN		B14-P3	E6-22	
50	WHT/BLK/RED		B14-P2	E6-21	
51	YEL		B14-YEL	B14-P2	
52	BLU		B14-BLU	B14-P4	
53	BLK		B14-BLK	B14-P3	
54	RED		B14-RED	B14-P1	
55-1	WHT/BLK/BLU		P14-C	E6-25	∞
55-2	WHT/BLK/VIO		P14-E	E6-26	
56	BLK		P14-H	E6-1	
57	BRN		P14-J	E6-2	
58	RED		P14-K	E6-3	
59	ORN		P14-L	E6-4	
60	YEL		P14-M	E6-5	
61	GRN		P14-N	E6-6	
62	BLU		P14-P	E6-7	
63	VIO		P14-R	E6-8	
64	GY		P14-S	E6-9	
65	WHT		P14-T	E6-10	
66	WHT/BLK		P14-U	E6-11	
67	WHT/BRN		P14-V	E6-12	
68	WHT/RED		P14-W	E6-13	
69	WHT/ORN		P14-X	E6-14	
70	WHT/YEL		P14-Y	E6-15	
71	WHT/GRN		P14-AA	E6-16	
72	WHT/BLU		P14-BB	E6-17	
73	WHT/VIO		P14-CC	E6-18	
74-1	WHT/BRN/GRN		P14-Z	E6-31	∞
74-2	WHT/BRN/BLU		P14-DD	E6-32	
75-1	WHT/BLK/GRN		P14-EE	E6-24	∞
75-2	WHT/BLK/YEL		P14-HH	E6-23	
76-1	WHT/BRN/ORN		P14-FF	E6-29	∞
76-2	WHT/BRN/YEL		P14-LL	E6-30	
77-1	WHT/BLK/GY		P14-KK	E6-27	∞
77-2	WHT/BRN/RED		P14-MM	E6-28	
78	WT/GY		P14-JJ	E6-19	
79	WHT/BLK/BRN		P14-NN	E6-20	
80-1	WHT/RED/VIO		B12-P3	E6-39	∞
80-2	WHT/RED/GY		B12-P1	E6-40	
81	WHT/BLK		B12-WHT/BLK	B12-P3	
82	WHT/RED		B12-WHT/RED	B12-P1	
83	WHT/YEL		B12-WHT/YEL	B12-P2	
84	WHT/BLU		B12-WHT/BLU	B12-P4	
85	YEL	30	B12-P2	B12-P4	
86	WHT/BRN/VIO		E6-33	SPARE	
87	WHT/BRN/GY		E6-34	SPARE	
88	WHT/RED/ORN		E6-35	SPARE	
89	WHT/RED/YEL		E6-36	SPARE	
90	WHT/RED/GRN		E6-37	SPARE	
91	WHT/RED/BLU		E6-38	SPARE	
~~92~~	~~BLU~~	~~32~~	~~P14-E~~	~~P14-D~~	
[illegible]	~~BLU~~	~~32~~	~~B14-P1~~	~~B14-P4~~	

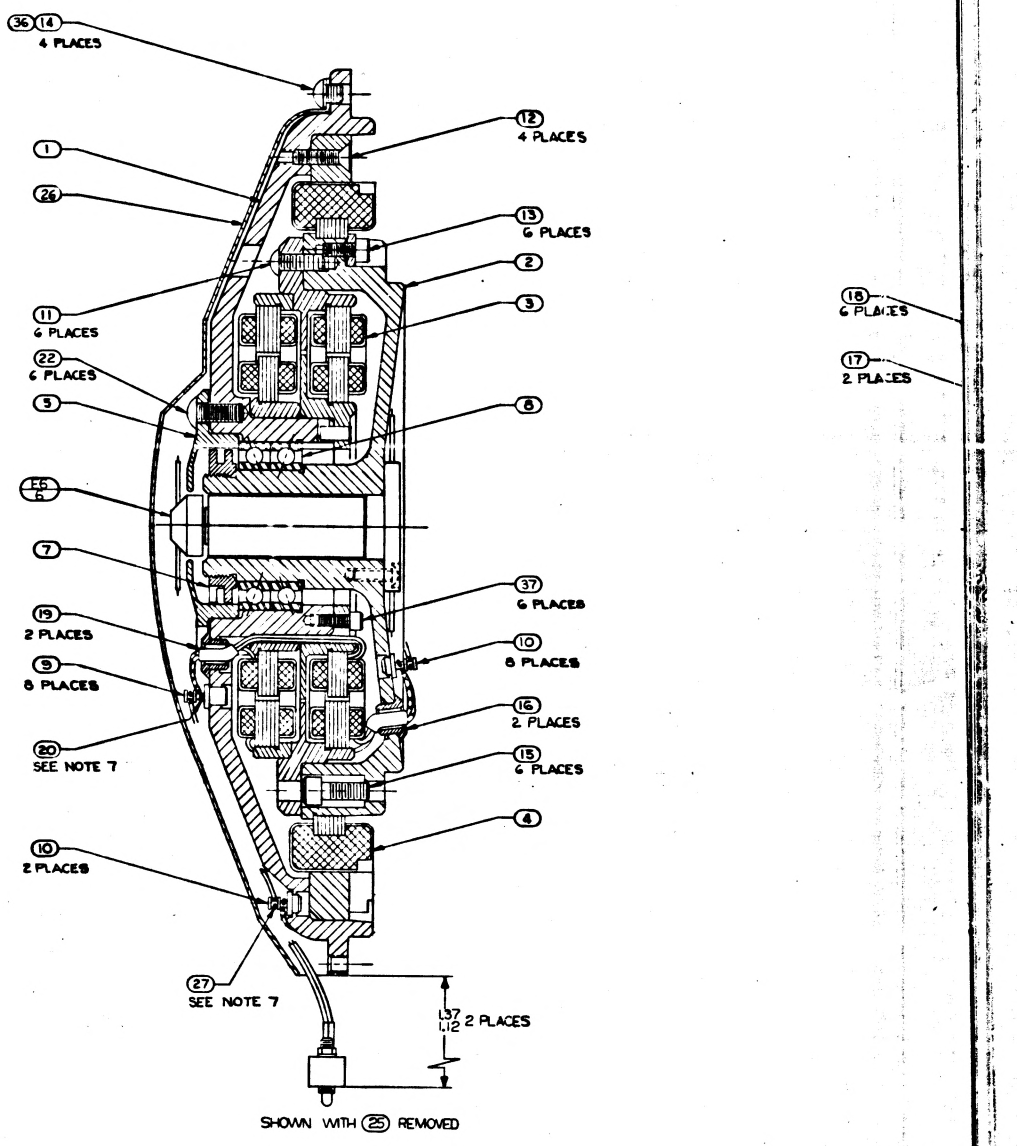


.100 MAX
.640 MAX

SECTION C-C
2 PLACES



E6
㉑ BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
SEE NOTE 5
S1 S3 S2 S4 S1 S3 S2 S4
B12
B14
L562 RAD MAX SEE NOTE 13
B6-2
B6-1
C
C
SEE NOTE 12 2 PLACES
J9 23
J11 23
J9
J11
PIN A
PIN A
-C-
㉞ TYP
㉕ 2 PLACES
SHOWN WITH ITEM'S ⑭, ㉖ & ㊱ REMOVED
SEE NOTE 2 TYP
㉟ 2 PLACES
SHOWN WITH ㉕ REMOVED



㊱⑭ 4 PLACES
⑫ 4 PLACES
①
㉖
⑬ 6 PLACES
②
③
⑪ 6 PLACES
㉒ 6 PLACES
⑤
⑧
E6 6
⑦
㊲ 6 PLACES
⑲ 2 PLACES
⑩ 8 PLACES
⑨ 8 PLACES
⑯ 2 PLACES
⑳ SEE NOTE 7
⑮ 6 PLACES
④
⑩ 2 PLACES
㉗ SEE NOTE 7
1.37 1.12 2 PLACES
⑱ 6 PLACES
⑰ 2 PLACES

SHOWN WITH ㉕ REMOVED

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS 10/64 HIGH COLOR BLACK PER ND 1002019 AT LOCATION SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑧ TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW SHOWN WHEN ① & ② ARE IN POSITION SHOWN. APPLY THIN COAT OF ㊵ TO INSIDE DIAMETER OF ⑧ AND TO FAYING SURFACE OF ② BEFORE ASSEMBLY
4. APPLY ㉑ TO ② & ⑦ AFTER ASSEMBLY
5. IDENTIFY USING DWG. NO., REVISION LETTER, MANUFACTUERS SYMBOL & SERIAL NO. ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATION PER NOTE 2
6. SCREW TORQUE REQUIREMENTS ± 7%

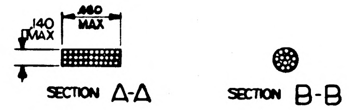
⑦	100 IN-LB
㉒	10 IN-LB
⑪ ⑫ ⑬ ⑱	5 IN-LB
⑰ ㊲	3.5 IN-LB

7. SOLDER ALL LEADS FROM ③ & ④ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ⑳. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, ㉓, OR ㉔ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM
9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM HSG. BRG. ① OR REMOVE TORQUE MOTOR ④ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ④
10. MAXIMUM ALLOWABLE TORQUE 15 OB-IN.
11. ASSEMBLE AND TEST PER THE REQUIREMENTS OF PER ATP 1000010
12. USE CHICAGO STITCH LACING IN AREA INDICATED
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. ALL SPARE LEADS TO BE 3.00 ± .12 LONG & TO TERMINATE NEAR P14/24 AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS

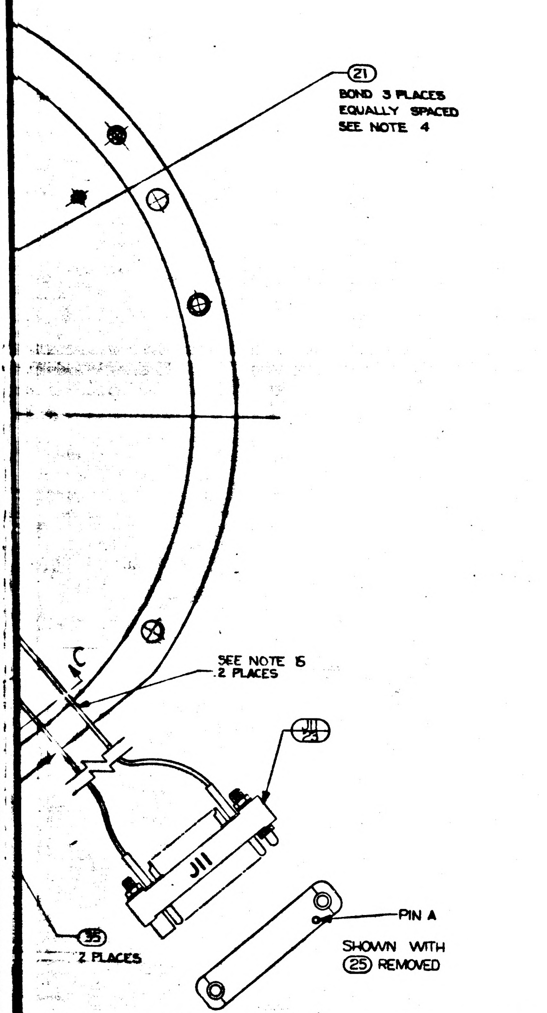
1000010 REV H SHEET 1

INCHES 0 2
PHOTOGRAPHIC SCALE ONLY

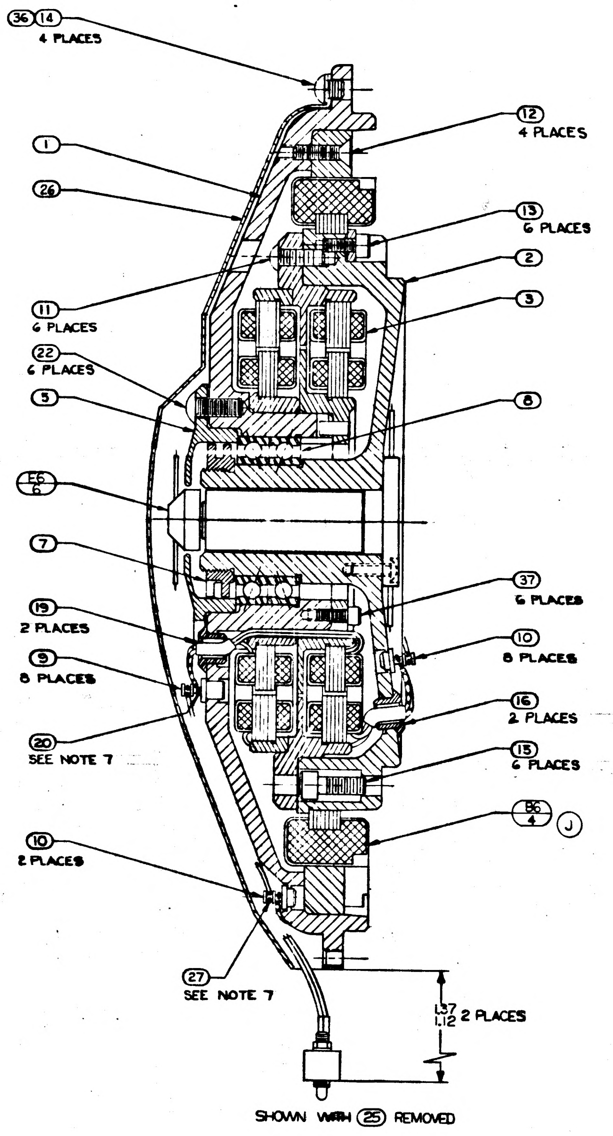
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES TDRR 01806	6/26/63	ejb / RKB
J	TDRR 01985	7-16-63	ejb / WK.



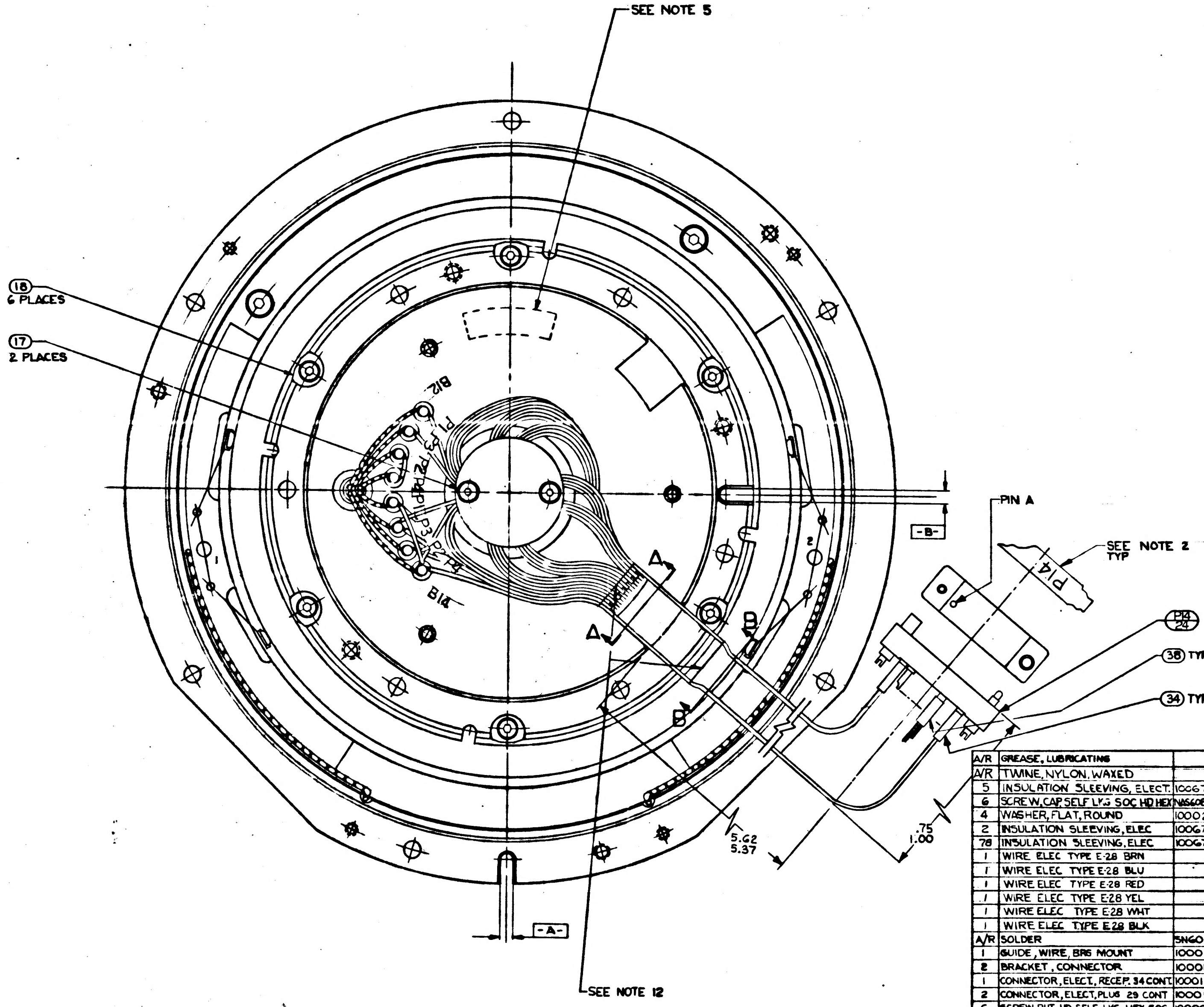
.140 MAX
.460 MAX
SECTION A-A
SECTION B-B



21
BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
SEE NOTE 15 2 PLACES
J11 / 24
J11
35
2 PLACES
PIN A
SHOWN WITH 25 REMOVED



36 14
4 PLACES
12
4 PLACES
1
26
13
6 PLACES
2
3
11
6 PLACES
22
6 PLACES
5
8
E6 / 6
7
37
6 PLACES
19
2 PLACES
10
8 PLACES
9
8 PLACES
16
2 PLACES
20
SEE NOTE 7
15
6 PLACES
B6 / 4
J
10
2 PLACES
27
SEE NOTE 7
1.37 / 1.12 2 PLACES
SHOWN WITH 25 REMOVED



SEE NOTE 5
18
6 PLACES
17
2 PLACES
PIN A
SEE NOTE 2 TYP
-B-
P14 / 24
38 TYP
34 TYP
A
B
5.62 / 5.37
.75 / 1.00
-A-
SEE NOTE 12

EPARATE STUB SHAFT (2) FROM HSG. BRG. (1) OR REMOVE TORQUE MOTOR (4)
SSEMBLING KEEPER TO TORQUE MOTOR (4)
LE TORQUE 15 OZ-IN.
EST PER THE REQUIRMENTS OF PER ATP 1000010
TITCH LACING IN AREA INDICATED
EXTEND BEYOND THIS RADIUS.
TO BE 3.00 ± .12 LONG & TO TERMINATE NEAR P14/24 AFTER FOLDING
LVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
STITCH LACING IN AREA INDICATED

REPLACES REV G WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
A/R	GREASE, LUBRICATING		MIL-G-25760		40
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	39
5	INSULATION SLEEVING, ELECT.	1006776-16		5/16 LONG	38
6	SCREW, CAP SELF LKG SOC HD HEX	NAS608C256LL4			37
4	WASHER, FLAT, ROUND	1000254			36
2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LONG	35
78	INSULATION SLEEVING, ELEC	1006776-18		3/16 LONG	34
1	WIRE ELEC TYPE E-28 BRN		MIL-W-16878	9" LONG	33
1	WIRE ELEC TYPE E-28 BLU		MIL-W-16878	12" LONG	32
1	WIRE ELEC TYPE E-28 RED		MIL-W-16878	36" LONG	31
1	WIRE ELEC TYPE E-28 YEL		MIL-W-16878	26" LONG	30
1	WIRE ELEC TYPE E-28 WHT		MIL-W-16878	10" LONG	29
1	WIRE ELEC TYPE E-28 BLK		MIL-W-16878	30" LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
1	GUIDE, WIRE, BRG MOUNT	1000112			26
2	BRACKET, CONNECTOR	1000125			25
1	CONNECTOR, ELECT., RECEP. 34 CONT.	1000119			24
2	CONNECTOR, ELECT, PLUG 29 CONT	1000117			23
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			22
A/R	GOODYEAR CPA923A		MIL-A-13883		21
A/R	SOLDER	SN10WARP2	QQ-S-571		20
2	INSULATION SLEEVING, ELEC	1006776-9		3/16 LONG	19
6	CLAMP, TORQUE MOTOR	1000087			18
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-2			17
2	BUSHING, INSULATOR	1000036			16
6	SCREW, CAP SOC HD, HEX	1000110-7			15
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			14
6	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS608C440LL4			13
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-7			12
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			11
10	TERMINAL, INSULATED	1000100-2			10
8	TERMINAL, INSULATED	1000100-1			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASSY, ELEC, 40 CONTACT	1000037			6
1	RETAINER, BEARING, I.A.	1000090			5
1	MOTOR, TORQUE DC, FRAMELESS	1000075			4
1	RSVR ASSY, 1X XMTR & GYRO ERROR	1000032			3
1	SHAFT, STUB 1X INNER AXIS	1000057			2
1	HOUSING, BEARING 1X INNER AXIS	1000095			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL1000201
1000004	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
W J Rhine 6-26-63
MIT APPROVAL

INTERGIMBAL SUBASSEMBLY
ONE SPEED INNER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000010
SHEET 1 OF 1

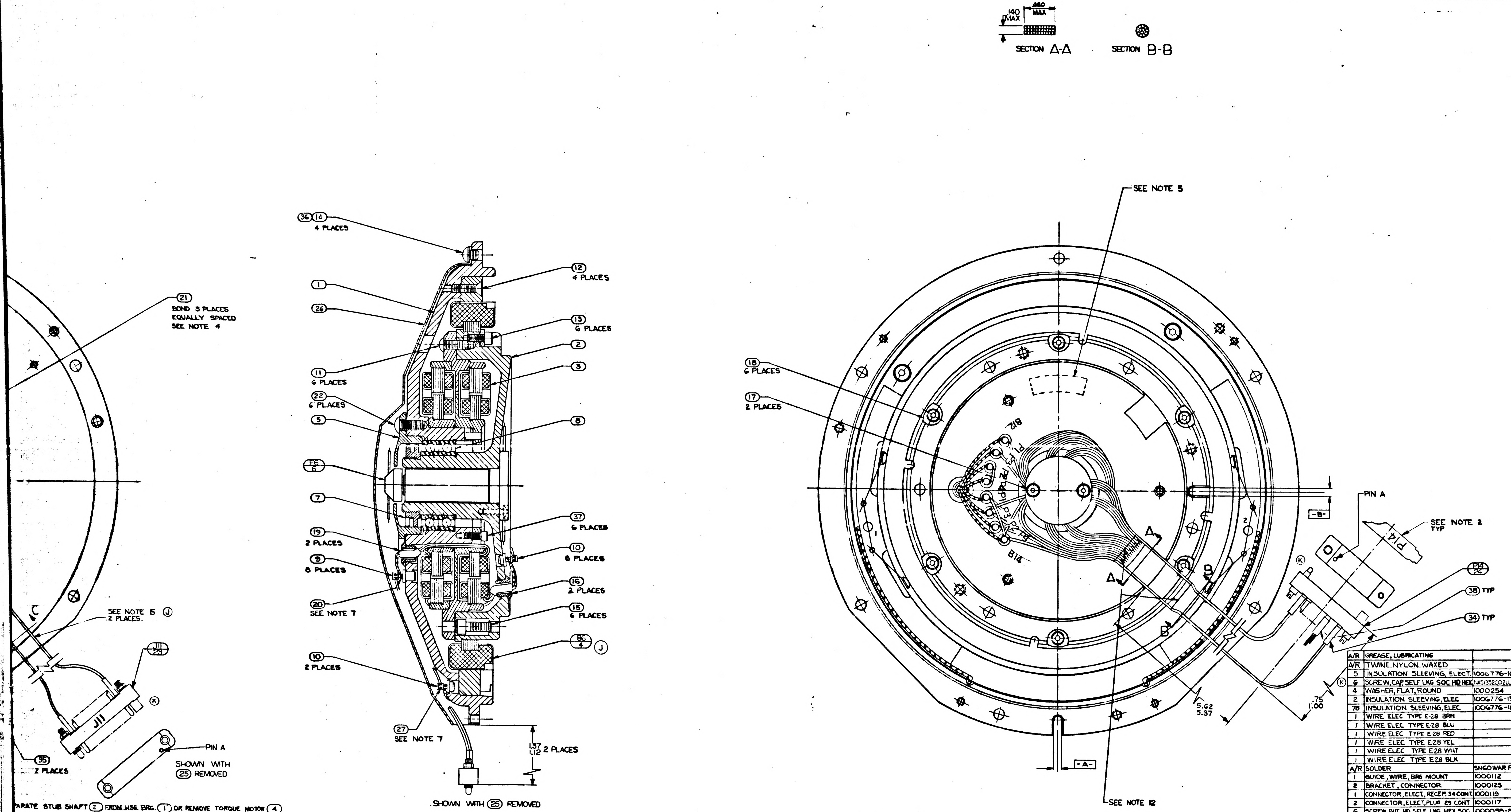
1000010

1000010 J

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES TDRR [illegible]	[illegible]	[illegible]
J	TDRR 01985	7-16-63	[illegible] WK
K	TDRR 03232	9-20-63	WK



.140 MAX
.460 MAX
SECTION A-A
SECTION B-B
(36) (14) 4 PLACES
(12) 4 PLACES
(1)
(26)
(13) 6 PLACES
(2)
(3)
(11) 6 PLACES
(22) 6 PLACES
(5)
(8)
E6 6
(7)
(37) 6 PLACES
(19) 2 PLACES
(10) 8 PLACES
(9) 8 PLACES
(16) 2 PLACES
(20) SEE NOTE 7
(15) 6 PLACES
B6 4 (J)
(10) 2 PLACES
(27) SEE NOTE 7
1.37 1.12 2 PLACES
SHOWN WITH (25) REMOVED
(21) BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
SEE NOTE 15 (J) 2 PLACES
J11 23
J11
(K)
(35) 2 PLACES
PIN A
SHOWN WITH (25) REMOVED
SEE NOTE 5
(18) 6 PLACES
(17) 2 PLACES
B12
B14
PIN A
SEE NOTE 2 TYP
P14
-B-
P14 29
(38) TYP
(34) TYP
(K)
5.62 5.37
.75 1.00
-A-
SEE NOTE 12

ARATE STUB SHAFT (2) FROM HSG. BRG. (1) OR REMOVE TORQUE MOTOR (4)
EMBLING KEEPER TO TORQUE MOTOR (4)
TORQUE 15 OZ-IN.
T PER THE REQUIRMENTS OF PER ATP 1000010
CH LACING IN AREA INDICATED
XTEND BEYOND THIS RADIUS.
BE 3.00 ± .12 LONG & TO TERMINATE NEAR P14 24 AFTER FOLDING
ES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
TCH LACING IN AREA INDICATED

REPLACES REV G WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	GREASE, LUBRICATING		MIL-G-25760		40
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	39
5	INSULATION SLEEVING, ELECT.	1006776-16		5/16 LONG	38
6	SCREW, CAP SELF LKG SOC HD HEX	NAS1352C02LL4			37
4	WASHER, FLAT, ROUND	1000254			36
2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LONG	35
78	INSULATION SLEEVING, ELEC	1006776-18		3/16 LONG	34
1	WIRE ELEC TYPE E-28 BRN		MIL-W-16878	9" LONG	33
1	WIRE ELEC TYPE E-28 BLU		MIL-W-16878	12" LONG	32
1	WIRE ELEC TYPE E-28 RED		MIL-W-16878	36" LONG	31
1	WIRE ELEC TYPE E-28 YEL		MIL-W-16878	26" LONG	30
1	WIRE ELEC TYPE E-28 WHT		MIL-W-16878	10" LONG	29
1	WIRE ELEC TYPE E-28 BLK		MIL-W-16878	30" LONG	28
A/R	SOLDER	SN60WAR P2	QQ-S-571		27
1	GUIDE, WIRE, BRG MOUNT	1000112			26
2	BRACKET, CONNECTOR	1000125			25
1	CONNECTOR, ELECT., RECEP. 34 CONT.	1000119			24
2	CONNECTOR, ELECT, PLUG 29 CONT	1000117			23
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			22
A/R	GOODYEAR CPA923A		MIL-A-13883		21
A/R	SOLDER	SN10WARP 2	QQ-S-571		20
2	INSULATION SLEEVING, ELEC	1006776-9		3/16 LONG	19
6	CLAMP, TORQUE MOTOR	1000087			18
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-2			17
2	BUSHING, INSULATOR	1000036			16
6	SCREW, CAP SOC HD, HEX	1000110-7			15
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			14
6	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			13
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			12
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			11
10	TERMINAL, INSULATED	1000100-2			10
8	TERMINAL, INSULATED	1000100-1			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASSY, ELEC, 40 CONTACT	1000037			6
1	RETAINER, BEARING, I.A.	1000090			5
1	MOTOR, TORQUE DC, FRAMELESS	1000075			4
1	RSVR ASSY, 1X XMTR & GYRO ERROR	1000032			3
1	SHAFT, STUB 1X INNER AXIS	1000057			2
1	HOUSING, BEARING 1X INNER AXIS	1000095			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL1000201
1000004	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T.
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC W. J. Rhine 6-26-63
MIT APPROVAL

INTERGIMBAL
SUBASSEMBLY
ONE SPEED INNER AXIS

SCALE 8/1
UNIT WT
CODE IDENT

M.I.T.
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000010
SHEET 1 OF 1

1000010 K

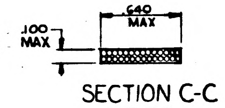
1000010 K 1

MASTER
MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1	BLK		J9-A	E6-1	
2	BRN		J9-B	E6-2	
3	RED		J9-C	E6-3	
4	ORN		J9-D	E6-4	
5	YEL		J9-E	E6-5	
6	GRN		J9-F	E6-6	
7	BLU		J9-H	E6-7	
8	VIO		J9-J	E6-8	
9	GY		J9-M	E6-9	
10-1	WHT/RED/VIO		J9-K	E6-39	∞
10-2	WHT/RED/GY		J9-N	E6-40	
11-1	RED	31	J9-K	J11-K	∞
11-2	BRN	33	J9-N	J11-N	
12	WHT/BRN/VIO		J9-L	E6-33	
13	WHT		J9-P	E6-10	
14	WHT/BLK		J9-R	E6-11	
15	WHT/BRN		J9-S	E6-12	
16	WHT/RED		J9-T	E6-13	
17	WHT/ORN		J9-U	E6-14	
18	WHT/YEL		J9-V	E6-15	
19	WHT/GRN		J9-W	E6-16	
20	WHT/BLU		J9-X	E6-17	
21	WHT/VIO		J9-Y	E6-18	
22	WHT/BRN/GY		J9-Z	E6-34	
23	WHT/RED/ORN		J9-a	E6-35	
24	WHT/RED/YEL		J9-b	E6-36	
25	WHT/RED/GRN		J9-Z	E6-37	
26	WHT/RED/BLU		J9-d	E6-38	
27	WHT/BLK/BRN		J11-B	E6-20	
28	WHT/GY		J11-C	E6-19	
29-1	BLK	28	J11-D	B6-1	∞
29-2	WHT	29	J11-E	B6-2	
30	BLK		B6-BLK	B6-1	
31	WHT		B6-WHT	B6-2	
32-1	RED	31	J11-J	B12-S1	∞
32-2	BLK	28	J11-H	B12-S3	
33-1	YEL	30	J11-L	B12-S2	∞
33-2	BLU	32	J11-M	B12-S4	
34	WHT/BLK		B12-WHT/BLK	B12-S3	
35	WHT/RED		B12-WHT/RED	B12-S1	
36	WHT/YEL		B12-WHT/YEL	B12-S2	
37	WHT/BLU		B12-WHT/BLU	B12-S4	
38-1	WHT/BLK/BLU		J11-P	E6-25	∞
38-2	WHT/BLK/VIO		J11-R	E6-26	
38-3	RED	31	J11-R	B14-S1	
38-4	WHT/BLK/RED		J11-T	E6-21	
38-5	WHT/BLK/ORN		J11-U	E6-22	
38-6	BLK	28	J11-V	B14-S3	
38-7	YEL	30	J11-Y	B14-S2	
39	BLK		B14-BLK	B14-S3	
40	RED		B14-RED	B14-S1	
41	YEL		B14-YEL	B14-S2	
42	BLU		B14-BLU	B14-S4	
43	RED	31	B14-S1	B14-S4	
44-1	WHT/BLK/GY		J11-W	E6-27	∞
44-2	WHT/BRN/RED		J11-X	E6-28	
45-1	WHT/BRN/ORN		J11-Z	E6-29	∞
45-2	WHT/BRN/YEL		J11-a	E6-30	
46-1	WHT/BRN/GRN		J11-Z	E6-31	∞
46-2	WHT/BRN/BLU		J11-d	E6-32	
47-1	WHT/BLK/YEL		J11-b	E6-23	∞
47-2	WHT/BLK/GRN		J11-e	E6-24	
48-1	YEL	30	P14-A	B14-P2	∞
48-2	BLK	28	P14-B	B14-P3	
48-3	BLU	32	P14-D	B14-P4	
48-4	RED	31	P14-F	B14-P1	
49	WHT/BLK/ORN		B14-P3	E6-22	
50	WHT/BLK/RED		B14-P2	E6-21	
51	YEL		B14-YEL	B14-P2	
52	BLU		B14-BLU	B14-P4	
53	BLK		B14-BLK	B14-P3	
54	RED		B14-RED	B14-P1	
55-1	WHT/BLK/BLU		P14-C	E6-25	∞
55-2	WHT/BLK/VIO		P14-E	E6-26	
56	BLK		P14-H	E6-1	
57	BRN		P14-J	E6-2	
58	RED		P14-K	E6-3	
59	ORN		P14-L	E6-4	
60	YEL		P14-M	E6-5	
61	GRN		P14-N	E6-6	
62	BLU		P14-P	E6-7	
63	VIO		P14-R	E6-8	
64	GY		P14-S	E6-9	
65	WHT		P14-T	E6-10	
66	WHT/BLK		P14-U	E6-11	
67	WHT/BRN		P14-V	E6-12	
68	WHT/RED		P14-W	E6-13	
69	WHT/ORN		P14-X	E6-14	
70	WHT/YEL		P14-Y	E6-15	
71	WHT/GRN		P14-AA	E6-16	
72	WHT/BLU		P14-BB	E6-17	
73	WHT/VIO		P14-CC	E6-18	
74-1	WHT/BRN/GRN		P14-Z	E6-31	∞
74-2	WHT/BRN/BLU		P14-DD	E6-32	
75-1	WHT/BLK/GRN		P14-EE	E6-24	∞
75-2	WHT/BLK/YEL		P14-HH	E6-23	
76-1	WHT/BRN/ORN		P14-FF	E6-29	∞
76-2	WHT/BRN/YEL		P14-LL	E6-30	
77-1	WHT/BLK/GY		P14-KK	E6-27	∞
77-2	WHT/BRN/RED		P14-MM	E6-28	
78	WT/GY		P14-JJ	E6-19	
79	WHT/BLK/BRN		P14-NN	E6-20	
80-1	WHT/RED/VIO		B12-P3	E6-39	∞
80-2	WHT/RED/GY		B12-P1	E6-40	
81	WHT/BLK		B12-WHT/BLK	B12-P3	
82	WHT/RED		B12-WHT/RED	B12-P1	
83	WHT/YEL		B12-WHT/YEL	B12-P2	
84	WHT/BLU		B12-WHT/BLU	B12-P4	
85	YEL	30	B12-P2	B12-P4	
86	WHT/BRN/VIO		E6-33	SPARE	
87	WHT/BRN/GY		E6-34	SPARE	
88	WHT/RED/ORN		E6-35	SPARE	
89	WHT/RED/YEL		E6-36	SPARE	
90	WHT/RED/GRN		E6-37	SPARE	
91	WHT/RED/BLU		E6-38	SPARE	
92	BLU	32	P14-E	P14-D	
[illegible]	BLU	32	B14-P1	B14-P4	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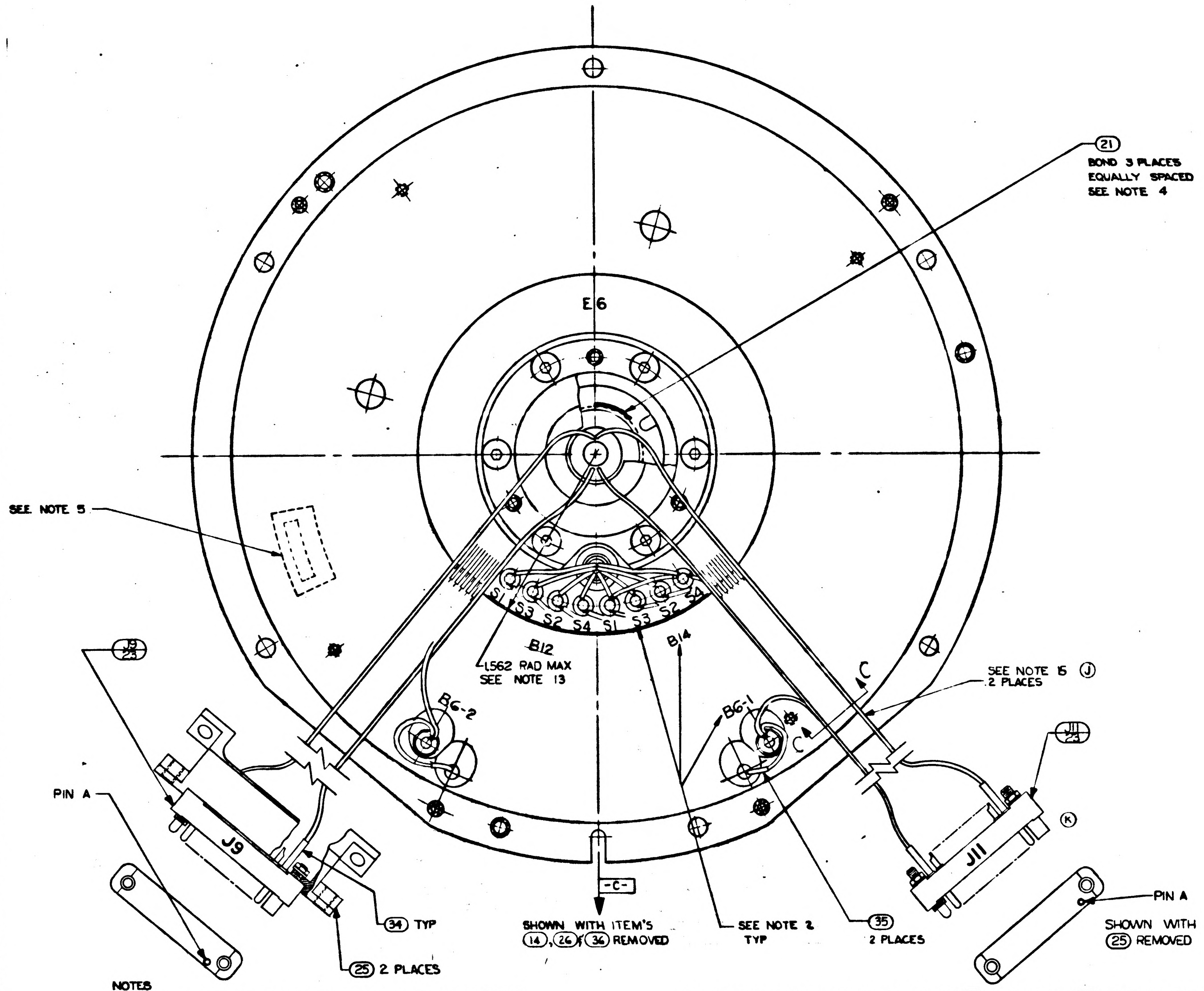
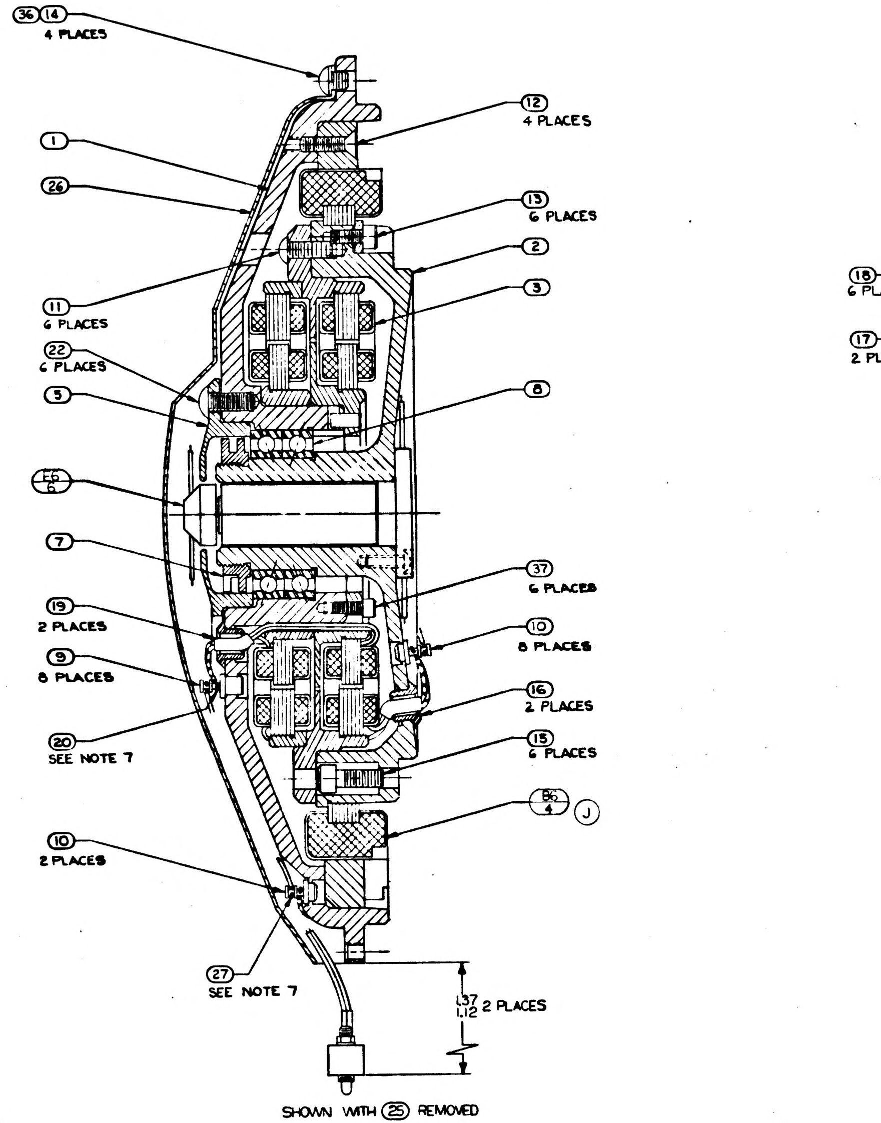
SECTION C-C
2 PLACES


(21) BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
E6
SEE NOTE 5
S1
S3
S2
S4
B12
B14
L562 RAD MAX SEE NOTE 13
B6-2
B6-1
C
SEE NOTE 15 (J) 2 PLACES
(J11/24)
(J9/24)
PIN A
J9
J11
(K)
-C-
(34) TYP
(25) 2 PLACES
SHOWN WITH ITEM'S (14),(26) & (36) REMOVED
SEE NOTE 2 TYP
(35) 2 PLACES
PIN A
SHOWN WITH (25) REMOVED


(36)(14) 4 PLACES
(12) 4 PLACES
(1)
(26)
(13) 6 PLACES
(2)
(3)
(11) 6 PLACES
(22) 6 PLACES
(5)
(8)
(E6/8)
(7)
(37) 6 PLACES
(19) 2 PLACES
(10) 8 PLACES
(9) 8 PLACES
(16) 2 PLACES
(20) SEE NOTE 7
(15) 6 PLACES
(B6/4) (J)
(10) 2 PLACES
(27) SEE NOTE 7
.37 / .12 2 PLACES
(18) 6 PL
(17) 2 PL

SHOWN WITH (25) REMOVED

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS 10/64 HIGH COLOR BLACK PER ND 1002019 AT LOCATION SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (8) TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW SHOWN WHEN (1) & (2) ARE IN POSITION SHOWN. APPLY THIN COAT OF (40) TO INSIDE DIAMETER OF (8) AND TO FAYING SURFACE OF (2) BEFORE ASSEMBLY.
4. APPLY (21) TO (2) & (7) AFTER ASSEMBLY
5. IDENTIFY USING DWG. NO., REVISION LETTER, MANUFACTUERS SYMBOL & SERIAL NO. ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATION PER NOTE 2
6. SCREW TORQUE REQUIREMENTS ± 7%

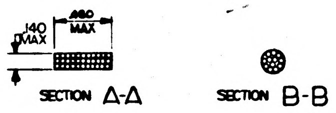
(7)	100 IN-LB
(22)	10 IN-LB
(11)(12)(13)(14)	5 IN-LB
(17)(37)	3.5 IN-LB

(J) 7. SOLDER ALL LEADS FROM (3) & (4) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (23) & (24) PER MIL-STD-440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM
9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM HSG. BRG. (1) OR REMOVE TORQUE MOTOR (4) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (4)
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE AND TEST PER THE REQUIRMENTS OF PER ATP 1000010
12. USE CHICAGO STITCH LACING IN AREA INDICATED
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. ALL SPARE LEADS TO BE 3.00 ± .12 LONG & TO TERMINATE NEAR (P14/24) AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
15. USE FIGURE EIGHT STITCH LACING IN AREA INDICATED (J)

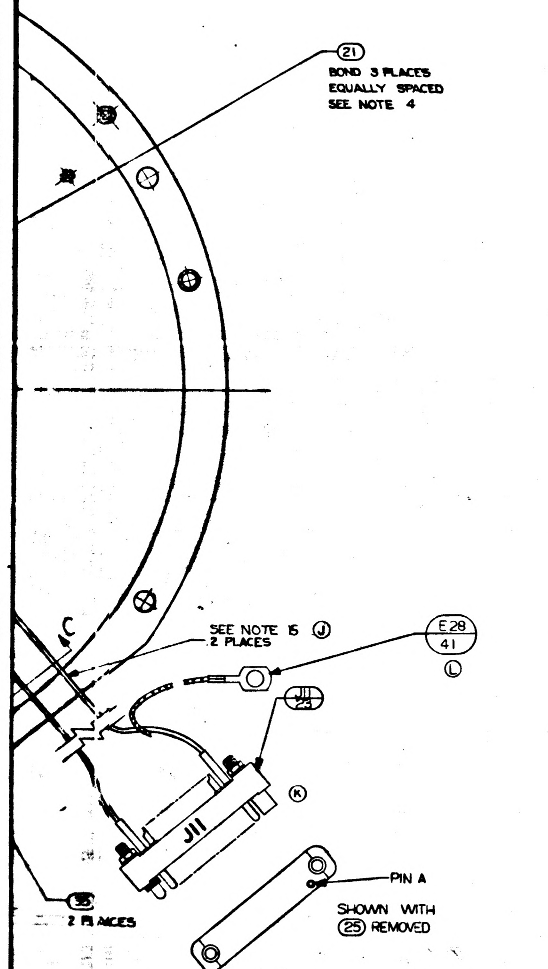
1000010	REV K	SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

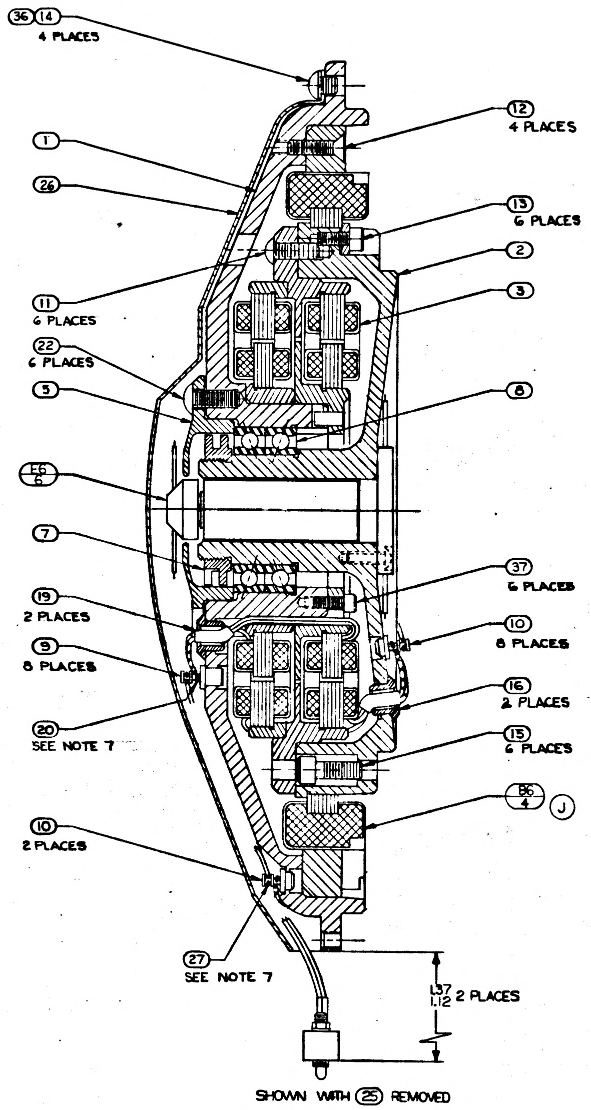
SYM	DESCRIPTION	DATE	APPROVAL	
H	REPLACES REV G WITH CHANGES			
J	TDRR 01985	7-16-63		WK
K	TDRR 03232	9-20-63		WK
L	TDRR 05168	12-10-63		WK



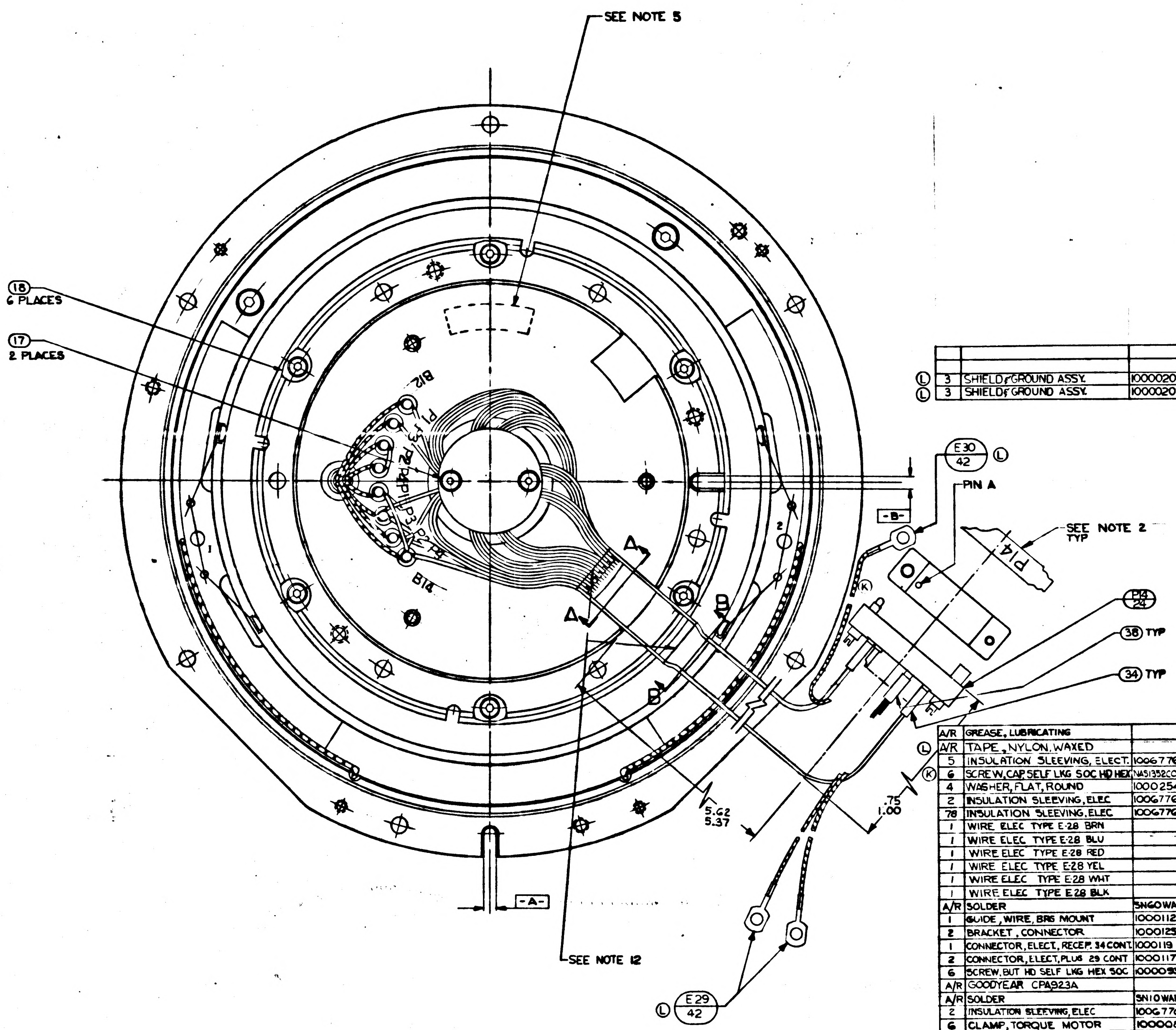
.140 MAX
.480 MAX
SECTION A-A
SECTION B-B



21
BOND 3 PLACES
EQUALLY SPACED
SEE NOTE 4
SEE NOTE 15 (J)
2 PLACES
C
E28
41
(L)
J11
J11
(K)
35
2 PLACES
PIN A
SHOWN WITH
(25) REMOVED



36 14
4 PLACES
1
26
11
6 PLACES
22
6 PLACES
5
F6
7
19
2 PLACES
9
8 PLACES
20
SEE NOTE 7
10
2 PLACES
27
SEE NOTE 7
12
4 PLACES
13
6 PLACES
2
3
8
37
6 PLACES
10
8 PLACES
16
2 PLACES
15
6 PLACES
B6
4
(J)
.37
1.12 2 PLACES
SHOWN WITH (25) REMOVED



SEE NOTE 5
18
6 PLACES
17
2 PLACES
B12
B14
A
A
B
B
E30
42
(L)
PIN A
-B-
SEE NOTE 2
TYP
P14
P13
29
38 TYP
34 TYP
5.62
5.37
.75
1.00
-A-
SEE NOTE 12
E29
42
(L)

3	SHIELD & GROUND ASSY.	1000020-2			42
3	SHIELD & GROUND ASSY.	1000020-1			41

SEPARATE STUB SHAFT (2) FROM HSG. BRG. (1) OR REMOVE TORQUE MOTOR (4)
SEMBLING KEEPER TO TORQUE MOTOR (4)
LE TORQUE 15 OZ-IN.
TEST PER THE REQUIREMENTS OF PER ATP 1000010
STITCH LACING IN AREA INDICATED
EXTEND BEYOND THIS RADIUS.
TO BE 3.0 ± .12 LONG & TO TERMINATE NEAR P14/24 AFTER FOLDING
SLEEVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
STITCH LACING IN AREA INDICATED
EVING ON ITEMS (41) & (42) AFTER ASSY. TWISTING TO CONSIST OF THE
TURNS PER INCH MINIMUM

EFFECTIVITY
4
3
6

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	GREASE, LUBRICATING		MIL-G-25760		40
A/R	TAPE, NYLON, WAXED		MIL-T-713	TY. P CL.2	39
5	INSULATION SLEEVING, ELECT.	1006776-16		5/16 LONG	38
6	SCREW, CAP SELF LKG SOC HD HEX	NAS1352C02LL4			37
4	WASHER, FLAT, ROUND	1000254			36
2	INSULATION SLEEVING, ELEC	1006776-15		3/8 LONG	35
78	INSULATION SLEEVING, ELEC	1006776-18		5/16 LONG	34
1	WIRE ELEC TYPE E-28 BRN		MIL-W-16878	9" LONG	33
1	WIRE ELEC TYPE E-28 BLU		MIL-W-16878	12" LONG	32
1	WIRE ELEC TYPE E-28 RED		MIL-W-16878	36" LONG	31
1	WIRE ELEC TYPE E-28 YEL		MIL-W-16878	26" LONG	30
1	WIRE ELEC TYPE E-28 WHT		MIL-W-16878	10" LONG	29
1	WIRE ELEC TYPE E-28 BLK		MIL-W-16878	30" LONG	28
A/R	SOLDER	SN60WAR P2	QQ-S-571		27
1	GUIDE, WIRE, BRG MOUNT	1000112			26
2	BRACKET, CONNECTOR	1000125			25
1	CONNECTOR, ELECT., RECEP. 34 CONT.	1000119			24
2	CONNECTOR, ELECT, PLUG 29 CONT	1000117			23
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			22
A/R	GOODYEAR CPA923A		MIL-A-13883		21
A/R	SOLDER	SN10WARP 2	QQ-S-571		20
2	INSULATION SLEEVING, ELEC	1006776-9		3/16 LONG	19
6	CLAMP, TORQUE MOTOR	1000087			18
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-2			17
2	BUSHING, INSULATOR	1000036			16
6	SCREW, CAP SOC HD, HEX	1000110-7			15
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			14
6	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			13
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			12
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			11
10	TERMINAL, INSULATED	1000100-2			10
8	TERMINAL, INSULATED	1000100-1			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASSY, ELEC, 40 CONTACT	1000037			6
1	RETAINER, BEARING, I.A.	1000090			5
1	MOTOR, TORQUE DC, FRAMELESS	1000075			4
1	RSVR ASSY, IX XMTR & GYRO ERROR	1000032			3
1	SHAFT, STUB IX INNER AXIS	1000057			2
1	HOUSING, BEARING IX INNER AXIS	1000095			1

LIST OF PARTS AND MATERIALS

REPLACES REV G WITH CHANGES

NEXT ASSY	USED ON
1000204	DL1000201
1000004	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT
APPROVED
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
W. J. Rhine 6-26-63
MIT APPROVAL

INTERGIMBAL SUBASSEMBLY ONE SPEED INNER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000010
SHEET 1 OF 1

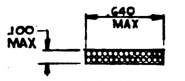
MASTER

1000010

F2

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 8
1-1	BLK		J9-A	E6-1	
1-2	BRN		J9-B	E6-2	
1-3	RED		J9-C	E6-3	
2	ORN		J9-D	E6-4	
3	YEL		J9-E	E6-5	
4	GRN		J9-F	E6-6	
5-1	BLU		J9-H	E6-7	
5-2	VIO		J9-J	E6-8	
6-1	GY		J9-M	E6-9	
7-1	WHT/RED/VIO		J9-K	E6-39	
7-2	WHT/RED/GY		J9-N	E6-40	
8-1	RED	31	J9-K	J11-K	
8-2	BRN	33	J9-N	J11-N	
9	WHT/BRN/VIO		J9-L	E6-33	
6-2	WHT		J9-P	E6-10	
10-1	WHT/BLK		J9-R	E6-11	
10-2	WHT/BRN		J9-S	E6-12	
11-1	WHT/RED		J9-T	E6-13	
11-2	WHT/ORN		J9-U	E6-14	
11-3	WHT/YEL		J9-V	E6-15	
12	WHT/GRN		J9-W	E6-16	
13	WHT/BLU		J9-X	E6-17	
14	WHT/VIO		J9-Y	E6-18	
15	WHT/BRN/GY		J9-Z	E6-34	
16	WHT/RED/ORN		J9-a	E6-35	
17	WHT/RED/YEL		J9-b	E6-36	
18	WHT/RED/GRN		J9-Z	E6-37	
19	WHT/RED/BLU		J9-d	E6-38	
20	WHT/BLK/BRN		J11-B	E6-20	
21	WHT/GY		J11-C	E6-19	
22-1	BLK	28	J11-D	B6-1	
22-2	WHT	29	J11-E	B6-2	
23	BLK		B6-BLK	B6-1	
24	WHT		B6-WHT	B6-2	
25-1	RED	31	J11-J	B12-S1	
25-2	BLK	28	J11-H	B12-S3	
26-1	YEL	30	J11-L	B12-S2	
26-2	BLU	32	J11-M	B12-S4	
27	WHT/BLK		B12-WHT/BLK	B12-S3	
28	WHT/RED		B12-WHT/RED	B12-S1	
29	WHT/YEL		B12-WHT/YEL	B12-S2	
30	WHT/BLU		B12-WHT/BLU	B12-S4	
31-1	WHT/BLK/BLU		J11-P	E6-25	
31-2	WHT/BLK/VIO		J11-R	E6-26	
31-3	RED	31	J11-R	B14-S1	
31-4	WHT/BLK/RED		J11-T	E6-21	
31-5	WHT/BLK/ORN		J11-U	E6-22	
31-6	BLK	28	J11-V	B14-S3	
31-7	YEL	30	J11-Y	B14-S2	
32	BLK		B14-BLK	B14-S3	
33	RED		B14-RED	B14-S1	
34	YEL		B14-YEL	B14-S2	
35	BLU		B14-BLU	B14-S4	
36	RED	31	B14-S1	B14-S4	
37-1	WHT/BLK/GY		J11-W	E6-27	
37-2	WHT/BRN/RED		J11-X	E6-28	
37-3	WHT/BRN/ORN		J11-Z	E6-29	
38	WHT/BRN/YEL		J11-a	E6-30	
39	WHT/BRN/GRN		J11-Z	E6-31	
40	WHT/BRN/BLU		J11-d	E6-32	
41-1	WHT/BLK/YEL		J11-b	E6-23	
41-2	WHT/BLK/GRN		J11-e	E6-24	
42-1	YEL	30	P14-A	B14-P2	
42-2	BLK	28	P14-B	B14-P3	
42-3	BLU	32	P14-D	B14-P4	
42-4	RED	31	P14-F	B14-P1	
43	WHT/BLK/ORN		B14-P3	E6-22	
44	WHT/BLK/RED		B14-P2	E6-21	
45	YEL		B14-YEL	B14-P2	
46	BLU		B14-BLU	B14-P4	
47	BLK		B14-BLK	B14-P3	
48	RED		B14-RED	B14-P1	
49-1	WHT/BLK/BLU		P14-C	E6-25	
49-2	WHT/BLK/VIO		P14-E	E6-26	
50-1	BLK		P14-W	E6-1	
50-2	BRN		P14-Y	E6-2	
50-3	RED		P14-X	E6-3	
51	ORN		P14-L	E6-4	
52	YEL		P14-N	E6-5	
53	GRN		P14-M	E6-6	
54-1	BLU		P14-KK	E6-7	
54-2	VIO		P14-MM	E6-8	
55-1	GY		P14-FF	E6-9	
55-2	WHT		P14-LL	E6-10	
56-1	WHT/BLK		P14-Z	E6-11	
56-2	WHT/BRN		P14-DD	E6-12	
57-1	WHT/RED		P14-T	E6-13	
57-2	WHT/ORN		P14-V	E6-14	
57-3	WHT/YEL		P14-U	E6-15	
58	WHT/GRN		P14-P	E6-16	
59	WHT/BLU		P14-S	E6-17	
60	WHT/VIO		P14-R	E6-18	
61	WHT/BRN/GRN		P14-K	E6-31	
62	WHT/BRN/BLU		P14-J	E6-32	
63-1	WHT/BLK/GRN		P14-EE	E6-24	
63-2	WHT/BLK/YEL		P14-HH	E6-23	
64-1	WHT/BRN/ORN		P14-BB	E6-29	
65	WHT/BRN/YEL		P14-H	E6-30	
64-2	WHT/BLK/GY		P14-AA	E6-27	
64-3	WHT/BRN/RED		P14-CC	E6-28	
66	WT/GY		P14-JJ	E6-19	
67	WHT/BLK/BRN		P14-NN	E6-20	
68-1	WHT/RED/VIO		B12-P3	E6-39	
68-2	WHT/RED/GY		B12-P1	E6-40	
69	WHT/BLK		B12-WHT/BLK	B12-P3	
70	WHT/RED		B12-WHT/RED	B12-P1	
71	WHT/YEL		B12-WHT/YEL	B12-P2	
72	WHT/BLU		B12-WHT/BLU	B12-P4	
73	YEL	30	B12-P2	B12-P4	
74	WHT/BRN/VIO		E6-33	SPARE	
75	WHT/BRN/GY		E6-34	SPARE	
76	WHT/RED/ORN		E6-35	SPARE	
77	WHT/RED/YEL		E6-36	SPARE	
78	WHT/RED/GRN		E6-37	SPARE	
79	WHT/RED/BLU		E6-38	SPARE	
80	BLU	32	P14-E	P14-D	
81	BLU	32	B14-P1	B14-P4	
1-A	BLK	28	SHLD 1	E-27	
11-A	BLK	28	SHLD 11	E-27	
37-A	BLK	28	SHLD 37	E-28	
50-A	BLK	28	SHLD 50	E-29	
64-A	BLK	28	SHLD 64	E-29	
57-A	BLK	28	SHLD 57	E-30	



.100 MAX
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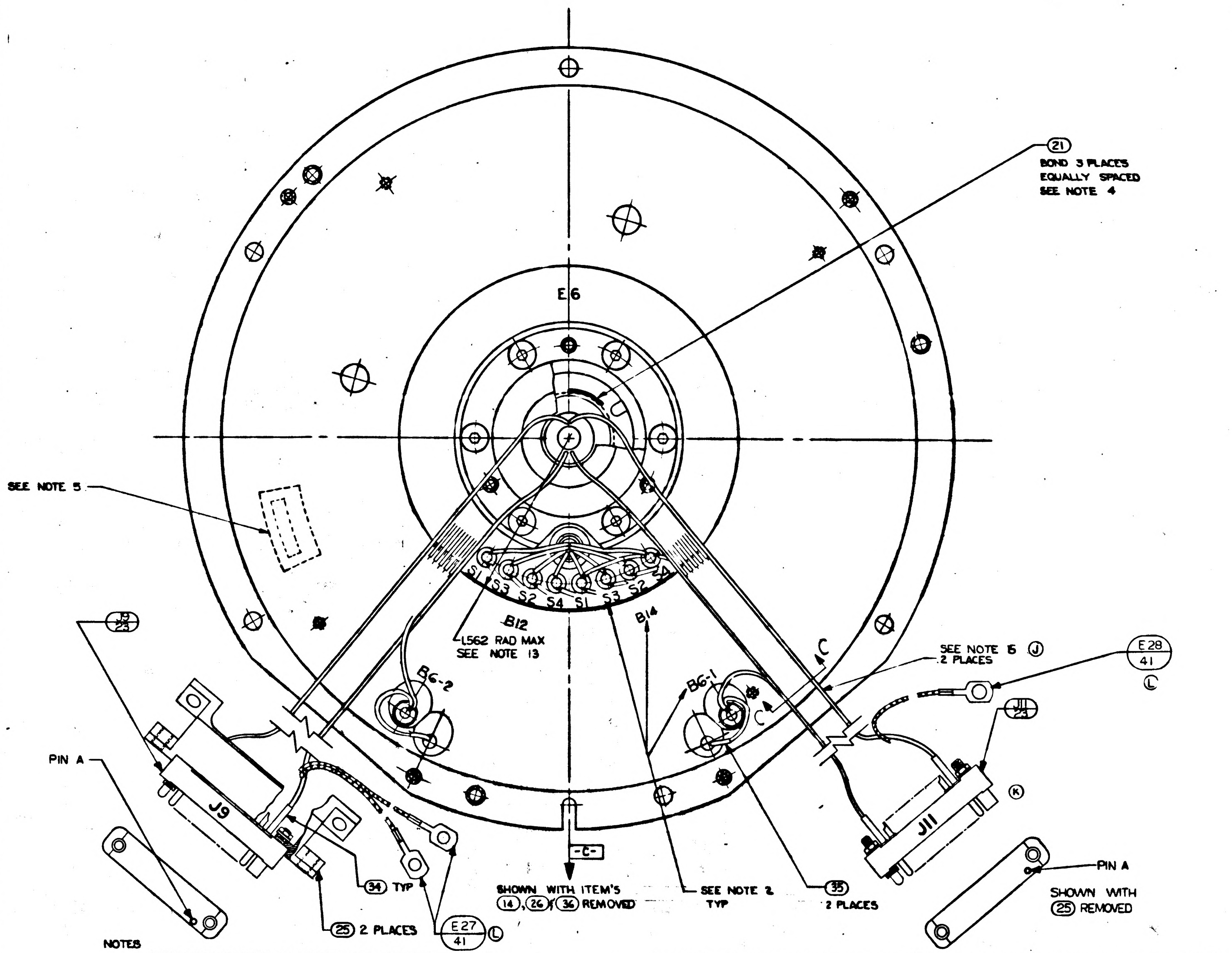
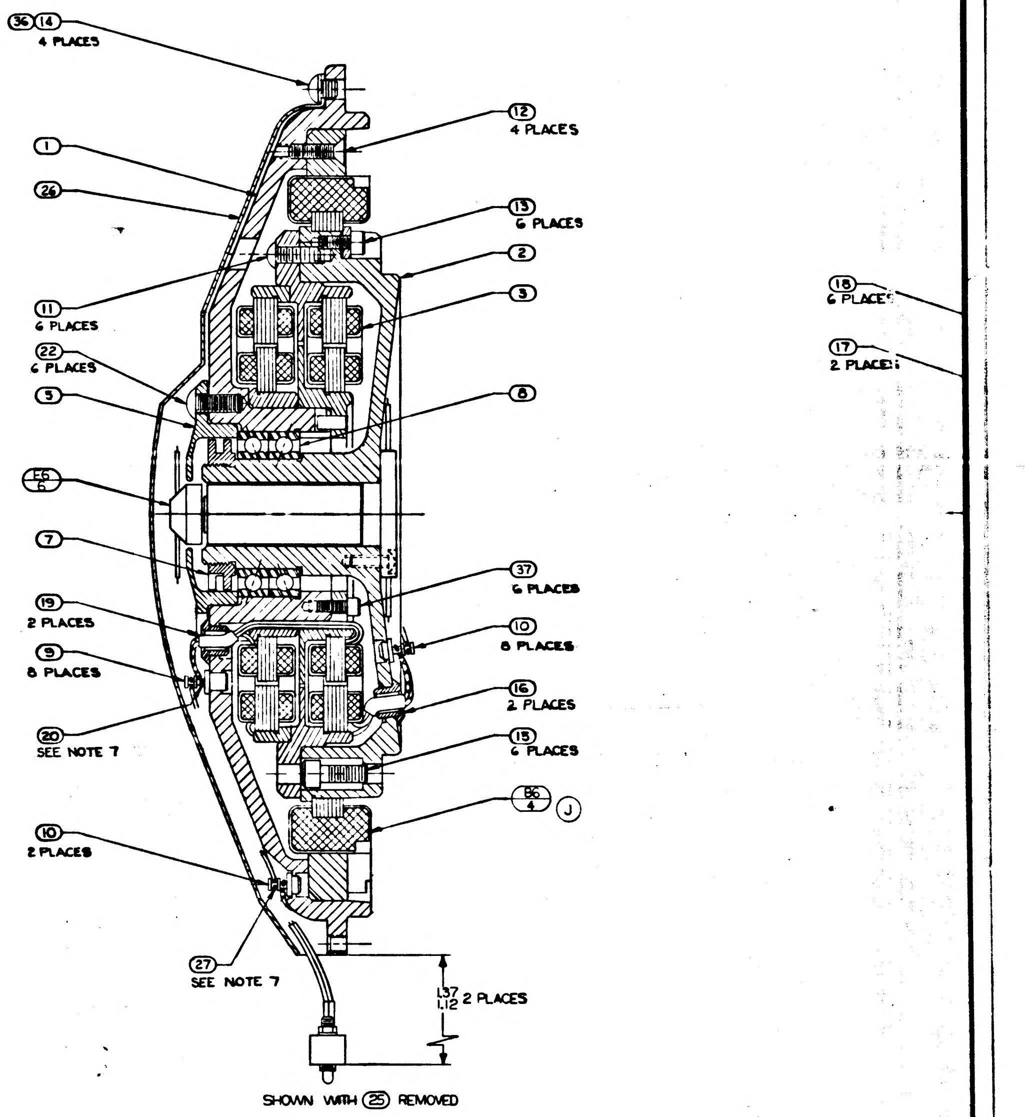
SECTION C-C
2 PLACES



E6
21
BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
SEE NOTE 5
S1 S3 S2 S4 S1 S3 S2 S4
B12
L562 RAD MAX SEE NOTE 13
B14
C
SEE NOTE 6 2 PLACES
E28 41
J11 24
B6-2
B6-1
J9 23
PIN A
J9
J11
34 TYP
25 2 PLACES
E27 41
-C-
SHOWN WITH ITEM'S 14, 26 & 36 REMOVED
SEE NOTE 2 TYP
35 2 PLACES
PIN A
SHOWN WITH 25 REMOVED



36 14 4 PLACES
12 4 PLACES
1
26
13 6 PLACES
2
3
11 6 PLACES
22 6 PLACES
5
8
E6
7
37 6 PLACES
19 2 PLACES
10 8 PLACES
9 8 PLACES
16 2 PLACES
20 SEE NOTE 7
15 6 PLACES
B6 4
10 2 PLACES
27 SEE NOTE 7
.37 .12 2 PLACES
18 6 PLACES
17 2 PLACES
SHOWN WITH 25 REMOVED

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS 10/64 HIGH COLOR BLACK PER ND 1002019 AT LOCATION SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF (8) TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW SHOWN WHEN (1) & (2) ARE IN POSITION SHOWN. APPLY THIN COAT OF (40) TO INSIDE DIAMETER OF (8) AND TO FAYING SURFACE OF (2) BEFORE ASSEMBLY
4. APPLY (21) TO (2) & (7) AFTER ASSEMBLY
5. IDENTIFY USING DWG. NO., REVISION LETTER, MANUFACTUERS SYMBOL & SERIAL NO. ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATION PER NOTE 2
6. SCREW TORQUE REQUIREMENTS ± 7%

(7)	100 IN-LB
(22)	10 IN-LB
(11) (12) (13) (16)	5 IN-LB
(17) (37)	3.5 IN-LB

Ⓙ 7. SOLDER ALL LEADS FROM (3) & (4) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (23) & (24) PER MIL-STD-440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.

Ⓛ ~~8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~

9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM HSG. BRG. (1) OR REMOVE TORQUE MOTOR (4) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (4)
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE AND TEST PER THE REQUIREMENTS OF PER ATP 1000010
12. USE CHICAGO STITCH LACING IN AREA INDICATED
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. ALL SPARE LEADS TO BE 3.00 ± .12 LONG & TO TERMINATE NEAR P14/24 AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS

Ⓙ 15. USE FIGURE EIGHT STITCH LACING IN AREA INDICATED

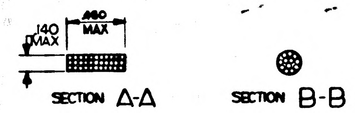
Ⓛ 16. HEAT SHRINK SLEEVING ON ITEMS (41) & (42) AFTER ASSY. TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH MINIMUM

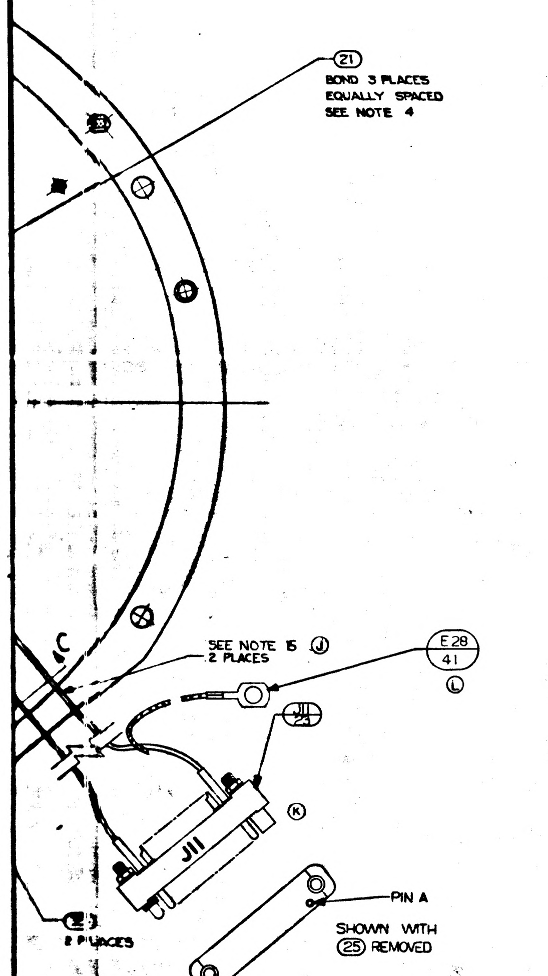
NO. OF LEADS	NO. OF TURNS
2	4
3	3
4 OR MORE	2

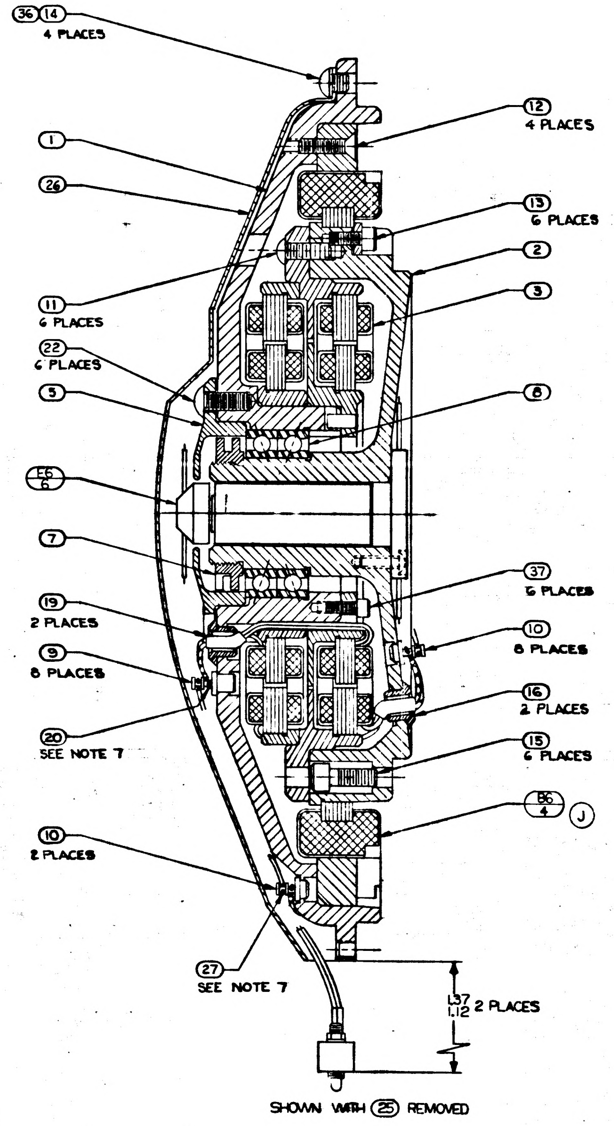
1000010 | REV L | SHEET 1

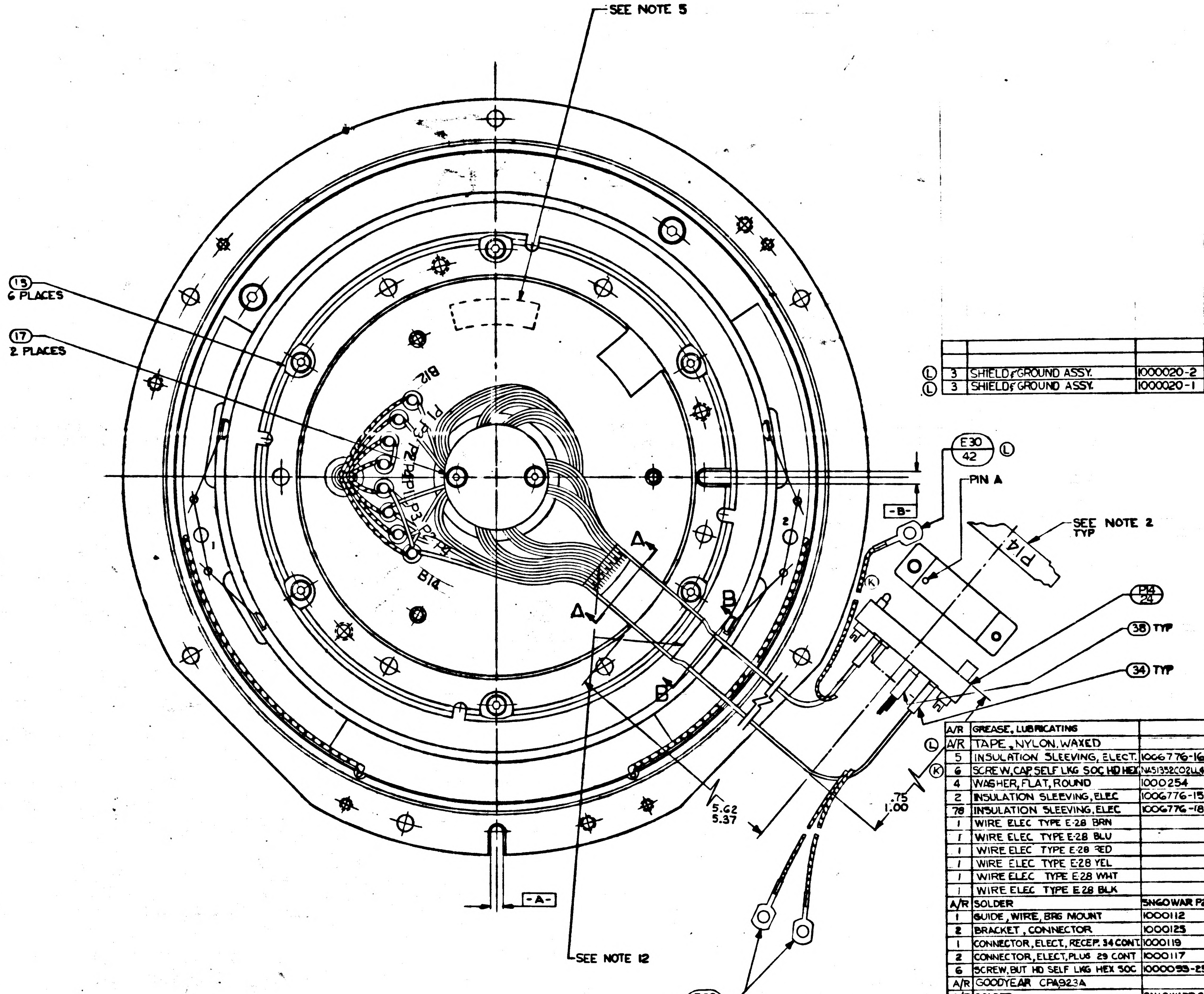
INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
H	REPLACES REV G WITH CHANGES TDRR [illegible]	[illegible]	[illegible]	
J	TDRR 01986	7-16-63		WK
K	TDRR 03232	9-20-63		WK
L	TDRR 05168	12-10-63		WK
M	TDRR 06237	18 FEB 64		


.140 MAX
.460 MAX
SECTION A-A
SECTION B-B


㉑
BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
C
SEE NOTE 15 Ⓙ
2 PLACES
E28
41
Ⓛ
J11
24
J11
Ⓚ
2 PLACES
PIN A
SHOWN WITH ㉕ REMOVED


㊱ ⑭
4 PLACES
⑫
4 PLACES
①
㉖
⑬
6 PLACES
②
③
⑪
6 PLACES
㉒
6 PLACES
⑤
⑧
E5
6
⑦
㊲
6 PLACES
⑲
2 PLACES
⑩
8 PLACES
⑨
8 PLACES
⑯
2 PLACES
⑳
SEE NOTE 7
⑮
6 PLACES
B6
4
Ⓙ
⑩
2 PLACES
㉗
SEE NOTE 7
1.37
1.12
2 PLACES
SHOWN WITH ㉕ REMOVED


SEE NOTE 5
⑬
6 PLACES
⑰
2 PLACES
B12
P1
P2
P3
B14
A
A
B
B
E30
42
Ⓛ
PIN A
-B-
SEE NOTE 2
TYP
P14
P14
29
㊳ TYP
㉞ TYP
5.62
5.37
.75
1.00
-A-
SEE NOTE 12
Ⓛ
E29
42

Ⓛ	3	SHIELD & GROUND ASSY.	1000020-2			42
Ⓛ	3	SHIELD & GROUND ASSY.	1000020-1			41

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	A/R	GREASE, LUBRICATING		MIL-G-25760		40
Ⓛ	A/R	TAPE, NYLON, WAXED		MIL-T-713	TY. P CL.2	39
	5	INSULATION SLEEVING, ELECT.	1006776-16		5/16 LONG	38
Ⓚ	6	SCREW, CAP SELF LKG SOC HD HEX	NAS1352C02LL4			37
	4	WASHER, FLAT, ROUND	1000254			36
	2	INSULATION SLEEVING, ELEC	1006776-15		3/4 LONG	35
	78	INSULATION SLEEVING, ELEC	1006776-18		3/16 LONG	34
	1	WIRE ELEC TYPE E-28 BRN		MIL-W-16878	9" LONG	33
	1	WIRE ELEC TYPE E-28 BLU		MIL-W-16878	12" LONG	32
	1	WIRE ELEC TYPE E-28 RED		MIL-W-16878	36" LONG	31
	1	WIRE ELEC TYPE E-28 YEL		MIL-W-16878	26" LONG	30
	1	WIRE ELEC TYPE E-28 WHT		MIL-W-16878	10" LONG	29
	1	WIRE ELEC TYPE E-28 BLK		MIL-W-16878	30" LONG	28
	A/R	SOLDER	SN60WAR P2	QQ-S-571		27
	1	GUIDE, WIRE, BRG MOUNT	1000112			26
	2	BRACKET, CONNECTOR	1000125			25
	1	CONNECTOR, ELECT, RECEP. 34 CONT	1000119			24
	2	CONNECTOR, ELECT, PLUG 29 CONT	1000117			23
	6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			22
	A/R	GOODYEAR CPA923A		MIL-A-13883		21
	A/R	SOLDER	SN10WARP 2	QQ-S-571		20
	2	INSULATION SLEEVING, ELEC	1006776-9		3/16 LONG	19
	6	CLAMP, TORQUE MOTOR	1000087			18
	2	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-2			17
	2	BUSHING, INSULATOR	1000036			16
	6	SCREW, CAP SOC HD, HEX	1000110-7			15
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			14
Ⓚ	6	SCREW, CAP, SELF LKG, SOC HD, HEX	NAS1352C04LL4			13
	4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			12
	6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			11
	10	TERMINAL, INSULATED	1000100-2			10
	8	TERMINAL, INSULATED	1000100-1			9
	1	BEARING, BALL, DUPLEX	1000029			8
	1	NUT, BEARING RETAINER	1000086			7
	1	SLIP RING ASSY, ELEC, 40 CONTACT	1000037			6
	1	RETAINER, BEARING, I.A.	1000090			5
	1	MOTOR, TORQUE DC, FRAMELESS	1000075			4
	1	RSVR ASSY, IX XMTR & GYRO ERROR	1000032			3
	1	SHAFT, STUB IX INNER AXIS	1000057			2
	1	HOUSING, BEARING IX INNER AXIS	1000095			1

LIST OF PARTS AND MATERIALS

EPARATE STUB SHAFT ② FROM HSG. BRG. ① OR REMOVE TORQUE MOTOR ④
SSEMBLE KEEPER TO TORQUE MOTOR ④
E TORQUE 15 OZ-IN.
EST PER THE REQUIREMENTS OF PER ATP 1000010
TCH LACING IN AREA INDICATED
EXTEND BEYOND THIS RADIUS.
O BE 3.00 ± .12 LONG & TO TERMINATE NEAR P14/24 AFTER FOLDING
LVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
TCH LACING IN AREA INDICATED
ING ON ITEMS ㊶ & ㊷ AFTER ASSY. TWISTING TO CONSIST OF THE
TURNS PER INCH

[illegible] IS IN	NO OF FULL TURNS MAX
	4
	3

REPLACES REV G WITH CHANGES

1000204	DL1000201
1000004	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
DATE
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
W. J. Rhine 6-26-63
MIT APPROVAL

INTERGIMBAL
SUBASSEMBLY
ONE SPEED INNER AXIS
SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000010
SHEET 1 OF 1

MASTER

100 010 REV M SHEET 1

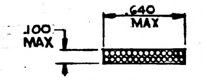
1000010 M

INCHES
PHOTOGRAPHIC SCALE ONLY

E-2

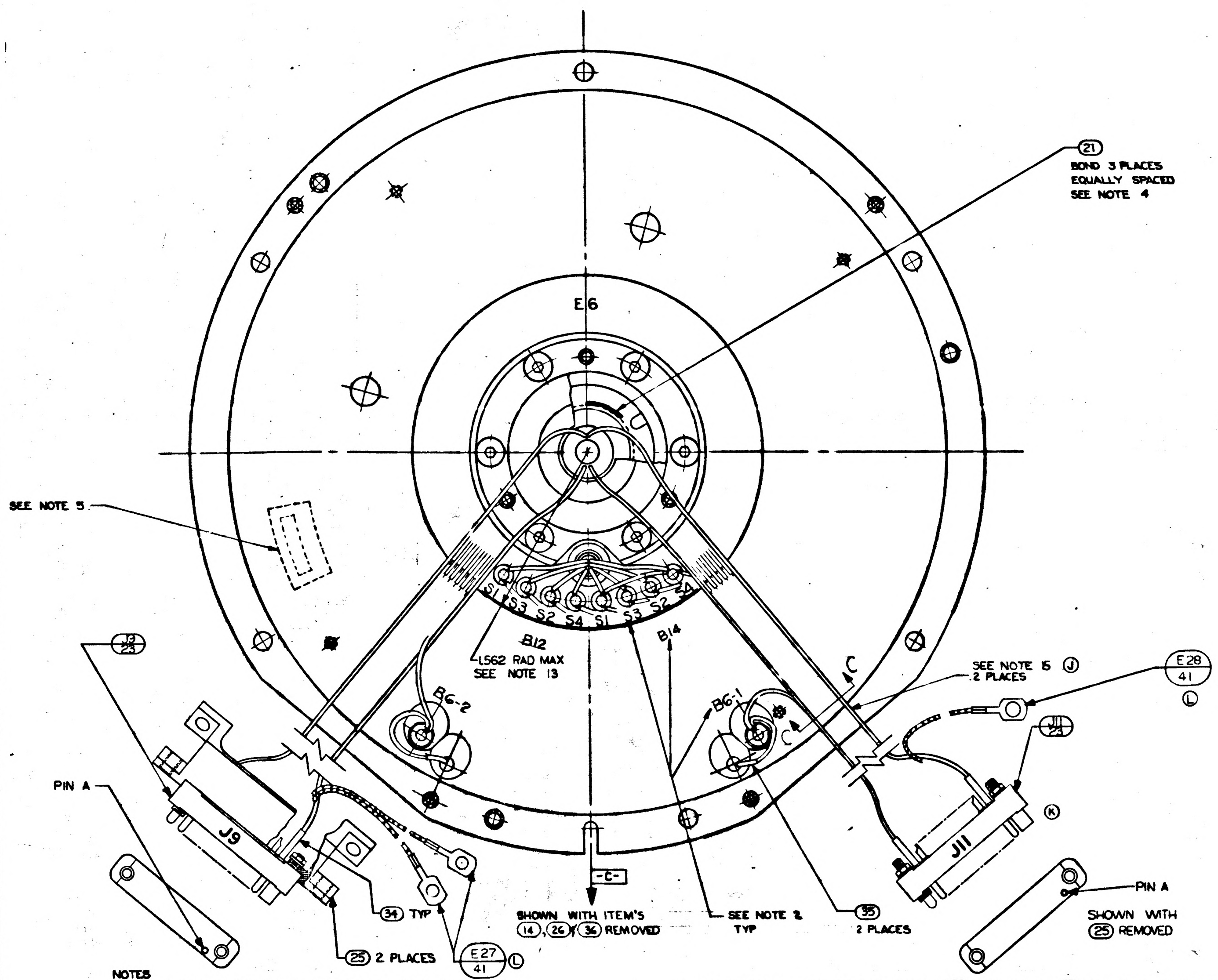
WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 16
1-1	BLK		J9-A	E6-1	
1-2	BRN		J9-B	E6-2	
1-3	RED		J9-C	E6-3	
2	ORN		J9-D	E6-4	
3	YEL		J9-E	E6-5	
4	GRN		J9-F	E6-6	
5-1	BLU		J9-H	E6-7	8
5-2	VIO		J9-J	E6-8	8
6-1	GY		J9-M	E6-9	8
7-1	WHT/RED/VIO		J9-K	E6-39	8
7-2	WHT/RED/GY		J9-N	E6-40	8
8-1	RED	31	J9-K	J11-K	8
8-2	BRN	33	J9-N	J11-N	8
9	WHT/BRN/VIO		J9-L	E6-33	
6-2	WHT		J9-P	E6-10	8
10-1	WHT/BLK		J9-R	E6-11	8
10-2	WHT/BRN		J9-S	E6-12	8
11-1	WHT/RED		J9-T	E6-13	
11-2	WHT/ORN		J9-U	E6-14	
11-3	WHT/YEL		J9-V	E6-15	
12	WHT/GRN		J9-W	E6-16	
13	WHT/BLU		J9-X	E6-17	
14	WHT/VIO		J9-Y	E6-18	
15	WHT/BRN/GY		J9-Z	E6-34	
16	WHT/RED/ORN		J9-a	E6-35	
17	WHT/RED/YEL		J9-b	E6-36	
18	WHT/RED/GRN		J9-z	E6-37	
19	WHT/RED/BLU		J9-d	E6-38	
20	WHT/BLK/BRN		J11-B	E6-20	
21	WHT/GY		J11-C	E6-19	
22-1	BLK	28	J11-D	B6-1	8
22-2	WHT	29	J11-E	B6-2	8
23	BLK		B6-BLK	B6-1	
24	WHT		B6-WHT	B6-2	
25-1	RED	31	J11-J	B12-S1	8
25-2	BLK	28	J11-H	B12-S3	8
26-1	YEL	30	J11-L	B12-S2	8
26-2	BLU	32	J11-M	B12-S4	8
27	WHT/BLK		B12-WHT/BLK	B12-S3	
28	WHT/RED		B12-WHT/RED	B12-S1	
29	WHT/YEL		B12-WHT/YEL	B12-S2	
30	WHT/BLU		B12-WHT/BLU	B12-S4	
31-1	WHT/BLK/BLU		J11-P	E6-25	8
31-2	WHT/BLK/VIO		J11-R	E6-26	8
31-3	RED	31	J11-R	B14-S1	8
31-4	WHT/BLK/RED		J11-T	E6-21	8
31-5	WHT/BLK/ORN		J11-U	E6-22	8
31-6	BLK	28	J11-V	B14-S3	8
31-7	YEL	30	J11-Y	B14-S2	8
32	BLK		B14-BLK	B14-S3	
33	RED		B14-RED	B14-S1	
34	YEL		B14-YEL	B14-S2	
35	BLU		B14-BLU	B14-S4	
36	RED	31	B14-S1	B14-S4	
37-1	WHT/BLK/GY		J11-W	E6-27	
37-2	WHT/BRN/RED		J11-X	E6-28	
37-3	WHT/BRN/ORN		J11-Z	E6-29	
38	WHT/BRN/YEL		J11-a	E6-30	
39	WHT/BRN/GRN		J11-z	E6-31	
40	WHT/BRN/BLU		J11-d	E6-32	
41-1	WHT/BLK/YEL		J11-b	E6-23	8
41-2	WHT/BLK/GRN		J11-e	E6-24	8
42-1	YEL	30	P14-A	B14-P2	8
42-2	BLK	28	P14-B	B14-P3	8
42-3	BLU	32	P14-D	B14-P4	8
42-4	RED	31	P14-F	B14-P1	8
43	WHT/BLK/ORN		B14-P3	E6-22	
44	WHT/BLK/RED		B14-P2	E6-21	
45	YEL		B14-YEL	B14-P2	
46	BLU		B14-BLU	B14-P4	
47	BLK		B14-BLK	B14-P3	
48	RED		B14-RED	B14-P1	
49-1	WHT/BLK/BLU		P14-C	E6-25	8
49-2	WHT/BLK/VIO		P14-E	E6-26	8
50-1	BLK		P14-W	E6-1	
50-2	BRN		P14-Y	E6-2	
50-3	RED		P14-X	E6-3	
51	ORN		P14-L	E6-4	
52	YEL		P14-N	E6-5	
53	GRN		P14-M	E6-6	
54-1	BLU		P14-KK	E6-7	8
54-2	VIO		P14-MM	E6-8	8
55-1	GY		P14-FF	E6-9	8
55-2	WHT		P14-LL	E6-10	8
56-1	WHT/BLK		P14-Z	E6-11	8
56-2	WHT/BRN		P14-DD	E6-12	8
57-1	WHT/RED		P14-T	E6-13	
57-2	WHT/ORN		P14-V	E6-14	
57-3	WHT/YEL		P14-U	E6-15	
58	WHT/GRN		P14-P	E6-16	
59	WHT/BLU		P14-S	E6-17	
60	WHT/VIO		P14-R	E6-18	
61	WHT/BRN/GRN		P14-K	E6-31	
62	WHT/BRN/BLU		P14-J	E6-32	
63-1	WHT/BLK/GRN		P14-EE	E6-24	8
63-2	WHT/BLK/YEL		P14-HH	E6-23	8
64-1	WHT/BRN/ORN		P14-BB	E6-29	
65	WHT/BRN/YEL		P14-H	E6-30	
64-2	WHT/BLK/GY		P14-AA	E6-27	
64-3	WHT/BRN/RED		P14-CC	E6-28	
66	WT/GY		P14-JJ	E6-19	
67	WHT/BLK/BRN		P14-NN	E6-20	
68-1	WHT/RED/VIO		B12-P3	E6-39	8
68-2	WHT/RED/GY		B12-P1	E6-40	8
69	WHT/BLK		B12-WHT/BLK	B12-P3	
70	WHT/RED		B12-WHT/RED	B12-P1	
71	WHT/YEL		B12-WHT/YEL	B12-P2	
72	WHT/BLU		B12-WHT/BLU	B12-P4	
73	YEL	30	B12-P2	B12-P4	
74	WHT/BRN/VIO		E6-33	SPARE	
75	WHT/BRN/GY		E6-34	SPARE	
76	WHT/RED/ORN		E6-35	SPARE	
77	WHT/RED/YEL		E6-36	SPARE	
78	WHT/RED/GRN		E6-37	SPARE	
79	WHT/RED/BLU		E6-38	SPARE	
80	BLU	32	P14-E	P14-D	
81	BLU	32	B14-P1	B14-P4	
1-A	BLK	28	SHLD 1	E-27	
11-A	BLK	28	SHLD 11	E-27	
37-A	BLK	28	SHLD 37	E-28	
50-A	BLK	28	SHLD 50	E-29	
64-A	BLK	28	SHLD 64	E-29	
57-A	BLK	28	SHLD 57	E-30	

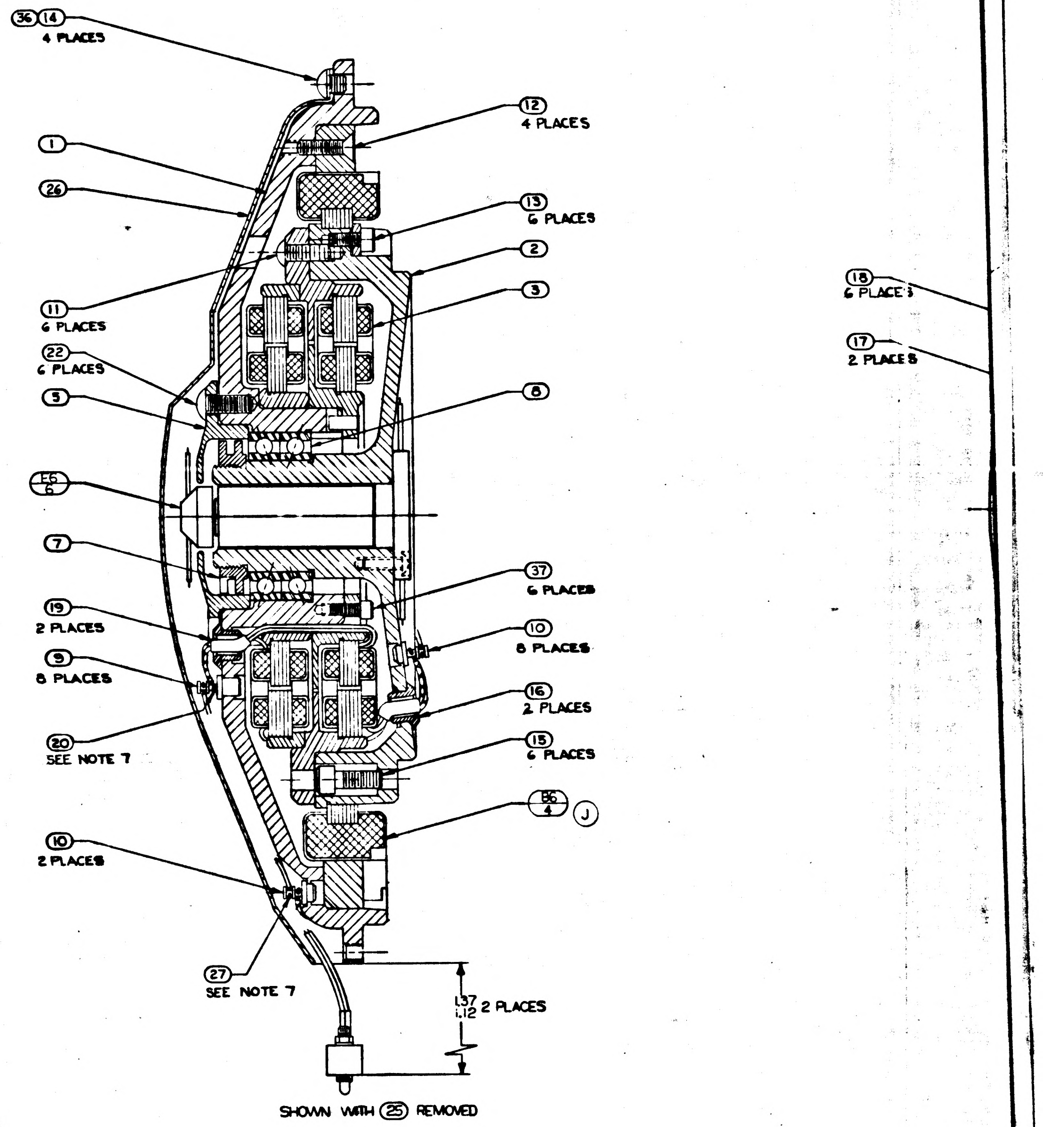


.100 MAX
.640 MAX

SECTION C-C
2 PLACES



E6
21
BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
SEE NOTE 5
B12
.1562 RAD MAX SEE NOTE 13
B14
S1 S3 S2 S4 S1 S3 S2 S4
B6-2
B6-1
C
SEE NOTE 15
2 PLACES
J
E28
41
L
J11
24
K
12
23
PIN A
J9
34 TYP
25 2 PLACES
E27
41
L
-C-
SHOWN WITH ITEM'S 14, 26 & 36 REMOVED
SEE NOTE 2 TYP
35 2 PLACES
PIN A
SHOWN WITH 25 REMOVED



36 14 4 PLACES
12 4 PLACES
1
26
13 6 PLACES
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E6
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37 6 PLACES
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B6 4
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17 2 PLACES
SHOWN WITH 25 REMOVED

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
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3. ECCENTRICITY MARKS ON BOTH RACES OF (8) TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW SHOWN WHEN (1) & (2) ARE IN POSITION SHOWN. APPLY THIN COAT OF (40) TO INSIDE DIAMETER OF (8) AND TO FAYING SURFACE OF (2) BEFORE ASSEMBLY
4. APPLY (21) TO (2) & (7) AFTER ASSEMBLY
5. IDENTIFY USING DWG. NO., REVISION LETTER, MANUFACTUERS SYMBOL & SERIAL NO. ON (1) & MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATION PER NOTE 2
6. SCREW TORQUE REQUIREMENTS ± 7%

(7)	100 IN-LB
(22)	10 IN-LB
(11) (12) (13) (14)	3 IN-LB
(17) (37)	3.5 IN-LB

(J) 7. SOLDER ALL LEADS FROM (3) & (4) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (20). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (23) & (24) PER MIL-STD-440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.

(L) ~~8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~

9. CAUTION: DO NOT SEPARATE STUB SHAFT (2) FROM HSG. BRG. (1) OR REMOVE TORQUE MOTOR (4) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (4)
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE AND TEST PER THE REQUIRMENTS OF PER ATP 1000010
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14. ALL SPARE LEADS TO BE 3.00 ± .12 LONG & TO TERMINATE NEAR (P14 / 24) AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS

(J) 15. USE FIGURE EIGHT STITCH LACING IN AREA INDICATED

(L) 16. HEAT SHRINK SLEEVING ON ITEMS (41) & (42) AFTER ASSY. TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

(M)

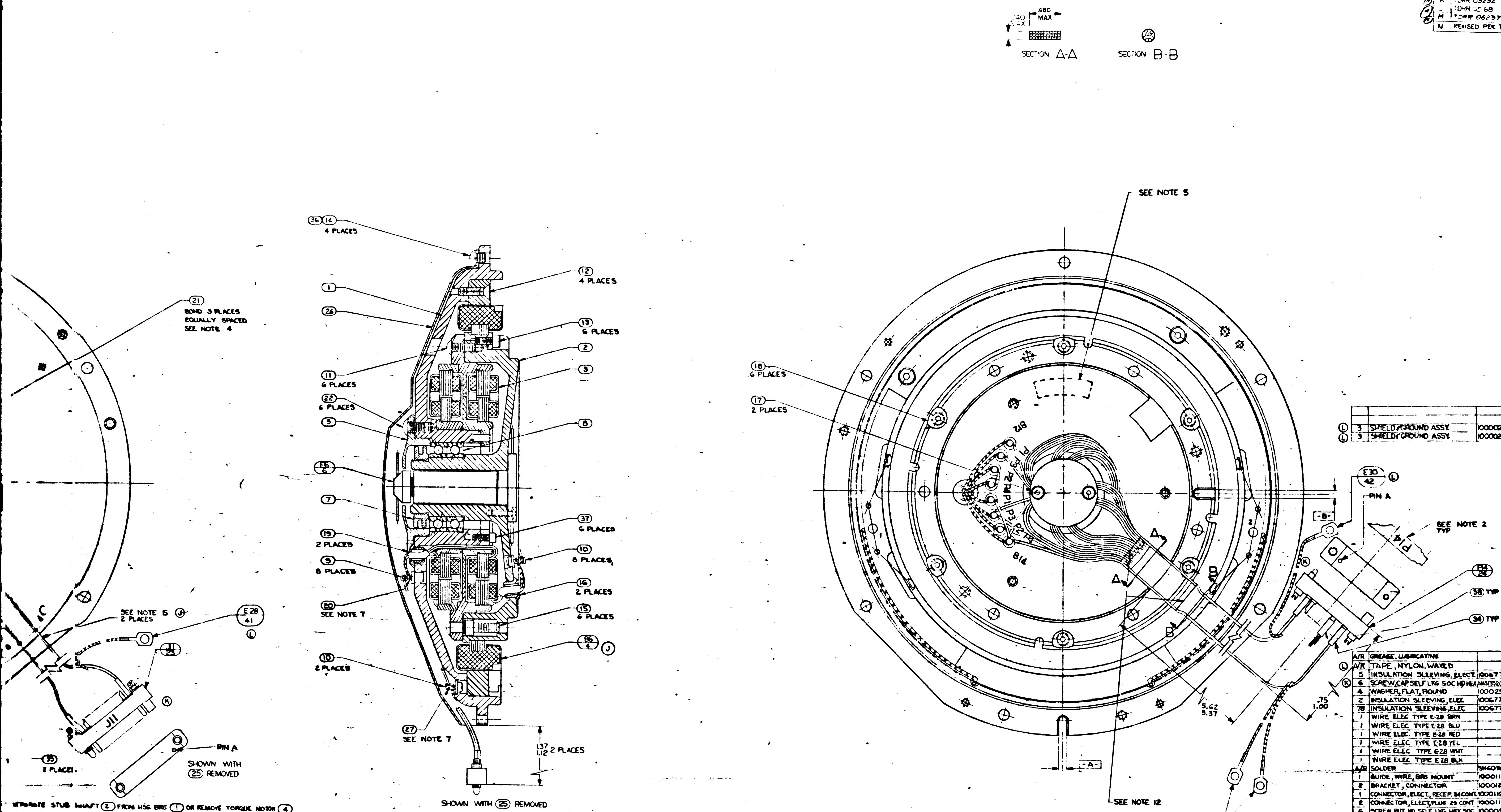
NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000010 REV M SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

F-1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES TDRR 01...	6/26/63	agB RKB
J	TDRR 01986	7-16-63	agB WK
K	TDRR 03232	9-20-63	WK
L	TDRR 05 68	12-10-63	WK
M	TDRR 06237	18 FEB 64	WK
N	REVISED PER TDRR 07952	4 MAR 64	


SECTION A-A
SECTION B-B
.480 MAX
SEE NOTE 5
SEE NOTE 2 TYP
SEE NOTE 12
SEE NOTE 7
SEE NOTE 6
36 14 4 PLACES
12 4 PLACES
13 6 PLACES
11 6 PLACES
22 6 PLACES
37 6 PLACES
19 2 PLACES
9 8 PLACES
10 8 PLACES
16 2 PLACES
15 6 PLACES
B6 4
10 2 PLACES
18 6 PLACES
17 2 PLACES
21 BOND 3 PLACES EQUALLY SPACED SEE NOTE 4
E28 41
E29 42
E30 42
E5 6
P14 24
38 TYP
34 TYP
35 2 PLACES
J11
PIN A
SHOWN WITH 25 REMOVED
1.37 1.12 2 PLACES
5.62 5.37
.75 1.00
B12
B14
P1
-A-
-B-

3	SHIELD, GROUND ASSY	1000020-2			42
3	SHIELD, GROUND ASSY	1000020-1			41

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	GREASE, LUBRICATING		MIL-G-25760		40
A/R	TAPE, NYLON, WAXED		MIL-T-713	TY. P CL. 2	39
5	INSULATION SLEEVING, ELECT.	1006776-16		5/16 LONG	38
6	SCREW, CAP SELF LKG SOC HD HEX	NAS1352C02LL4			37
4	WASHER, FLAT, ROUND	1000254			36
2	INSULATION SLEEVING, ELEC	1006776-15		3/8 LONG	35
78	INSULATION SLEEVING, ELEC	1006776-18		3/16 LONG	34
1	WIRE ELEC TYPE E-28 BRN		MIL-W-16878	9" LONG	33
1	WIRE ELEC TYPE E-28 BLU		MIL-W-16878	12" LONG	32
1	WIRE ELEC. TYPE E-28 RED		MIL-W-16878	36" LONG	31
1	WIRE ELEC TYPE E-28 YEL		MIL-W-16878	26" LONG	30
1	WIRE ELEC TYPE E-28 WHT		MIL-W-16878	10" LONG	29
1	WIRE ELEC TYPE E 28 BLK		MIL-W-16878	30" LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
1	GUIDE, WIRE, BRG MOUNT	1000112			26
2	BRACKET, CONNECTOR	1000125			25
1	CONNECTOR, ELECT., RECEP. 34 CONT	1000119			24
2	CONNECTOR, ELECT, PLUG 29 CONT	1000117			23
6	SCREW, BUT HD SELF LKG HEX SOC	1000098-25			22
A/R	GOODYEAR CPA923A		MIL-A-19883		21
A/R	SOLDER	SN10WARP2	QQ-S-571		20
2	INSULATION SLEEVING, ELEC	1006776-9		3/16 LONG	19
6	CLAMP, TORQUE MOTOR	1000087			18
2	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-2			17
2	BUSHING, INSULATOR	1000036			16
6	SCREW, CAP SOC HD, HEX	1000110-7			15
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			14
6	SCREW, CAP SELF LKG, SOC HD, HEX	NAS1352C04LL4			13
4	SCREW, FLAT HD, SELF LKG, HEX SOC	1000104-17			12
6	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-15			11
10	TERMINAL, INSULATED	1000100-2			10
8	TERMINAL, INSULATED	1000100-1			9
1	BEARING, BALL, DUPLEX	1000029			8
1	NUT, BEARING RETAINER	1000086			7
1	SLIP RING ASSY, ELEC, 40 CONTACT	1000037			6
1	RETAINER, BEARING, I.A.	1000090			5
1	MOTOR, TORQUE DC, FRAMELESS	1000078			4
1	RSVR ASSY, 1X XMTR & GYRO ERROR	1000032			3
1	SHAFT, STUB 1X INNER AXIS	1000057			2
1	HOUSING, BEARING 1X INNER AXIS	1000095			1

LIST OF PARTS AND MATERIALS

REPLACES REV G WITH CHANGES

... SEPARATE STUB SHAFT (2) FROM HSG. BRG (1) OR REMOVE TORQUE MOTOR (4)
... ASSEMBLING KEEPER TO TORQUE MOTOR (4)
... TORQUE ... 5 OZ-IN.
... PER THE REQUIRMENTS OF PER ATP 1000010
... LACING IN AREA INDICATED
... EXTEND BEYOND THIS RADIUS.
... BE 3.00 ... LONG & TO TERMINATE NEAR P14/24 AFTER FOLDING
... ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
... LACING IN AREA INDICATED
... ON ITEMS (41) & (42) AFTER ASSY. TWISTING TO CONSIST OF THE
... PER INCH

... TURNS MIN	NO OF FULL TURNS MAX
2	4
1	3

1000204	DL1000201
1000004	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC W. J. Rhine 6-26-63
BY DIRECTION MIT APPROVAL

INTERGIMBAL
SUBASSEMBLY
ONE SPEED INNER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS

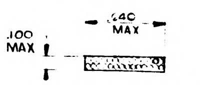
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000010
SHEET 1 OF 1

1000010 REV N SHEET 1

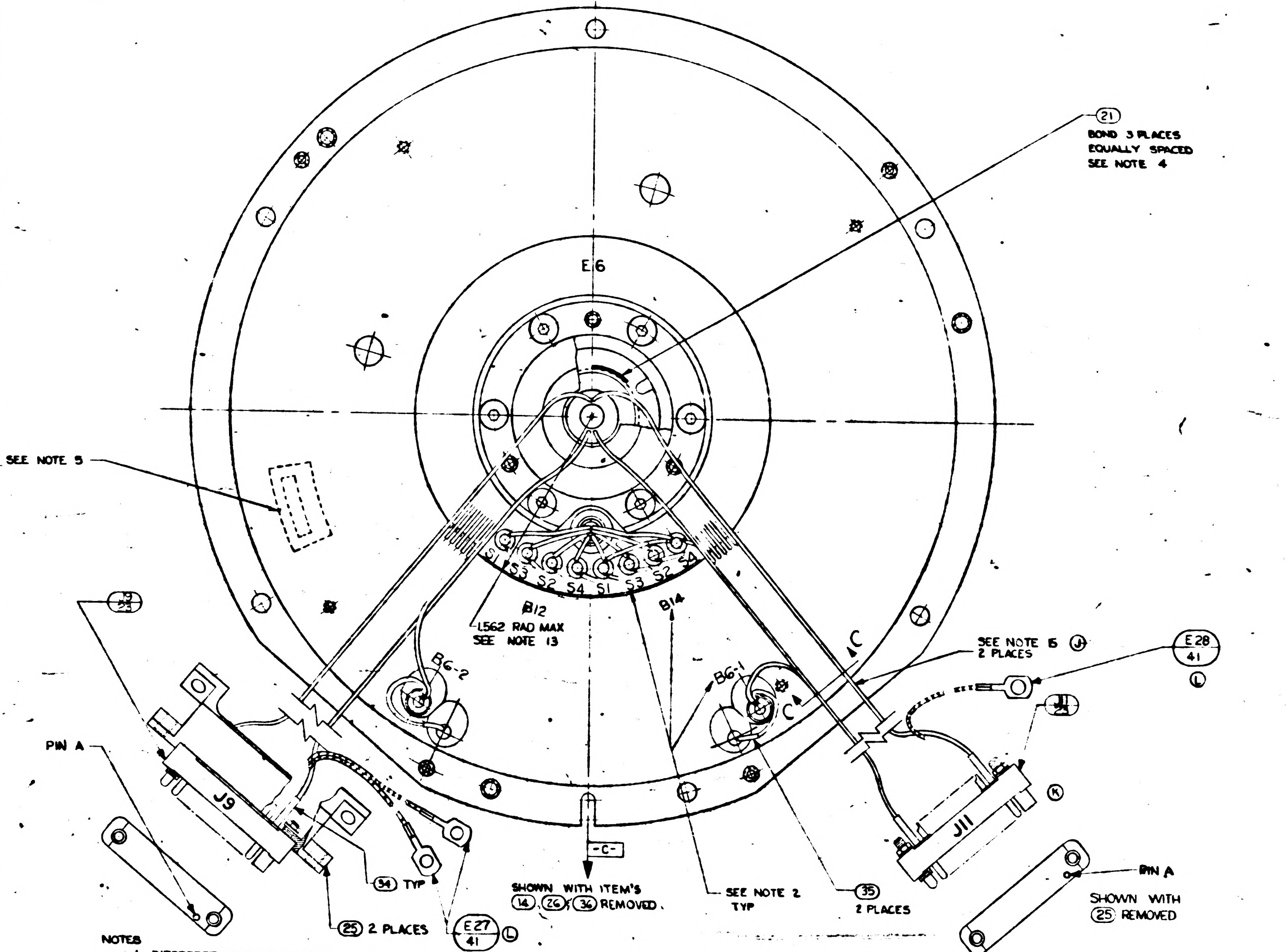
2/1000010

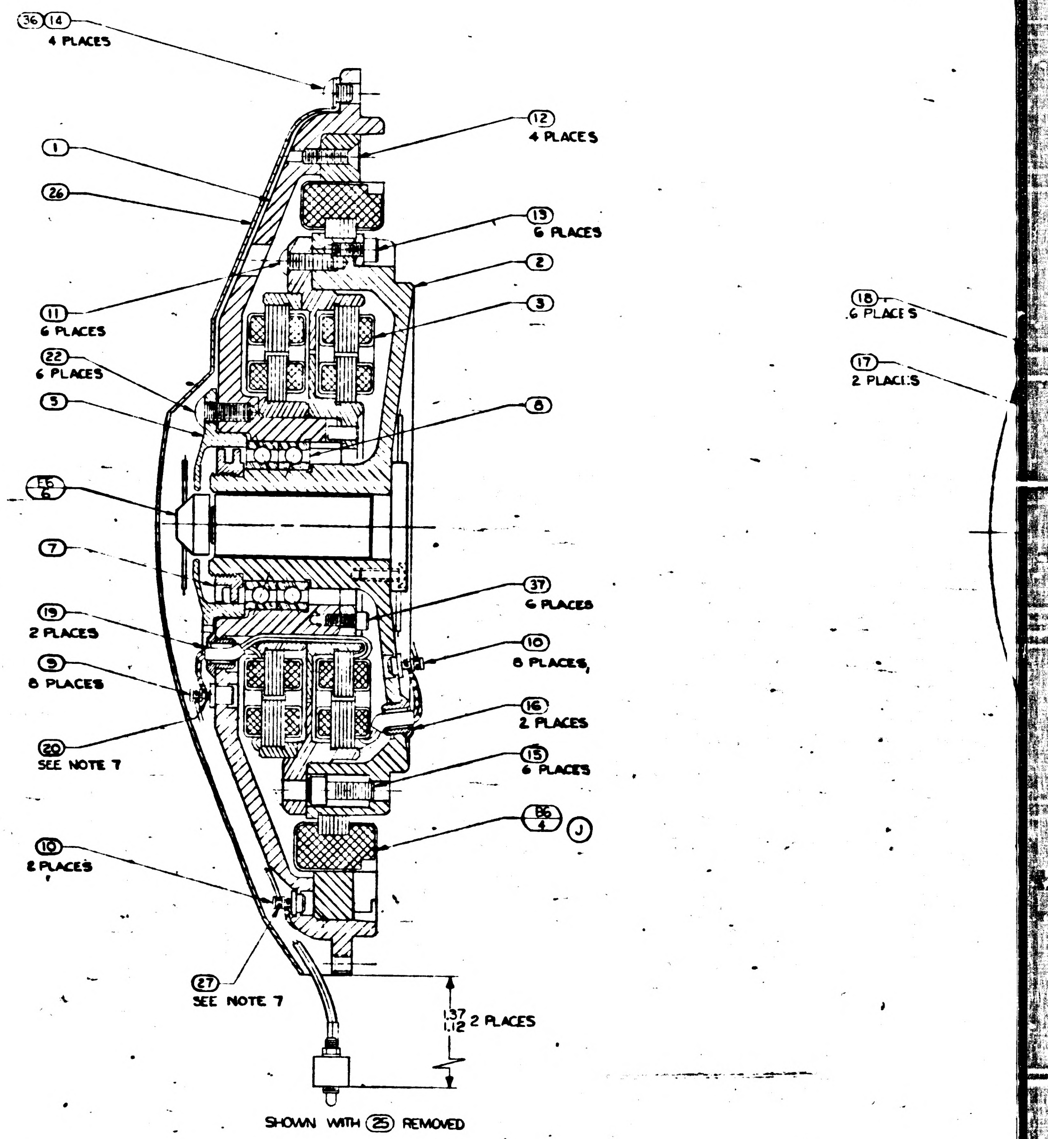
WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 16
Ⓛ 1-1	BLK		J9-A	E6-1	
1-2	BRN		J9-B	E6-2	
1-3	RED		J9-C	E6-3	
2-1	ORN		J9-D	E6-4	
2-2	YEL		J9-E	E6-5	
2-3	GRN		J9-F	E6-6	
5-1	BLU		J9-H	E6-7	
5-2	VIO		J9-J	E6-8	
6-1	GY		J9-M	E6-9	
7-1	WHT/RED/VIO		J9-K	E6-39	
7-2	WHT/RED/GY		J9-N	E6-40	
8-1	RED	31	J9-K	J11-K	
8-2	BRN	33	J9-N	J11-N	
9	WHT/BRN/VIO		J9-L	E6-33	
6-2	WHT		J9-P	E6-10	
10-1	WHT/BLK		J9-R	E6-11	
10-2	WHT/BRN		J9-S	E6-12	
11-1	WHT/RED		J9-T	E6-13	
11-2	WHT/ORN		J9-U	E6-14	
11-3	WHT/YEL		J9-V	E6-15	
12-1	WHT/GRN		J9-W	E6-16	
12-2	WHT/BLU		J9-X	E6-17	
12-3	WHT/VIO		J9-Y	E6-18	
15	WHT/BRN/GY		J9-Z	E6-34	
16	WHT/RED/ORN		J9-a	E6-35	
17	WHT/RED/YEL		J9-b	E6-36	
18	WHT/RED/GRN		J9-Z	E6-37	
19	WHT/RED/BLU		J9-d	E6-38	
20	WHT/BLK/BRN		J11-B	E6-20	
21	WHT/GY		J11-C	E6-19	
22-1	BLK	28	J11-D	B6-1	
22-2	WHT	29	J11-E	B6-2	
23	BLK		B6-BLK	B6-1	
24	WHT		B6-WHT	B6-2	
25-1	RED	31	J11-J	B12-S1	
25-2	BLK	28	J11-H	B12-S3	
26-1	YEL	30	J11-L	B12-S2	
26-2	BLU	32	J11-M	B12-S4	
27	WHT/BLK		B12-WHT/BLK	B12-S3	
28	WHT/RED		B12-WHT/RED	B12-S1	
29	WHT/YEL		B12-WHT/YEL	B12-S2	
30	WHT/BLU		B12-WHT/BLU	B12-S4	
31-1	WHT/BLK/BLU		J11-P	E6-25	
31-2	WHT/BLK/VIO		J11-R	E6-26	
31-3	RED	31	J11-R	B14-S1	
31-4	WHT/BLK/RED		J11-T	E6-21	
31-5	WHT/BLK/ORN		J11-U	E6-22	
31-6	BLK	28	J11-V	B14-S3	
31-7	YEL	30	J11-Y	B14-S2	
32	BLK		B14-BLK	B14-S3	
33	RED		B14-RED	B14-S1	
34	YEL		B14-YEL	B14-S2	
35	BLU		B14-BLU	B14-S4	
36	RED	31	B14-S1	B14-S4	
37-1	WHT/BLK/GY		J11-W	E6-27	
37-2	WHT/BRN/RED		J11-X	E6-28	
37-3	WHT/BRN/ORN		J11-Z	E6-29	
38-1	WHT/BRN/YEL		J11-a	E6-30	
38-2	WHT/BRN/GRN		J11-Z	E6-31	
38-3	WHT/BRN/BLU		J11-d	E6-32	
41-1	WHT/BLK/YEL		J11-b	E6-23	
41-2	WHT/BLK/GRN		J11-e	E6-24	
42-1	YEL	30	P14-A	B14-P2	
42-2	BLK	28	P14-B	B14-P3	
42-3	BLU	32	P14-D	B14-P4	
42-4	RED	31	P14-F	B14-P1	
43	WHT/BLK/ORN		B14-P3	E6-22	
44	WHT/BLK/RED		B14-P2	E6-21	
45	YEL		B14-YEL	B14-P2	
46	BLU		B14-BLU	B14-P4	
47	BLK		B14-BLK	B14-P3	
48	RED		B14-RED	B14 P1	
49-1	WHT/BLK/BLU		P14-C	E6-25	
49-2	WHT/BLK/VIO		P14-E	E6-26	
50-1	BLK		P14-W	E6-1	
50-2	BRN		P14-Y	E6-2	
50-3	RED		P14-X	E6-3	
51-1	ORN		P14-L	E6-4	
51-2	YEL		P14-N	E6-5	
51-3	GRN		P14-M	E6-6	
54-1	BLU		P14-KK	E6-7	
54-2	VIO		P14-MM	E6-8	
55-1	GY		P14-FF	E6-9	
55-2	WHT		P14-LL	E6-10	
56-1	WHT/BLK		P14-Z	E6-11	
56-2	WHT/BRN		P14-DD	E6-12	
57-1	WHT/RED		P14-T	E6-13	
57-2	WHT/ORN		P14-V	E6-14	
57-3	WHT/YEL		P14-U	E6-15	
58-1	WHT/GRN		P14-P	E6-16	
58-2	WHT/BLU		P14-S	E6-17	
58-3	WHT/VIO		P14-R	E6-18	
61-1	WHT/BRN/GRN		P14-K	E6-31	
61-2	WHT/BRN/BLU		P14 J	E6-32	
63-1	WHT/BLK/GRN		P14-EE	E6-24	
63-2	WHT/BLK/YEL		P14-HH	E6-23	
64-1	WHT/BRN/ORN		P14-BB	E6-29	
61-3	WHT/BRN/YEL		P14-H	E6-30	
64-2	WHT/BLK/GY		P14-AA	E6-27	
64-3	WHT/BRN/RED		P14-CC	E6-28	
66	WT/GY		P14-JJ	E6-19	
67	WHT/BLK/BRN		P14-NN	E6-20	
68-1	WHT/RED/VIO		B12-P3	E6-39	
68-2	WHT/RED/GY		B12-P1	E6-40	
69	WHT/BLK		B12-WHT/BLK	B12-P3	
70	WHT/RED		B12-WHT/RED	B12-P1	
71	WHT/YEL		B12-WHT/YEL	B12-P2	
72	WHT/BLU		B12-WHT/BLU	B12-P4	
73	YEL	30	B12-P2	B12-P4	
74	WHT/BRN/VIO		E6-33	SPARE	
75	WHT/BRN/GY		E6-34	SPARE	
76	WHT/RED/ORN		E6-35	SPARE	
77	WHT/RED/YEL		E6-36	SPARE	
78	WHT/RED/GRN		E6-37	SPARE	
79	WHT/RED/BLU		E6-38	SPARE	
80	BLU	32	P14-E	P14-D	
81	BLU	32	B14-P1	B14-P4	
1-A	BLK	28	SHLD 1	E-27	
11-A	BLK	28	SHLD 11	E-27	
37-A	BLK	28	SHLD 37	E-28	
50-A	BLK	28	SHLD 50	E-29	
64-A	BLK	28	SHLD 64	E-29	
57-A	BLK	28	SHLD 57	E-30	



SECTION C-C
2 PLACES





SHOWN WITH ㉕ REMOVED

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS 1/16 HIGH COLOR BLACK PER ND 1002019 AT LOCATION SHOWN.
3. ECCENTRICITY MARKS ON BOTH RACES OF ⑧ TO BE ALIGNED WITHIN 5° OF -C- AND IN THE DIRECTION OF THE ARROW SHOWN WHEN ① & ② ARE IN POSITION SHOWN. APPLY THIN COAT OF ㊵ TO INSIDE DIAMETER OF ⑧ AND TO FAYING SURFACE OF ② BEFORE ASSEMBLY
4. APPLY ㉑ TO ② & ⑦ AFTER ASSEMBLY
5. IDENTIFY USING DWG. NO., REVISION LETTER, MANUFACTUERS SYMBOL & SERIAL NO ON ① & MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATION PER NOTE 2
6. SCREW TORQUE REQUIREMENTS ± 7%

⑦	100 IN-LB
㉒	10 IN-LB
⑪ ⑫ ⑬ ⑭	5 IN-LB
⑰ ㊲	35 IN-LB

Ⓙ 7. SOLDER ALL LEADS FROM ③ & ④ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ⑳ SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ㉓ & ㉔ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.

Ⓛ ~~8. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~

9. CAUTION: DO NOT SEPARATE STUB SHAFT ② FROM HSG. BRG ① OR REMOVE TORQUE MOTOR ④ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ④
10. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
11. ASSEMBLE AND TEST PER THE REQUIRMENTS OF PER ATP 1000010
12. USE CHICAGO STITCH LACING IN AREA INDICATED
13. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
14. ALL SPARE LEADS TO BE 3.00 ± .12 LONG & TO TERMINATE NEAR P14/24 AFTER FOLDING BACK ON THEMSELVES ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS Ⓙ
15. USE FIGURE EIGHT STITCH LACING IN AREA INDICATED

Ⓛ 16. HEAT SHRINK SLEEVING ON ITEMS ㊶ & ㊷ AFTER ASSY. TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

Ⓜ

NO OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000010	N	1

1/1000010

	1000010

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000032	Resolver Assy, One Speed, Transmitter & Gyro Error	1
1000057	Shaft, Stub One Speed, Inner Axis	1
1000029	Ball, Bearing, Duplex	1
1000086	Nut, Bearing Retainer	1
1000090	Retainer, Bearing Inner and Middle Axis	1
1000037	Slip Ring Assy, Electrical, 40 Contact	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000036	Bushing, Insul.	2
1000095	Housing, Bearing One Speed, Inner Axis	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000004	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W A Kupfer 10/17/62

INTERGIMBAL SUB-ASSEMBLY
ONE SPEED
INNER AXIS.

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000010

SHEET OF

1000011

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00093	8Nov62	[illegible] WK

PART NO.	DESCRIPTION	REQD.
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000015	15 Speed Resolver Sub-Assy	1
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000004	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 10-17-62
BY DIRECTION MIT APPROVAL
W [illegible] 10/17/62

INTERGIMBAL SUB-ASSEMBLY
15 SPEED
INNER AXIS.

SCALE | UNIT WT. | CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000011

SHEET OF

1000011

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000015	15 Speed Resolver Sub-Assy	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000004	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED A J Boyce 10/17/62
CHECKED
DRAWN
APPROVED FOR MSC
10-17-62
BY DIRECTION MIT APPROVAL
10/17/62

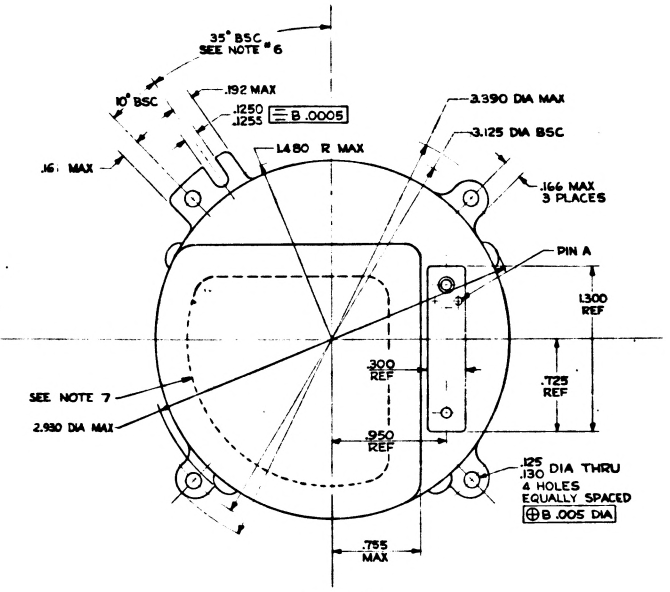
INTERGIMBAL SUB-ASSEMBLY
15 SPEED
INNER AXIS.

SCALE
UNIT WT.
CODE IDENT.

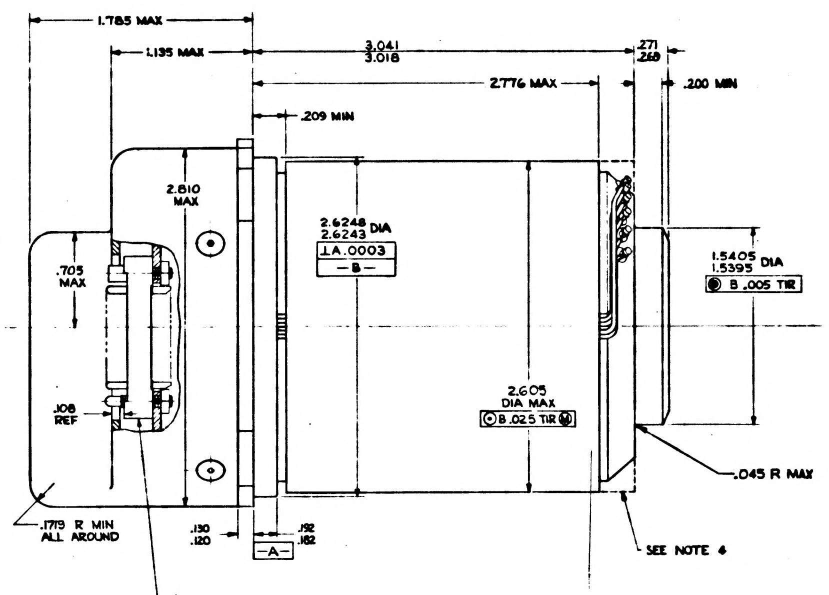
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000011
SHEET OF

		REVISIONS TDRR 01024		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS	3-5-63	
	B	GENERAL REVISIONS	4-5-63	WJB WY

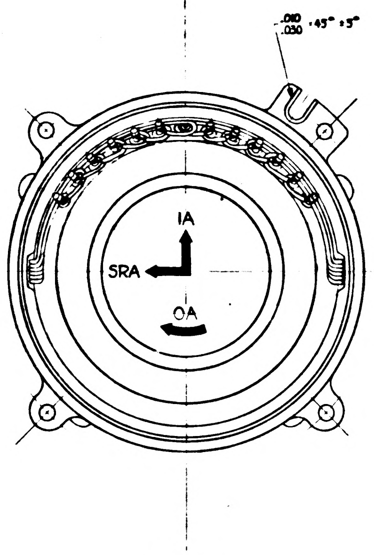
(M)


35° BSC
SEE NOTE #6
10° BSC
.192 MAX
.1250
.1255
B .0005
.16 MAX
1.480 R MAX
3.390 DIA MAX
3.125 DIA BSC
.166 MAX
3 PLACES
PIN A
1.300 REF
.300 REF
.725 REF
.950 REF
SEE NOTE 7
2.930 DIA MAX
.125
.130 DIA THRU
4 HOLES
EQUALLY SPACED
⊕B .005 DIA
.755 MAX

SG END


1.785 MAX
1.135 MAX
3.041
3.018
.271
.268
2.776 MAX
.200 MIN
.209 MIN
2.810 MAX
2.6248
2.6243 DIA
⊥A .0003
—B—
1.5405
1.5395 DIA
B .005 TIR
.705 MAX
2.605
DIA MAX
⊙B .025 TIR Ⓜ
.108 REF
.045 R MAX
.1719 R MIN
ALL AROUND
.130
.120
.192
.182
—A—
SEE NOTE 4

CONNECTOR: CONTINENTAL
NM 26-22 PGDS
(OR EQUIVALENT)
MUST MATE WITH CONNECTOR
NASA DWG NO 1000121


.010
.030 ×45° ±5°
IA
SRA
OA

TG END

IRIG WIRING

PIN	FUNCTION
A	SPARE
B	AUX HEATER –
C	CONTROL HEATER +
D	3200 CPS HI
E	AUX HEATER +
F	CONTROL HEATER –
H	TEMP SENSOR +
J	SIGNAL HI (S_{2_1})
K	TEMP SENSOR –
L	3200 CPS RET
M	SIGNAL LO (S_{1_B})
N	WHEEL ϕB COMMON
P	SPARE
R	SPARE
S	WHEEL ϕA COMMON
T	THERMISTOR – (T.G. END)
U	WHEEL ϕB (0°) 800 CPS
V	WHEEL ϕA (90° LEAD) 800 CPS
W	THERMISTOR + (T.G. END)
X	SPARE
Y	TORQUE –
Z	THERMISTOR – (S.G. END)
a	SPARE
b	TORQUE COMMON ±
c	THERMISTOR + (S.G. END)
d	TORQUE +

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. DIAMETERS TO BE CONCENTRIC TO —B— WITHIN .015 TIR UNLESS OTHERWISE SPECIFIED.
3. ASSEMBLY MUST BE SHIPPED AND STORED WITH OA VERTICAL (POSITIVE OA UP) WITHIN 45°
4. THE GYRO, & ALL TERMINALS & WIRES MUST LIE WITHIN VOLUME BOUNDED BY DOTTED LINES.
5. ASSEMBLY MUST CONFORM TO REQUIREMENTS SPECIFIED IN MIT/IL REPORT R-348
6. SLOT TO BE ALIGNED WITH RESPECT TO IA WITHIN ±1 MINUTE OF ARC.
7. IDENTIFY USING DWG NO, SERIAL NO., MANFACTUERS SYMBOL AND AXIS ORIENTATION AT THE INDICATED LOCATION PER MIL-STD-130. (NAMEPLATE PERMISSIBLE)
8. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN MIL-Q-9858
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 40°F AND 160°F DURING SHIPMENT AND STORAGE ASSEMBLY MUST BE RETESTED PER MIT/IL REPORT R-348 IF TEMPERATURE OF ASSEMBLY EXCEEDS THESE LIMITS

ORIGINAL SOURCE OF SUPPLY:
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
INSTRUMENTATION LABORATORY
68 ALBANY STREET
CAMBRIDGE 39, MASSACHUSETTS
PART NO. D-105306

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED | DATE
CHECKED
DRAWN RES
APPROVED FOR MSC W J Rhine 5-1-63
BY DIRECTION MIT APPROVAL
1 May 63

GYRO PREALIGNED ASSEMBLY
25 IRIG
SPECIFICATION CONTROL DRAWING

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000012
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000013

REVISIONS TDRR 00334				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00418	2/19/63	aJB WH

PART NUMBER	DESCRIPTION	QUANITY
1000134	Heater Plate Assembly	1
1000123	Connector Elect. Plug, 26 Contact.	1
1007006	PIP Suspension Capacitor Assy.	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	2/6/63
CHECKED		
DRAWN	ROSE	1-25-63

APPROVED FOR MSC

MIT/IL APPROVAL	DATE
	6Feb63

PIP PREALIGNED
ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000013

SHEET OF

1000013

REVISIONS TDRR 00334

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00418	2/19/63	AJB	WH
	B	TDRR 00768	4/10/63	AJB	WL

PART NUMBER	DESCRIPTION	QUANITY
1000134	Heater Plate Assembly	1
1000123	Connector Elect. Plug, 26 Contact.	1
1007006	PIP Suspension Capacitor Assy.	1
1000242-7	Ferrule	2
1000243-5	Ferrule	2
	Braid, wire (Cop, Tin ctd, Tubular QQ-B-575, 11/16 ID x 36 AWG 9 Inches	
	Insulation Sleeving, Elect. Heat Shrink Size 8 AWG MIL-I-23053 Class 1 9 inches	

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	2/6/63
CHECKED		
DRAWN	ROSE	1-25-63
APPROVED FOR MSC		
MIT/IL APPROVAL	W Wrigley	6 Feb 63

PIP PREALIGNED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000013

REVISIONS TDRR 00334

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00418	2/19/63	ajB	WK
	B	TDRR 00768	4/10/63	ajB	WK
	C	TDRR 01064	5/1/63	ajB	WK

PART NUMBER	DESCRIPTION	QUANITY
1000134	Heater Plate Assembly	1
1000123	Connector Elect. Plug, 26 Contact.	1
1007006	PIP Suspension Capacitor Assy.	1 - See Note 1
1000242-7	Ferrule	2
1000243-5	Ferrule	2
	Braid, wire (Cop, Tin ctd, Tubular QQ-B-575, 7/64 ID x 36 AWG ~~8 Inches~~	6 inches
	Insulation Sleeving, Elect. Heat Shrink Size 8 AWG MIL-I-23053 Class 1 BLK	2 inches
	Insulation Sleeving, Elect. Heat Shrink Size 12 AWG MIL-I-23053 Class 1 WHT	6 inches
1006776-18	Insulation Sleeving, Elect	19 inches

Wire, Elect, Type ET28, MIL-W-16878

Color	Length
WHT/BRN	16 inches
WHT/RED	16 inches
WHT	3 inches
YEL	15 inches
GRN	15 inches
BLK	3 inches

Note 1: Select on Assembly per ND1002024

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJBoyce	2/6/63
CHECKED		
DRAWN	ROSE	1-25-63

APPROVED FOR MSC

MIT/IL APPROVAL DATE 6/5/63

PIP PREALIGNED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000013

SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NUMBER	DESCRIPTION	QUANITY
1000134	Heater Plate Assembly	1
1000123	Connector Elect. Plug, 26 Contact.	1
~~1007006~~	~~PIP Suspension Capacitor Assy.~~	~~1~~ - See Note 1
1000242-7	Ferrule	2
1000243-5	Ferrule	2
	Braid, wire (Cop, Tin ctd, Tubular QQ-B-575, 7/64 ID x 36 AWG ~~8 inches~~	6 inches
	Insulation Sleeving, Elect. Heat Shrink Size 8 AWG MIL-I-23053 Class 1 BLK	2 inches
	Insulation Sleeving, Elect. Heat Shrink Size 12 AWG MIL-I-23053 Class 1 WHT	6 inches
1006776-18	Insulation Sleeving, Elect	19 inches
1007028	NETWORK SUB ASSY (PIP SUSP. CAP.)	1 SEE NOTE 1

1000013

REVISIONS TDRR 00334

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00418	2/19/63	ajb	WK
	B	TDRR 00768	4/10/63	ajB	WK
	C	TDRR 01064	5/1/63	ajb	WK
	D	TDRR 01263	5/15/63	ajb	WK

Wire, Elect, Type ET28, MIL-W-16878

Color	Length
WHT/BRN	16 inches
WHT/RED	16 inches
WHT	3 inches
YEL	15 inches
GRN	15 inches
BLK	3 inches

Note 1: Select on Assembly per ND1002024

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	2/6/63
CHECKED		
DRAWN	ROSE	1-25-63

APPROVED FOR MSC

MIT/IL APPROVAL DATE 6/5/63

PIP PREALIGNED
ASSEMBLY

SCALE | UNIT WT. | CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000013

SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NUMBER	DESCRIPTION	QUANITY
1000134	Heater Plate Assembly	1
1000123	Connector Elect. Plug, 26 Contact.	1
~~1007006~~	~~PIP Suspension Capacitor Assy.~~	~~1~~ - See Note 1
1000242-7	Ferrule	2
1000243-5	Ferrule	2
	Braid, wire (Cop, Tin ctd, Tubular QQ-B-575, 7/64 ID x 36 AWG ~~8 Inches~~	6 inches
	Insulation Sleeving, Elect. Heat Shrink Size 8 AWG MIL-I-23053 Class 1 BLK	2 inches
	Insulation Sleeving, Elect. Heat Shrink Size 12 AWG MIL-I-23053 Class 1 WHT	6 inches
1006776-18	Insulation Sleeving, Elect	19 inches
1007028	NETWORK SUB ASSY (PIP SUSP. CAP.)	1 SEE NOTE 1

1000013

REVISIONS TDRR 00334

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00418	2/19/63	ajB	WK
	B	TDRR 00768	4/10/63	ajB	WK
	C	TDRR 01064	5/1/63	ajB	WK
	D	TDRR 01263	5/15/63	ajB	WK
	E	REPLACED BY REV F WITH CHANGES TDRR 01670	6/19/63	ajB	WK

Wire, Elect, Type ET28, MIL-W-16878

Color	Length
WHT/BRN	16 inches
WHT/RED	16 inches
WHT	3 inches
YEL	15 inches
GRN	15 inches
BLK	3 inches

REPLACED BY REV F WITH CHANGES

Note 1: Select on Assembly per ND1002024

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	2/6/63
CHECKED		
DRAWN	ROSE	1-25-63
APPROVED FOR MSC	William J. Swift	2-26-63
MIT/IL APPROVAL	W. Kupfer	6/26/63

PIP PREALIGNED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000013

SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-1-63	WK
	G	TDRR 02128	7-17-63	WK

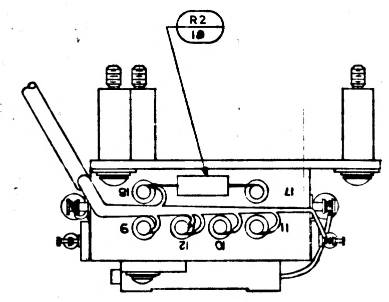
WIRING LEGEND

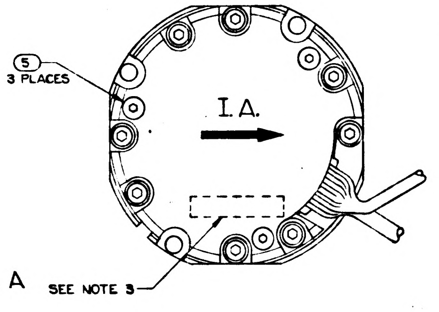
COND NO.	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	8
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	8
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	8
15-1	RED		1		4	H	8
15-2	RED		1		4	K	8
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	8
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	8
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	8
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	8
27-3	WHT/GY		2	SG-6	4	J	8
27-B	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	8
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

SEE DETAIL A

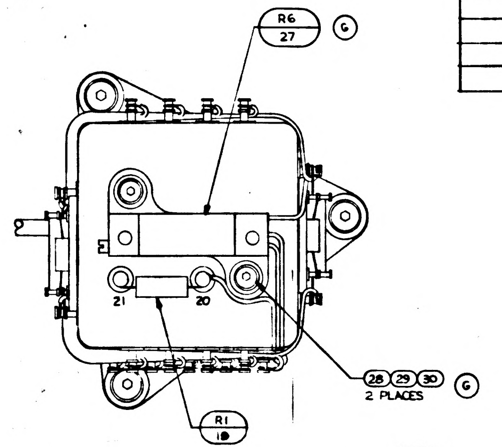
RESISTOR SELECTION CHART

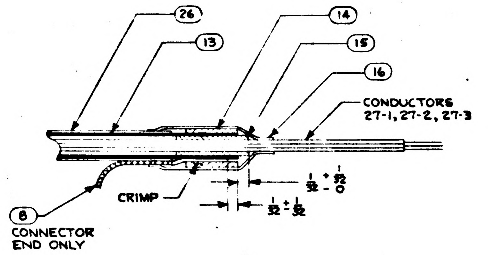
R2		R5 AND R7		R8 AND R9					
1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-43	112.0K	-6	11.0	-28	15.4	-50	19.8
		-44	134.5K	-7	11.2	-29	15.6	-51	20.0
		-45	157.0K	-8	11.4	-30	15.8		
		-46	179.5K	-9	11.6	-31	16.0		
		-47	202.5K	-10	11.8	-32	16.2		
		-48	225.0K	-11	12.0	-33	16.4		
				-12	12.2	-34	16.6		
				-13	12.4	-35	16.8		
				-14	12.6	-36	17.0		
				-15	12.8	-37	17.2		
				-16	13.0	-38	17.4		
				-17	13.2	-39	17.6		
				-18	13.4	-40	17.8		
				-19	13.6	-41	18.0		
				-20	13.8	-42	18.2		
				-21	14.0	-43	18.4		
				-22	14.2	-44	18.6		





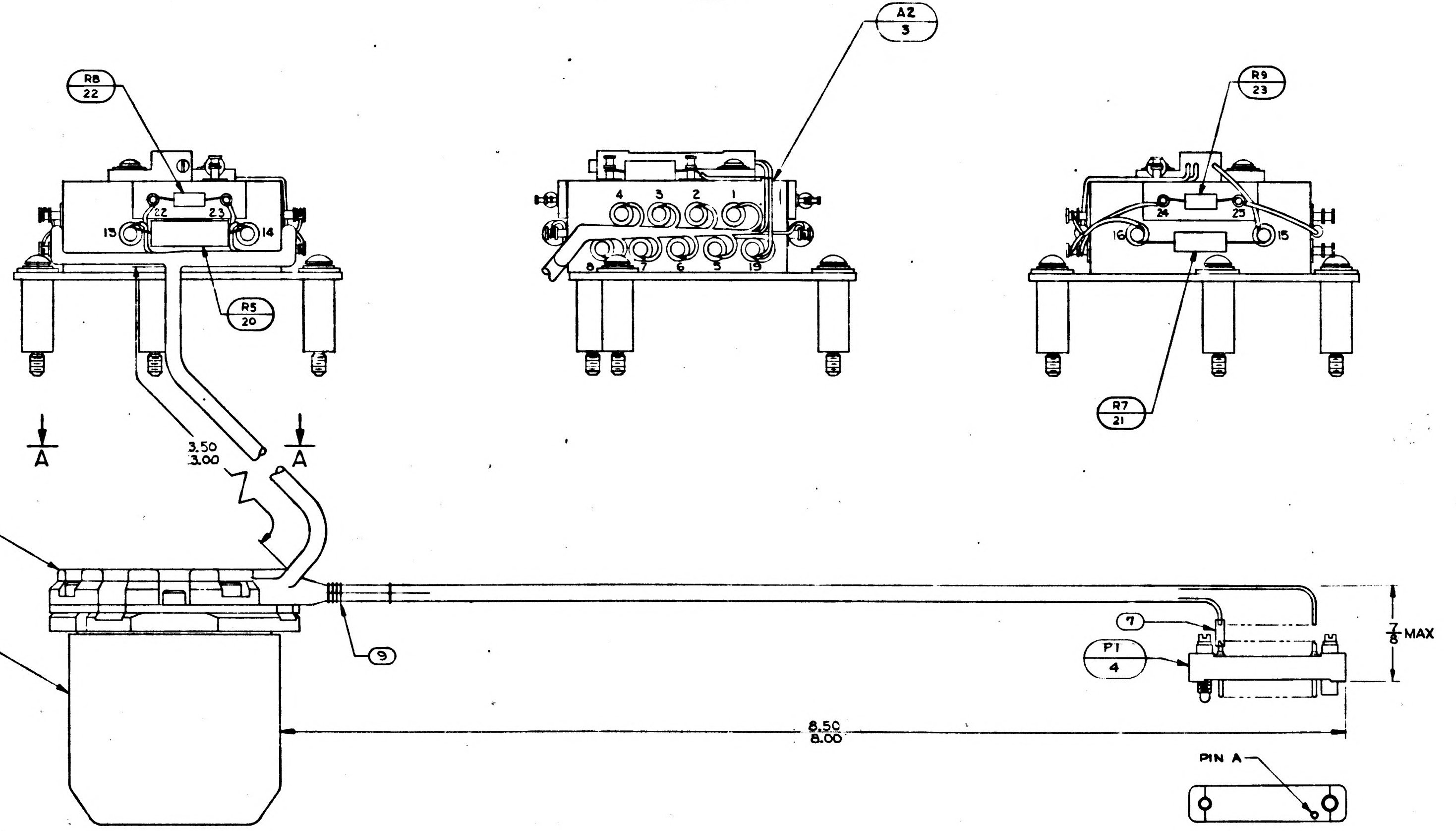
VIEW A-A





DETAIL A

SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. IDENTIFY USING DWG. NO., REVISION LETTER AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION USING ITEM ⑩ PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM ⑨
7. ITEM ⑩ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	WASHER, LOCK	MS35338-77			30
2	WASHER, FLAT, ROUND	MS15795-302			29
2	SCREW, BUT HD	1006783-93			28
1	POTENTIOMETER ASSY	1007089			27
1	INSULATION SLEEVING, ELEC HEAT SHRINK, SIZE 12 AWG		MIL-I-23053 CLASS 1 WHT	5 3/8 LONG	26
1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16" TOT. LG	25
1	WIRE, ELECTRICAL ET 28 WHT/RED		MIL-W-16878	16" TOT. LG	24
1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
1	RESISTOR, FIXED	1010251-37			19
1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
1	WIRE, ELECTRICAL ET-28 WHT.		MIL-W-16878	2 1/2 TOT. LG.	17
2	INSULATION SLEEVING, ELECT, HEAT SHRINK, SIZE 8 AWG		MIL-I-23053 CLASS 1 BLK	5/8 LONG	16
2	FERRULE, INNER	1000243-5			15
2	FERRULE, OUTER	1000242-7			14
6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	7/64 ID × 36 AWG	13
1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	15" TOT. LG.	12
	WIRE ELECTRICAL ET 28 GRN		MIL-W-16878	[illegible] LG.	11
A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	9
1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	[illegible] LG.	8
.25	INSULATION SLEEVING, ELEC	1006776-18		[illegible] LONG	7
A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
3	SCREW, BUT. HD, SOC, SPL	1000250-3			5
1	CONNECTOR	1000123			4
1	NETWORK SUB-ASS'Y	[illegible]			3
1	16 PIP MOD D	1000179			2
1	HEATER PLATE ASS'Y	1000134			1

LIST OF PARTS AND MATERIALS

REPLACES REV E
WITH CHANGES ⓖ

G	G		
F	—		DL1000201
SHEET 1	SHEET 2	1000005	DL1000001
REVISION STATUS OF SHEETS		NEXT ASSY	USED ON
		APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED DATE 5-19-63
CHECKED
DRAWN RGS 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE

PIP PRE-ALIGNED
ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF

MASTER

1000013

INCHES
PHOTOGRAPHIC SCALE ONLY

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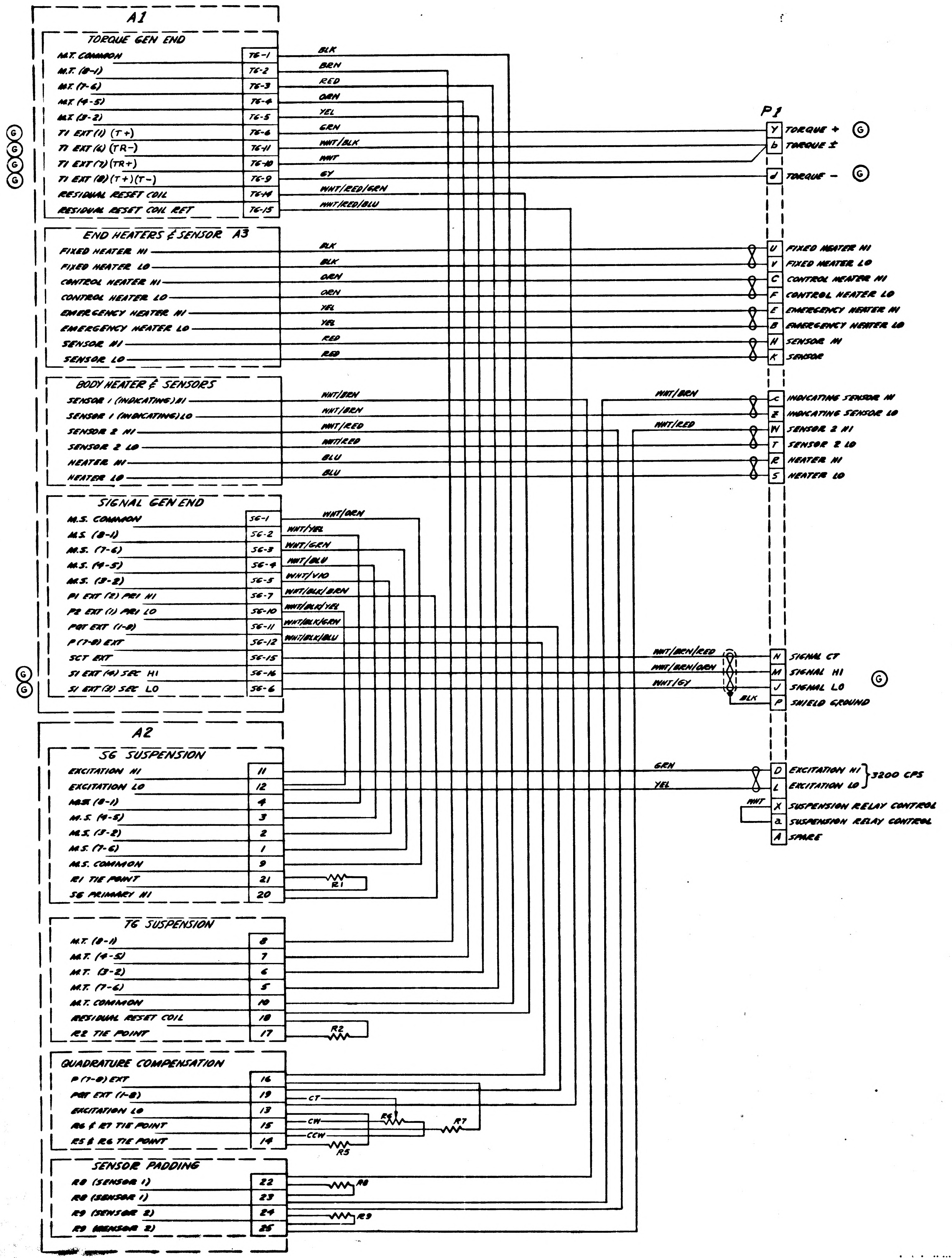
REVISIONS TDRR 01670

SYM	DESCRIPTION	DATE	APPROVAL	
F	THIS SHEET ADDED TDRR 01670	5-1-63	ajs	
G	TDRR 02128	7-17-63	ajs	NK


A1
TORQUE GEN END
M.T. COMMON
M.T. (8-1)
M.T. (7-6)
M.T. (4-5)
M.T. (3-2)
T1 EXT (1) (T+)
T1 EXT (6) (TR−)
T1 EXT (7) (TR+)
T1 EXT (8) (T+)(T−)
RESIDUAL RESET COIL
RESIDUAL RESET COIL RET
TG-1
TG-2
TG-3
TG-4
TG-5
TG-6
TG-11
TG-10
TG-9
TG-14
TG-15
BLK
BRN
RED
ORN
YEL
GRN
WHT/BLK
WHT
GY
WHT/RED/GRN
WHT/RED/BLU
G
G
G
G
END HEATERS & SENSOR A3
FIXED HEATER HI
FIXED HEATER LO
CONTROL HEATER HI
CONTROL HEATER LO
EMERGENCY HEATER HI
EMERGENCY HEATER LO
SENSOR HI
SENSOR LO
BLK
BLK
ORN
ORN
YEL
YEL
RED
RED
BODY HEATER & SENSORS
SENSOR 1 (INDICATING) HI
SENSOR 1 (INDICATING) LO
SENSOR 2 HI
SENSOR 2 LO
HEATER HI
HEATER LO
WHT/BRN
WHT/BRN
WHT/RED
WHT/RED
BLU
BLU
SIGNAL GEN END
M.S. COMMON
M.S. (8-1)
M.S. (7-6)
M.S. (4-5)
M.S. (3-2)
P1 EXT (2) PRI HI
P2 EXT (1) PRI LO
PQT EXT (1-8)
P (7-8) EXT
SCT EXT
S1 EXT (4) SEC HI
S1 EXT (3) SEC LO
SG-1
SG-2
SG-3
SG-4
SG-5
SG-7
SG-10
SG-11
SG-12
SG-15
SG-16
SG-6
WHT/ORN
WHT/YEL
WHT/GRN
WHT/BLU
WHT/VIO
WHT/BLK/BRN
WHT/BLK/YEL
WHT/BLK/GRN
WHT/BLK/BLU
G
G
A2
SG SUSPENSION
EXCITATION HI
EXCITATION LO
M.S. (8-1)
M.S. (4-5)
M.S. (3-2)
M.S. (7-6)
M.S. COMMON
R1 TIE POINT
SG PRIMARY HI
11
12
4
3
2
1
9
21
20
R1
TG SUSPENSION
M.T. (8-1)
M.T. (4-5)
M.T. (3-2)
M.T. (7-6)
M.T. COMMON
RESIDUAL RESET COIL
R2 TIE POINT
8
7
6
5
10
18
17
R2
QUADRATURE COMPENSATION
P (7-8) EXT
PQT EXT (1-8)
EXCITATION LO
R6 & R7 TIE POINT
R5 & R6 TIE POINT
16
19
13
15
14
CT
CW
CCW
R6
R7
R5
SENSOR PADDING
R8 (SENSOR 1)
R8 (SENSOR 1)
R9 (SENSOR 2)
R9 (SENSOR 2)
22
23
24
25
R8
R9
P1
Y TORQUE + G
b TORQUE ±
d TORQUE − G
U FIXED HEATER HI
V FIXED HEATER LO
C CONTROL HEATER HI
F CONTROL HEATER LO
E EMERGENCY HEATER HI
B EMERGENCY HEATER LO
H SENSOR HI
K SENSOR
WHT/BRN
WHT/RED
c INDICATING SENSOR HI
Z INDICATING SENSOR LO
W SENSOR 2 HI
T SENSOR 2 LO
R HEATER HI
S HEATER LO
WHT/BRN/RED
WHT/BRN/ORN
WHT/GY
BLK
N SIGNAL CT
M SIGNAL HI
J SIGNAL LO
P SHIELD GROUND
G
GRN
YEL
WHT
D EXCITATION HI
L EXCITATION LO
3200 CPS
X SUSPENSION RELAY CONTROL
a SUSPENSION RELAY CONTROL
A SPARE

REF DESIG	PART NO	DESCRIPTION	VALUE	TOL %	RATING
A1	1000179	16 PIP MOD D			
A2	1007028	PIP SUSPENSION ASSY			
A3	1000134	HEATER PLATE ASSY			
P1	1000123	CONNECTOR-PLUG			
R1	1010251-	RESISTOR-FIXED		±1	1/4 W
R2	1010251-37		20.7Ω	±1	1/4 W
R5	1010377-			±1	1/10 W
R6	1010373-25	-VARIABLE	50K	±5	1 W
R7	1010377-	-FIXED		±1	1/10 W
R8	1010330-			±0.1	.035 W
R9	1010330-			±0.1	.035 W

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN THENO DATE 5-16-63
CHECKED WINBERG
APPROVAL A.E. Winberg
APPROVAL G J Boyce 6-18-63
NASA APPROVAL
MIT APPROVAL W K 19 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIP PRE-ALIGNED ASSY

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 1000013
SCALE
WT
SHEET 2 OF 2

1000013 G

MASTER

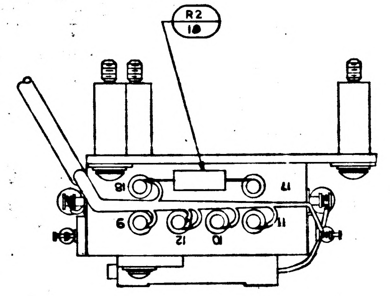
INCHES
PHOTOGRAPHIC SCALE ONLY

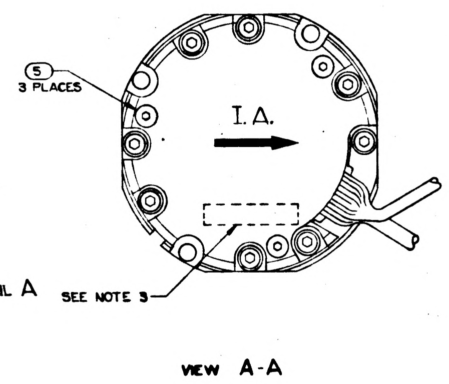
WIRING LEGEND							
COND NO.	COLOR	FIND NO.	FROM		TO		TWIST
			ITEM	TERM.	ITEM	TERM	
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	
27-3	WHT/GY		2	SG-6	4	J	
27-B	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

}SEE DETAIL A

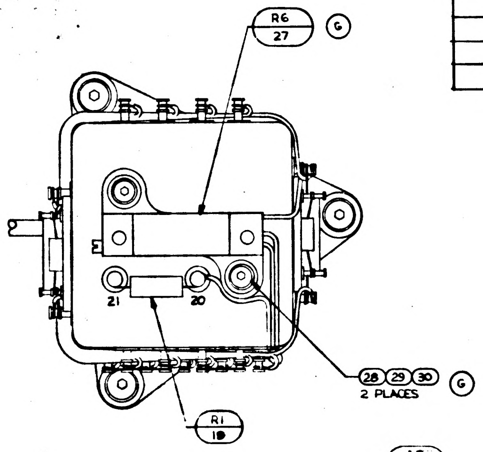
RESISTOR SELECTION CHART									
R2		R5 AND R7		R8 AND R9					
1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	19.8
-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-43	112.0K	-6	11.0	-28	15.4	-50	19.8
		-44	134.5K	-7	11.2	-29	15.6	-51	20.0
		-45	157.0K	-8	11.4	-30	15.8		
		-46	179.5K	-9	11.6	-31	16.0		
		-47	202.5K	-10	11.8	-32	16.2		
		-48	225.0K	-11	12.0	-33	16.4		
				-12	12.2	-34	16.6		
				-13	12.4	-35	16.8		
				-14	12.6	-36	17.0		
				-15	12.8	-37	17.2		
				-16	13.0	-38	17.4		
				-17	13.2	-39	17.6		
				-18	13.4	-40	17.8		
				-19	13.6	-41	18.0		
				-20	13.8	-42	18.2		
				-21	14.0	-43	18.4		
				-22	14.2	-44	18.6		

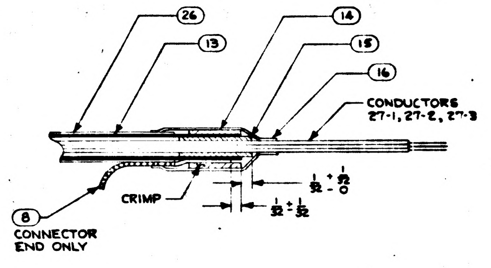
REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-1-63		
	G	TDRR 02128	7-17-63	QJB	
	H	TDRR 03503	10-2-63		





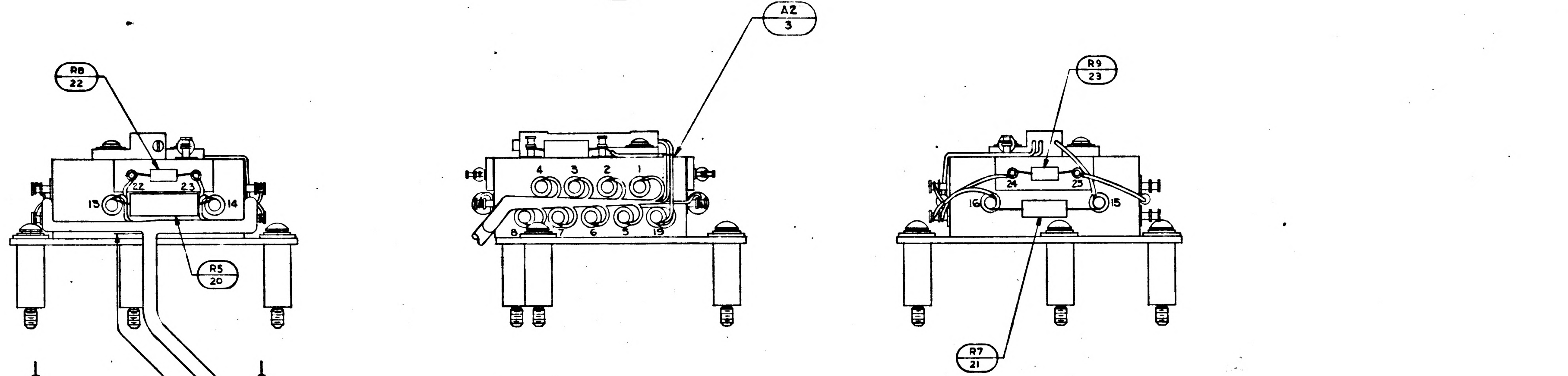
VIEW A-A

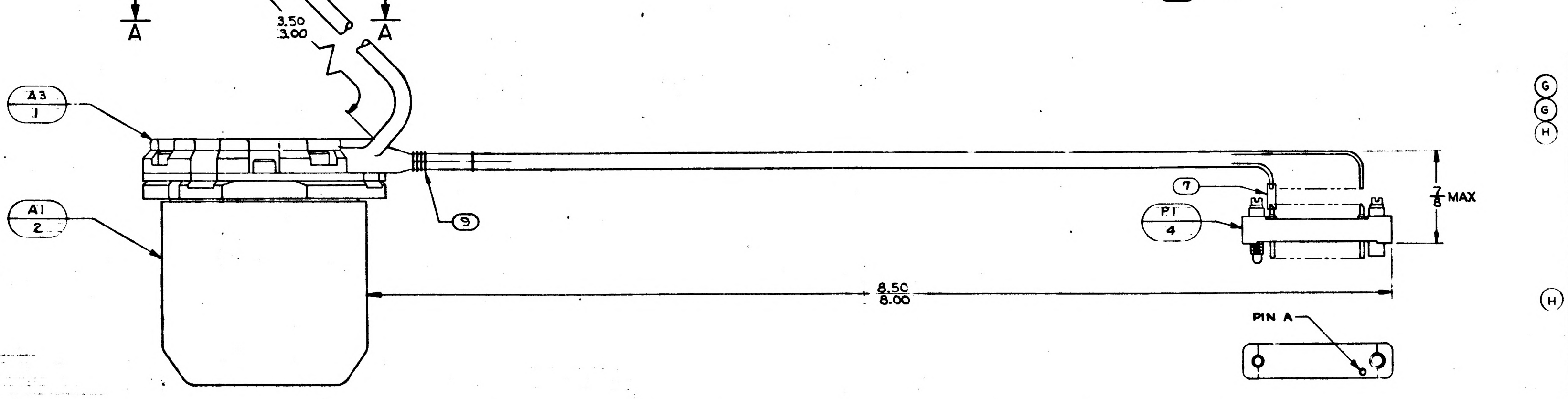




DETAIL A

SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES





NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION USING ITEM ⑩ PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM ⑨
7. ITEM ⑩ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.

REPLACES REV E
WITH CHANGES

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	2	WASHER, LOCK	MS35338-77			30
G	2	WASHER, FLAT, ROUND	MS15795-302			29
G	2	SCREW, BUT HD	1006783-93			28
G	1	POTENTIOMETER ASSY	1007089			27
H	1	INSULATION SLEEVING, ELEC HEAT SHRINK, SIZE 12 AWG	1010490-300		5 3/8 LONG	26
	1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16" TOT. LG	25
	1	WIRE, ELECTRICAL ET 28 WHT/RED		MIL-W-16878	[illegible] TOT. LG	24
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
	1	RESISTOR, FIXED	1010251-37			19
	1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	1	WIRE, ELECTRICAL ET-28 WHT.		MIL-W-16878	2 1/2 TOT. LG.	17
H	2	INSULATION SLEEVING, ELECT, HEAT SHRINK, SIZE 8 AWG	1010490-136			16
	2	FERRULE, INNER	1000243-5			15
	2	FERRULE, OUTER	1000242-7			14
	6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	1/4 ID × 36 AWG	13
	1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	15" TOT. LG.	12
	1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	5" TOT. LG.	11
	A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
	A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	9
	1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	2" TOT. LG.	8
	.25	INSULATION SLEEVING, ELEC	1006776-18		3/4 LONG	7
	A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
	3	SCREW, BUT. HD, SOC, SPL	1000250-3			5
	1	CONNECTOR	1000123			4
G	1	NETWORK SUB-ASS'Y	1007028			3
	1	16 PIP MOD D	1000179			2
	1	HEATER PLATE ASS'Y	1000134			1

LIST OF PARTS AND MATERIALS

G	G		
F	—		DL1000201
SHEET 1	SHEET 2	1000005	DL1000001
REVISION STATUS OF SHEETS		NEXT ASSY	USED ON
		APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED | DATE 5-29-63
CHECKED
DRAWN RGS 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE

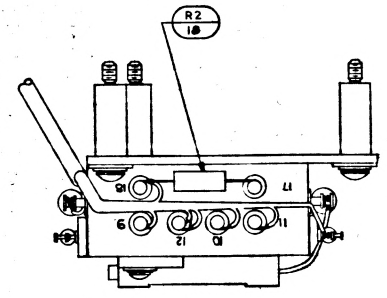
PIP PRE-ALIGNED ASSEMBLY

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SCALE 2/1
UNIT WT.
CODE IDENT.
SHEET 1 OF 2

MASTER

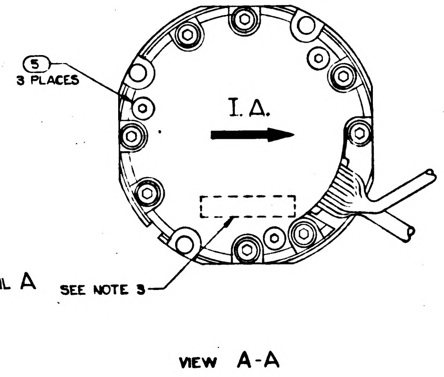
WIRING LEGEND							
COND NO.	COLOR	FIND NO.	FROM		TO		TWIST
			ITEM	TERM.	ITEM	TERM	
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	8
27-3	WHT/GY		2	SG-6	4	J	
27-3	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

SEE DETAIL A

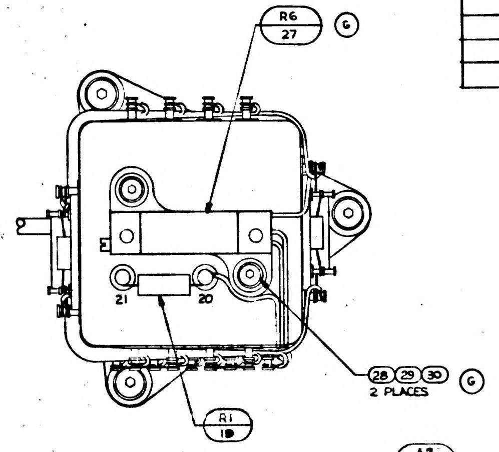


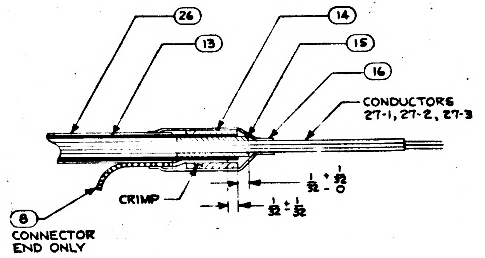
RESISTOR SELECTION CHART									
R2		R5 AND R7		R8 AND R9					
1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-43	112.0K	-6	11.0	-28	15.4	-50	19.8
		-44	134.5K	-7	11.2	-29	15.6	-51	20.0
		-45	157.0K	-8	11.4	-30	15.8		
		-46	179.5K	-9	11.6	-31	16.0		
		-47	202.5K	-10	11.8	-32	16.2		
		-48	225.0K	-11	12.0	-33	16.4		
				-12	12.2	-34	16.6		
				-13	12.4	-35	16.8		
				-14	12.6	-36	17.0		
				-15	12.8	-37	17.2		
				-16	13.0	-38	17.4		
				-17	13.2	-39	17.6		
				-18	13.4	-40	17.8		
				-19	13.6	-41	18.0		
				-20	13.8	-42	18.2		
				-21	14.0	-43	18.4		
				-22	14.2	-44	18.6		

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-1-63	ajB	wk
	G	TDRR 02128	7-17-63	ajB	wk
	H	TDRR 03503	10-2-63		wk
	J	TDRR 03660	10-8-63		wk

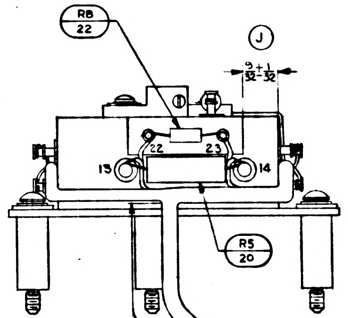


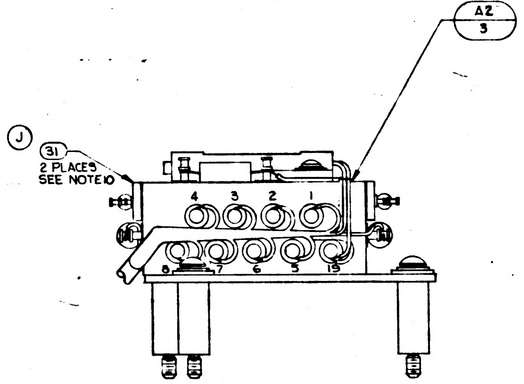
VIEW A-A

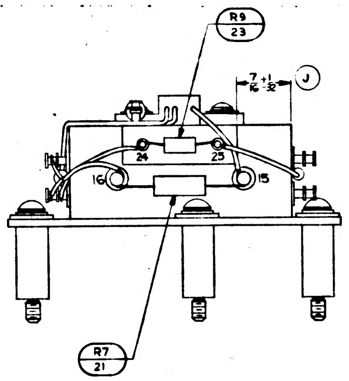


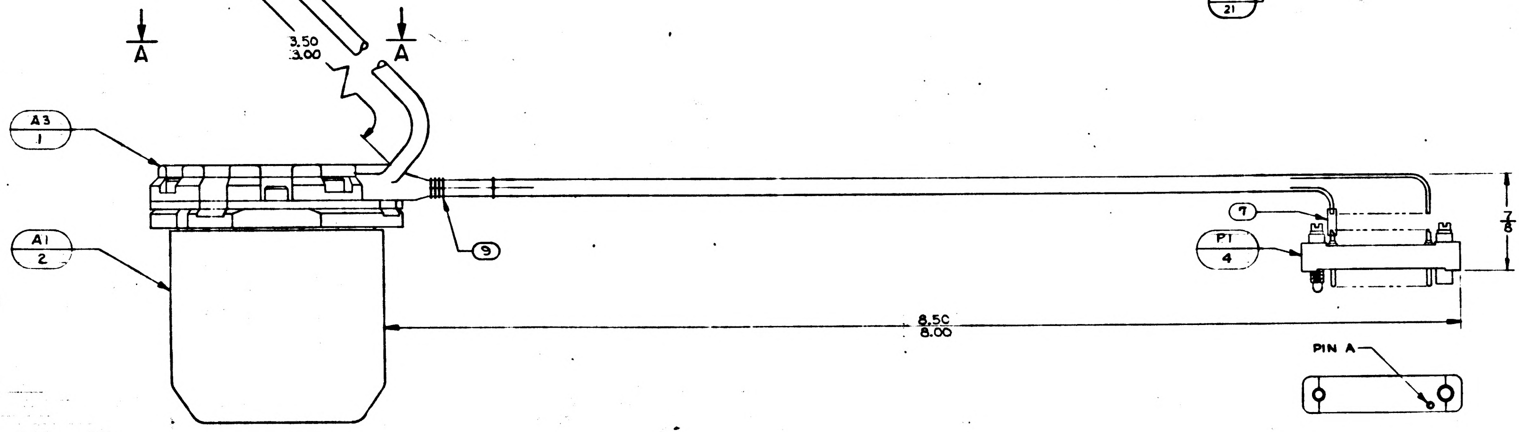


DETAIL A
SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES









NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION USING ITEM ⑩ PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM ⑨
7. ITEM ⑩ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ±10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
Ⓙ 10. BOND ITEM ㉛ TO ITEM ③ AT INDICATED LOCATION PER ND1002004

REPLACES REV E
WITH CHANGES Ⓖ

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓙ	2	TERMINAL BOARD	1007014			31
	2	WASHER, LOCK	MS35338-77			30
Ⓖ	2	WASHER, FLAT, ROUND	MS15795-302			29
	2	SCREW, BUT HD	1006783-93			28
Ⓖ	1	POTENTIOMETER ASSY	1007089			27
Ⓗ	1	INSULATION SLEEVING, ELEC HEAT SHRINK, SIZE 12 AWG	1010490-800		5⅜ LONG	26
	1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16" TOT. LG	25
	1	WIRE, ELECTRICAL ET 28 WHT/RED		MIL-W-16878	16" TOT. LG	24
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
	1	RESISTOR, FIXED	1010251-37			19
	1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	1	WIRE, ELECTRICAL ET-28 WHT.		MIL-W-16878	2½ TOT. LG.	17
Ⓗ	2	INSULATION SLEEVING, ELECT, HEAT SHRINK, SIZE 8 AWG	1010490-136			16
	2	FERRULE, INNER	1000243-5			15
	2	FERRULE, OUTER	1000242-7			14
	6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	¼ ID × 36 AWG	13
	1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	[illegible] T. LG.	12
	1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	[illegible] T. LG.	11
	A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
	A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	9
	1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	[illegible] TOT. LG.	8
	.25	INSULATION SLEEVING, ELEC	1006776-18		½ LONG	7
	A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
	3	SCREW, BUT. HD, SOC, SPL	1000250-3			5
	1	CONNECTOR	1000123			4
Ⓖ	1	NETWORK SUB-ASS'Y	1007028			3
	1	16 PIP MOD D	1000179			2
	1	HEATER PLATE ASS'Y	1000134			1

LIST OF PARTS AND MATERIALS

J	G		
H	G		
G	G		
F	—		DL1000201
SHEET 1	SHEET 2	1000005	DL1000001
REVISION STATUS OF SHEETS		NEXT ASSY	USED ON
		APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED ajBogue DATE 5-19-63
CHECKED
DRAWN RGS 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE
W Kupfer

PIP PRE-ALIGNED
ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF 2

MASTER

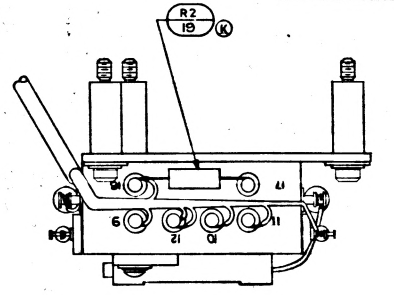
INCHES
PHOTOGRAPHIC SCALE ONLY

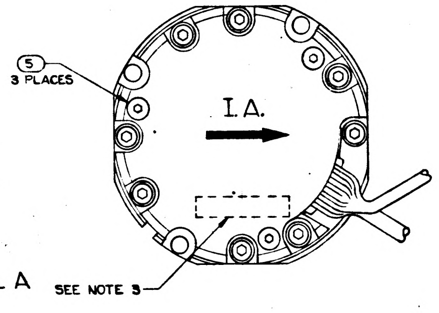
WIRING LEGEND							
COND NO.	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	
27-3	WHT/GY		2	SG-6	4	J	
27-B	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

SEE DETAIL A

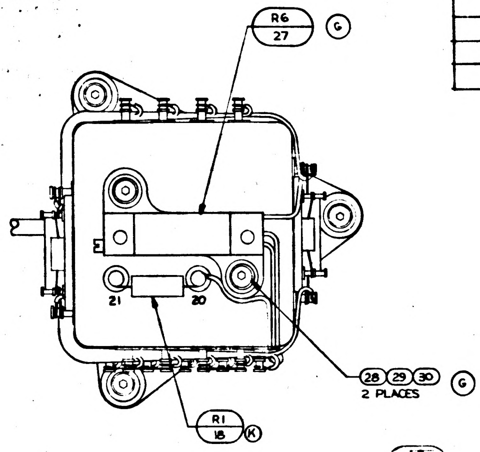
RESISTOR SELECTION CHART											
R2	Ⓚ	R1	Ⓚ	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	-33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	16.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

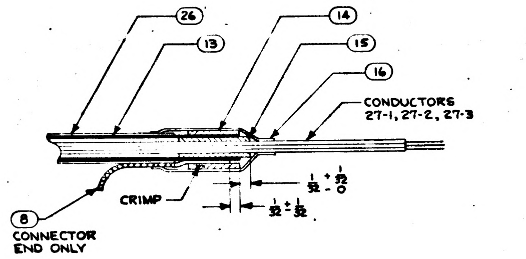
REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-1-63		WK
	G	TDRR 02128	7-17-63		WK
	H	TDRR 03503	10-2-63		WK
	J	TDRR 03860	10-8-63		WK
	K	TDRR 04045	10-23-63		WK



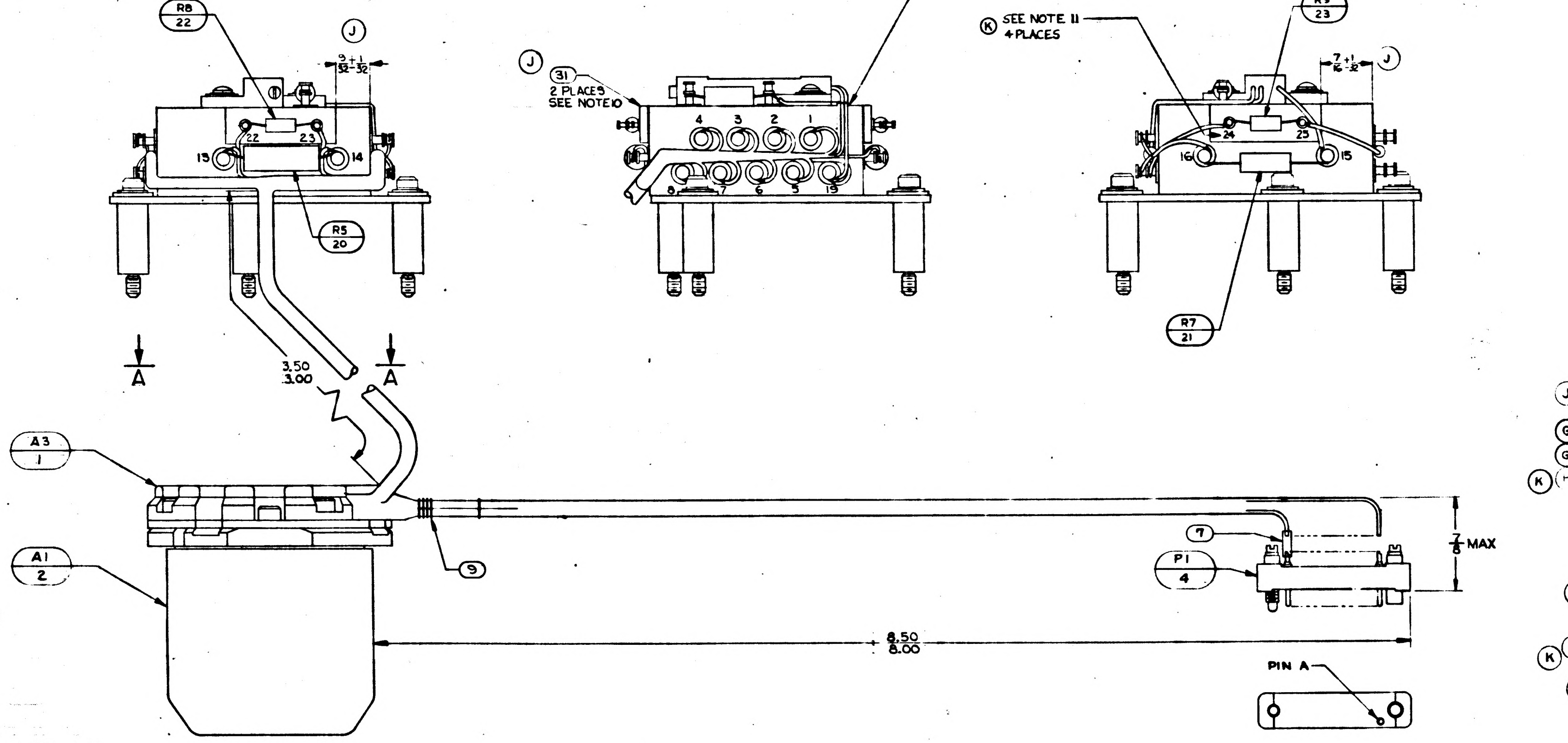


VIEW A-A





DETAIL A
SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION USING ITEM ⑩ PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM ⑨
7. ITEM ⑩ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.

Ⓙ 10. BOND ITEM ㉛ TO ITEM ③ AT INDICATED LOCATION PER ND1002004

Ⓚ 11. MARK TERMINAL DESIGNATION $\frac{.093}{.073}$ HIGH ON ITEM ㉛ PER ND1002019

Ⓚ 12. PIPA CALIBRATION MODULE, NASA DWG NO. 1007009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013

Ⓖ REPLACES REV E
WITH CHANGES

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓙ	2	TERMINAL BOARD	1007014			31
	2	WASHER, LOCK	MS35338-77			30
Ⓖ	2	WASHER, FLAT, ROUND	MS15795-302			29
Ⓖ	2	SCREW, BUT HD	1006783-93			28
	1	POTENTIOMETER ASSY	1007089			27
Ⓚ Ⓗ	1	INSULATION SLEEVING, ELEC HEAT SHRINK,	1010490-800			26
	1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TOT. LG	25
	1	WIRE, ELECTRICAL ET 28 WHT/RED		MIL-W-16878	16 TOT. LG	24
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
Ⓚ	1	RESISTOR, FIXED	1010251		SEE NOTE 5	19
	1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	1	WIRE, ELECTRICAL ET-28 WHT.		MIL-W-16878	2½ TOT. LG.	17
Ⓚ Ⓗ	2.	INSULATION SLEEVING, ELECT, HEAT SHRINK,	1010490-138			16
	2	FERRULE, INNER	1000243-5			15
Ⓚ	2	FERRULE, OUTER	1000242-5			14
	6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	[illegible] ID = 36 AWG	13
	1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	[illegible] T. LG.	12
	1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	5" TOT. LG.	11
	A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
Ⓚ	A/R	TAPE, NYLON, WAXED		MIL-T-713	[illegible]	9
	1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	[illegible] TOT. LG.	8
	.25	INSULATION SLEEVING, ELEC	1006776-18		[illegible] LONG	7
	A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
	3	SCREW, BUT. HD, SOC, SPL	1000250-3			5
	1	CONNECTOR	1000123			4
Ⓖ	1	NETWORK SUB-ASS'Y	1007028			3
	1	16 PIP MOD D	1000179			2
	1	HEATER PLATE ASS'Y	1000134			1

LIST OF PARTS AND MATERIALS

K	K		
J	G		
H	G		
G	G		
F	—		DL1000201
SHEET 1	SHEET 2	1000005	DL1000001
REVISION STATUS OF SHEETS		NEXT ASSY	USED ON
		APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN RGS
APPROVED FOR MSC
MIT/IL APPROVAL DATE

PIP PRE-ALIGNED
ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF 2

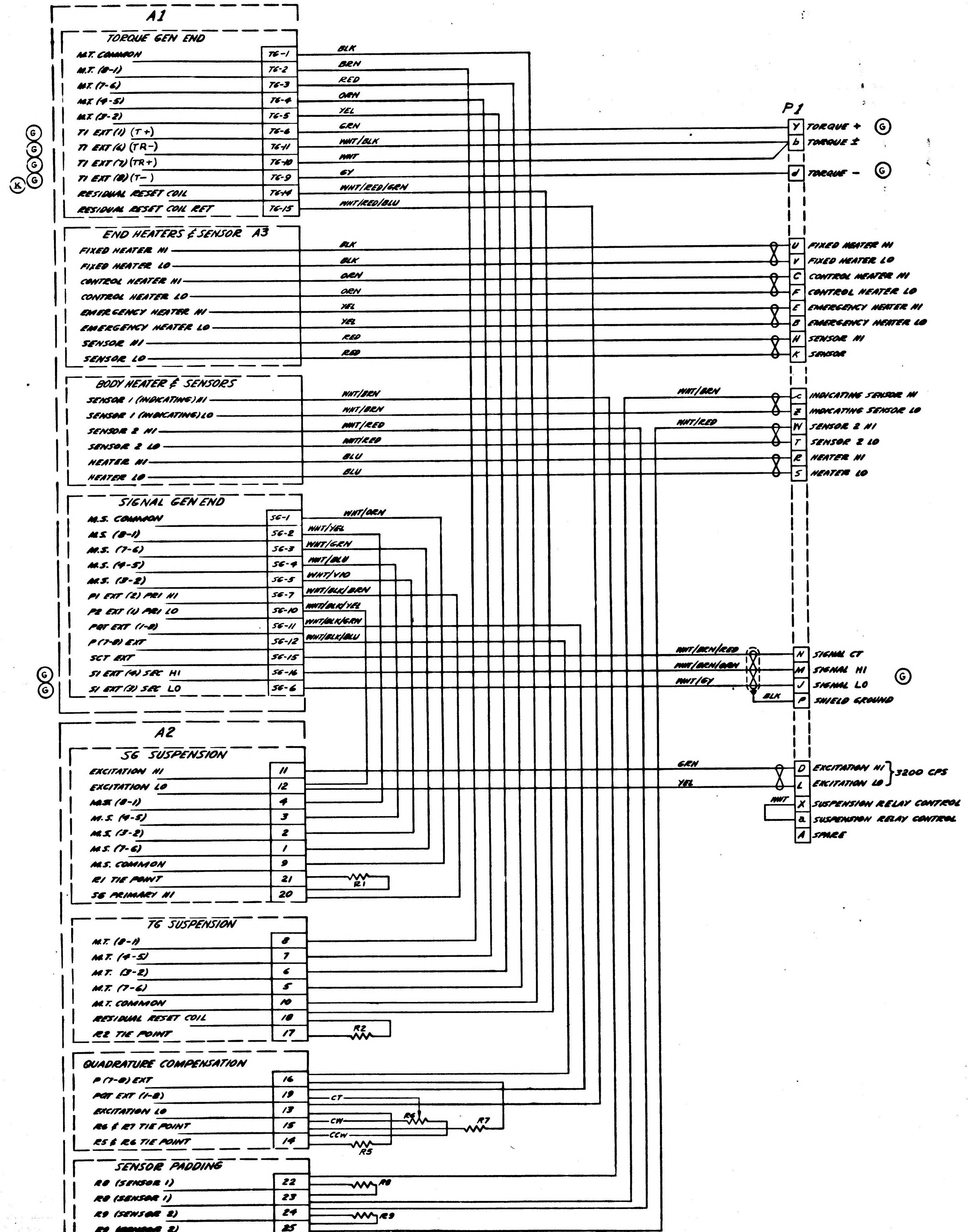
MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 01670

SYM	DESCRIPTION	DATE	APPROVAL	
F	THIS SHEET ADDED TDRR 01670	5-1-63	QJS	
G	TDRR 02128	7-17-63	QJS	WK
K	TDRR 04045	10-23-63		


A1
TORQUE GEN END
M.T. COMMON — T6-1 — BLK
M.T. (8-1) — T6-2 — BRN
M.T. (7-6) — T6-3 — RED
M.T. (4-5) — T6-4 — ORN
M.T. (3-2) — T6-5 — YEL
T1 EXT (1) (T+) — T6-6 — GRN
T1 EXT (6) (TR−) — T6-11 — WHT/BLK
T1 EXT (7) (TR+) — T6-10 — WHT
T1 EXT (8) (T−) — T6-9 — GY
RESIDUAL RESET COIL — T6-14 — WHT/RED/GRN
RESIDUAL RESET COIL RET — T6-15 — WHT/RED/BLU
G
G
G
G
K
END HEATERS & SENSOR A3
FIXED HEATER HI — BLK
FIXED HEATER LO — BLK
CONTROL HEATER HI — ORN
CONTROL HEATER LO — ORN
EMERGENCY HEATER HI — YEL
EMERGENCY HEATER LO — YEL
SENSOR HI — RED
SENSOR LO — RED
BODY HEATER & SENSORS
SENSOR 1 (INDICATING) HI — WHT/BRN
SENSOR 1 (INDICATING) LO — WHT/BRN
SENSOR 2 HI — WHT/RED
SENSOR 2 LO — WHT/RED
HEATER HI — BLU
HEATER LO — BLU
SIGNAL GEN END
M.S. COMMON — SG-1 — WHT/ORN
M.S. (8-1) — SG-2 — WHT/YEL
M.S. (7-6) — SG-3 — WHT/GRN
M.S. (4-5) — SG-4 — WHT/BLU
M.S. (3-2) — SG-5 — WHT/VIO
P1 EXT (2) PRI HI — SG-7 — WHT/BLK/BRN
P2 EXT (1) PRI LO — SG-10 — WHT/BLK/YEL
PQT EXT (1-8) — SG-11 — WHT/BLK/GRN
P (7-8) EXT — SG-12 — WHT/BLK/BLU
SCT EXT — SG-15
S1 EXT (4) SEC HI — SG-16
S1 EXT (3) SEC LO — SG-6
G
G
A2
SG SUSPENSION
EXCITATION HI — 11
EXCITATION LO — 12
M.S. (8-1) — 4
M.S. (4-5) — 3
M.S. (3-2) — 2
M.S. (7-6) — 1
M.S. COMMON — 9
R1 TIE POINT — 21
SG PRIMARY HI — 20
R1
TG SUSPENSION
M.T. (8-1) — 8
M.T. (4-5) — 7
M.T. (3-2) — 6
M.T. (7-6) — 5
M.T. COMMON — 10
RESIDUAL RESET COIL — 18
R2 TIE POINT — 17
R2
QUADRATURE COMPENSATION
P (7-8) EXT — 16
PQT EXT (1-8) — 19
EXCITATION LO — 13
R6 & R7 TIE POINT — 15
R5 & R6 TIE POINT — 14
CT
CW
CCW
R6
R7
R5
SENSOR PADDING
R8 (SENSOR 1) — 22
R8 (SENSOR 1) — 23
R9 (SENSOR 2) — 24
R9 (SENSOR 2) — 25
R8
R9
P1
Y TORQUE + G
b TORQUE ±
d TORQUE − G
U FIXED HEATER HI
V FIXED HEATER LO
C CONTROL HEATER HI
F CONTROL HEATER LO
E EMERGENCY HEATER HI
B EMERGENCY HEATER LO
H SENSOR HI
K SENSOR
WHT/BRN
WHT/RED
c INDICATING SENSOR HI
Z INDICATING SENSOR LO
W SENSOR 2 HI
T SENSOR 2 LO
R HEATER HI
S HEATER LO
WHT/BRN/RED
WHT/BRN/GRN
WHT/GY
BLK
N SIGNAL CT
M SIGNAL HI
J SIGNAL LO
P SHIELD GROUND
G
GRN
YEL
WHT
D EXCITATION HI
L EXCITATION LO
3200 CPS
X SUSPENSION RELAY CONTROL
a SUSPENSION RELAY CONTROL
A SPARE

REF DESIG	PART NO	DESCRIPTION	VALUE	TOL %	RATING
A1	1000179	16 PIP MOD D			
A2	1007028	PIP SUSPENSION ASSY			
A3	1000134	HEATER PLATE ASSY			
P1	1000123	CONNECTOR - PLUG			
R1	1010251-	RESISTOR - FIXED		±1	1/4 W
R2	1010251			±1	1/4 W
R5	1010377-			±1	1/10 W
R6	1010373-25	-VARIABLE	50K	±5	1 W
R7	1010377-	-FIXED		±1	1/10 W
R8	1010330-			±0.1	.035 W
R9	1010330-			±0.1	.035 W

K

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN TMFINO DATE 5-16-63
CHECKED WINBERG
APPROVAL A.E. Winberg
APPROVAL
NASA APPROVAL
MIT APPROVAL 19 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIP PRE-ALIGNED ASSY

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 1000013
SCALE
WT
SHEET 2 OF 2

1000013 K

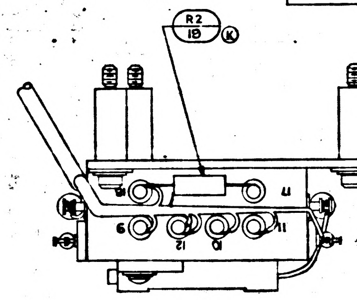
INCHES
PHOTOGRAPHIC SCALE ONLY

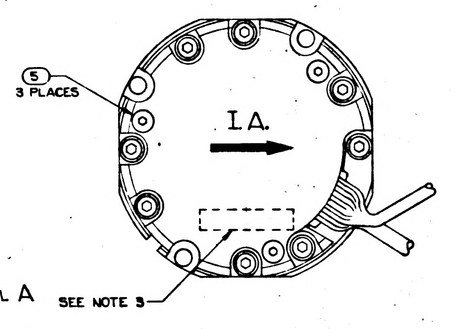
WIRING LEGEND							
COND NO.	COLOR	FIND NO.	FROM		TO		TWIST
			ITEM	TERM.	ITEM	TERM	
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	
27-3	WHT/GY		2	SG-6	4	J	
27-B	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

SEE DETAIL A (conductors 27-1, 27-2, 27-3, 27-B)

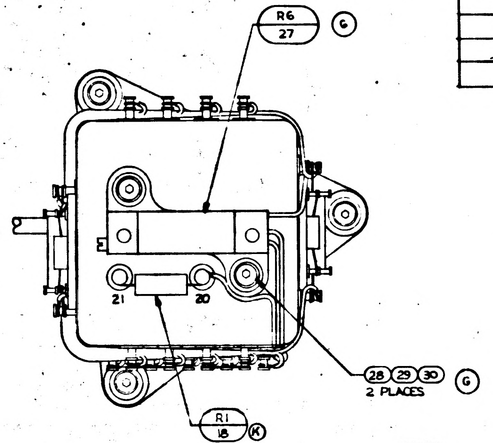
RESISTOR SELECTION CHART											
R2	(K)	R1	(K)	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	-33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	16.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

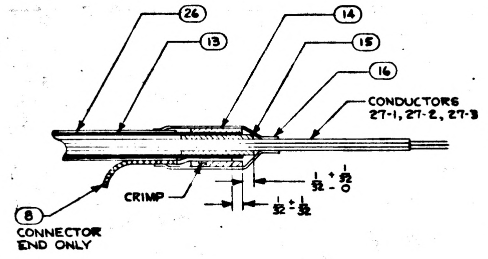
REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-1-63		WK
	G	TDRR 02128	7-17-63		WK
	H	TDRR 03503	10-2-63		WK
	J	TDRR 03660	10-8-63		WK
	K	TDRR 04045	10-23-63		WK
	L	TDRR 04568	11-12-63		





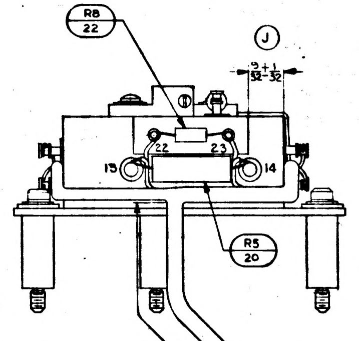
VIEW A-A

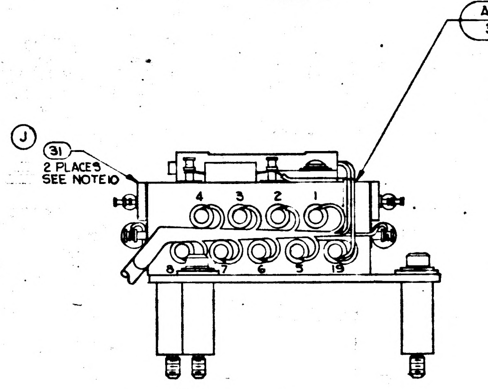


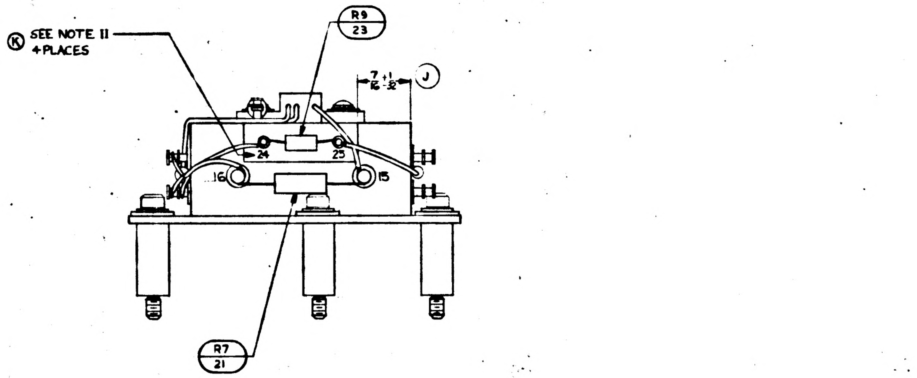


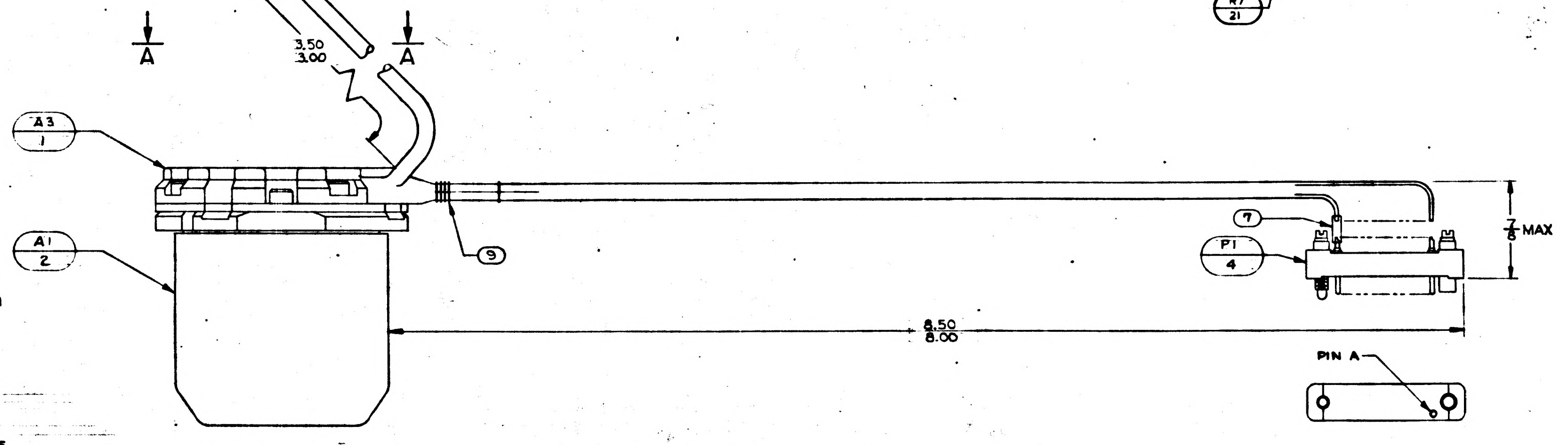
DETAIL A

SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES









NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING (6)
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM (2) AT INDICATED LOCATION USING ITEM (10) PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM (9)
7. ITEM (10) TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
(J) 10. BOND ITEM (31) TO ITEM (3) AT INDICATED LOCATION PER ND1002004
(K) 11. MARK TERMINAL DESIGNATION $\frac{.093}{.073}$ HIGH ON ITEM (31) PER ND1002019
12. PIPA CALIBRATION MODULE, NASA DWG NO. 1007009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013 (K)

REPLACES REV E
WITH CHANGES

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
(J)	2	TERMINAL BOARD	1007014			31
	2	WASHER, LOCK	MS35338-77			30
	2	WASHER, FLAT, ROUND	MS15795-302			29
(G)	2	SCREW, BUT HD	1006783-93			28
(G)	1	POTENTIOMETER ASSY	1007089			27
(K) (H)	1	INSULATION SLEEVING, ELEC HEAT SHRINK,	1010490-800			26
	1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TOT. LG	25
	1	WIRE, ELECTRICAL ET 28 WHT/RED		MIL-W-16878	16 TOT. LG	24
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
(K)	1	RESISTOR, FIXED	1010251		SEE NOTE 5	19
	1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	1	WIRE, ELECTRICAL ET-28 WHT.		MIL-W-16878	2½ TOT. LG.	17
(K) (H)	2.	INSULATION SLEEVING, ELECT, HEAT SHRINK,	1010490-138			16
	2	FERRULE, INNER	1000243-5			15
(K)	2	FERRULE, OUTER	1000242-5			14
	6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	[illegible] ID = 36 AWG	13
	1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	15" TOT. LG.	12
	1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	15" TOT. LG.	11
	A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
(K)	A/R	TAPE, NYLON, WAXED		MIL-T-713	CLASS [illegible]	9
	1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	[illegible] TOT. [illegible]	8
	.25	INSULATION SLEEVING, ELEC	1006776-18		[illegible] LONG	7
	A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
(L)	3	SCREW, BUT. HD, SOC, SPL	1000250-1			5
	1	CONNECTOR	1000125			4
(G)	1	NETWORK SUB-ASS'Y	1007028			3
	1	16 PIP MOD D	1000179			2
	1	HEATER PLATE ASS'Y	1000134			1

LIST OF PARTS AND MATERIALS

K	K
J	G
H	G
G	G
F	—
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED DATE 5-12-63
CHECKED
DRAWN RGS 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE

PIP PRE-ALIGNED
ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	
27-3	WHT/GY		2	SG-6	4	J	
27-B	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

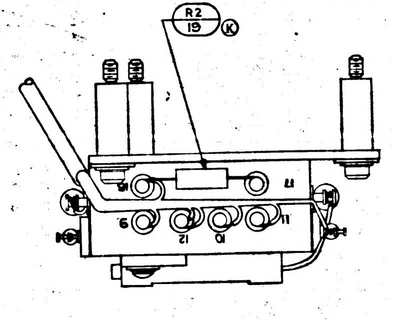
SEE DETAIL A

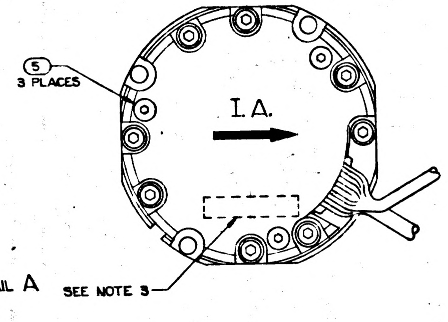
RESISTOR SELECTION CHART

R2	Ⓚ	R1	Ⓚ	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	-33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	16.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

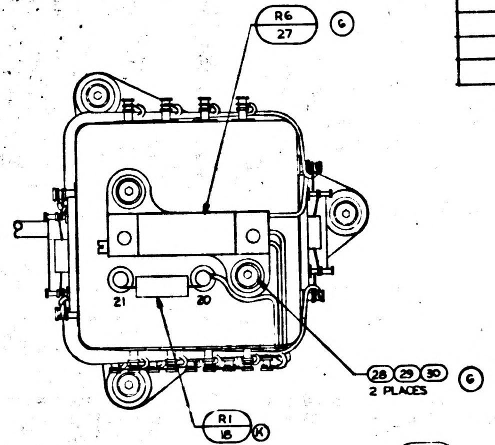
REVISIONS

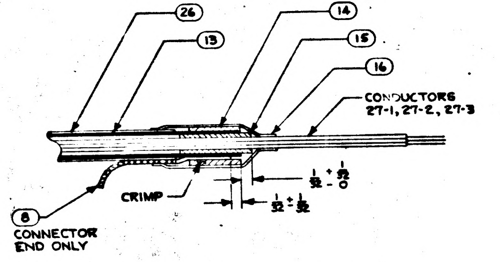
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-63	[illegible]	[illegible]
	G	TDRR 02128	7-17-63	[illegible]	[illegible]
	H	TDRR 03503	10-2-63	[illegible]	[illegible]
	J	TDRR 03660	10-8-63	[illegible]	[illegible]
	K	TDRR 04045	10-23-63	[illegible]	[illegible]
	L	TDRR 04563	11-12-63	[illegible]	[illegible]
	M	TDRR 04943	12-[illegible]	[illegible]	[illegible]





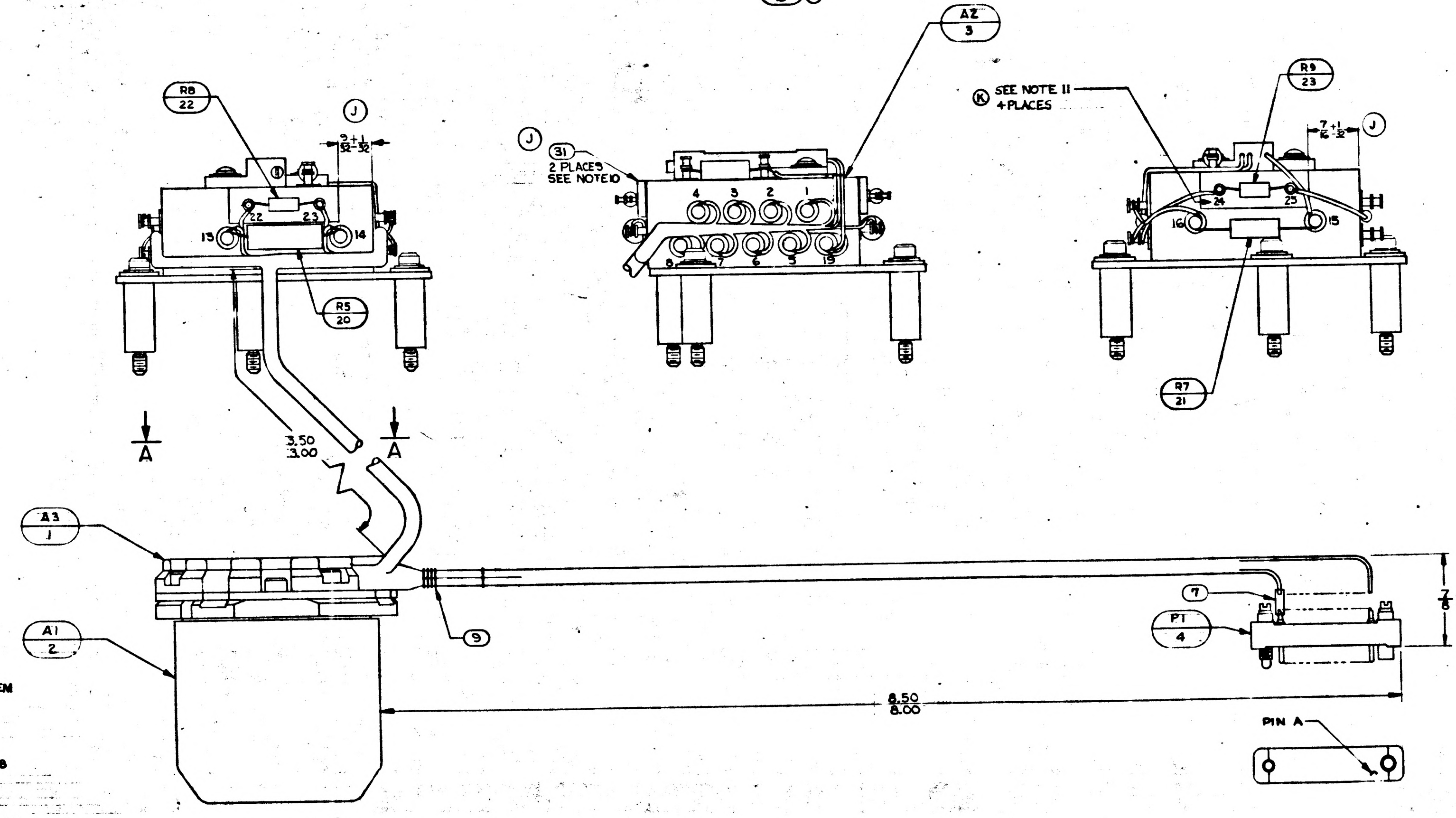
VIEW A-A





DETAIL A

SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION USING ITEM ⑩ PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM ⑨
7. ITEM ⑩ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.

Ⓙ 10. BOND ITEM ㉛ TO ITEM ③ AT INDICATED LOCATION PER ND1002004

Ⓚ 11. MARK TERMINAL DESIGNATION $\frac{.093}{.073}$ HIGH ON ITEM ㉛ PER ND1002019

Ⓚ 12. PIPA CALIBRATION MODULE, NASA DWG NO. 1007009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013

REPLACES REV E
WITH CHANGES

LIST OF PARTS AND MATERIALS

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓙ	2	TERMINAL BOARD	1007014			31
	2	WASHER, LOCK	MS35338-77			30
Ⓖ	2	WASHER, FLAT, ROUND	MS15795-302			29
Ⓖ	2	SCREW, BUT HD	1006783-93			28
	1	POTENTIOMETER ASSY	1007089			27
Ⓚ Ⓗ	1	INSULATION SLEEVING, ELEC HEAT SHRINK,	1010490-800			26
	1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TOT. LG	25
	1	WIRE, ELECTRICAL ET28 WHT/RED		MIL-W-16878	16 TOT. LG	24
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
Ⓚ	1	RESISTOR, FIXED	1010251		SEE NOTE 5	19
	1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	1	WIRE, ELECTRICAL ET-28 WHT.		MIL-W-16878	2½ TOT. LG.	17
Ⓜ Ⓚ Ⓗ	2.	INSULATION SLEEVING, ELECT, HEAT SHRINK,	1010491-136			16
	2	FERRULE, INNER	1000243-5			15
Ⓚ	2	FERRULE, OUTER	1000242-5			14
	6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	[illegible] ID=36 AWG	13
	1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	[illegible] TOT. LG.	12
	1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	[illegible] TOT. LG.	11
	A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
Ⓚ	A/R	TAPE, NYLON, WAXED		MIL-T-713	[illegible]	9
	1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	[illegible] TOT. LG.	8
	.25	INSULATION SLEEVING, ELEC	1006776-18		[illegible] LONG	7
	A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
Ⓛ	3	SCREW, BUT. HD, SOC, SFL	1000250-1			5
	1	CONNECTOR	1000123			4
Ⓖ	1	NETWORK SUB-ASS'Y	1007028			3
	1	16 PIP MOD D	1000179			2
	1	HEATER PLATE ASS'Y	1000134			1

REVISION STATUS OF SHEETS	
SHEET 1	SHEET 2
M	
L	
K	K
J	G
H	G
G	G
F	—

APPLICATION	
NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED G.G.Ayres DATE 5-29-63
CHECKED
DRAWN RGS 5-25-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE

PIP PRE-ALIGNED ASSEMBLY

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000013
SCALE 2/1
UNIT WT.
CODE IDENT.
SHEET 1 OF 2

MASTER

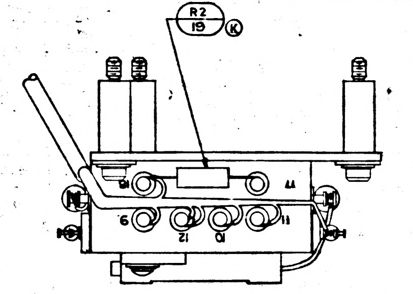
INCHES
PHOTOGRAPHIC SCALE ONLY

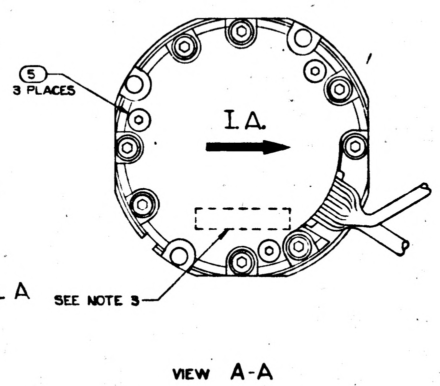
WIRING LEGEND							
COND NO.	COLOR	FIND NO.	FROM		TO		TWIST
			ITEM	TERM.	ITEM	TERM	
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	8
27-3	WHT/GY		2	SG-6	4	J	
27-B	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

SEE DETAIL A

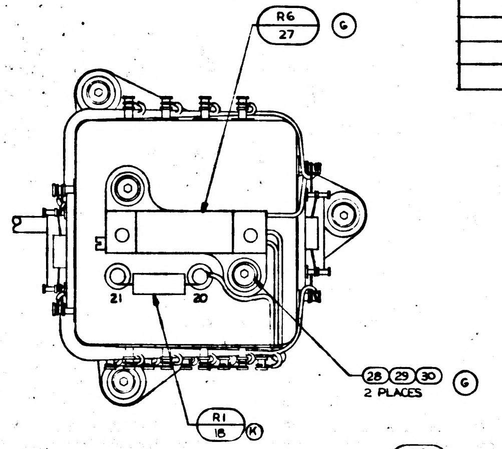
RESISTOR SELECTION CHART											
R2	Ⓚ	R1	Ⓚ	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	-33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	16.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

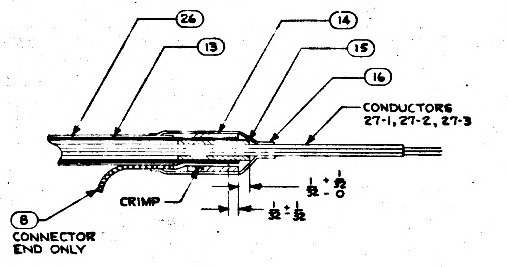
REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	3-1-63		
	G	TDRR 02128	7-17-63		
	H	TDRR 03503	10-2-63		
	J	TDRR 03660	10-8-63		
	K	TDRR 04045	10-23-63		
	L	TDRR 04568	11-12-63		
	M	TDRR 04943	12-3-63		
	N	TDRR 05744	1-15-6		





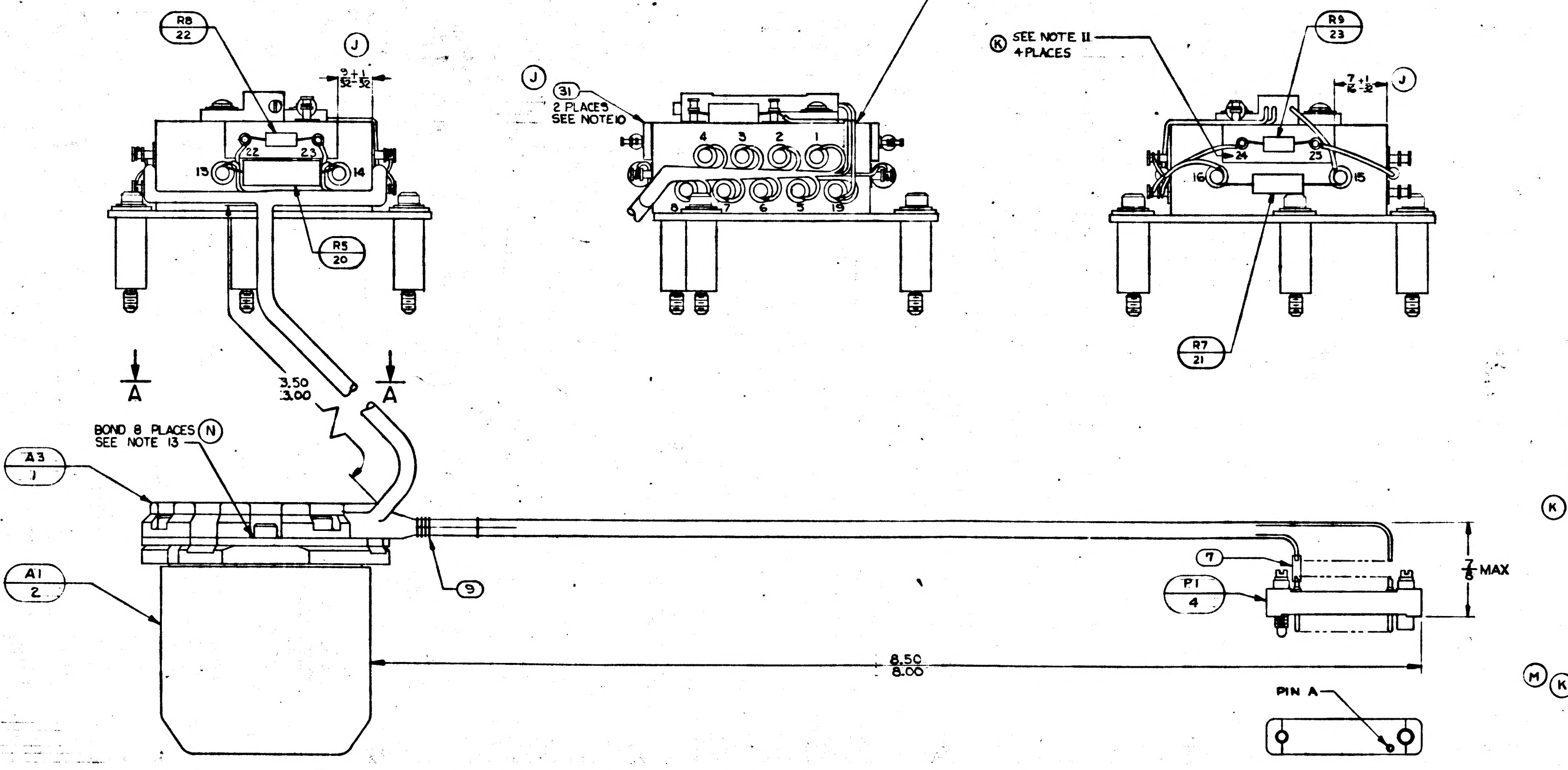
VIEW A-A





DETAIL A

SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION USING ITEM ⑩ PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM ⑨
7. ITEM ⑩ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
10. Ⓙ BOND ITEM ㉛ TO ITEM ③ AT INDICATED LOCATION PER ND1002004
11. Ⓚ MARK TERMINAL DESIGNATION $^{.093}_{.073}$ HIGH ON ITEM ㉛ PER ND1002019
12. Ⓚ PIPA CALIBRATION MODULE, NASA DWG NO. 1007009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000018
13. BOND SCREW TO HOUSING OR ALIGNMENT RING AFTER ALIGNMENT WITH BONDING AGENT PER ND1002004 TYPE II SEMI-RIGID

REPLACES REV E
WITH CHANGES

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓙ	2	TERMINAL BOARD	1007014			31
	2	WASHER, LOCK	MS35338-77			30
Ⓖ	2	WASHER, FLAT, ROUND	MS15795-302			29
Ⓖ	2	SCREW, BUT HD	1006783-93			28
	1	POTENTIOMETER ASSY	1007089			27
Ⓚ Ⓗ	1	INSULATION SLEEVING, ELEC HEAT SHRINK,	1010490-800			26
	1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TOT. LG	25
	1	WIRE, ELECTRICAL ET 28 WHT/RED		MIL-W-16878	16 TOT. LG	24
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
	1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
	1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
Ⓚ	1	RESISTOR, FIXED	1010251		SEE NOTE 5	19
	1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	1	WIRE, ELECTRICAL ET-28 WHT.		MIL-W-16878	2½ TOT. LG.	17
Ⓜ Ⓚ Ⓗ	2.	INSULATION SLEEVING, ELECT, HEAT SHRINK,	1010491-136			16
	2	FERRULE, INNER	1000243-5			15
Ⓚ	2	FERRULE, OUTER	1000242-5			14
	6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	⅛ ID=36 AWG	13
	1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	[illegible] TOT. LG.	12
	1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	[illegible] TOT. LG.	11
	A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
Ⓚ	A/R	TAPE, NYLON, WAXED		MIL-T-713	[illegible]	9
	1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	[illegible]	8
	.25	INSULATION SLEEVING, ELEC	1006776-18		[illegible] LONG	7
	A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
Ⓛ	3	SCREW, BUT. HD, SOC, SPL	1000250-1			5
	1	CONNECTOR	1000123			4
Ⓖ	1	NETWORK SUB-ASS'Y	1007028			3
	1	16 PIP MOD D	1000179			2
	1	HEATER PLATE ASS'Y	1000134			1

LIST OF PARTS AND MATERIALS

N	K
M	K
L	K
K	K
J	G
H	G
G	G
F	—
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED 5-19-63
CHECKED
DRAWN RGS 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE

PIP PRE-ALIGNED ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF

MASTER

WIRING LEGEND

COND NO.	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	b	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	Y	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	
27-3	WHT/GY		2	SG-6	4	J	
27-3	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

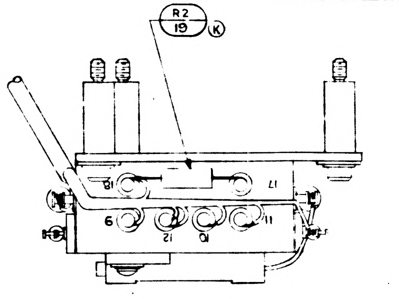
SEE DETAIL A (conductors 27-1, 27-2, 27-3, 27-3)

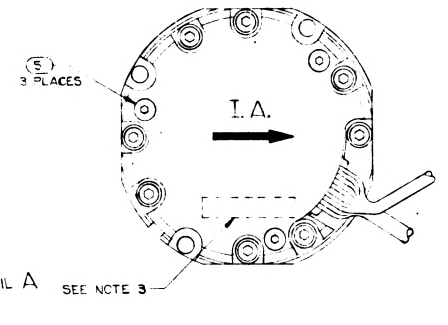
RESISTOR SELECTION CHART

R2	(K)	R1	(K)	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	-33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	16.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

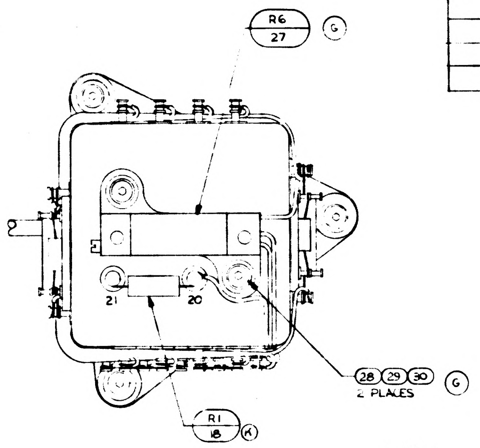
REVISIONS

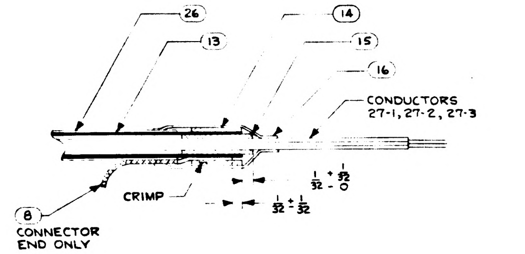
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-1-63	
	G	TDRR 02128	7-17-63	
	H	TDRR 03503	10-2-63	
	J	TDRR 03560	10-8-63	
	K	TDRR 04045	10-23-63	
	L	TDRR 04568	11-12-63	
	M	TDRR 04943	12-3-63	
	N	TDRR 05[illegible]34	1-5-64	
	P	TDRR 09658	6-15-64	RG



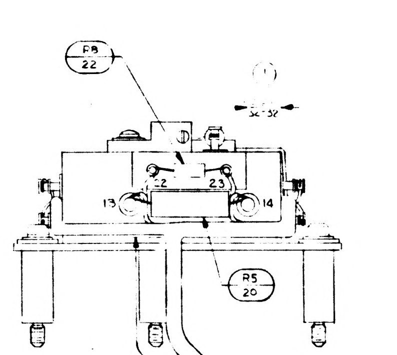


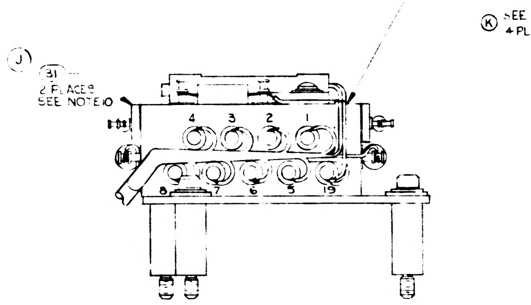
VIEW A-A

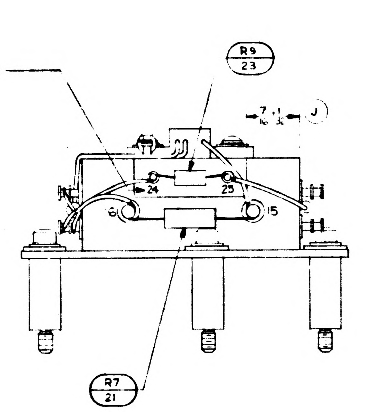


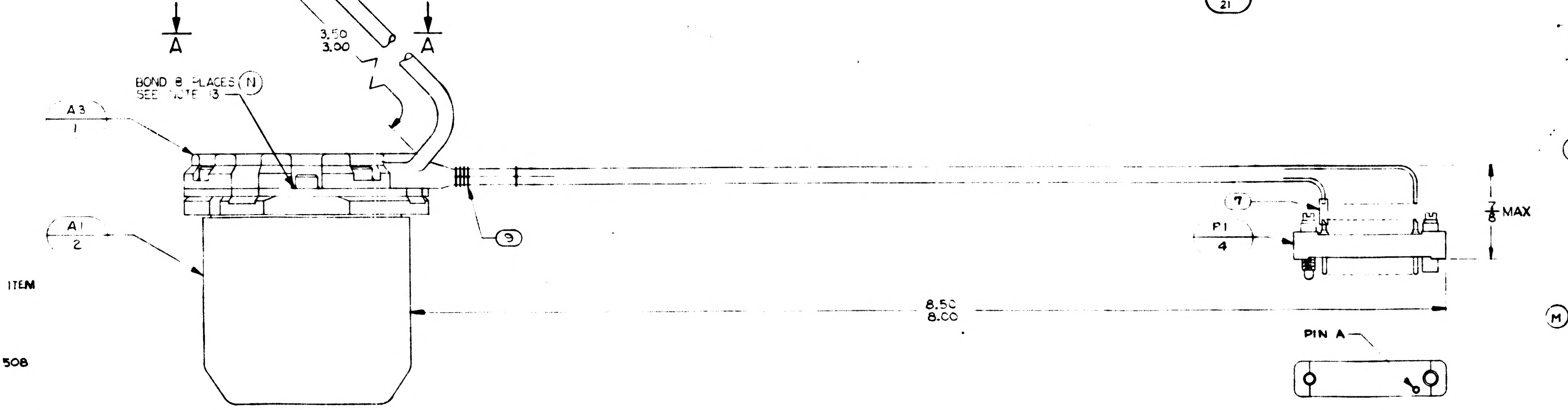


DETAIL A
SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES









NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING (6)
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM 2 AT INDICATED LOCATION USING ITEM [illegible] PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM 9
7. ITEM 10 TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE. [illegible] ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
10. BOND ITEM 3 TO ITEM [illegible], AT INDICATED LOCATION PER ND1002004
11. MARK TERMINAL DESIGNATIONS .093/.073 HIGH ON ITEM (31) PER ND1002019
12. PIPA CALIBRATION MODULE, NASA DWG NO. 1007009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013
13. BOND SCREW TO HOUSING OR ALIGNMENT RING AFTER ALIGNMENT WITH BONDING AGENT PER ND1002004 TYPE II SEMI RIGID

REPLACES REV E
WITH CHANGES

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	TERMINAL BOARD	1007014			31
2	WASHER, LOCK	MS35338-77			30
2	WASHER, FLAT, ROUND	MS15795-302			29
2	SCREW, BUT HD	1006783-93			28
1	POTENTIOMETER ASSY	1007089			27
1	INSULATION SLEEVING, ELEC HEAT SHRINK,	1010490-800			26
1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TOT. LG	25
1	WIRE, ELECTRICAL ET-28 [illegible]		MIL-W-16878	[illegible] LG	24
1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
1	RESISTOR, FIXED	1010251		SEE NOTE 5	19
1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
1	WIRE, ELECTRICAL ET-28 WHT		MIL-W-16878	2½ TOT. LG.	17
2	INSULATION SLEEVING, ELECT, HEAT SHRINK,	1010491-136			16
2	FERRULE, INNER	1000243-5			15
2	FERRULE, OUTER	1000242-5			14
6"	BRAID, WIRE (COP. TIN CTD, TUBULAR)		QQ-B-575	[illegible] ID = 36 AWG	13
1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	[illegible] TOT. LG.	12
	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	[illegible] TOT. LG.	11
A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	9
1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	[illegible] LG	8
25	INSULATION SLEEVING, ELEC	1006776-18		[illegible] LONG	7
A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
3	SCREW, BUT. HD, SOC, SPL	1000250-1			5
1	CONNECTOR	1000123			4
1	NETWORK SUB-ASS'Y	1007028			3
1	16 PIP MOD D	1000179			2
1	HEATER PLATE ASS'Y	1000134			1

LIST OF PARTS AND MATERIALS

SHEET 1	SHEET 2
P	P
N	K
M	K
L	K
K	K
J	G
H	G
G	G
F	—

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

APPROVED | DATE 5-19-63
CHECKED
DRAWN RGS 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE

PIP PRE-ALIGNED ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

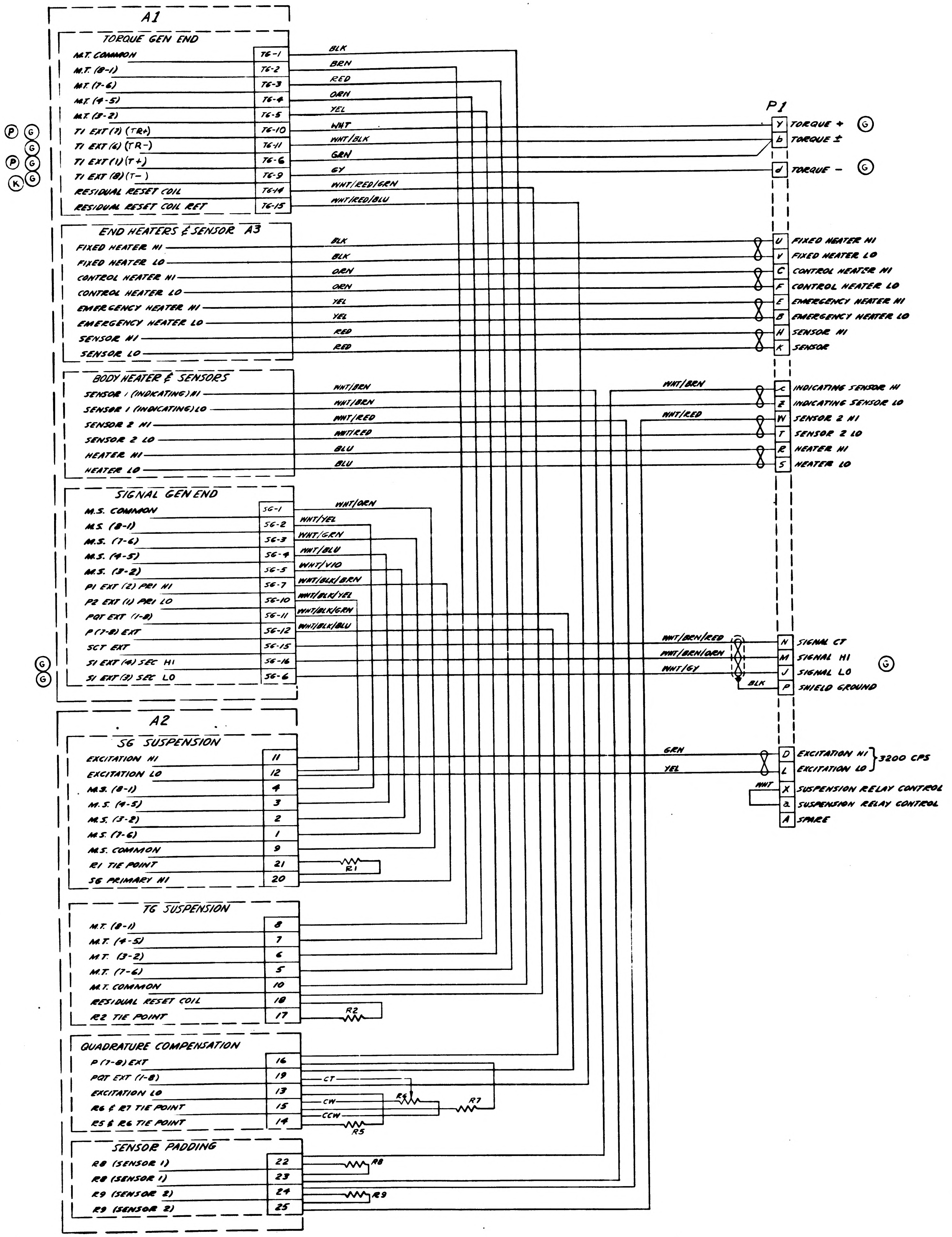
NASA DRAWING NO.
1000013

SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 01670

SYM	DESCRIPTION	DATE	APPROVAL	
F	THIS SHEET ADDED TDRR 01670	5-1-63	AJB	
G	TDRR 02128	7-17-63	AJB	WK
K	TDRR 04045	10-23-63		WK
P	TDRR 09658	6-15-64	RB	


A1
TORQUE GEN END
M.T. COMMON
M.T. (8-1)
M.T. (7-6)
M.T. (4-5)
M.T. (3-2)
T1 EXT (7) (TR+)
T1 EXT (6) (TR−)
T1 EXT (1) (T+)
T1 EXT (8) (T−)
RESIDUAL RESET COIL
RESIDUAL RESET COIL RET
TG-1
TG-2
TG-3
TG-4
TG-5
TG-10
TG-11
TG-6
TG-9
TG-14
TG-15
BLK
BRN
RED
ORN
YEL
WHT
WHT/BLK
GRN
GY
WHT/RED/GRN
WHT/RED/BLU
P
G
G
P
G
K
G
P1
Y
TORQUE +
b
TORQUE ±
d
TORQUE −
G
G
END HEATERS & SENSOR A3
FIXED HEATER HI
FIXED HEATER LO
CONTROL HEATER HI
CONTROL HEATER LO
EMERGENCY HEATER HI
EMERGENCY HEATER LO
SENSOR HI
SENSOR LO
BLK
BLK
ORN
ORN
YEL
YEL
RED
RED
U
FIXED HEATER HI
V
FIXED HEATER LO
C
CONTROL HEATER HI
F
CONTROL HEATER LO
E
EMERGENCY HEATER HI
B
EMERGENCY HEATER LO
H
SENSOR HI
K
SENSOR
BODY HEATER & SENSORS
SENSOR 1 (INDICATING) HI
SENSOR 1 (INDICATING) LO
SENSOR 2 HI
SENSOR 2 LO
HEATER HI
HEATER LO
WHT/BRN
WHT/BRN
WHT/RED
WHT/RED
BLU
BLU
WHT/BRN
WHT/RED
c
INDICATING SENSOR HI
Z
INDICATING SENSOR LO
W
SENSOR 2 HI
T
SENSOR 2 LO
R
HEATER HI
S
HEATER LO
SIGNAL GEN END
M.S. COMMON
M.S. (8-1)
M.S. (7-6)
M.S. (4-5)
M.S. (3-2)
P1 EXT (2) PRI HI
P2 EXT (1) PRI LO
PQT EXT (1-8)
P (7-8) EXT
SCT EXT
S1 EXT (4) SEC HI
S1 EXT (3) SEC LO
SG-1
SG-2
SG-3
SG-4
SG-5
SG-7
SG-10
SG-11
SG-12
SG-15
SG-16
SG-6
WHT/ORN
WHT/YEL
WHT/GRN
WHT/BLU
WHT/VIO
WHT/BLK/BRN
WHT/BLK/YEL
WHT/BLK/GRN
WHT/BLK/BLU
G
G
WHT/BRN/RED
WHT/BRN/ORN
WHT/GY
BLK
N
SIGNAL CT
M
SIGNAL HI
J
SIGNAL LO
P
SHIELD GROUND
G
A2
SG SUSPENSION
EXCITATION HI
EXCITATION LO
M.S. (8-1)
M.S. (4-5)
M.S. (3-2)
M.S. (7-6)
M.S. COMMON
R1 TIE POINT
SG PRIMARY HI
11
12
4
3
2
1
9
21
20
R1
GRN
YEL
D
EXCITATION HI
L
EXCITATION LO
3200 CPS
WHT
X
SUSPENSION RELAY CONTROL
a
SUSPENSION RELAY CONTROL
A
SPARE
TG SUSPENSION
M.T. (8-1)
M.T. (4-5)
M.T. (3-2)
M.T. (7-6)
M.T. COMMON
RESIDUAL RESET COIL
R2 TIE POINT
8
7
6
5
10
18
17
R2
QUADRATURE COMPENSATION
P (7-8) EXT
PQT EXT (1-8)
EXCITATION LO
R6 & R7 TIE POINT
R5 & R6 TIE POINT
16
19
13
15
14
CT
CW
CCW
R6
R7
R5
SENSOR PADDING
R8 (SENSOR 1)
R8 (SENSOR 1)
R9 (SENSOR 2)
R9 (SENSOR 2)
22
23
24
25
R8
R9

REF DESIG	PART NO	DESCRIPTION	VALUE	TOL %	RATING
A1	1000179	16 PIP MOD D			
A2	1007028	PIP SUSPENSION ASSY			
A3	1000134	HEATER PLATE ASSY			
P1	1000123	CONNECTOR - PLUG			
R1	1010251-	RESISTOR - FIXED		±1	1/4 W
R2	1010251			±1	1/4 W
R5	1010377-			±1	1/10 W
R6	1010373-25	- VARIABLE	50K	±5	1 W
R7	1010377-	- FIXED		±1	1/10 W
R8	1010330-			±0.1	.035 W
R9	1010330-			±0.1	.035 W

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN TWENO DATE 5-16-63
CHECKED WINBERG
APPROVAL A.E. Winberg
APPROVAL C.J. Bogen 6-19-63
NASA APPROVAL
MIT APPROVAL W Kupfer 19 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIP PRE-ALIGNED ASSY

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 1000013
SCALE
WT
SHEET 2 OF 2

WIRING LEGEND

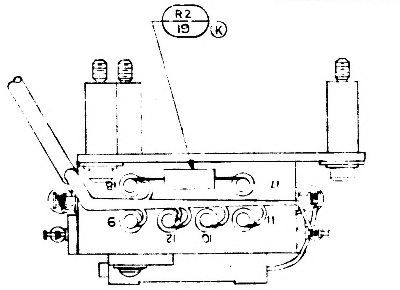
COND NO	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	b	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	Y	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	∞
12-2	BLK		1		4	V	∞
13-1	ORN		1		4	C	∞
13-2	ORN		1		4	F	∞
3-3	YEL		1		4	E	∞
3-4	YEL		1		4	B	∞
15-1	RED		1		4	H	∞
15-2	RED		1		4	K	∞
16-1	WHT/BRN	25	3	23	4	c	∞
16-2	WHT/BRN		2		4	z	∞
17-1	WHT/RED	24	3	25	4	W	∞
17-2	WHT/RED		2		4	T	∞
18-1	BLU		2		4	R	∞
18-2	BLU		2		4	S	∞
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	∞
27-2	WHT/BRN/ORN		2	SG-16	4	M	∞
27-3	WHT/GY		2	SG-6	4	J	∞
27-3		33		SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	∞
29-2	YEL	12	3	12	4	L	∞
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	
13B		32		SHLD 13	4	A	

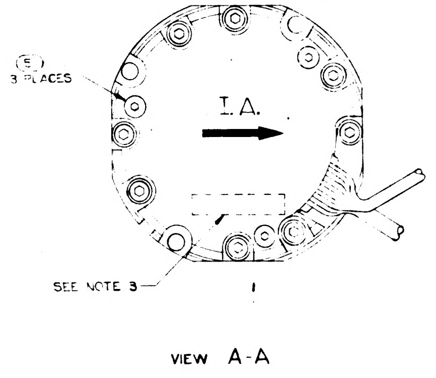
RESISTOR SELECTION CHART

R2	(K)	R1	(K)	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	4.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	-33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	16.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

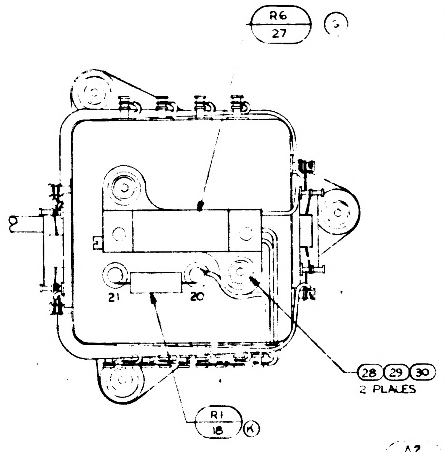
REVISIONS

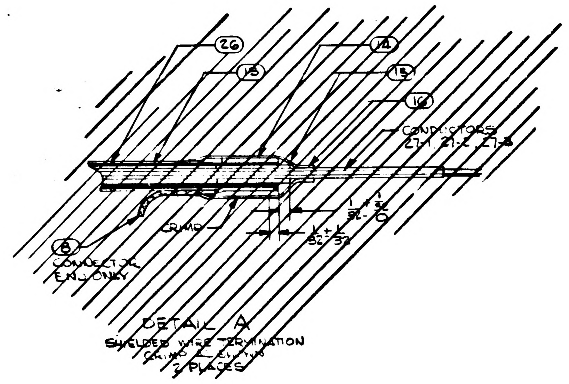
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5- -63		WK
	G	TDRR 02128	7-17-63		WK
	H	TDRR 03503	10-2-63		WK
	J	TDRR 03560	10-8-63		WK
	K	TDRR 04045	10-23-63		WK
	L	TDRR 04568	11-12-63		
	M	TDRR 04943	12-3-63		
	N	TDRR [illegible]	[illegible]		
	P	TDRR 09658	6-15-64	EB	
	R	TDRR 10498	7-7-64	JM	



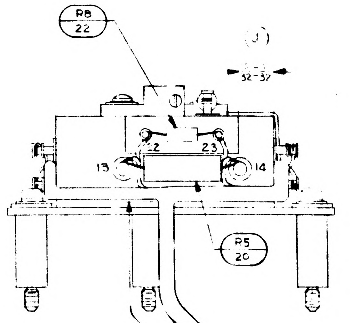


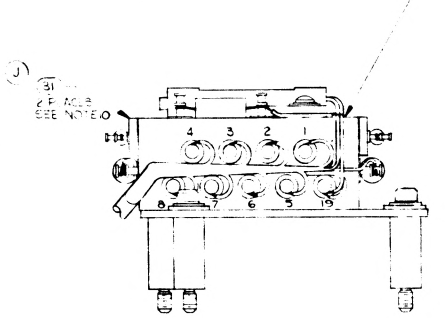
VIEW A-A

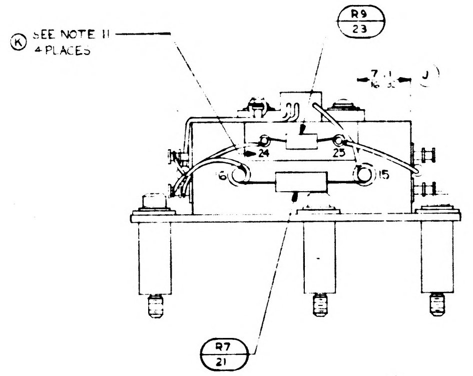


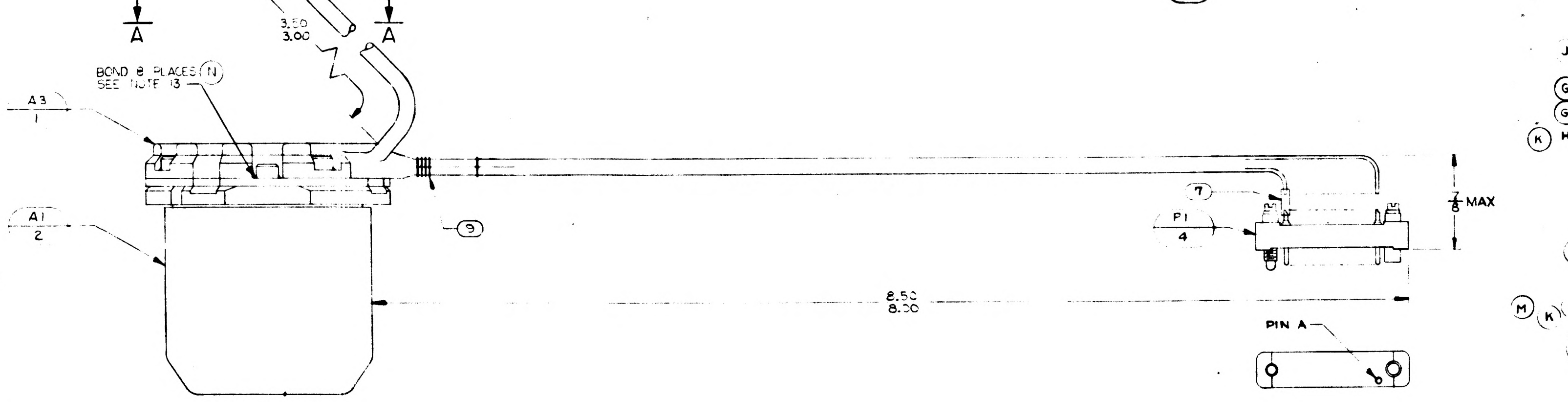


DETAIL A
SHIELDED WIRE TERMINATION
2 PLACES









NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING (6)
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM 2 AT INDICATED LOCATION USING ITEM 10 PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM 9
7. ITEM 10 TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 30°F ±10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
10. BOND ITEM 31 TO ITEM 3 AT INDICATED LOCATION PER ND1002004
11. MARK TERMINAL DESIGNATION .093/.073 HIGH ON ITEM 31 PER ND1002019
12. PIPA CALIBRATION MODULE, NASA DWG NO. 1007009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013
13. BOND SCREW TO HOUSING OR ALIGNMENT RING AFTER ALIGNMENT WITH BONDING AGENT PER ND1002004 TYPE II SEMI-RIGID

REPLACES REV E
WITH CHANGES

LIST OF PARTS AND MATERIALS

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	SHLD AND GROUND ASSY	1001472-2			33
1	SHLD AND GROUND ASSY	1001472-1			32
2	TERMINAL BOARD	1007014			31
2	WASHER, LOCK	MS35338-77			30
2	WASHER, FLAT, ROUND	MS15795-302			29
2	SCREW, BUT HD	1006783-93			28
1	POTENTIOMETER ASSY	1007089			27
	[illegible]				26
1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TOT. LG	25
1	WIRE, ELECTRICAL ET-28 WHT/RED		MIL-W-16878	16 TOT. LG	24
1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
1	RESISTOR, FIXED	1010251		SEE NOTE 5	19
1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
1	WIRE ELECTRICAL ET-28 WHT		MIL-W-16878	2½ TOT. LG.	17
~~2~~	~~INSULATION SLEEVING, ELECT. HEAT SHRINK~~				~~16~~
	[illegible]				~~15~~
	[illegible]				~~14~~
	[illegible]				~~13~~
1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	TOT. LG.	12
1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	TOT. LG.	11
A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	9
	~~WIRE~~ [illegible]				~~8~~
25	INSULATION SLEEVING, ELEC	1006776-18		5/16 LONG	7
A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
3	SCREW, BUT. HD, SOC, SPL	1000250-1			5
1	CONNECTOR	1000123			4
1	NETWORK SUB-ASS'Y	1007028			3
1	16 PIP MOD D	1000179			2
1	HEATER PLATE ASS'Y	1000134			1

SHEET 1	SHEET 2
R	R
P	P
N	K
M	K
L	K
K	K
J	G
H	G
G	G
F	—

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED | DATE 5-79-
CHECKED
DRAWN RGS 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE

PIP PRE-ALIGNED ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

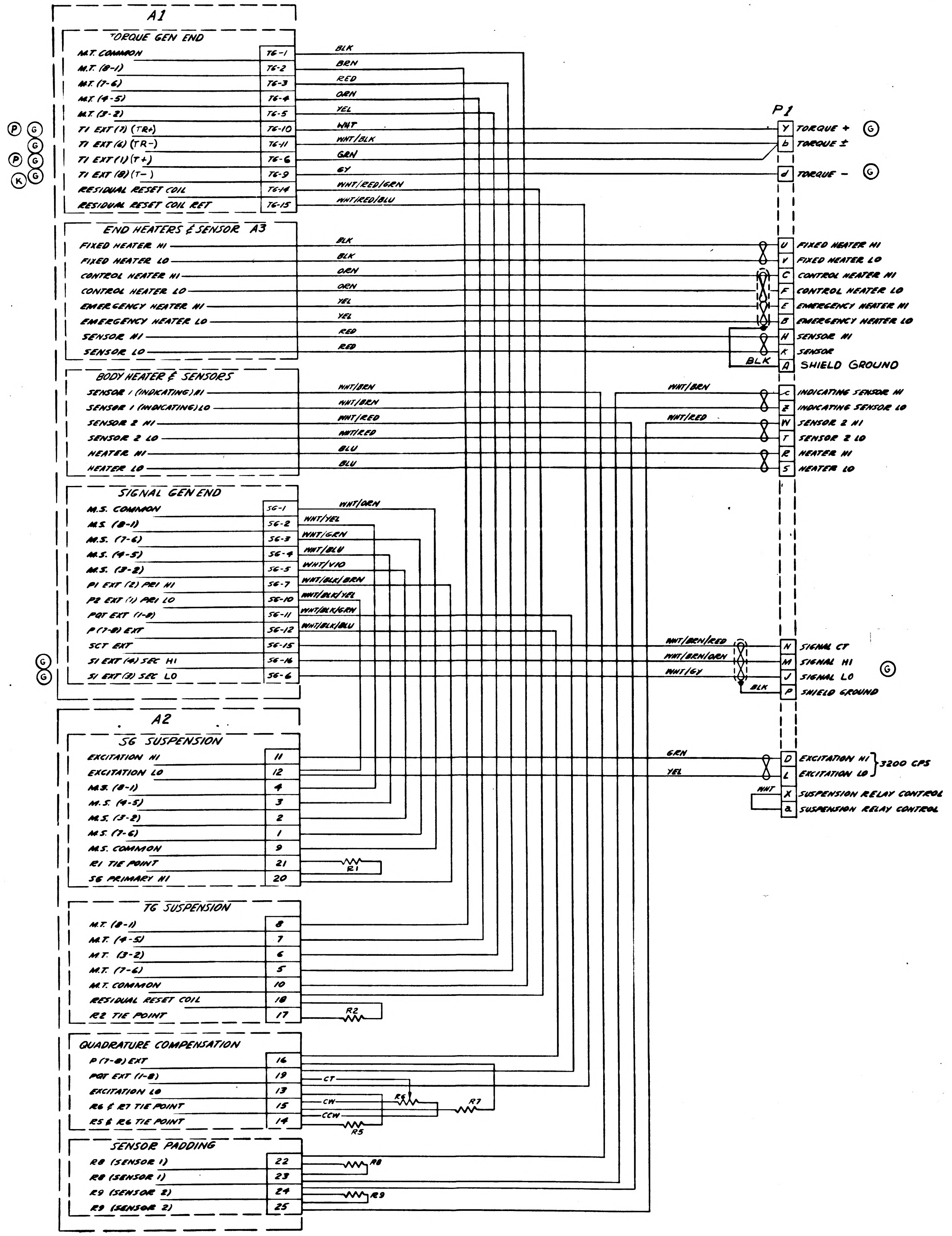
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF 2

6 5 4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 01670

SYM	DESCRIPTION	DATE	APPROVAL	
F	THIS SHEET ADDED TDRR 01670	5-1-63	ajs	
G	TDRR 02128	7-17-63	ajs	WK
K	TDRR 04045	10-23-63		WK
P	TDRR 09658	6-15-64	RS	
R	TDRR .0498	7-7-65	JN	


A1
TORQUE GEN END
M.T. COMMON
M.T. (8-1)
M.T. (7-6)
M.T. (4-5)
M.T. (3-2)
T1 EXT (7) (TR+)
T1 EXT (6) (TR−)
T1 EXT (1) (T+)
T1 EXT (8) (T−)
RESIDUAL RESET COIL
RESIDUAL RESET COIL RET
TG-1
TG-2
TG-3
TG-4
TG-5
TG-10
TG-11
TG-6
TG-9
TG-14
TG-15
P
G
G
P
G
K
G
BLK
BRN
RED
ORN
YEL
WHT
WHT/BLK
GRN
GY
WHT/RED/GRN
WHT/RED/BLU
END HEATERS & SENSOR A3
FIXED HEATER HI
FIXED HEATER LO
CONTROL HEATER HI
CONTROL HEATER LO
EMERGENCY HEATER HI
EMERGENCY HEATER LO
SENSOR HI
SENSOR LO
BLK
BLK
ORN
ORN
YEL
YEL
RED
RED
BODY HEATER & SENSORS
SENSOR 1 (INDICATING) HI
SENSOR 1 (INDICATING) LO
SENSOR 2 HI
SENSOR 2 LO
HEATER HI
HEATER LO
WHT/BRN
WHT/BRN
WHT/RED
WHT/RED
BLU
BLU
SIGNAL GEN END
M.S. COMMON
M.S. (8-1)
M.S. (7-6)
M.S. (4-5)
M.S. (3-2)
P1 EXT (2) PRI HI
P2 EXT (1) PRI LO
PQT EXT (1-8)
P (7-8) EXT
SCT EXT
S1 EXT (4) SEC HI
S1 EXT (3) SEC LO
SG-1
SG-2
SG-3
SG-4
SG-5
SG-7
SG-10
SG-11
SG-12
SG-15
SG-16
SG-6
G
G
WHT/ORN
WHT/YEL
WHT/GRN
WHT/BLU
WHT/VIO
WHT/BLK/BRN
WHT/BLK/YEL
WHT/BLK/GRN
WHT/BLK/BLU
A2
SG SUSPENSION
EXCITATION HI
EXCITATION LO
M.S. (8-1)
M.S. (4-5)
M.S. (3-2)
M.S. (7-6)
M.S. COMMON
R1 TIE POINT
SG PRIMARY HI
11
12
4
3
2
1
9
21
20
R1
TG SUSPENSION
M.T. (8-1)
M.T. (4-5)
M.T. (3-2)
M.T. (7-6)
M.T. COMMON
RESIDUAL RESET COIL
R2 TIE POINT
8
7
6
5
10
18
17
R2
QUADRATURE COMPENSATION
P (7-8) EXT
PQT EXT (1-8)
EXCITATION LO
R6 & R7 TIE POINT
R5 & R6 TIE POINT
16
19
13
15
14
CT
CW
CCW
R6
R7
R5
SENSOR PADDING
R8 (SENSOR 1)
R8 (SENSOR 1)
R9 (SENSOR 2)
R9 (SENSOR 2)
22
23
24
25
R8
R9
P1
Y TORQUE + G
b TORQUE ±
d TORQUE − G
U FIXED HEATER HI
V FIXED HEATER LO
C CONTROL HEATER HI
F CONTROL HEATER LO
E EMERGENCY HEATER HI
B EMERGENCY HEATER LO
H SENSOR HI
K SENSOR
BLK
A SHIELD GROUND
WHT/BRN
WHT/RED
c INDICATING SENSOR HI
Z INDICATING SENSOR LO
W SENSOR 2 HI
T SENSOR 2 LO
R HEATER HI
S HEATER LO
WHT/BRN/RED
WHT/BRN/ORN
WHT/GY
N SIGNAL CT
M SIGNAL HI
J SIGNAL LO
BLK
P SHIELD GROUND
G
GRN
YEL
D EXCITATION HI
L EXCITATION LO
3200 CPS
WHT
X SUSPENSION RELAY CONTROL
a SUSPENSION RELAY CONTROL

K

REF DESIG	PART NO	DESCRIPTION	VALUE	TOL %	RATING
A1	1000179	16 PIP MOD D			
A2	1007028	PIP SUSPENSION ASSY			
A3	1000134	HEATER PLATE ASSY			
P1	1000123	CONNECTOR-PLUG			
R1	1010251-	RESISTOR-FIXED		±1	1/4 W
R2	1010251			±1	1/4 W
R5	1010377-			±1	1/10 W
R6	1010373-25	-VARIABLE	50 K	±5	1 W
R7	1010377-	-FIXED		±1	1/10 W
R8	1010330-			±0.1	.035 W
R9	1010330-			±0.1	.035 W

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN THENO DATE 5-16-63
CHECKED WINBERG
APPROVAL A.E. Winberg
APPROVAL A J Boyce 6-15-63
NASA APPROVAL
MIT APPROVAL W Kupfer 19 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIP PRE-ALIGNED ASSY

CODE IDENT NO. | SIZE E | NASA DRAWING NO. 1000013
SCALE | WT | SHEET 2 OF 2

1000013 R

WIRING LEGEND

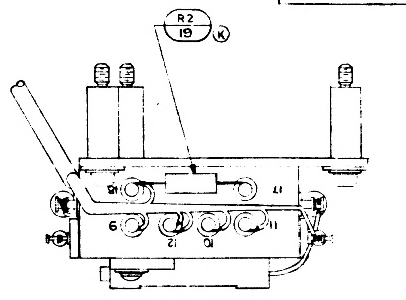
COND NO.	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	b	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	Y	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
13-3	YEL		1		4	E	8
13-4	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	
27-3	WHT/GY		2	SG-6	4	J	
27-B		33		SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	
13B		32		SHLD 13	4	A	

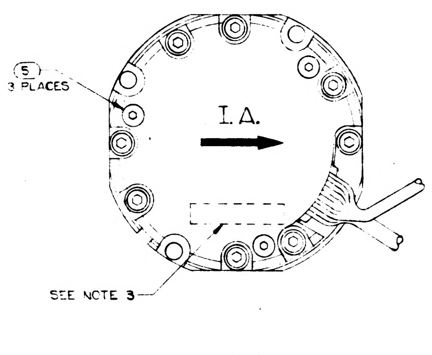
RESISTOR SELECTION CHART

R2	(K)	R1	(K)	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	4.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	-33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	16.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

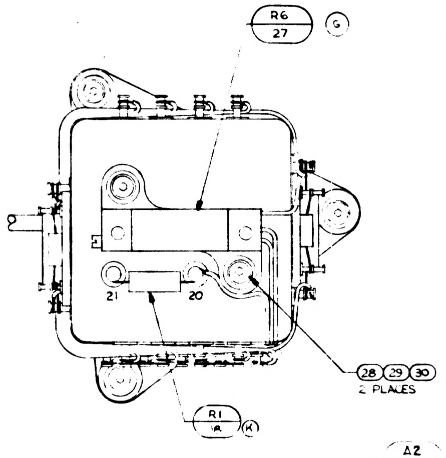
REVISIONS

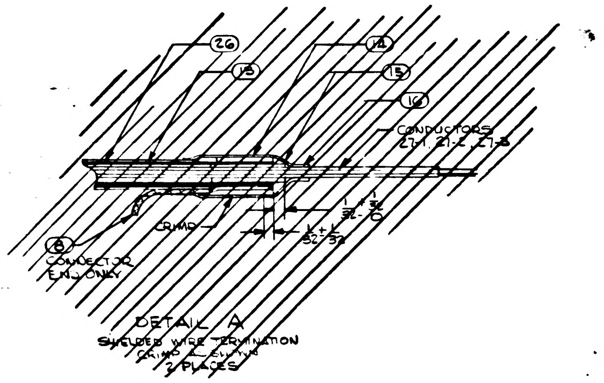
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-1-63	GJB	WK
	G	TDRR 02128	7-17-63	GJB	WK
	H	TDRR 03503	10-2-63		WK
	J	TDRR 03660	10-8-63		WK
	K	TDRR 04045	10-23-63		WK
	L	TDRR 04568	11-12-63		
	M	TDRR 04943	12-3-63		
	N	TDRR 06714	1-5-64		
	P	TDRR 09658	6-15-64	RB	
	R	TDRR 10498	7-7-64	JM	J.L.
	S	TDRR 10803	17 JUL 64	WP	J.E.



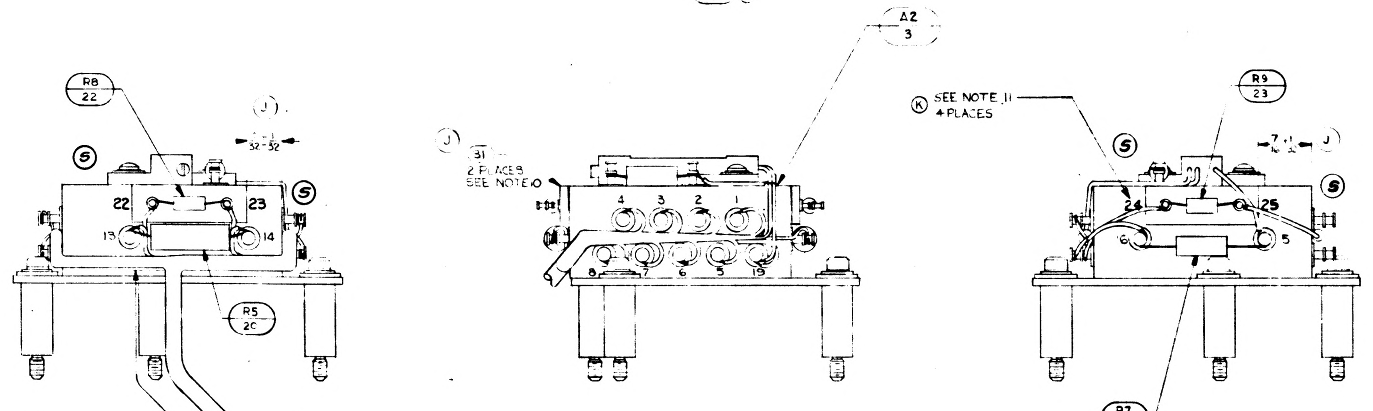


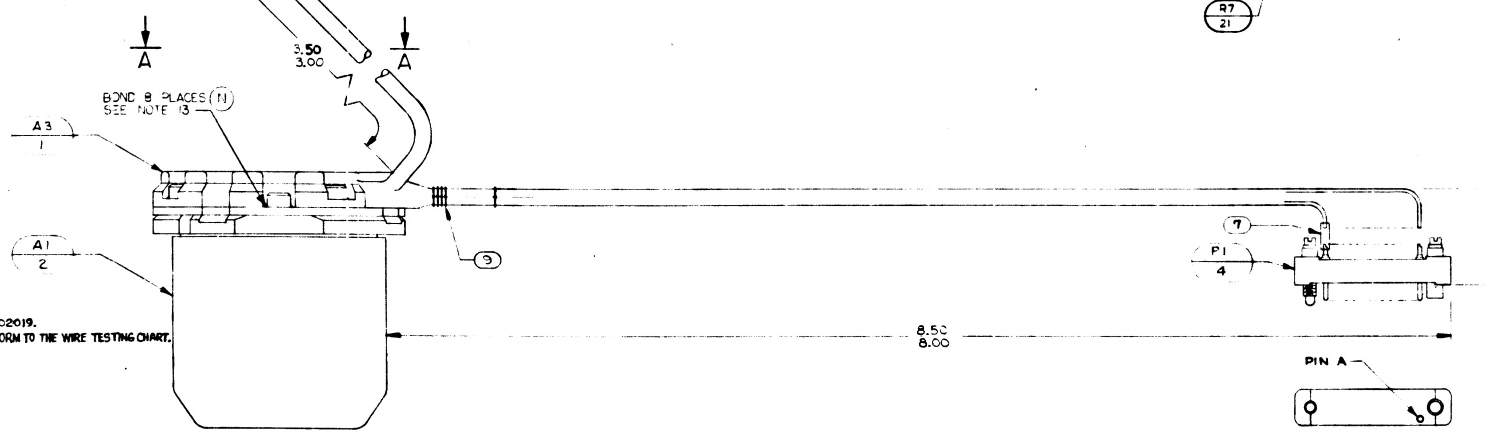
VIEW A-A





DETAIL A
SHIELDED WIRE TERMINATION CRIMP
2 PLACES





NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. (S) IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM 2 AT INDICATED LOCATION ~~USING ITEM 10 PER MIL-STD-130~~ PER ND1002019.
4. (S) TWISTED CONDUCTORS ~~TO HAVE 4 TURNS PER INCH MINIMUM~~. SHALL CONFORM TO THE WIRE TESTING CHART.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM 9
7. (S) ~~ITEM 10 TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508~~
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ±10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
10. (J) BOND ITEM 31 TO ITEM 3 AT INDICATED LOCATION PER ND1002004
11. (S) (K) MARK TERMINAL DESIGNATION .14/.10 HIGH ON ITEM 3 PER ND1002019.
12. (K) PIPA CALIBRATION MODULE, NASA DWG NO. 1007009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013
13. BOND SCREW TO HOUSING OR ALIGNMENT RING AFTER ALIGNMENT WITH BONDING AGENT PER ND1002004 TYPE II SEMI-RIGID

(S)

NO. OF LEADS	NO. OF FULL TURNS PER INCH MINIMUM	NO. OF FULL TURNS PER INCH MAXIMUM
2 OR 3	2	4
4 OR MORE	1	3

LIST OF PARTS AND MATERIALS

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	SHLD AND GROUND ASSY	1001472-2			33
1	SHLD AND GROUND ASSY	1001472-1			32
2	TERMINAL BOARD	1007014			31
2	WASHER, LOCK	MS35338-77			30
2	WASHER, FLAT, ROUND	MS15795-302			29
2	SCREW, BUT HD	1006783-93			28
1	POTENTIOMETER ASSY	1007089			27
					26
1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TOT. LG	25
1	WIRE, ELECTRICAL ET-28 WHT/RED		MIL-W-16878	[illegible] LG	24
1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
1	RESISTOR, FIXED	1010251		SEE NOTE 5	19
1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
1	WIRE, ELECTRICAL ET-28 WHT		MIL-W-16878	2½ TOT. LG.	17
~~2~~	~~HEAT SHRINK~~				~~16~~
					~~15~~
					~~14~~
					~~13~~
1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	[illegible] TOT. LG.	12
1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	5 TOT. LG.	11
~~A/R~~	~~INK, BLACK, FUNGUS PROOF~~		~~TT-I-558~~	~~SEE NOTE 7~~	~~10~~
A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	9
	~~WIRE ELECTRICAL~~				~~8~~
25	INSULATION SLEEVING, ELEC	1006776-18		5/16 LONG	7
A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
3	SCREW, BUT. HD, SOC, SPL	1000250-1			5
1	CONNECTOR	1000123			4
1	NETWORK SUB-ASS'Y	1007028			3
1	16 PIP MOD D	1000179			2
1	HEATER PLATE ASS'Y	1000134			1

SHEET 1	SHEET 2
S	R
R	R
P	P
N	K
M	K
L	K
K	K
J	G
H	G
G	G
F	—

REVISION STATUS OF SHEETS

REPLACES REV E
WITH CHANGES

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

APPROVED GJ Bryan | DATE 5-79-63
CHECKED
DRAWN RGS | 4-25-63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE

PIP PRE-ALIGNED ASSEMBLY

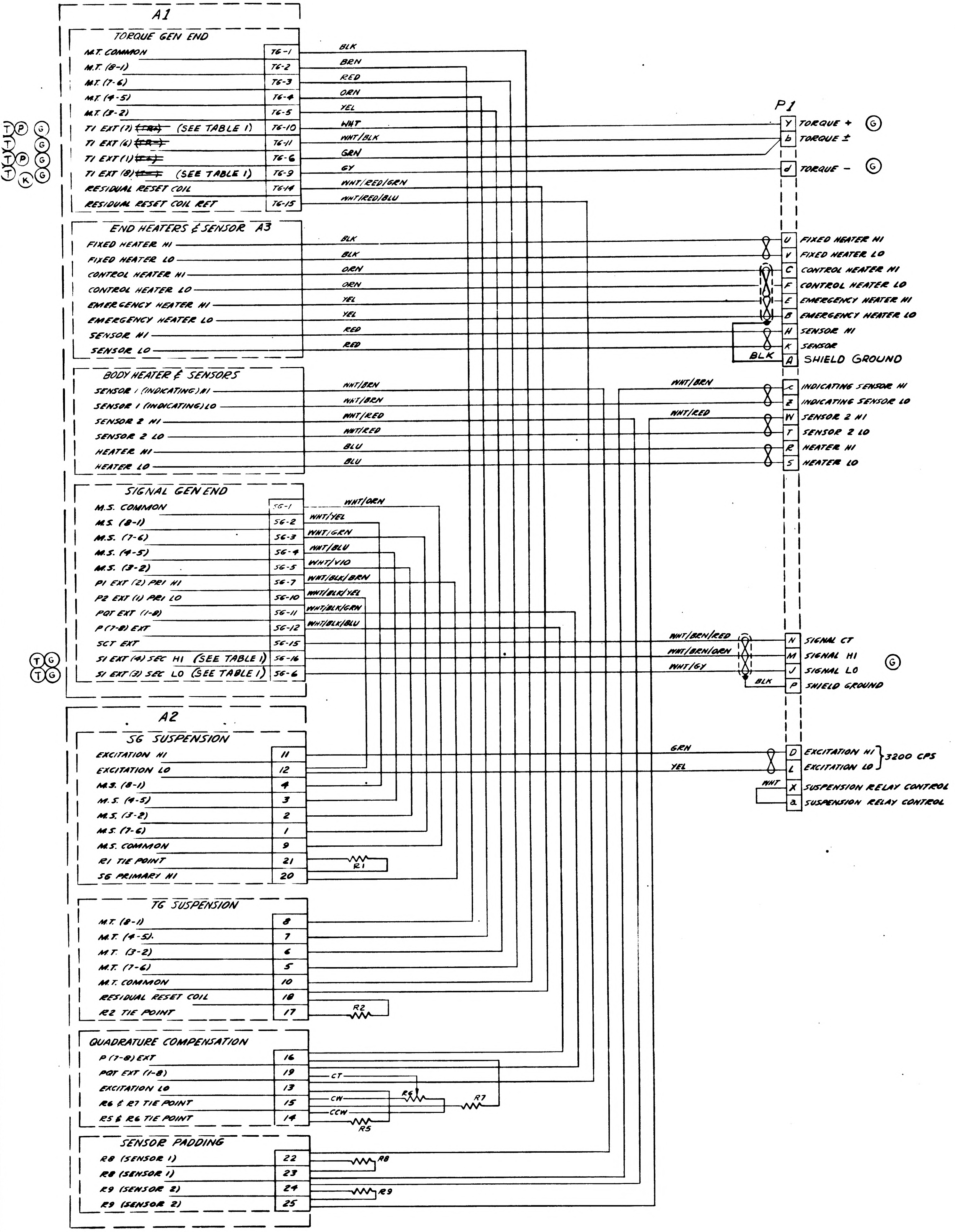
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 01670

SYM	DESCRIPTION	DATE	APPROVAL	
F	THIS SHEET ADDED TDRR 01670	5-1-63	GJB	
G	TDRR 02128	7-17-63	GJB	WK
K	TDRR 04045	10-23-63	[illegible]	WK
P	TDRR 09658	6-15-64	RS	[illegible]
R	TDRR 10498	7-7-64	JN	[illegible]
S	TDRR 10803	7 JUL 64	JWP	JEG
T	TDRR 11879	8 SEP 64	JWP	CP


A1
TORQUE GEN END
M.T. COMMON
M.T. (8-1)
M.T. (7-6)
M.T. (4-5)
M.T. (3-2)
TI EXT (7) (SEE TABLE 1)
TI EXT (6)
TI EXT (1)
TI EXT (8) (SEE TABLE 1)
RESIDUAL RESET COIL
RESIDUAL RESET COIL RET
TG-1
TG-2
TG-3
TG-4
TG-5
TG-10
TG-11
TG-6
TG-9
TG-14
TG-15
BLK
BRN
RED
ORN
YEL
WHT
WHT/BLK
GRN
GY
WHT/RED/GRN
WHT/RED/BLU
T P G
T G
T P G
T K G
END HEATERS & SENSOR A3
FIXED HEATER HI
FIXED HEATER LO
CONTROL HEATER HI
CONTROL HEATER LO
EMERGENCY HEATER HI
EMERGENCY HEATER LO
SENSOR HI
SENSOR LO
BLK
BLK
ORN
ORN
YEL
YEL
RED
RED
BODY HEATER & SENSORS
SENSOR 1 (INDICATING) HI
SENSOR 1 (INDICATING) LO
SENSOR 2 HI
SENSOR 2 LO
HEATER HI
HEATER LO
WHT/BRN
WHT/BRN
WHT/RED
WHT/RED
BLU
BLU
SIGNAL GEN END
M.S. COMMON
M.S. (8-1)
M.S. (7-6)
M.S. (4-5)
M.S. (3-2)
P1 EXT (2) PRI HI
P2 EXT (1) PRI LO
PQT EXT (1-8)
P (7-8) EXT
SCT EXT
S1 EXT (4) SEC HI (SEE TABLE 1)
S1 EXT (3) SEC LO (SEE TABLE 1)
SG-1
SG-2
SG-3
SG-4
SG-5
SG-7
SG-10
SG-11
SG-12
SG-15
SG-16
SG-6
WHT/ORN
WHT/YEL
WHT/GRN
WHT/BLU
WHT/VIO
WHT/BLK/BRN
WHT/BLK/YEL
WHT/BLK/GRN
WHT/BLK/BLU
T G
T G
A2
SG SUSPENSION
EXCITATION HI 11
EXCITATION LO 12
M.S. (8-1) 4
M.S. (4-5) 3
M.S. (3-2) 2
M.S. (7-6) 1
M.S. COMMON 9
R1 TIE POINT 21
SG PRIMARY HI 20
R1
TG SUSPENSION
M.T. (8-1) 8
M.T. (4-5) 7
M.T. (3-2) 6
M.T. (7-6) 5
M.T. COMMON 10
RESIDUAL RESET COIL 18
R2 TIE POINT 17
R2
QUADRATURE COMPENSATION
P (7-8) EXT 16
PQT EXT (1-8) 19
EXCITATION LO 13
R6 & R7 TIE POINT 15
R5 & R6 TIE POINT 14
CT
CW
CCW
R5
R6
R7
SENSOR PADDING
R8 (SENSOR 1) 22
R8 (SENSOR 1) 23
R9 (SENSOR 2) 24
R9 (SENSOR 2) 25
R8
R9
P1
Y TORQUE + G
b TORQUE ±
d TORQUE − G
U FIXED HEATER HI
V FIXED HEATER LO
C CONTROL HEATER HI
F CONTROL HEATER LO
E EMERGENCY HEATER HI
B EMERGENCY HEATER LO
H SENSOR HI
K SENSOR
A SHIELD GROUND
BLK
WHT/BRN
WHT/RED
c INDICATING SENSOR HI
Z INDICATING SENSOR LO
W SENSOR 2 HI
T SENSOR 2 LO
R HEATER HI
S HEATER LO
WHT/BRN/RED
WHT/BRN/ORN
WHT/GY
BLK
N SIGNAL CT
M SIGNAL HI
J SIGNAL LO
P SHIELD GROUND
G
GRN
YEL
WHT
D EXCITATION HI
L EXCITATION LO
3200 CPS
X SUSPENSION RELAY CONTROL
a SUSPENSION RELAY CONTROL

REF DESIG	PART NO	DESCRIPTION	VALUE	TOL %	RATING
A1	1000179	16 PIP MOD D			
A2	1007028	PIP SUSPENSION ASSY			
A3	1000134	HEATER PLATE ASSY			
P1	1000123	CONNECTOR-PLUG			
R1	1010251-	RESISTOR-FIXED		±1	1/4 W
R2	1010251			±1	1/4 W
R5	1010377-			±1	1/10 W
R6	1010373-25	-VARIABLE	50 K	±5	1 W
R7	1010377-	-FIXED		±1	1/10 W
R8	1010330-			±0.1	.035 W
R9	1010330-			±0.1	.035 W

(K)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN THENO DATE 5-16-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL G J Bogan 6-19-63
NASA APPROVAL
MIT APPROVAL W Kupfer 19 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIP PRE-ALIGNED ASSY

CODE IDENT NO. | SIZE E | NASA DRAWING NO 1000013
SCALE | WT | SHEET 2 OF 2

WIRING LEGEND

COND NO	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	b	
Ⓣ 7	GY		2	TG-9	4	SEE TABLE I	
Ⓣ 8	WHT		2	TG-10	4		
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
2-1	BLK		1		4	U	8
2-2	BLK		1		4	V	
3-1	ORN		1		4	C	8
3-2	ORN		1		4	F	
3-3	YEL		1		4	E	8
3-4	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	C	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
Ⓣ 27-2	WHT/BRN/ORN		2	SG-16	4	SEE TABLE I	
Ⓣ 27-3	WHT/GY		2	SG-6	4		
27-S		33		SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	7	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	
13B		32		SHLD 13	4	A	

Ⓣ
TABLE I

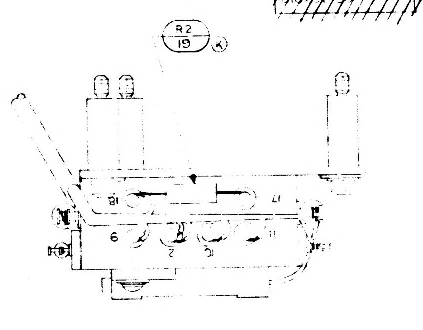
TYPE I APPLICABLE TO PIPS MIT DWG NO'S 96180, 113600-1, 113600-2, & 113600-6		TYPE II APPLICABLE TO PIPS MIT DWG NO'S 113600-3, 113600-4, & 113600-5.	
FROM TERM	TO TERM	FROM TERM	TO TERM
TG-9	d	TG-9	Y
TG-10	Y	TG-10	d
SG-6	J	SG-6	M
SG-16	M	SG-16	J

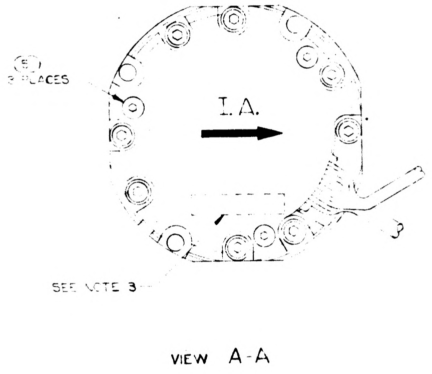
RESISTOR SELECTION CHART

R1		R5 AND R7		R8 AND R9					
1010225-32	16.5	010377-33	1.0K	1010330-1	0.0	1010330-23	4.4	1010330-45	18.8
-33	21.4	-38	22.5K	-2	0.2	-24	14.6	-46	19.0
-34	27.0	-40	45.0K	-3	0.4	-25	14.8	-47	19.2
-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
		-44	134.5K	-7	11.2	-29	15.6	-51	20.0
		-45	157.0K	-8	11.4	-30	15.8		
		-46	179.5K	-9	11.6	-31	16.0		
		-47	202.5K	-10	11.8	-32	16.2		
		-48	225.0K	-11	12.0	-33	16.4		
				-12	12.2	-34	16.6		
				-13	12.4	-35	16.8		
				-14	12.6	-36	17.0		
				-15	12.8	-37	17.2		
				-16	13.0	-38	17.4		
				-17	13.2	-39	17.6		
				-18	13.4	-40	17.8		
				-19	13.6	-41	18.0		
				-20	13.8	-42	18.2		
				-21	14.0	-43	18.4		
				-22	14.2	-44	18.6		

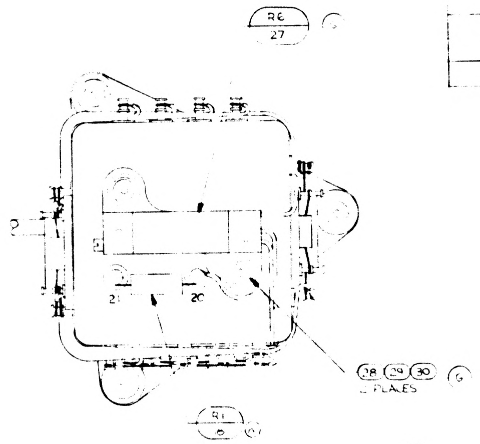
REVISIONS

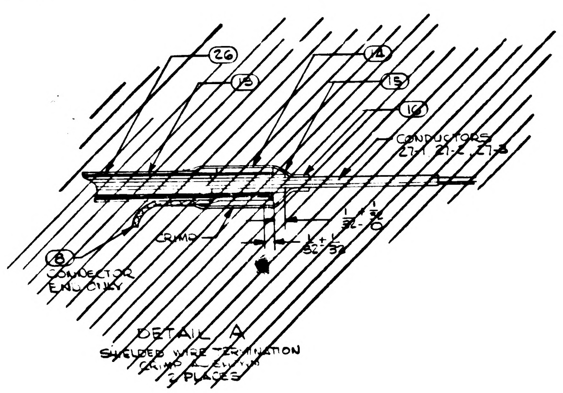
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	F	REPLACES REV E WITH CHANGES TDRR 01670	5- -63	
	G	TDRR 02128	7-17-63	
	H	TDRR 03503	10-2-63	
	J	TDRR 03[illegible]	10-8-63	
	K	TDRR 04045	10-23-63	
	L	TDRR 04568	11-12-63	
	M	TDRR 04943	12-3-63	
	N	[illegible]		
	P	TDRR 09658	6-15-64	EB
	R	TDRR 10498	7-7-64	JM
	S	TDRR 10803	17 JUL 64	WP J.E.G.
	T	TDRR 11879	9 SEP	WP
	U	TDRR 13378	20 OCT	



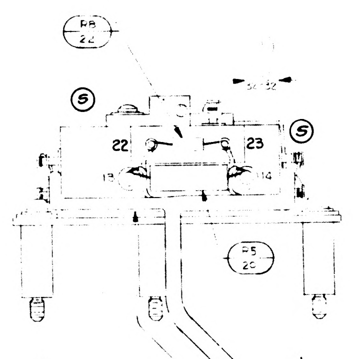


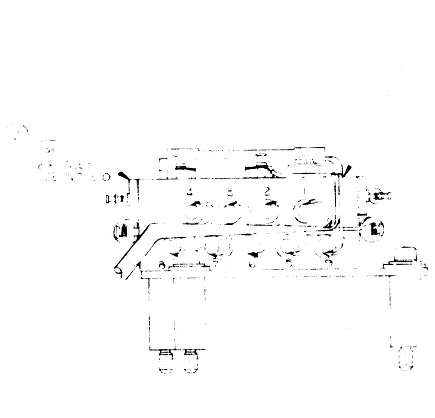
VIEW A-A

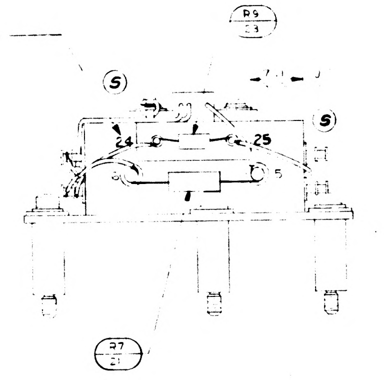


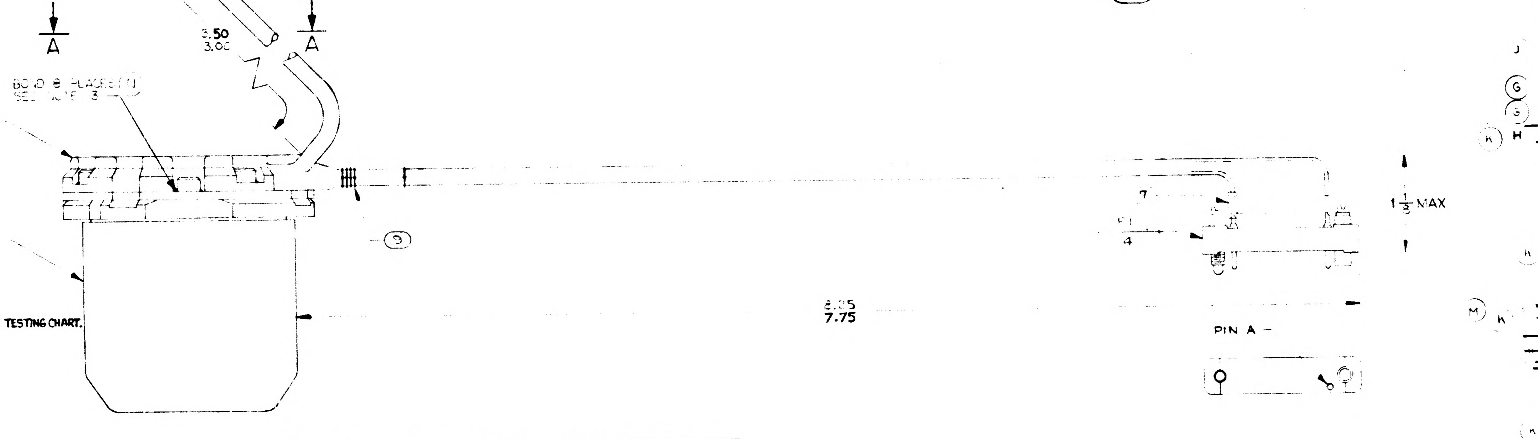


DETAIL A
SHIELDED WIRE TERMINATION
2 PLACES









NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING (6)
Ⓢ 3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM 2 AT INDICATED LOCATION ~~[illegible]~~ PER ND1002019.
Ⓢ 4. TWISTED CONDUCTORS ~~[illegible]~~. SHALL CONFORM TO THE WIRE TESTING CHART.
5. SELECT PER RESISTOR SELECTION CHART
6. LACE CABLE USING ITEM 9
Ⓢ ~~7. ITEM 10 TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508~~
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 30°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
10. BOND ITEM 31 TO ITEM 3 AT INDICATED LOCATION PER ND1002004
Ⓢ 11. MARK TERMINAL DESIGNATION .14/.10 HIGH ON ITEM (3) PER ND1002019.
12. PIPA CALIBRATION MODULE, NASA DWG NO. 1017009, TO BE CALIBRATED, SERIALIZED, AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013
13. BOND SCREW TO HOUSING OR ALIGNMENT RING AFTER ALIGNMENT WITH BONDING AGENT PER ND 1002004 TYPE II SEMI RIGID

Ⓢ

NO. OF LEADS	NO. OF FULL TURNS PER INCH MINIMUM	NO. OF FULL TURNS PER INCH MAXIMUM
2 OR 3	2	4
4 OR MORE	1	3

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	SHLD AND GROUND ASSY	1001472-2			33
1	SHLD AND GROUND ASSY	1001472-1			32
1	TERMINAL BOARD	[illegible]			31
2	WASHER, LOCK	MS35338-77			30
2	WASHER, FLAT, ROUND	MS15795-302			29
2	SCREW, BUT HD	006783-93			28
	POTENTIOMETER [illegible]	[illegible]			27
	~~[illegible]~~				26
1	WIRE, ELECTRICAL ET-28 WHT BRN		MIL-W-16878	16 TO G	25
1	WIRE, ELECTRICAL		MIL-W-16878	G	24
	RESISTOR, FIXED	1010330		SEE NOTE 5	23
1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
	RESISTOR, FIXED	1010377		SEE NOTE 5	20
1	RESISTOR, FIXED	10[illegible]-38		SEE NOTE 5	19
1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	WIRE, ELECTRICAL ET-28		MIL-W-16878		17
	~~INSULATION SLEEVING ELEC~~				16
	~~HEAT SHRINK~~				15
	~~[illegible]~~				14
	~~[illegible]~~				13
	WIRE, ELECTRICAL ET-28		MIL-W-16878	5" TO	12
	WIRE, ELECTRICAL ET-28 BRN		MIL-W-16878	5" TO	11
~~A/R~~	~~INK, BLACK, FUNGUS PROOF~~		~~TT-I-558~~	~~SEE NOTE 7~~	10
A/R	TAPE, NYLON, WAXED		MIL-T-713		9
	~~[illegible]~~				8
A/R	INSULATION SLEEVING ELEC	1006770-18		5/16 LONG	7
A/R	SOLDER CONT SN60WARP2		QQ-S-571		6
3	SCREW, BUT. HD. SOC,	1000[illegible]			5
1	CONNECTOR	1000123			4
1	NETWORK SUB-ASSY	[illegible]			3
1	16 PIP MOD D	1000179			2
1	HEATER PLATE ASSY	1000[illegible]			1

LIST OF PARTS AND MATERIALS

SHEET 1	SHEET 2
J	U
T	T
S	R
R	R
P	P
N	K
M	K
L	K
K	K
J	G
H	G
G	G
F	—

REVISION STATUS OF SHEETS

REPLACES REV E
WITH CHANGES

NEXT ASSY	USED ON
1000007	[illegible]

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN RGS
APPROVED FOR MSC
MIT/IL APPROVAL DATE
W Kapp

PIP PRE-ALIGNED ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

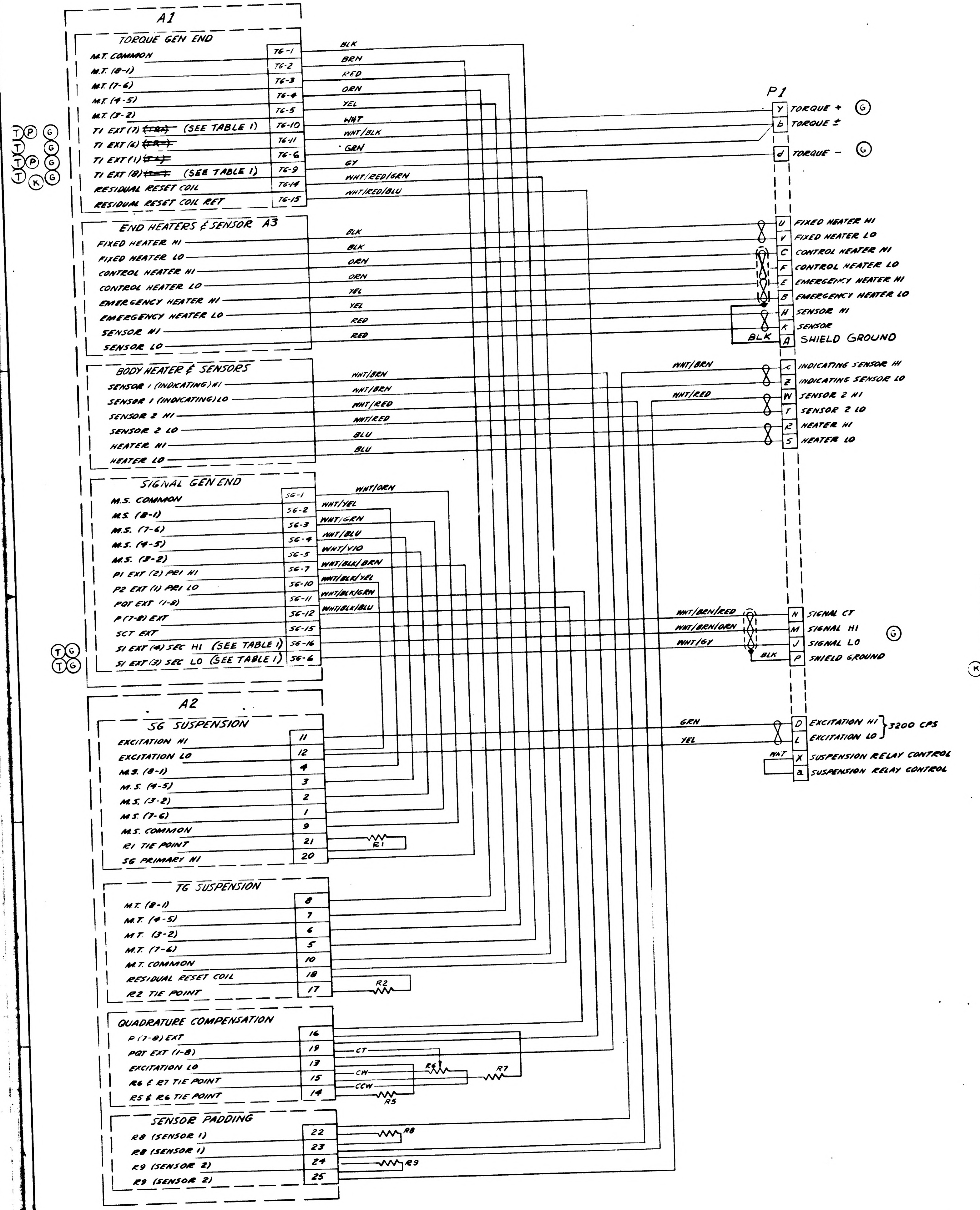
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET OF

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 01670

SYM	DESCRIPTION	DATE	APPROVAL	
F	THIS SHEET ADDED TDRR 01670	5-1-63	OJB	
G	TDRR 02128	7-17-63	OJB	WK
K	TDRR 04045	10-[illegible]-63	[illegible]	WK
P	TDRR 09658	5-64	R3	[illegible]
R	TDRR 10498	7-7-64	JN	[illegible]
S	TDRR 10803	7 JUL 64	JWP	J.E.G
T	TDRR 11879	9 SEP 64	JWP	CP
U	TDRR 13378	2 OCT 64	JWP	[illegible]


A1
TORQUE GEN END
M.T. COMMON
M.T. (8-1)
M.T. (7-6)
M.T. (4-5)
M.T. (3-2)
TI EXT (7) (SEE TABLE 1)
TI EXT (6)
TI EXT (1)
TI EXT (8) (SEE TABLE 1)
RESIDUAL RESET COIL
RESIDUAL RESET COIL RET
TG-1
TG-2
TG-3
TG-4
TG-5
TG-10
TG-11
TG-6
TG-9
TG-14
TG-15
T P G
T G
T P G
T K G
BLK
BRN
RED
ORN
YEL
WHT
WHT/BLK
GRN
GY
WHT/RED/GRN
WHT/RED/BLU
END HEATERS & SENSOR A3
FIXED HEATER HI
FIXED HEATER LO
CONTROL HEATER HI
CONTROL HEATER LO
EMERGENCY HEATER HI
EMERGENCY HEATER LO
SENSOR HI
SENSOR LO
BLK
BLK
ORN
ORN
YEL
YEL
RED
RED
BODY HEATER & SENSORS
SENSOR 1 (INDICATING) HI
SENSOR 1 (INDICATING) LO
SENSOR 2 HI
SENSOR 2 LO
HEATER HI
HEATER LO
WHT/BRN
WHT/BRN
WHT/RED
WHT/RED
BLU
BLU
SIGNAL GEN END
M.S. COMMON
M.S. (8-1)
M.S. (7-6)
M.S. (4-5)
M.S. (3-2)
P1 EXT (2) PRI HI
P2 EXT (1) PRI LO
PQT EXT (1-8)
P (7-8) EXT
SCT EXT
S1 EXT (4) SEC HI (SEE TABLE 1)
S1 EXT (3) SEC LO (SEE TABLE 1)
SG-1
SG-2
SG-3
SG-4
SG-5
SG-7
SG-10
SG-11
SG-12
SG-15
SG-16
SG-6
T G
T G
WHT/ORN
WHT/YEL
WHT/GRN
WHT/BLU
WHT/VIO
WHT/BLK/BRN
WHT/BLK/YEL
WHT/BLK/GRN
WHT/BLK/BLU
A2
SG SUSPENSION
EXCITATION HI
EXCITATION LO
M.S. (8-1)
M.S. (4-5)
M.S. (3-2)
M.S. (7-6)
M.S. COMMON
R1 TIE POINT
SG PRIMARY HI
11
12
4
3
2
1
9
21
20
R1
TG SUSPENSION
M.T. (8-1)
M.T. (4-5)
M.T. (3-2)
M.T. (7-6)
M.T. COMMON
RESIDUAL RESET COIL
R2 TIE POINT
8
7
6
5
10
18
17
R2
QUADRATURE COMPENSATION
P (7-8) EXT
PQT EXT (1-8)
EXCITATION LO
R6 & R7 TIE POINT
R5 & R6 TIE POINT
16
19
13
15
14
CT
CW
CCW
R6
R7
R5
SENSOR PADDING
R8 (SENSOR 1)
R8 (SENSOR 1)
R9 (SENSOR 2)
R9 (SENSOR 2)
22
23
24
25
R8
R9
P1
Y TORQUE + G
b TORQUE ±
d TORQUE − G
U FIXED HEATER HI
V FIXED HEATER LO
C CONTROL HEATER HI
F CONTROL HEATER LO
E EMERGENCY HEATER HI
B EMERGENCY HEATER LO
H SENSOR HI
K SENSOR
BLK
A SHIELD GROUND
WHT/BRN
c INDICATING SENSOR HI
Z INDICATING SENSOR LO
WHT/RED
W SENSOR 2 HI
T SENSOR 2 LO
R HEATER HI
S HEATER LO
WHT/BRN/RED
WHT/BRN/ORN
WHT/GY
N SIGNAL CT
M SIGNAL HI
J SIGNAL LO
G
BLK
P SHIELD GROUND
GRN
YEL
D EXCITATION HI
L EXCITATION LO
3200 CPS
WHT
X SUSPENSION RELAY CONTROL
a SUSPENSION RELAY CONTROL

REF DESIG	PART NO	DESCRIPTION	VALUE	TOL %	RATING
A1	1000179	16 PIP MOD D			
A2	1007028	PIP SUSPENSION ASSY			
A3	1000134	HEATER PLATE ASSY			
P1	1000123	CONNECTOR - PLUG			
				±1	1/4 W
R1	1010251-	RESISTOR - FIXED	18.8	±1	1/4 W
R2	1010251-38			±1	1/10 W
R5	1010377-		50K	±5	1 W
R6	1010373-25	- VARIABLE		±1	1/10 W
R7	1010377-	- FIXED		±0.1	.035 W
R8	1010330-			±0.1	.035 W
R9	1010330-				

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN THENO DATE 5-16-63
CHECKED WINBERG
APPROVAL A.E. Winberg
APPROVAL A.J. Boyce 6-19-63
NASA APPROVAL
MIT APPROVAL W Kupfer 19 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PIP PRE-ALIGNED ASSY

CODE IDENT NO
SIZE E
NASA DRAWING NO 1000013
SCALE
WT
SHEET 2 OF 2

WIRING LEGEND

COND NO	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	b	
7	GY		2	TG-9	4	SEE TABLE I	
8	WHT		2	TG-10	4		
9	WHT/BLK		2	[illegible]	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	
13-2	ORN		1		4	F	
13-3	YEL		1		4	E	
13-4	YEL		1		4	B	
15-1	RED		1		4	H	
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	3	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	9	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	
27-2	WHT/BRN/ORN		2	SG-16	4	SEE TABLE I	
27-3	WHT/GY		2	SG-6	4		
27-B		33		SHLD 27	4	[illegible]	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	[illegible]	11	3	11	4	D	
29-2	YEL	12	3	12	4	[illegible]	
30	WHT	7	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	
13B		32		SHLD 13	4	A	

TABLE I

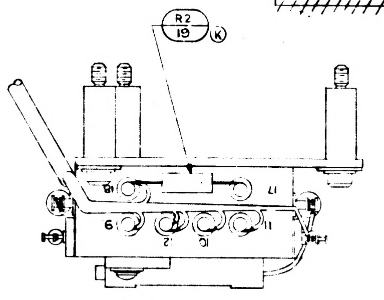
TYPE I APPLICABLE TO PIPS MIT DWG NO'S 96180, 113600-1, 113600-2, & 113600-6		TYPE II APPLICABLE TO PIPS MIT DWG NO'S 113600-3, 113600-4, & 113600-5.	
FROM TERM	TO TERM	FROM TERM	TO TERM
TG-9	d	TG-9	Y
TG-10	Y	TG-10	d
SG-6	J	SG-6	M
SG-16	M	SG-16	J

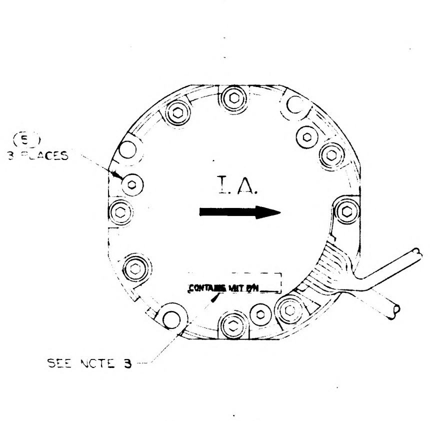
RESISTOR SELECTION CHART

R3	(K)	R1	(K)	R5 AND R7		R8 AND R9					
1010251-37	20.7	1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	4.4	1010330-45	18.8
1010251-38	18.8	-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
		-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
		-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
		-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-39	44.0	-43	112.0K	-6	11.0	-28	15.4	-50	19.8
				-44	134.5K	-7	11.2	-29	15.6	-51	20.0
				-45	157.0K	-8	11.4	-30	15.8		
				-46	179.5K	-9	11.6	-31	16.0		
				-47	202.5K	-10	11.8	-32	16.2		
				-48	225.0K	-11	12.0	33	16.4		
						-12	12.2	-34	16.6		
						-13	12.4	-35	6.8		
						-14	12.6	-36	17.0		
						-15	12.8	-37	17.2		
						-16	13.0	-38	17.4		
						-17	13.2	-39	17.6		
						-18	13.4	-40	17.8		
						-19	13.6	-41	18.0		
						-20	13.8	-42	18.2		
						-21	14.0	-43	18.4		
						-22	14.2	-44	18.6		

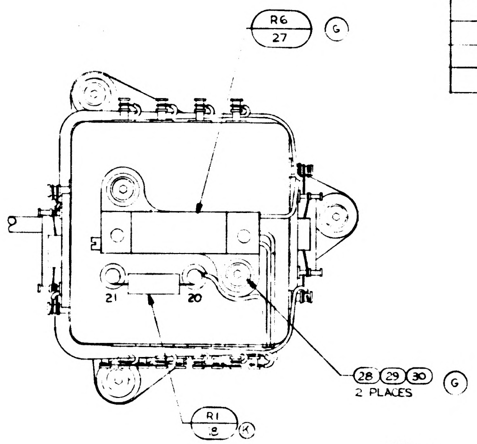
REVISIONS

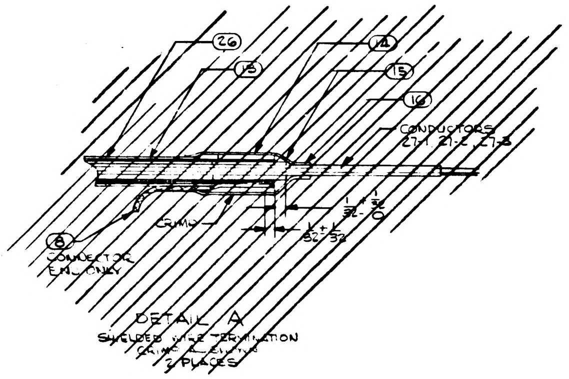
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-[illegible]-63	[illegible]	[illegible]
	G	TDRR 02128	7-17-63	[illegible]	[illegible]
	H	TDRR 03503	10-2-63	[illegible]	[illegible]
	J	TDRR [illegible]	10-8-63	[illegible]	[illegible]
	K	TDRR 04045	10-23-63	[illegible]	[illegible]
	L	TDRR 04568	11-12-63	[illegible]	[illegible]
	M	TDRR 04943	12-3-63	[illegible]	[illegible]
	N	TDRR [illegible]	[illegible]	[illegible]	[illegible]
	P	TDRR 09658	6-15-64	ER	[illegible]
	R	TDRR 10498	7-7-64	JM	[illegible]
	S	TDRR 10803	17 JUL 64	JWP	I.E.G.
	T	TDRR 11879	9 SEP [illegible]	JWP	[illegible]
	U	TDRR 13378	20 OCT [illegible]	JWP	[illegible]
	V	TDRR 6322	12 FEB 65	JWP	[illegible]
	W	REVISED PER TDRR 25003	10 JAN 66	[illegible]	[illegible]





VIEW A-A



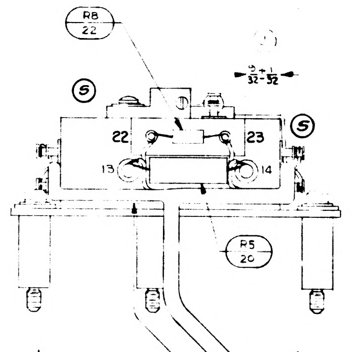


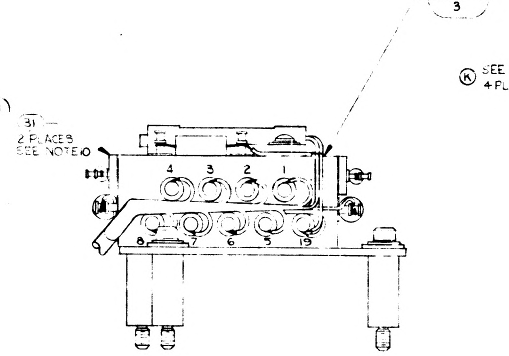
DETAIL A

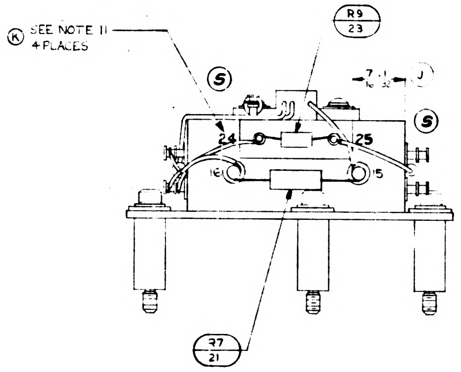
SHIELDED WIRE TERMINATION

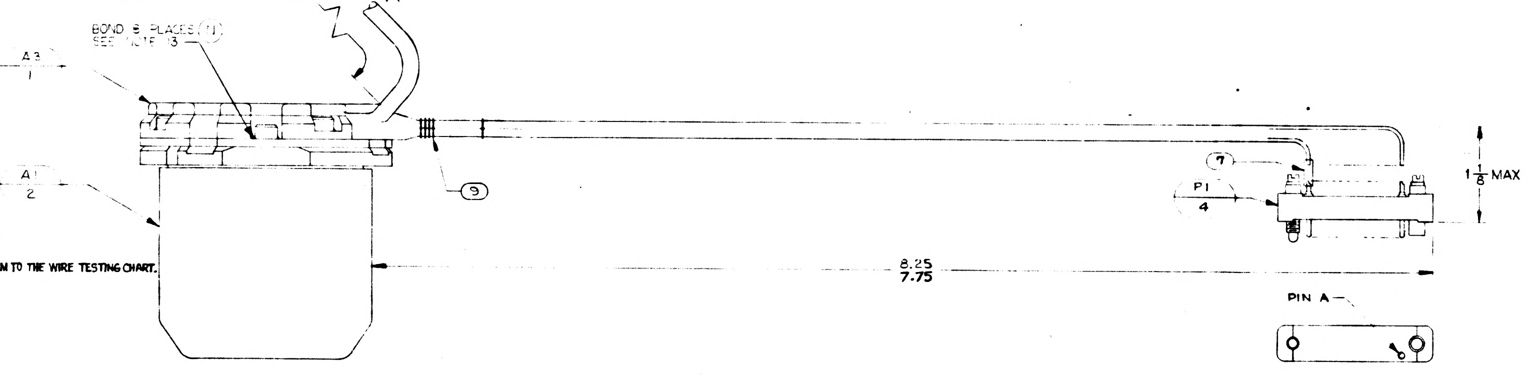
(CRIMP FERRULE)

2 PLACES









NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING (6)
3. IDENTIFY USING [illegible], REVISION LETTER, THE MIT/IL PART NO., AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION PER ND1002019.
4. TWIST CONDUCTORS ~~[illegible]~~ SHALL CONFORM TO THE WIRE TESTING CHART.
5. SELECT RESISTORS FROM RESISTOR SELECTION CHART
6. LACE CABLE USING ITEM 9
~~7. ITEM 10 TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508~~
8. [illegible] REQUIREMENTS OF ATP [illegible]
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, [illegible] ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.
10. BOND ITEM [illegible] TO ITEM 3 AT INDICATED LOCATION PER ND1002004
11. MARK TERMINAL DESIGNATION .14/.10 HIGH ON ITEM (3) PER ND1002013.
12. PIPA CALIBRATION [illegible], NASA DWG NO. 10[illegible]7009, TO BE CALIBRATED, SERIALIZED AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY PER ATP 1000013
13. BOND SCREW TO HOUSING OR ALIGNMENT RING AFTER ALIGNMENT WITH ADHESIVE, ITEM (34).

NO. OF LEADS	NO. OF FULL TURNS PER INCH MINIMUM	NO. OF FULL TURNS PER INCH MAXIMUM
2 OR 3	2	4
4 OR MORE	1	3

SHEET 1	SHEET 2
W	V
V	V
U	U
T	T
S	R
R	R
P	P
N	K
M	K
L	K
K	K
J	G
H	G
G	G
F	–

REVISION STATUS OF SHEETS

REPLACES REV E
WITH CHANGES

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

LIST OF PARTS AND MATERIALS

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	ADHESIVE EPOXY	2021529		SEE NOTE 13	34
1	SHLD AND GROUND ASSY	1001472-2			33
1	SHLD AND GROUND ASSY	1001472-1			32
2	TERMINAL BOARD	[illegible]			31
2	WASHER, LOCK	MS35338-77			30
2	WASHER, FLAT, ROUND	MS15795-302			29
2	SCREW, BUT HD	1006783-93			28
[illegible]	POTENTIOMETER ASSY	[illegible]			27
~~[illegible]~~	~~[illegible]~~				26
1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16 TO[illegible] LG	25
1	WIRE, ELECTRICAL [illegible]		MIL-W-16878	[illegible] LG	24
1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
1	RESISTOR, FIXED	1010251-38		SEE NOTE 5	19
1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
	WIRE ELECTRICAL ET-28 WHT		MIL-W-16878	2½ TO LG.	17
~~[illegible]~~	~~INSULATION SLEEVING, ELECT.~~ ~~HEAT SHRINK~~				16
~~[illegible]~~	~~[illegible]~~	~~[illegible]~~			15
~~[illegible]~~	~~[illegible]~~	~~[illegible]~~			14
~~[illegible]~~	~~BRAID WIRE [illegible]~~		~~[illegible]~~	~~[illegible]~~	13
1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	15" TO LG.	12
	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	15" TO LG.	11
~~A/R~~	~~INK, BLACK, FUNGUS PROOF~~		~~TT-I-1558~~	~~[illegible]~~	~~10~~
A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE [illegible]	9
	~~[illegible]~~		~~[illegible]~~	~~[illegible]~~	~~8~~
[illegible]	INSULATION SLEEVING, ELEC	1006776-18		5/16 LONG	7
A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
3	SCREW, BUT. HD. SOC, [illegible]	1000250-1			5
1	CONNECTOR	1000123			4
1	NETWORK SUB ASS'Y	1001028			3
1	16 PIP MOD D	1000179			2
1	HEATER PLATE ASS'Y	1000134			1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153

		DATE
APPROVED	[illegible]	5-9-63
CHECKED		
DRAWN	RGS	4-[illegible]-63
APPROVED FOR MSC		
MIT/IL APPROVAL	W Kupp[illegible]	DATE [illegible]

PIP PRE-ALIGNED ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000013

SHEET OF

1000013

REVISIONS TDRR 00334

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NUMBER	DESCRIPTION	QUANITY
1000134	Heater Plate Assembly	1
1000123	Connector Elect. Plug, 26 Contact.	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	2/6/63
CHECKED		
DRAWN	ROSE	1-25-63

APPROVED FOR MSC
William J. [illegible] 7 Feb 63

MIT/IL APPROVAL	DATE
	6 Feb 63

PIP PREALIGNED
ASSEMBLY

SCALE | UNIT WT. | CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000013

SHEET OF

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	F	REPLACES REV E WITH CHANGES TDRR 01670	5-63		

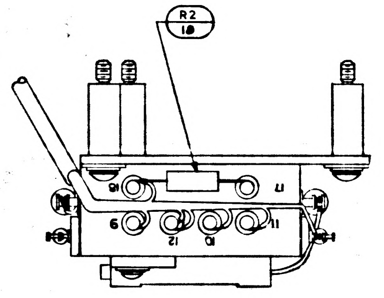
WIRING LEGEND

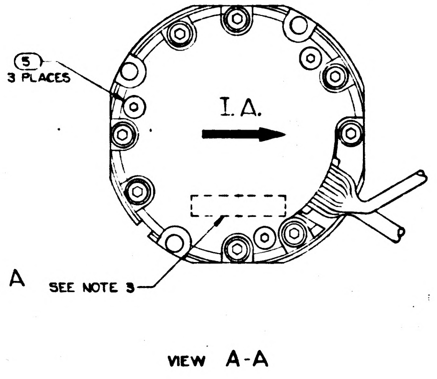
COND NO.	COLOR	FIND NO.	FROM ITEM	FROM TERM.	TO ITEM	TO TERM	TWIST
1	BLK		2	TG-1	3	10	
2	BRN		2	TG-2	3	8	
3	RED		2	TG-3	3	5	
4	ORN		2	TG-4	3	7	
5	YEL		2	TG-5	3	6	
6	GRN		2	TG-6	4	Y	
7	GY		2	TG-9	4	d	
8	WHT		2	TG-10	4	b	
9	WHT/BLK		2	TG-11	4	b	
10	WHT/RED/GRN		2	TG-14	3	18	
11	WHT/RED/BLU		2	TG-15	3	13	
12-1	BLK		1		4	U	8
12-2	BLK		1		4	V	
13-1	ORN		1		4	C	8
13-2	ORN		1		4	F	
14-1	YEL		1		4	E	8
14-2	YEL		1		4	B	
15-1	RED		1		4	H	8
15-2	RED		1		4	K	
16-1	WHT/BRN	25	3	23	4	c	8
16-2	WHT/BRN		2		4	Z	
17-1	WHT/RED	24	3	25	4	W	8
17-2	WHT/RED		2		4	T	
18-1	BLU		2		4	R	8
18-2	BLU		2		4	S	
19	WHT/ORN		2	SG-1	3	9	
20	WHT/YEL		2	SG-2	3	4	
21	WHT/GRN		2	SG-3	3	1	
22	WHT/BLU		2	SG-4	3	3	
23	WHT/VIO		2	SG-5	3	2	
24	WHT/BLK/BRN		2	SG-7	3	20	
25	WHT/BLK/GRN		2	SG-11	3	19	
26	WHT/BLK/BLU		2	SG-12	3	16	
27-1	WHT/BRN/RED		2	SG-15	4	N	8
27-2	WHT/BRN/ORN		2	SG-16	4	M	
27-3	WHT/GY		2	SG-6	4	J	
27-8	BLK	8	4	SHLD 27	4	P	
28	WHT/BLK/YEL		2	SG-10	3	12	
29-1	GRN	11	3	11	4	D	8
29-2	YEL	12	3	12	4	L	
30	WHT	17	4	X	4	a	
31	WHT/RED		2		3	24	
32	WHT/BRN		2		3	22	

SEE DETAIL A (27-1, 27-2, 27-3, 27-8)

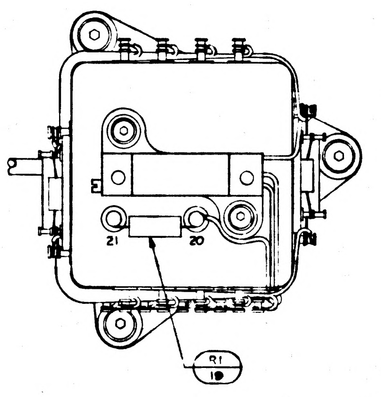
RESISTOR SELECTION CHART

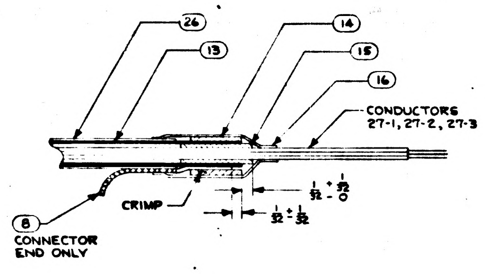
R2		R5 AND R7		R8 AND R9					
1010251-32	16.5	1010377-33	1.0K	1010330-1	10.0	1010330-23	14.4	1010330-45	18.8
-33	21.4	-38	22.5K	-2	10.2	-24	14.6	-46	19.0
-34	27.0	-40	45.0K	-3	10.4	-25	14.8	-47	19.2
-35	33.7	-41	67.5K	-4	10.6	-26	15.0	-48	19.4
-36	42.0	-42	90.0K	-5	10.8	-27	15.2	-49	19.6
		-43	112.0K	-6	11.0	-28	15.4	-50	19.8
		-44	134.5K	-7	11.2	-29	15.6	-51	20.0
		-45	157.0K	-8	11.4	-30	15.8		
		-46	179.5K	-9	11.6	-31	16.0		
		-47	202.5K	-10	11.8	-32	16.2		
		-48	225.0K	-11	12.0	-33	16.4		
				-12	12.2	-34	16.6		
				-13	12.4	-35	16.8		
				-14	12.6	-36	17.0		
				-15	12.8	-37	17.2		
				-16	13.0	-38	17.4		
				-17	13.2	-39	17.6		
				-18	13.4	-40	17.8		
				-19	13.6	-41	18.0		
				-20	13.8	-42	18.2		
				-21	14.0	-43	18.4		
				-22	14.2	-44	18.6		





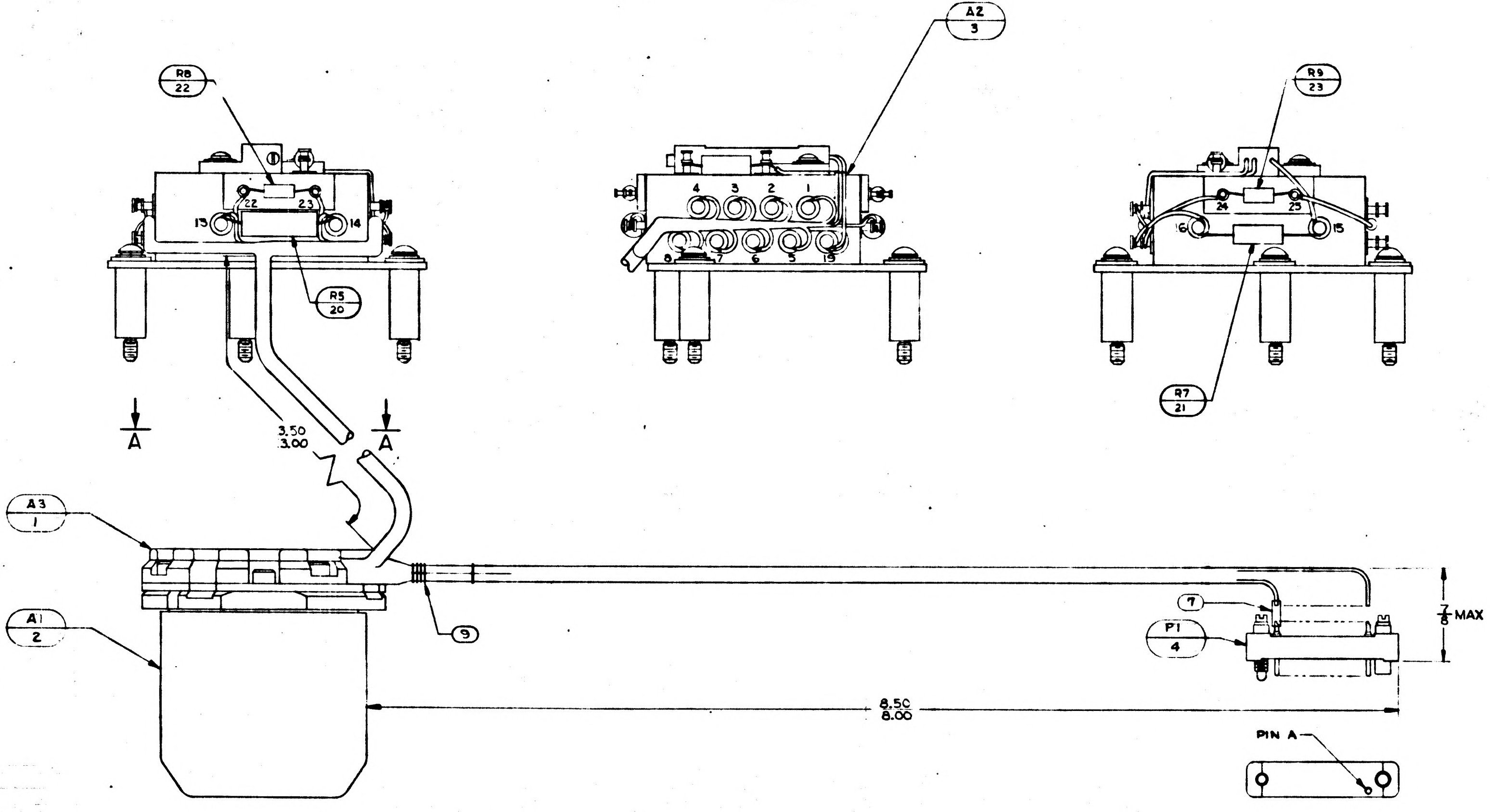
VIEW A-A





DETAIL A

SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
2 PLACES



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MIL-STD-440 USING ⑥
3. IDENTIFY USING DWG.NO., REVISION LETTER AND SERIAL NO. OF ITEM ② AT INDICATED LOCATION USING ITEM ⑩ PER MIL-STD-130
4. TWISTED CONDUCTORS TO HAVE 4 TURNS PER INCH MINIMUM.
5. SELECT RESISTORS FROM SELECTION CHART
6. LACE CABLE USING ITEM ⑨
7. ITEM ⑩ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
8. ASSEMBLY TO MEET REQUIREMENTS OF ATP 1000013
9. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED AT 130°F ± 10°F DURING CALIBRATION, SHIPMENT, STORAGE, AND USAGE. ASSEMBLY MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS SPECIFIED LIMITS.

REPLACES REV E
WITH CHANGES

LIST OF PARTS AND MATERIALS

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	INSULATION SLEEVING, ELEC HEAT SHRINK, SIZE 12 AWG		MIL-I-23053 CLASS 1 WHT	5 3/8 LONG	26
1	WIRE, ELECTRICAL ET-28 WHT/BRN		MIL-W-16878	16" TOT. LG	25
1	WIRE, ELECTRICAL ET 28 WHT/RED		MIL-W-16878	[illegible] LG	24
1	RESISTOR, FIXED	1010330		SEE NOTE 5	23
1	RESISTOR, FIXED	1010330		SEE NOTE 5	22
1	RESISTOR, FIXED	1010377		SEE NOTE 5	21
1	RESISTOR, FIXED	1010377		SEE NOTE 5	20
1	RESISTOR, FIXED	1010251-37			19
1	RESISTOR, FIXED	1010251		SEE NOTE 5	18
1	WIRE, ELECTRICAL ET-28 WHT		MIL-W-16878	2 1/2 TOT. LG.	7
2	INSULATION SLEEVING, ELECT, HEAT SHRINK, SIZE 8 AWG		MIL-I-23053 CLASS 1 BLK	5/8 LONG	16
2	FERRULE, INNER	1000243-5			15
2	FERRULE, OUTER	1000242-7			14
6"	BRAID, WIRE (COP, TIN CTD, TUBULAR)		QQ-B-575	7/64 ID × 36 AWG	13
1	WIRE, ELECTRICAL ET-28 YEL		MIL-W-16878	[illegible] LG.	12
1	WIRE, ELECTRICAL ET-28 GRN		MIL-W-16878	[illegible] TOT. LG.	11
A/R	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 7	10
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	9
1	WIRE, ELECTRICAL ET-28 BLK		MIL-W-16878	2 1/2 [illegible] LG.	8
.25	INSULATION SLEEVING, ELEC	1006776-18		3/16 LONG	7
A/R	SOLDER COMP SN60WARP2		QQ-S-571		6
3	SCREW, BUT. HD, SOC, SPL	1000250-3			5
1	CONNECTOR	1000123			4
1	SUSPENSION CAPACITOR ASS'Y	1007028			3
1	16 PIP MOD D	1000179			2
1	HEATER PLATE ASS'Y	1000134			1

F	—		DL1000201
SHEET 1	SHEET 2	1000005	DL1000001
REVISION STATUS OF SHEETS		NEXT ASSY	USED ON
		APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

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INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		5-29-63
CHECKED		
DRAWN	RGS	4-25-63
APPROVED FOR MSC		
MIT/IL APPROVAL		DATE

PIP PRE-ALIGNED ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
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CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000013
SHEET 1 OF 2

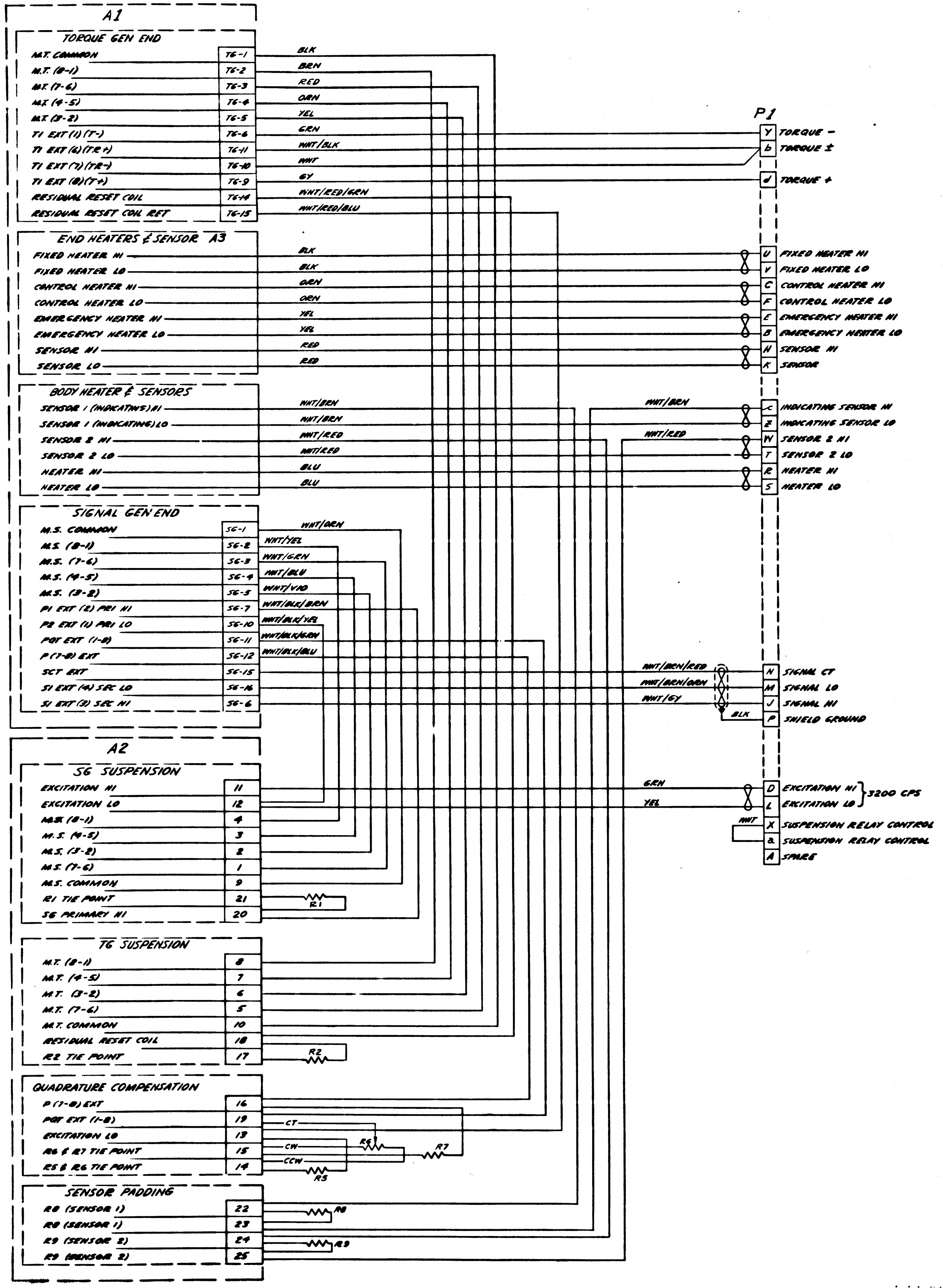
1000013

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 0670

SYM	DESCRIPTION	DATE	APPROVAL



A1
TORQUE GEN END
M.T. COMMON
M.T. (8-1)
M.T. (7-6)
M.T. (4-5)
M.T. (3-2)
T1 EXT (1)(T-)
T1 EXT (6)(TR+)
T1 EXT (7)(TR-)
T1 EXT (8)(T+)
RESIDUAL RESET COIL
RESIDUAL RESET COIL RET
TG-1
TG-2
TG-3
TG-4
TG-5
TG-6
TG-11
TG-10
TG-9
TG-14
TG-15
BLK
BRN
RED
ORN
YEL
GRN
WHT/BLK
WHT
GY
WHT/RED/GRN
WHT/RED/BLU
END HEATERS & SENSOR A3
FIXED HEATER HI
FIXED HEATER LO
CONTROL HEATER HI
CONTROL HEATER LO
EMERGENCY HEATER HI
EMERGENCY HEATER LO
SENSOR HI
SENSOR LO
BLK
BLK
ORN
ORN
YEL
YEL
RED
RED
BODY HEATER & SENSORS
SENSOR 1 (INDICATING) HI
SENSOR 1 (INDICATING) LO
SENSOR 2 HI
SENSOR 2 LO
HEATER HI
HEATER LO
WHT/BRN
WHT/BRN
WHT/RED
WHT/RED
BLU
BLU
SIGNAL GEN END
M.S. COMMON
M.S. (8-1)
M.S. (7-6)
M.S. (4-5)
M.S. (3-2)
P1 EXT (2) PRI HI
P2 EXT (1) PRI LO
PQT EXT (1-8)
P (7-8) EXT
SCT EXT
S1 EXT (4) SEC LO
S1 EXT (3) SEC HI
SG-1
SG-2
SG-3
SG-4
SG-5
SG-7
SG-10
SG-11
SG-12
SG-15
SG-16
SG-6
WHT/ORN
WHT/YEL
WHT/GRN
WHT/BLU
WHT/VIO
WHT/BLK/BRN
WHT/BLK/YEL
WHT/BLK/GRN
WHT/BLK/BLU
A2
SG SUSPENSION
EXCITATION HI
EXCITATION LO
M.S. (8-1)
M.S. (4-5)
M.S. (3-2)
M.S. (7-6)
M.S. COMMON
R1 TIE POINT
SG PRIMARY HI
11
12
4
3
2
1
9
21
20
R1
TG SUSPENSION
M.T. (8-1)
M.T. (4-5)
M.T. (3-2)
M.T. (7-6)
M.T. COMMON
RESIDUAL RESET COIL
R2 TIE POINT
8
7
6
5
10
18
17
R2
QUADRATURE COMPENSATION
P (7-8) EXT
PQT EXT (1-8)
EXCITATION LO
R6 & R7 TIE POINT
R5 & R6 TIE POINT
16
19
13
15
14
CT
CW
CCW
R6
R7
R5
SENSOR PADDING
R8 (SENSOR 1)
R8 (SENSOR 1)
R9 (SENSOR 2)
R9 (SENSOR 2)
22
23
24
25
R8
R9
P1
Y TORQUE -
b TORQUE ±
d TORQUE +
U FIXED HEATER HI
V FIXED HEATER LO
C CONTROL HEATER HI
F CONTROL HEATER LO
E EMERGENCY HEATER HI
B EMERGENCY HEATER LO
H SENSOR HI
K SENSOR
c INDICATING SENSOR HI
Z INDICATING SENSOR LO
W SENSOR 2 HI
T SENSOR 2 LO
R HEATER HI
S HEATER LO
WHT/BRN
WHT/RED
WHT/BRN/RED
WHT/BRN/ORN
WHT/GY
BLK
N SIGNAL CT
M SIGNAL LO
J SIGNAL HI
P SHIELD GROUND
GRN
YEL
WHT
D EXCITATION HI
L EXCITATION LO
3200 CPS
X SUSPENSION RELAY CONTROL
a SUSPENSION RELAY CONTROL
A SPARE

REF DESIG	PART NO	DESCRIPTION	VALUE	TOL %	RATING
A1	1000179	16 PIP MOD D			
A2	1007028	PIP SUSPENSION ASSY			
A3	1000134	HEATER PLATE ASSY			
P1	1000123	CONNECTOR-PLUG			
R1	1010251-	RESISTOR-FIXED	▷1	±1	1/4 W
R2	1010251-37		20.7Ω	±1	1/4 W
R5	1010377-		▷3	±1	1/10 W
R6	1010373-25	-VARIABLE	50K	±5	1 W
R7	1010377-	-FIXED	▷2	±1	1/10 W
R8	1010330-		▷3	±0.1	.035 W
	1010330-		▷3	±0.1	.035 W

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN THENO DATE 5-16-63
CHECKED WINBERG
APPROVAL A.E. Winberg
APPROVAL C.J. Bogan 6-18-63
NASA APPROVAL
MIT APPROVAL W Kupfer 19 June 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

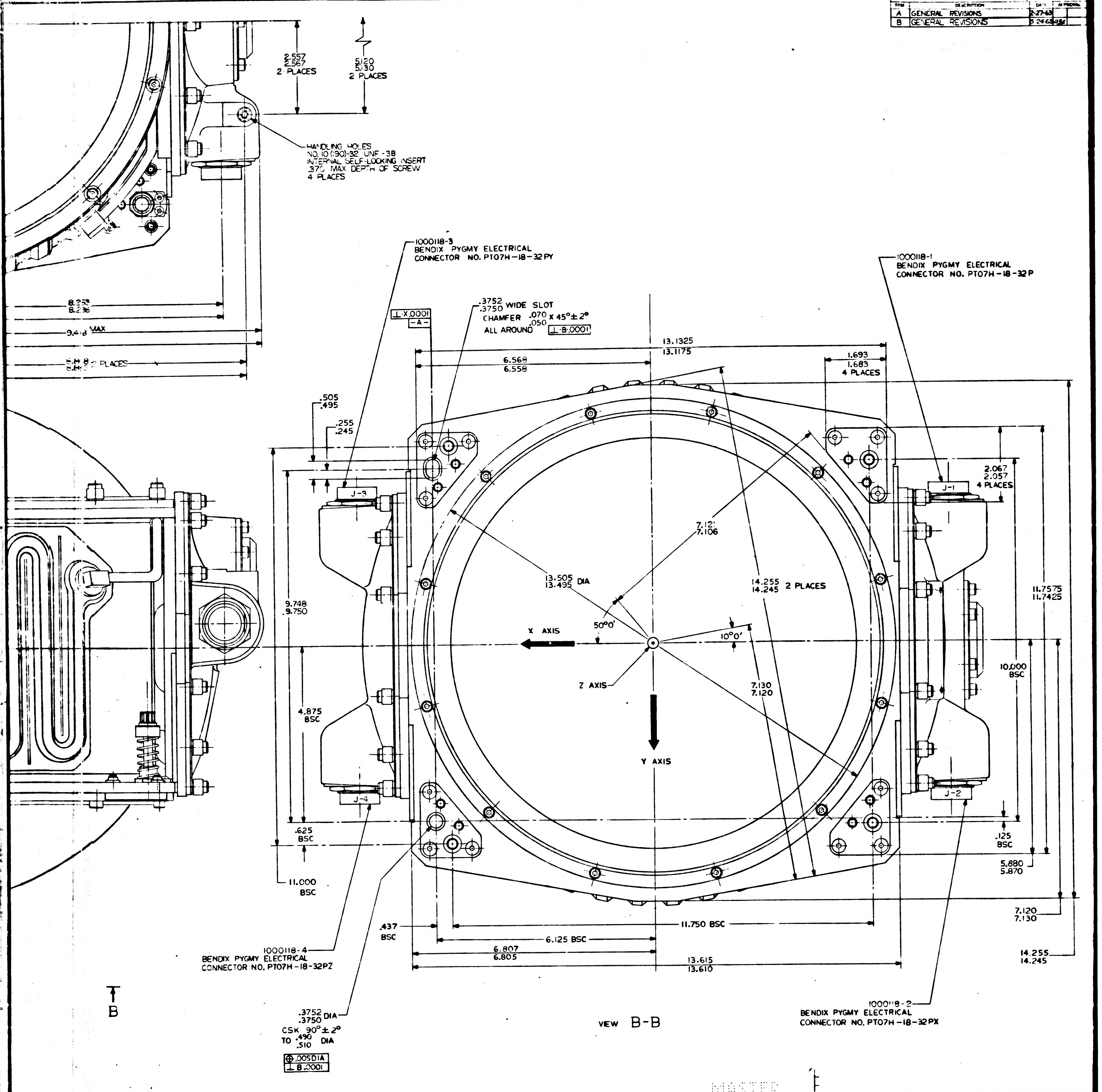
PIP PRE-ALIGNED ASSY

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 1000013
SCALE
WT
SHEET 2 OF 2

1000013

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01671			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS	2-27-63	
B	GENERAL REVISIONS	5 24 63	[illegible]


3
2
1
2.557
2.567
2 PLACES
5.120
5.130
2 PLACES
HANDLING HOLES
NO. 10 (.190)-32 UNF-3B
INTERNAL SELF-LOCKING INSERT
.375 MAX DEPTH OF SCREW
4 PLACES
1000118-3
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32PY
1000118-1
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32P
8.253
8.236
9.418 MAX
5.118 2 PLACES
⊥ X .0001
-A-
.3752
.3750 WIDE SLOT
CHAMFER .070
.050 X 45° ± 2°
ALL AROUND
⊥ B .0001
13.1325
13.1175
6.568
6.558
1.693
1.683
4 PLACES
.505
.495
.255
.245
J-3
J-1
2.067
2.057
4 PLACES
7.121
7.106
13.505
13.495 DIA
14.255
14.245 2 PLACES
11.7575
11.7425
9.748
9.750
X AXIS
50°0'
10°0'
Z AXIS
Y AXIS
10.000
BSC
7.130
7.120
4.875
BSC
J-4
J-2
.625
BSC
.125
BSC
5.880
5.870
11.000
BSC
7.120
7.130
.437
BSC
11.750 BSC
6.125 BSC
6.807
6.805
13.615
13.610
14.255
14.245
1000118-4
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32PZ
1000118-2
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32PX
B
.3752
.3750 DIA
CSK 90° ± 2°
TO .490
.510 DIA
⊕ .005 DIA
⊥ B .0001

VIEW B-B

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED AJBoyce 6-19-62
CHECKED
DRAWN ECB 6-10-62
W Kopper 19 [illegible]

GIMBAL ASSEMBLY
OUTLINE
IMU

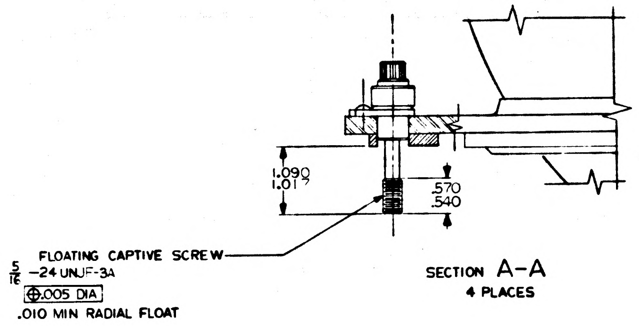
SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000016
SHEET 1 OF 1

3
2

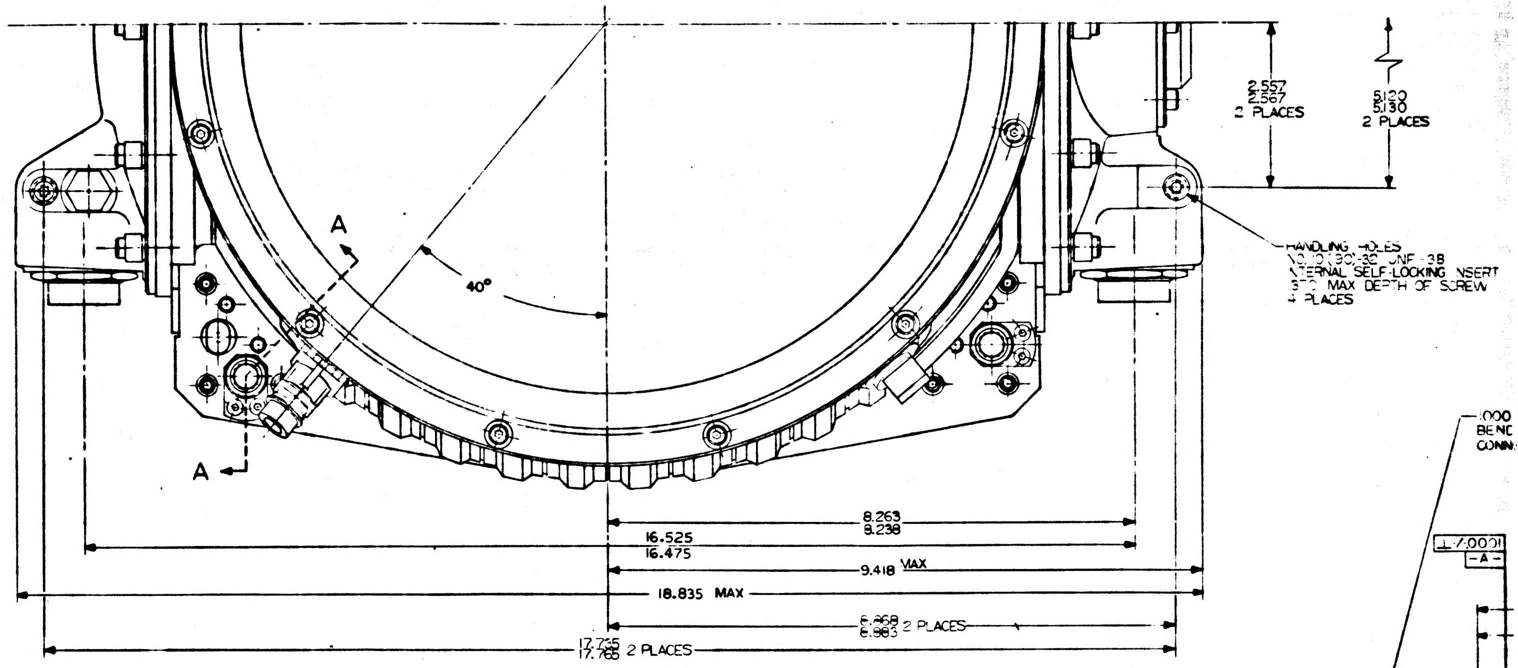
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F-2

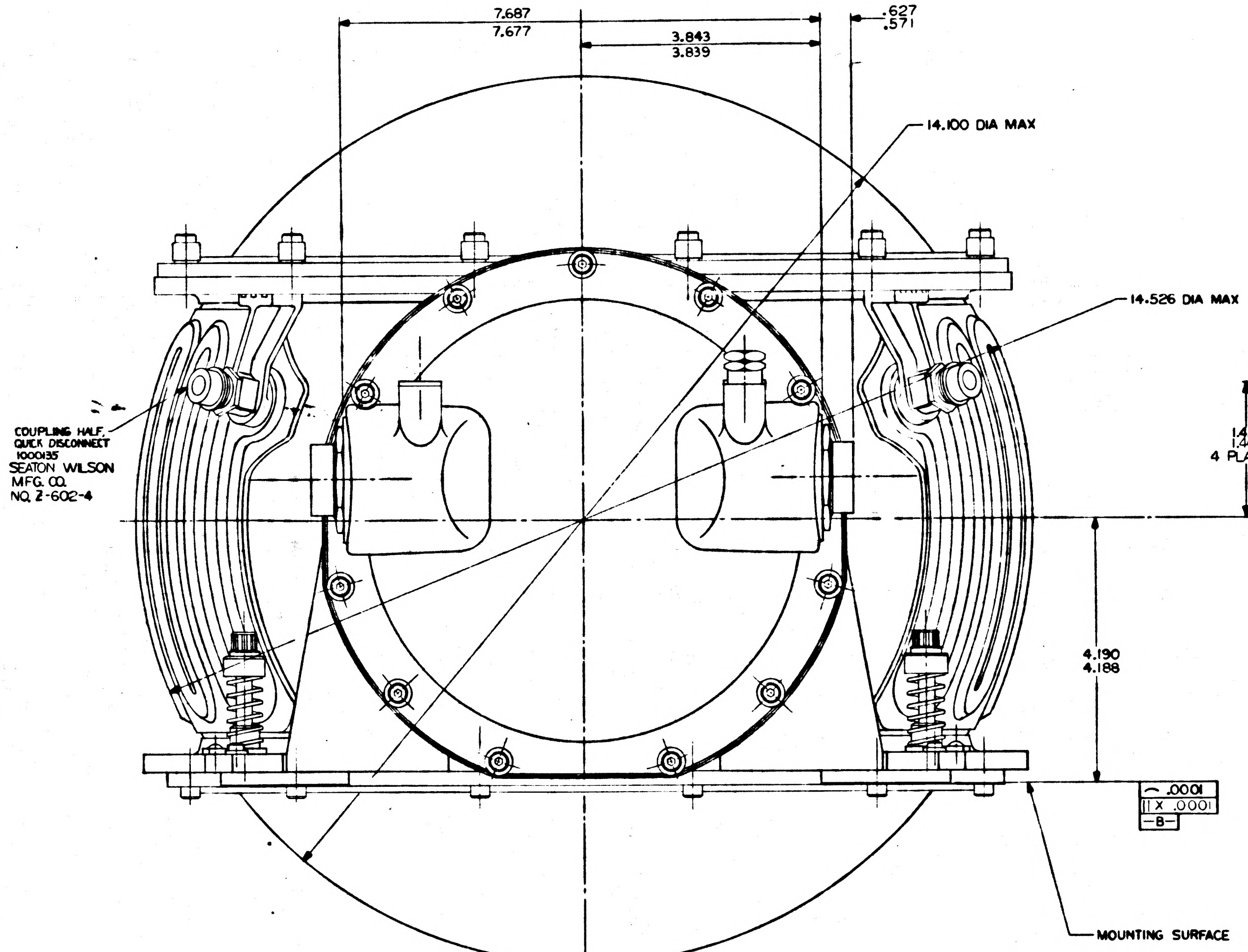


1.090
1.017
.570
.540
FLOATING CAPTIVE SCREW
5/16 -24 UNJF-3A
⊕.005 DIA
.010 MIN RADIAL FLOAT

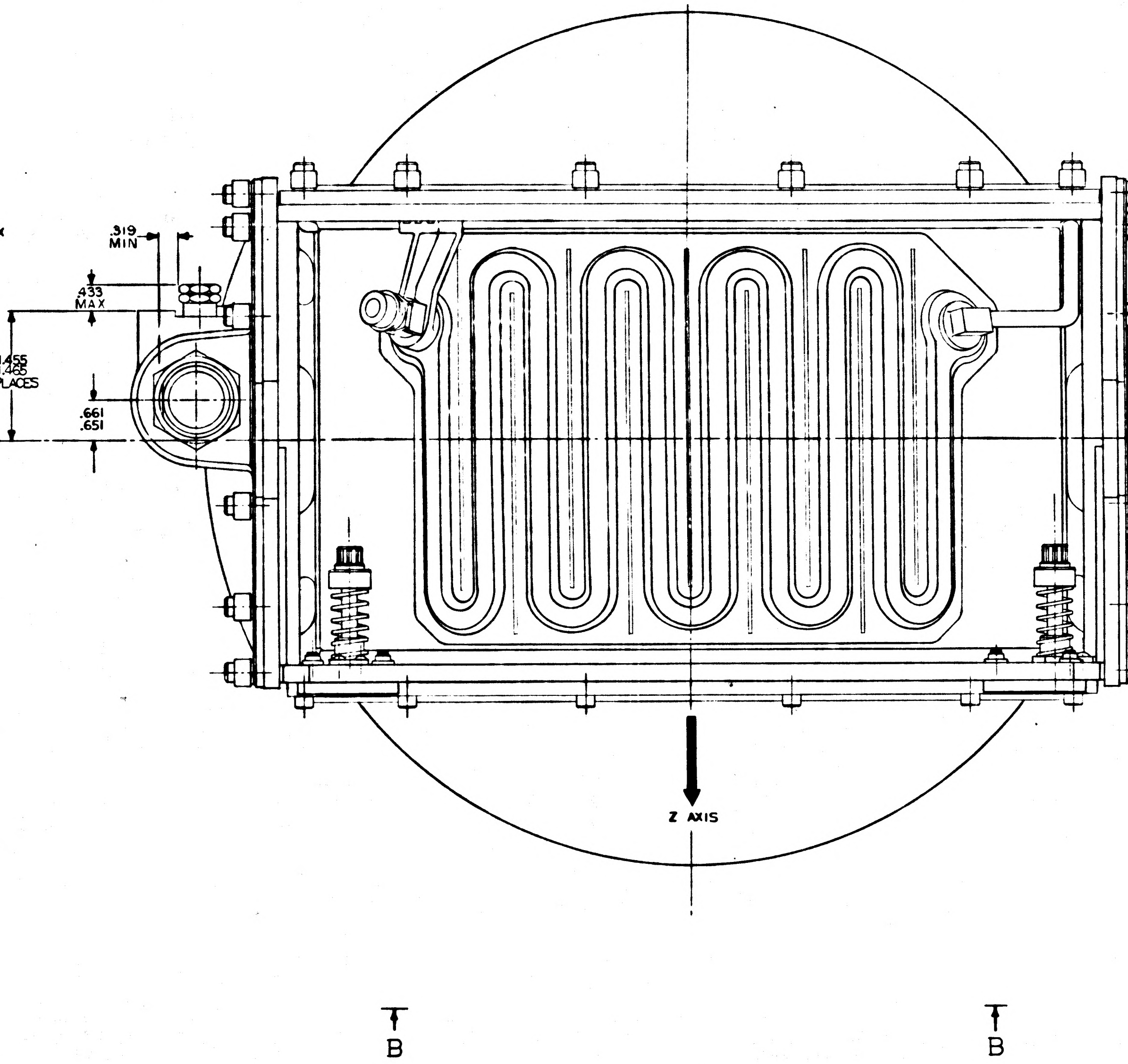
SECTION A-A
4 PLACES



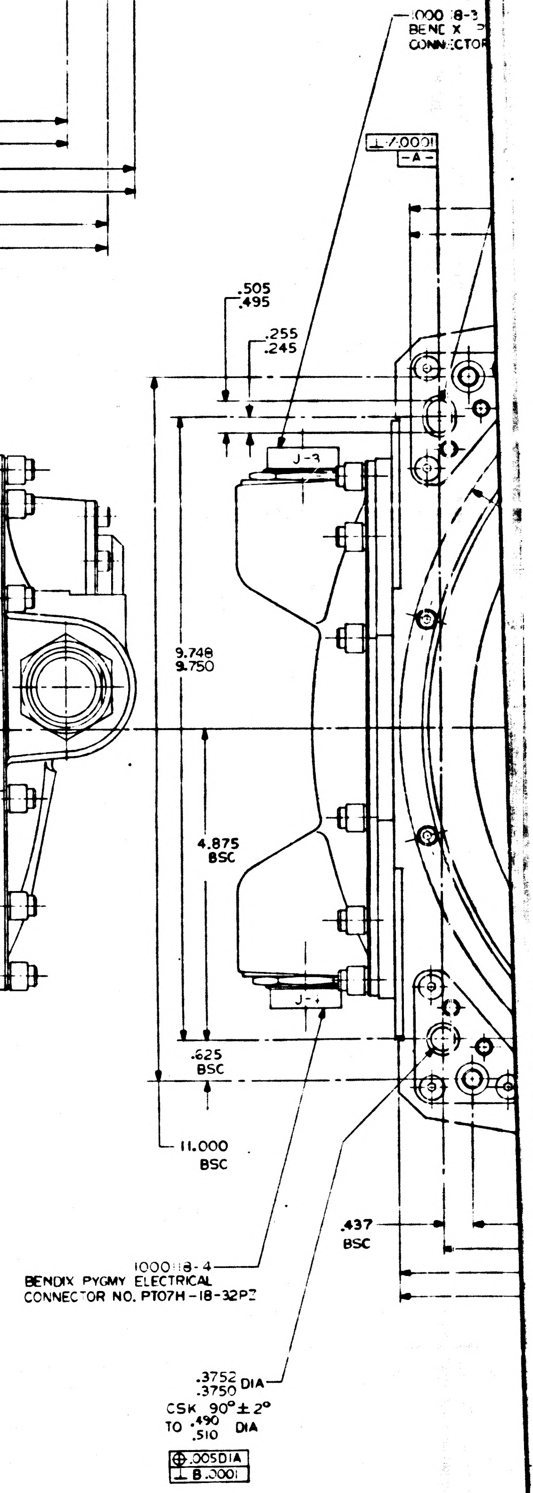
A
A
40°
2.557
2.567
2 PLACES
5.120
5.130
2 PLACES
HANDLING HOLES
NO. 10 (.190)-32 UNF-3B
INTERNAL SELF-LOCKING INSERT
.370 MAX DEPTH OF SCREW
4 PLACES
8.263
8.238
16.525
16.475
9.418 MAX
18.835 MAX
8.868
8.863 2 PLACES
17.755
17.765 2 PLACES



7.687
7.677
3.843
3.839
.627
.571
14.100 DIA MAX
14.526 DIA MAX
COUPLING HALF, QUICK DISCONNECT
1000135
SEATON WILSON
MFG. CO.
NO. 2-602-4
4.190
4.188
⌒ .0001
∥ X .0001
-B-
MOUNTING SURFACE



.319
MIN
.433
MAX
1.455
1.445
4 PLACES
.661
.651
Z AXIS
B
B



1000118-3
BENDIX P
CONNECTOR
⊥ / .0001
-A-
.505
.495
.255
.245
J-3
9.748
9.750
4.875
BSC
.625
BSC
J-4
11.000
BSC
.437
BSC
1000118-4
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32PZ
.3752
.3750 DIA
CSK 90° ± 2°
TO .490
.510 DIA
⊕ .005 DIA
⊥ B .0001

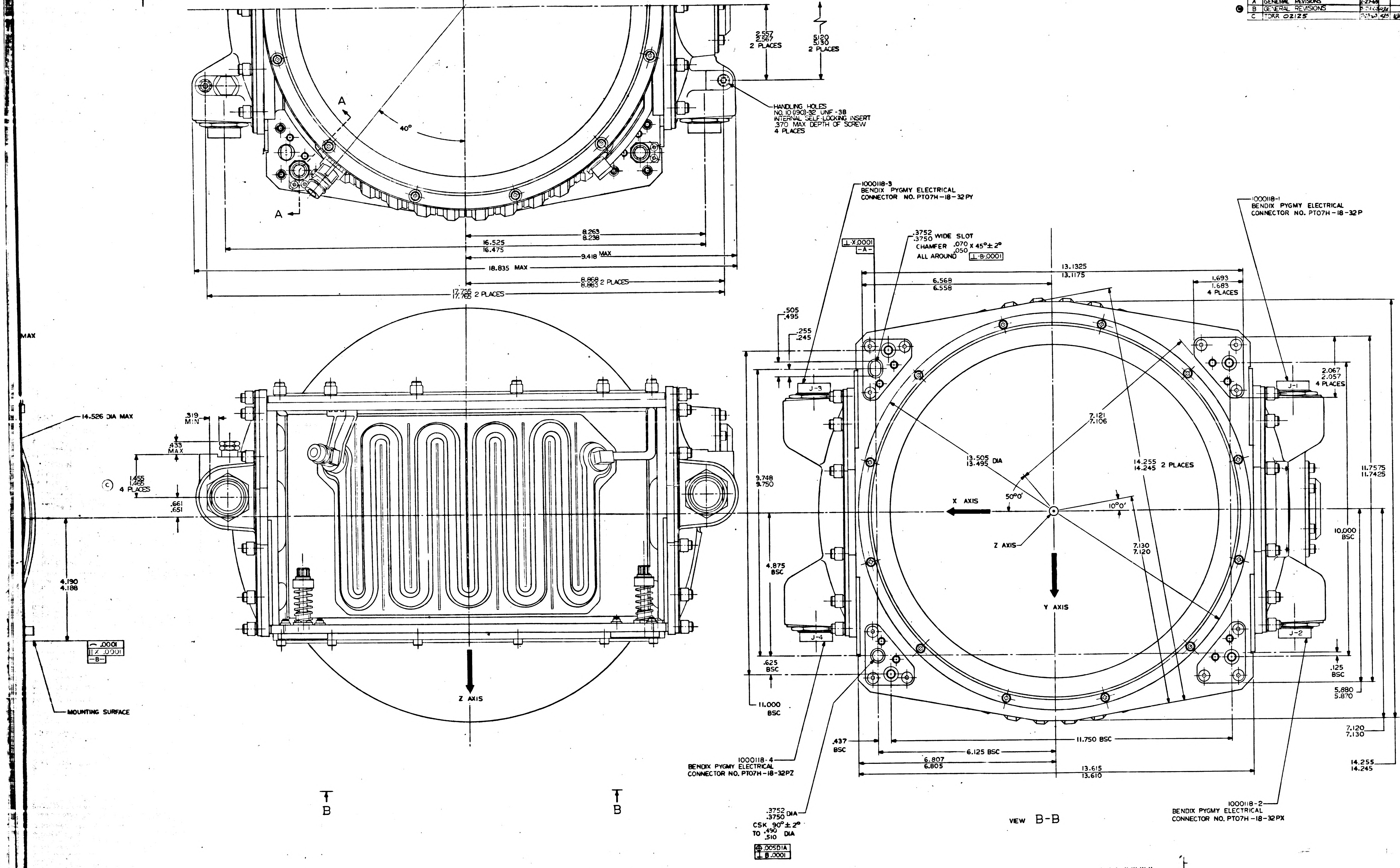
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MISALIGNMENT WITH DOWEL PINS ON NAV BASE DURING ASSEMBLY-1/16 MAX
3. TORQUING SEQUENCE FOR 5/16 HOLD DOWN BOLTS:

4. PROTECTIVE CAPS INSTALLED OVER ELECTRICAL & WATER CONNECTORS

1000016 B

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01671			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS	2-27-63	
B	GENERAL REVISIONS	5-24-63	
C	TDRR 02125	7-23-63	



4
3
2
1
D
C
B
A
2.557
2.567
2 PLACES
5.120
5.130
2 PLACES
HANDLING HOLES
NO. 10 (.190)-32 UNF-3B
INTERNAL SELF-LOCKING INSERT
.370 MAX DEPTH OF SCREW
4 PLACES
40°
A
A
8.263
8.238
16.525
16.475
9.418 MAX
18.835 MAX
8.868
8.863 2 PLACES
17.755
17.765 2 PLACES
MAX
14.526 DIA MAX
.319
MIN
.433
MAX
1.455
1.465
4 PLACES
C
.661
.651
4.190
4.188
.0001
X .0001
-B-
MOUNTING SURFACE
Z AXIS
B
B
1000118-3
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32PY
X .0001
-A-
.3752
.3750 WIDE SLOT
CHAMFER .070
.050 X 45° ± 2°
ALL AROUND
B .0001
1000118-1
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32P
13.1325
13.1175
6.568
6.558
1.693
1.683
4 PLACES
.505
.495
.255
.245
J-3
J-1
2.067
2.057
4 PLACES
7.121
7.106
13.505
13.495 DIA
14.255
14.245 2 PLACES
9.748
9.750
X AXIS
50°0'
10°0'
Z AXIS
7.130
7.120
11.7575
11.7425
10.000
BSC
4.875
BSC
Y AXIS
J-4
J-2
.625
BSC
.125
BSC
5.880
5.870
11.000
BSC
7.120
7.130
11.750 BSC
.437
BSC
6.125 BSC
6.807
6.805
13.615
13.610
14.255
14.245
1000118-4
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32PZ
.3752
.3750 DIA
CSK 90° ± 2°
TO .490
.510 DIA
.005 DIA
B .0001
VIEW B-B
1000118-2
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32PX
1000016 C

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NC

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED | 6-19-63
CHECKED
DRAWN ECB
APPROVED FOR MSC

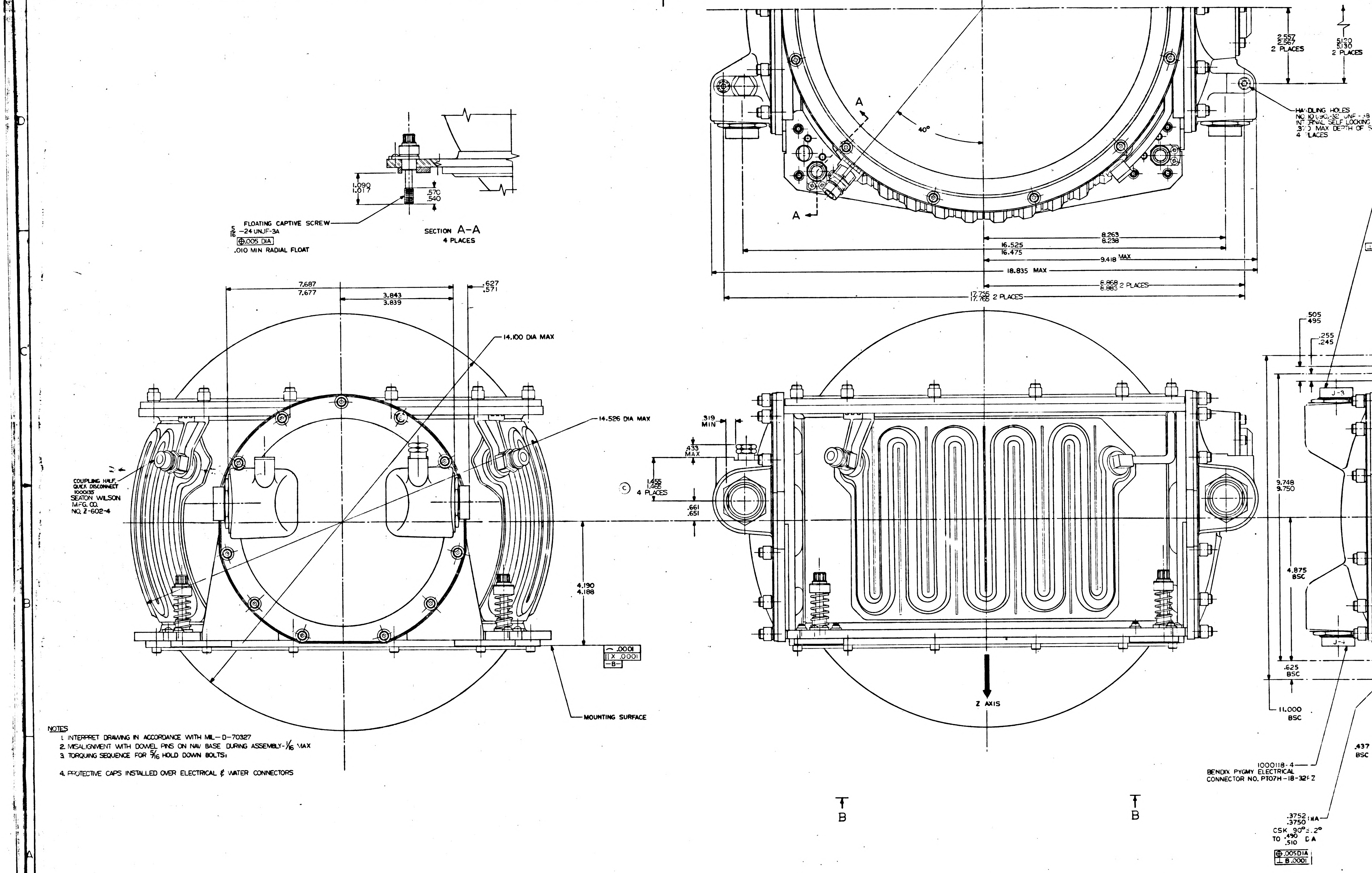
GIMBAL ASSEMBLY
OUTLINE
IMU

SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000016
SHEET 1 OF

INCHES
PHOTOGRAPHIC SCALE ONLY

F-2


2.557
2.567
2 PLACES
5.120
5.130
2 PLACES
HANDLING HOLES
NO. 10 (.190)-32 UNF - 3B
INTERNAL SELF LOCKING
.370 MAX DEPTH OF S
4 PLACES
A
40°
A
8.263
8.238
16.525
16.475
9.418 MAX
18.835 MAX
8.868
8.883 2 PLACES
17.735
17.765 2 PLACES
FLOATING CAPTIVE SCREW
5/16 -24 UNJF-3A
⊕ .005 DIA
.010 MIN RADIAL FLOAT
1.090
1.017
.570
.540
SECTION A-A
4 PLACES
7.687
7.677
3.843
3.839
.627
.571
14.100 DIA MAX
14.526 DIA MAX
COUPLING HALF,
QUICK DISCONNECT
1000135
SEATON WILSON
MFG. CO.
NO. Z-602-4
4.190
4.188
⌒ .0001
∥ X .0001
-B-
MOUNTING SURFACE
.319
MIN
.433
MAX
1.455
1.485
4 PLACES
.661
.651
Z AXIS
.505
.495
.255
.245
J-3
9.748
9.750
4.875
BSC
J-4
.625
BSC
11.000
BSC
.437
BSC
1000118-4
BENDIX PYGMY ELECTRICAL
CONNECTOR NO. PT07H-18-32FZ
.3752
.3750 DIA
CSK 90° ± .2°
TO .490
.510 DIA
⊕ .005 DIA
⊥ B .0001
B
B

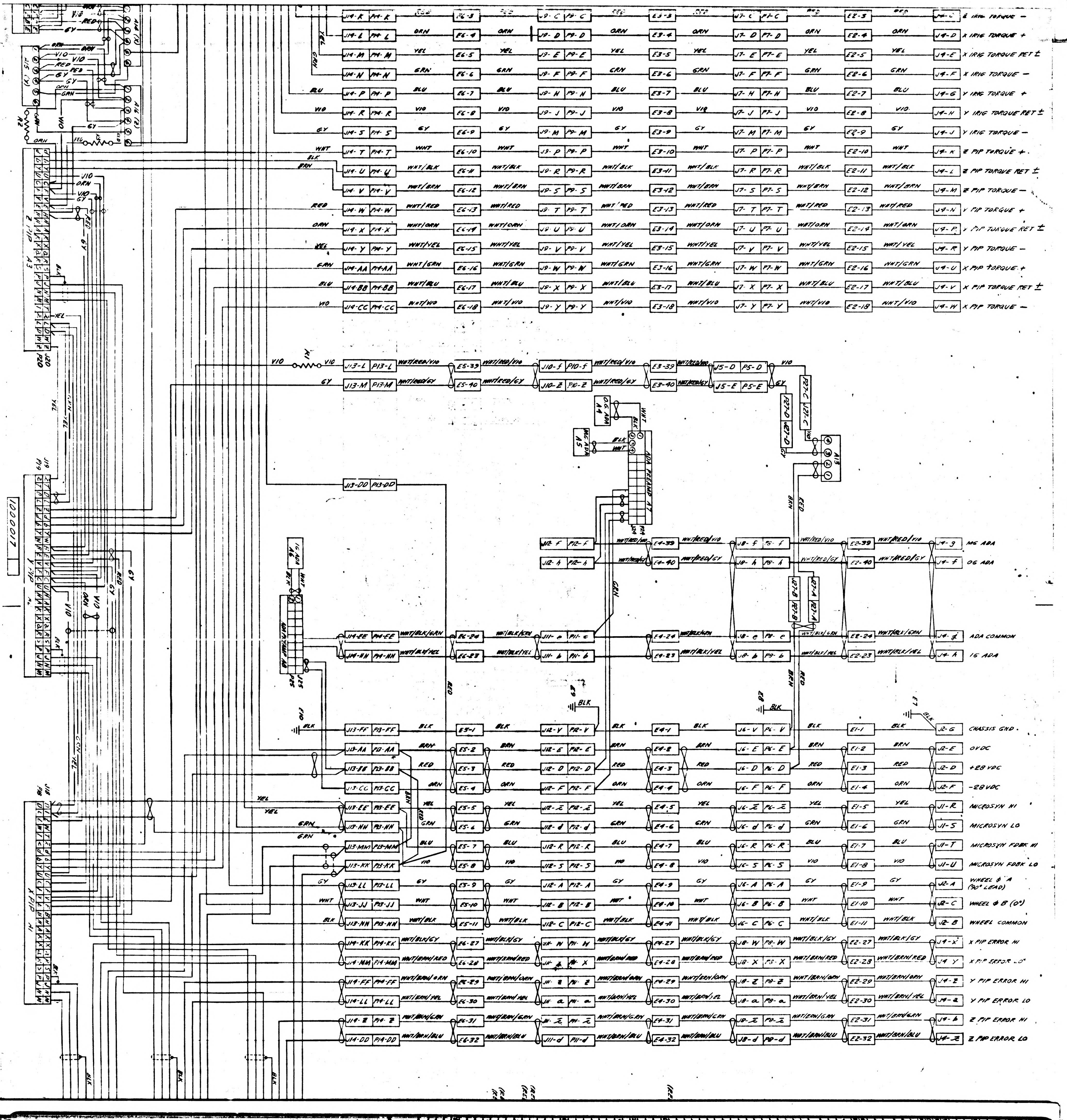
NOTES

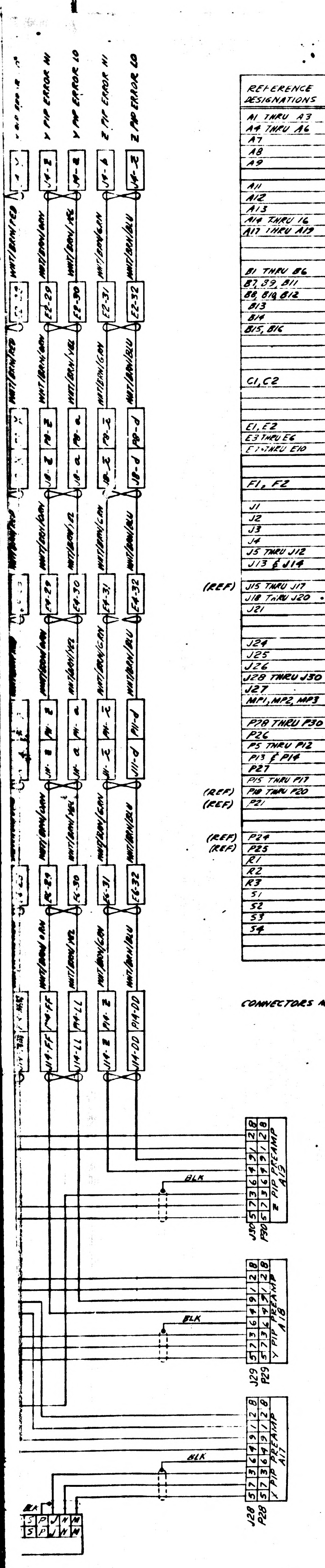
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MISALIGNMENT WITH DOWEL PINS ON NAV BASE DURING ASSEMBLY-1/16 MAX
3. TORQUING SEQUENCE FOR 5/16 HOLD DOWN BOLTS:

4. PROTECTIVE CAPS INSTALLED OVER ELECTRICAL & WATER CONNECTORS

1000016 C

INCHES
PHOTOGRAPHIC SCALE ONLY


Z IRIG TORQUE −
X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET ±
Y IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE −
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE −
MG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND
0VDC
+28 VDC
−28VDC
MICROSYN HI
MICROSYN LO
MICROSYN FDBK HI
MICROSYN FDBK LO
WHEEL ϕ A (90° LEAD)
WHEEL ϕ B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
ADA PREAMP A7
OG ADA A4
MG ADA A5
IG ADA A6
A13
Z PIP A3
Y PIP A2
X PIP A1
J18 P18
J19 P19
J20 P20
J25 P25
A16 (Z)
A15 (Y)
A14 (X)
R1
R2
E7
E8
E9
E10
1000017


Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
J4-Z
J4-B
J4-b
J4-Z
E2-29
E2-30
E2-31
E2-32
J8-Z P8-Z
J8-a P8-a
J8-Z P8-Z
J8-d P8-d
E4-29
E4-30
E4-31
E4-32
J11-B P11-B
J11-a P11-a
J11-Z P11-Z
J11-d P11-d
E6-29
E6-30
E6-31
E6-32
J14-FF P14-FF
J14-LL P14-LL
J14-Z P14-Z
J14-DD P14-DD
WHT/BRN/RED
WHT/BRN/GRN
WHT/BRN/YEL
WHT/BRN/GRY
WHT/BRN/BLU
BLK
Z PIP PREAMP A19
J30
P30
Y PIP PREAMP A18
J29
P29
X PIP PREAMP A17
J28
P28
8 2 1 9 4 6 3 7 5
S P J N M

	REFERENCE DESIGNATIONS	TITLE	NASA PART NUMBER	NUMBER REQUIRED
	A1 THRU A3	PIP	1000013	3
	A4 THRU A6	ADA	1000097	3
	A7	O.G & M.G ADA PREAMP		1
	A8	I.G. ADA PREAMP		1
	A9	IRIG PREAMP		1
	A11	PRECISION RESOLVER ASSY	1007004	1
	A12	EMERGENCY HEATER CONTROL	1007012	1
	A13	28 V DC REGULATOR	1007013	1
	A14 THRU 16	HEATER & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
	A17 THRU A19	PIP PREAMP	10007015	3
	B1 THRU B6	TORQUE MOTOR	1000075	6
	B7, B9, B11	RESOLVER 15X	1000078	3
	B8, B10, B12	RESOLVER 1X	1000030	3
	B13	RESOLVER, PITCH YAW	1000031-2	1
	B14	RESOLVER, GYRO ERROR	1000031-1	1
	B15, B16	BLOWER		2
	C1, C2	CAPACITOR		2
	E1, E2	SLIP RING	1000038	2
	E3 THRU E6	SLIP RING	1000037	4
	E7 THRU E10	TERMINAL, LUG		4
	F1, F2	FUSE	1000170	2
	J1	CONNECTOR, PLUG	1000118-1	1
	J2		1000118-2	1
	J3		1000118-3	1
	J4		1000118-4	1
	J5 THRU J12		1000117	8
	J13 & J14		1000120	2
(REF)	J15 THRU J17			3
	J18 THRU J20	RECEPTACLE	1000122	3
	J21		1010318-	1
	J24	RECEPTACLE		1
	J25			1
	J26	CONNECTOR, RECEPTACLE		1
	J28 THRU J30		1010318-	3
	J27	CONNECTOR, PLUG	1000222	1
	MP1, MP2, MP3	IRIG	1000012	3
	P28 THRU P30	CONNECTOR, PLUG	1010318-	3
	P26	CONNECTOR, PLUG		1
	P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
	P13 & P14		1000119	2
	P27		1000221	1
	P15 THRU P17		1000121	3
(REF)	P18 THRU P20	PLUG	1000123	3
(REF)	P21		1010318-	1
(REF)	P24	PLUG		1
(REF)	P25			1
	R1	RESISTOR-FIXED		1
	R2			1
	R3			1
	S1	MICRO SWITCH		1
	S2	SWITCH-THERMOSTATIC		1
	S3			1
	S4			1

CONNECTORS MARKED (REF) ARE INTEGRAL PARTS OF THEIR RESPECTIVE MODULES

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	COMPLETELY REVISED PER TDRR 00387	2-13 63	WL

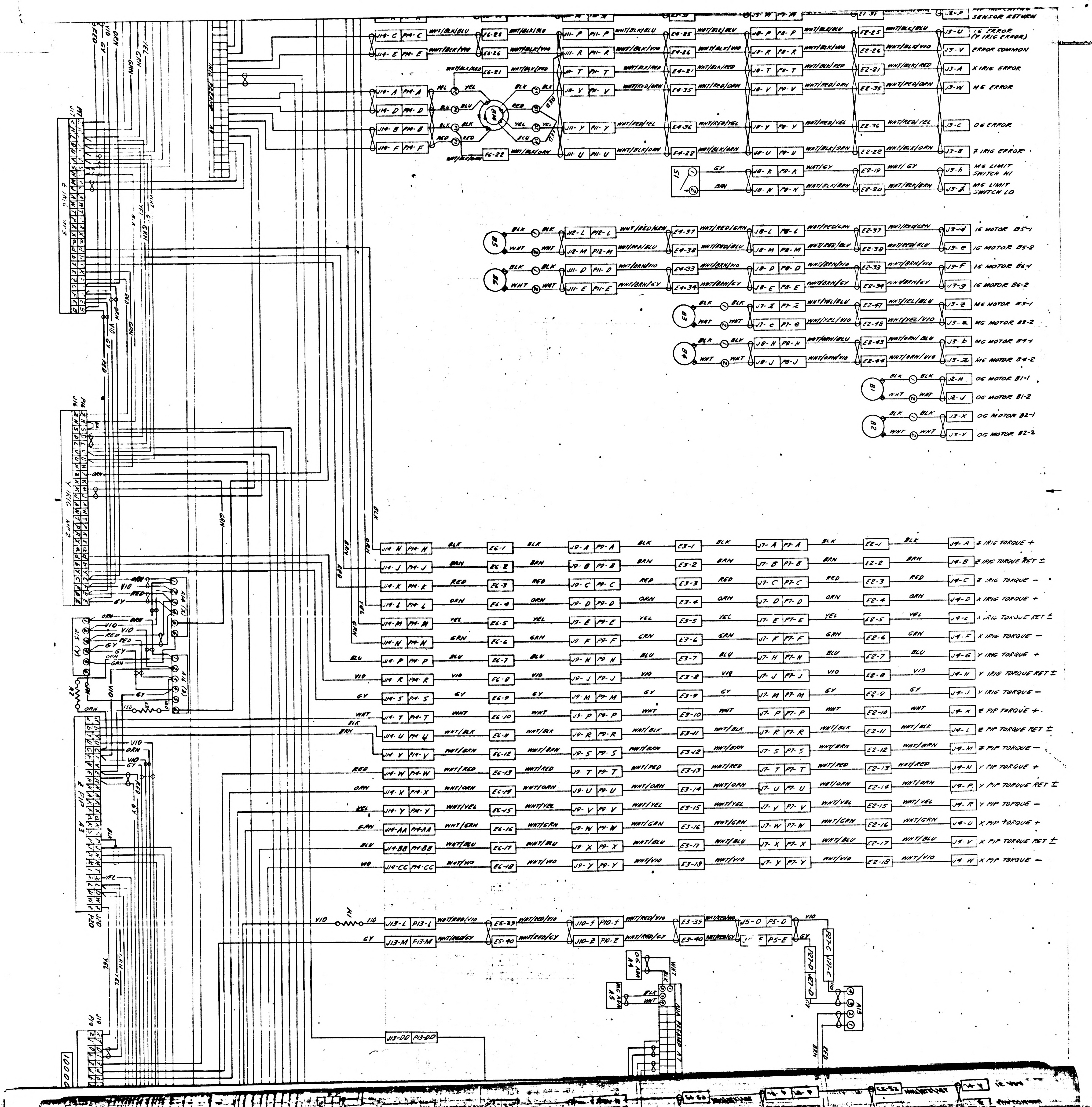
FOR INFORMATION ONLY

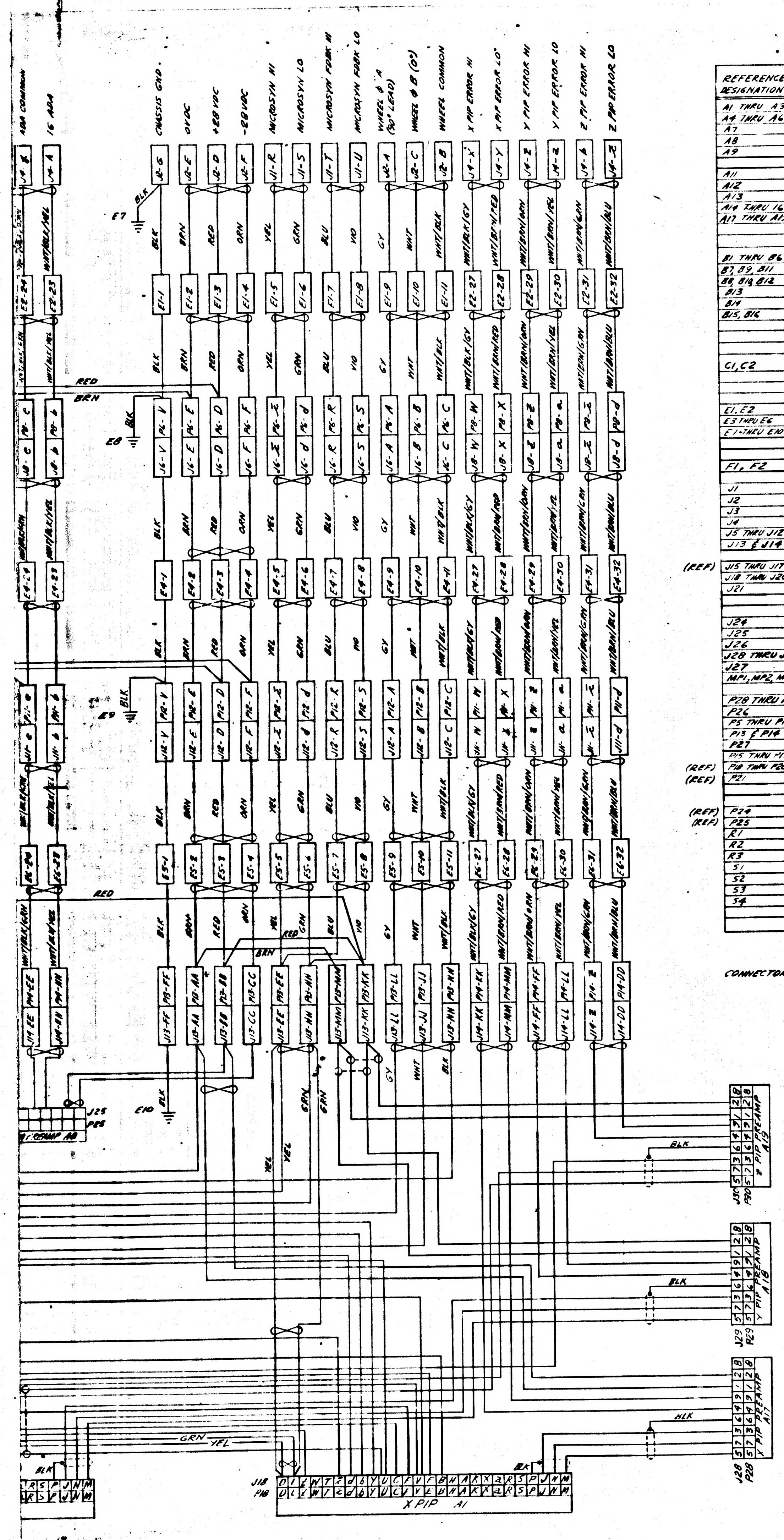
CLASS B RELEASE TDR No. 00122 DATE 11-25-62

DRAWING FOR REF:
1000001 I.M.U ASSY

K
J
I
H
G
F
E
D
C
B
1000017
A

M I T INSTRUMENTATION LAB	APOLLO I.M.U WIRING DIAGRAM	M I T INSTRUMENTATION LABORATORY CAMBRIDGE MASS
CONTRACT NA 9-153		DWG NO R-94383
APPROVED J.E. Miller 11-26-62		MANNED SPACECRAFT CENTER HOUSTON TEXAS
CHECKED W. Nberg 11-26-62		NASA DRAWING NO 1000017-A
DRAWN Heal 10-27-62	SCALE / UNIT WT / CODE IDENT	SHEET 1 OF 2
APPROVED FOR MSC BY DIRECTION W. S. Kupfer 28 Nov 1962		


SENSOR RETURN
J3-U IG ERROR (Y IRIG ERROR)
J3-V ERROR COMMON
J3-A X IRIG ERROR
J3-W MG ERROR
J3-C OG ERROR
J3-B Z IRIG ERROR
J3-h MG LIMIT SWITCH HI
J3-j MG LIMIT SWITCH LO
J3-d IG MOTOR B5-1
J3-e IG MOTOR B5-2
J3-f IG MOTOR B6-1
J3-g IG MOTOR B6-2
J3-Z MG MOTOR B3-1
J3-a MG MOTOR B3-2
J3-b MG MOTOR B4-1
J3-z MG MOTOR B4-2
J2-H OG MOTOR B1-1
J2-J OG MOTOR B1-2
J3-X OG MOTOR B2-1
J3-Y OG MOTOR B2-2
J4-A Z IRIG TORQUE +
J4-B Z IRIG TORQUE RET ±
J4-C Z IRIG TORQUE −
J4-D X IRIG TORQUE +
J4-E X IRIG TORQUE RET ±
J4-F X IRIG TORQUE −
J4-G Y IRIG TORQUE +
J4-H Y IRIG TORQUE RET ±
J4-J Y IRIG TORQUE −
J4-K Z PIP TORQUE +
J4-L Z PIP TORQUE RET ±
J4-M Z PIP TORQUE −
J4-N Y PIP TORQUE +
J4-P Y PIP TORQUE RET ±
J4-R Y PIP TORQUE −
J4-U X PIP TORQUE +
J4-V X PIP TORQUE RET ±
J4-W X PIP TORQUE −
S1
B1
B2
B3
B4
B5
B6
IRIG PREAMP A9
Z IRIG NP3
Y IRIG NP2
Z PIP A3
A14 (X)
A15 (Y)
A16 (Z)
R1
R2
P17 J17
P16 J16
P20 J20
P19 J19
J13-DD P13-DD
J13-L P13-L
J13-M P13-M
J5-D P5-D
P5-E
P27-C J27-C
P27-D J27-D
A13
ADA PREAMP A7
OG ADA A4
MG ADA A5
1000


ADA COMMON
IG ADA
CHASSIS GND.
0 VDC
+28 VDC
-28 VDC
MICROSYN HI
MICROSYN LO
MICROSYN FDBK HI
MICROSYN FDBK LO
WHEEL Φ A (90° LEAD)
WHEEL Φ B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
E7
E8
E9
E10
BLK
BRN
RED
ORN
YEL
GRN
BLU
VIO
GY
WHT
WHT/BLK
WHT/BLK/GY
WHT/BRN/RED
WHT/BRN/ORN
WHT/BRN/YEL
WHT/BRN/GRN
WHT/BRN/BLU
WHT/BLK/YEL
WHT/BLK/GRN
J25
P25
IG COMP A8
J18
P18
X PIP A1
J28
P28
X PIP PREAMP A17
J29
P29
Y PIP PREAMP A18
J30
P30
Z PIP PREAMP A19

REFERENCE DESIGNATIONS	TITLE	NASA PART NUMBER	NUMBER REQUIRED
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7	O.G & M.G ADA PREAMP		1
A8	I.G. ADA PREAMP		1
A9	IRIG PREAMP		1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 V DC REGULATOR	1007013	1
A14 THRU 16	HEATER & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	10007015	3
B1 THRU B6	TORQUE MOTOR	1000075	6
B7, B9, B11	RESOLVER 15X	1000078	3
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER, PITCH YAW	1000031-2	1
B14	RESOLVER, GYRO ERROR	1000031-1	1
B15, B16	BLOWER		2
C1, C2	CAPACITOR		2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG		4
F1, F2	FUSE	1000170	2
J1	CONNECTOR, PLUG	1000118-1	1
J2		1000118-2	1
J3		1000118-3	1
J4		1000118-4	1
J5 THRU J12		1000117	8
J13 & J14		1000120	2
(REF) J15 THRU J17			3
J18 THRU J20	RECEPTACLE	1000122	3
J21		1010318-	1
J24	REC. PTACLE		1
J25			1
J26	CONNECTOR, RECEPTACLE		1
J28 THRU J30		1010318-	3
J27	CONNECTOR, PLUG	1000222	1
MP1, MP2, MP3	IRIG	1000012	3
P28 THRU P30	CONNECTOR, PLUG	1010318-	3
P26	CONNECTOR, PLUG		1
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 & P14		1000119	2
P27		1000221	1
P15 THRU P17		1000121	3
(REF) P18 THRU P20	PLUG	1000123	3
(REF) P21		1010318-	1
(REF) P24	PLUG		1
(REF) P25			1
R1	RESISTOR-FIXED		1
R2			1
R3			1
S1	MICRO SWITCH		1
S2	SWITCH-THERMOSTATIC		1
S3			1
S4			1

CONNECTORS MARKED (REF) ARE INTEGRAL PARTS OF THEIR RESPECTIVE MODULES

FOR INFOR

CLASS B RELEASE T

DRAWING FOR REF:
1000001 I.M.U ASSY

A COMPLETE
1-62

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153

		DATE
APPROVED	[illegible]	1-2-62
CHECKED	WINBERG	12-2-62
DRAWN	THEAS	10-7-62

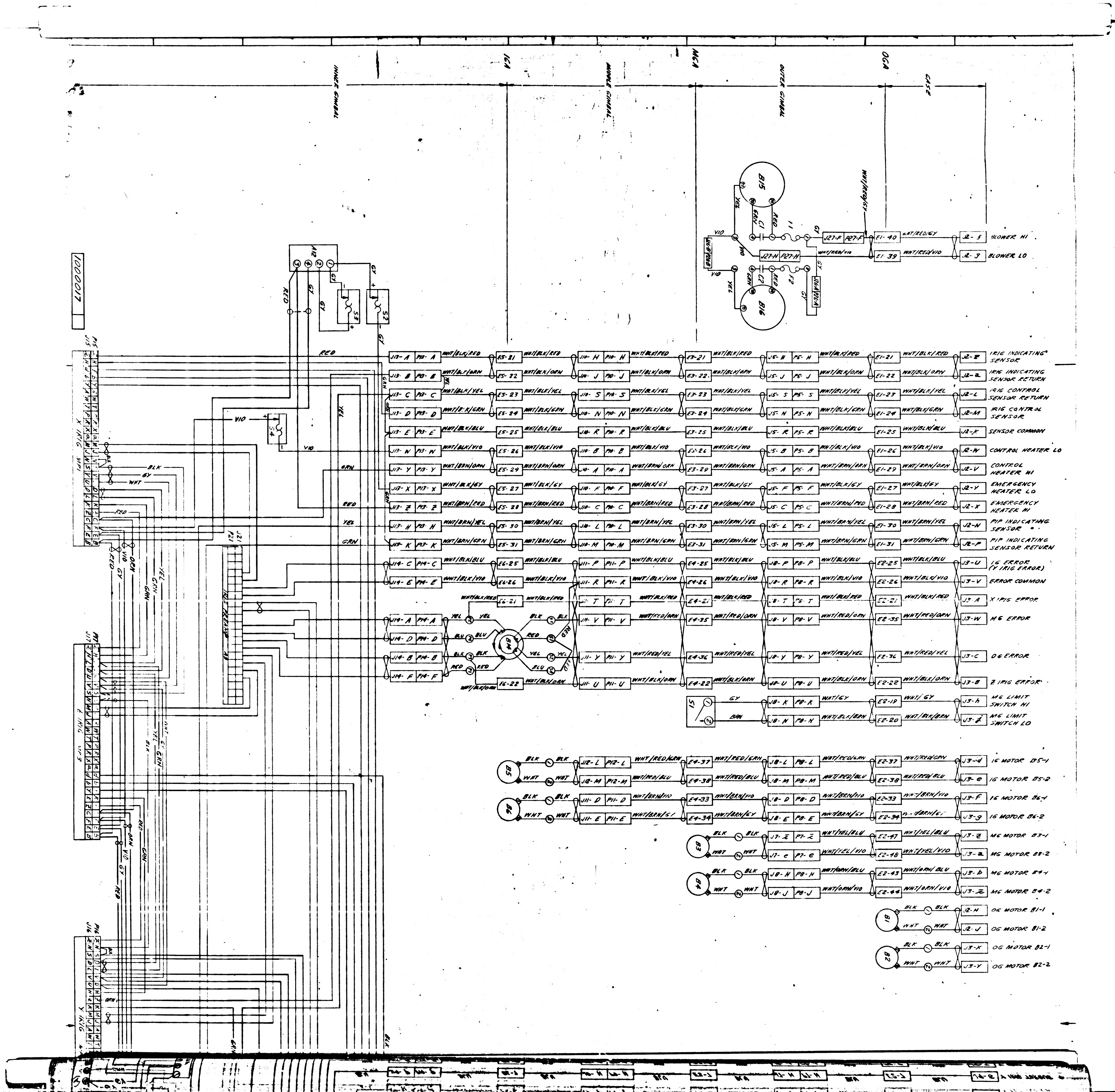
APPROVED FOR MSC

BY DIRECTION
28 Nov 1962

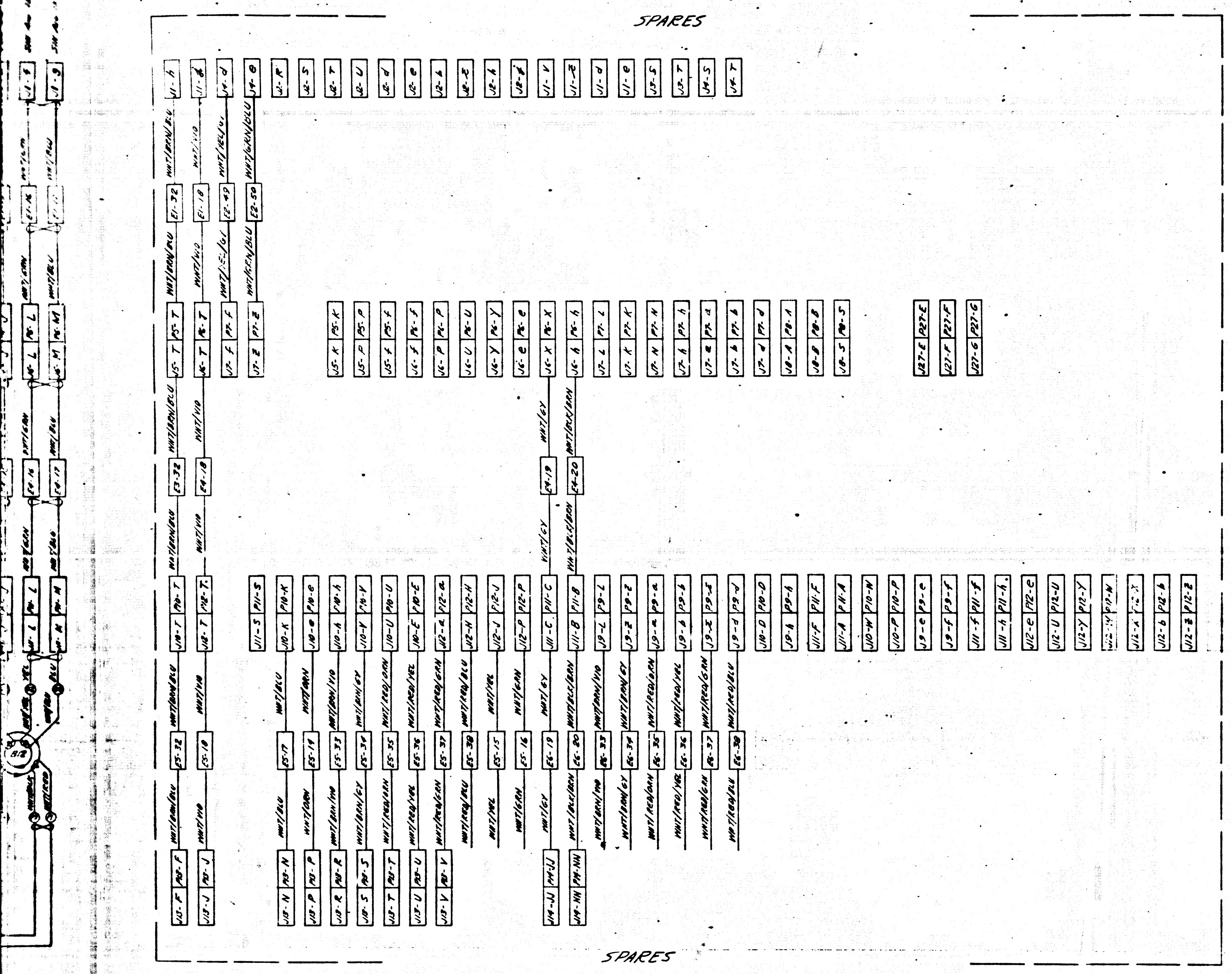
APOL

WIRING

SCALE


INNER GIMBAL
IGA
MIDDLE GIMBAL
MGA
OUTER GIMBAL
OGA
CASE
1000017
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR RETURN
IRIG CONTROL SENSOR
SENSOR COMMON
CONTROL HEATER LO
CONTROL HEATER HI
EMERGENCY HEATER LO
EMERGENCY HEATER HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
BLOWER HI
BLOWER LO
B15
B16
C1
C2
F1
F2
S1
S2
S3
S4
A12
B1
B2
B3
B4
B5
B6
P15 J15
X IRIG WP1
Z IRIG WP3
P16 J16
Y IRIG
J21 P21
J27-F P27-F
J27-H P27-H
WHT
BLK
RED
GRN
YEL
GY
VIO
ORN
BLU

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHT 1 FOR REVISIONS PER TORR 00387	8-13-63	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 00122 DATE 11-25-63

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9153

		DATE
APPROVED		11-20-
CHECKED		12 2
DRAWN	T. HENO	10-17-

APPROVED FOR MSC
BY DIRECTION W S
25 Nov 63

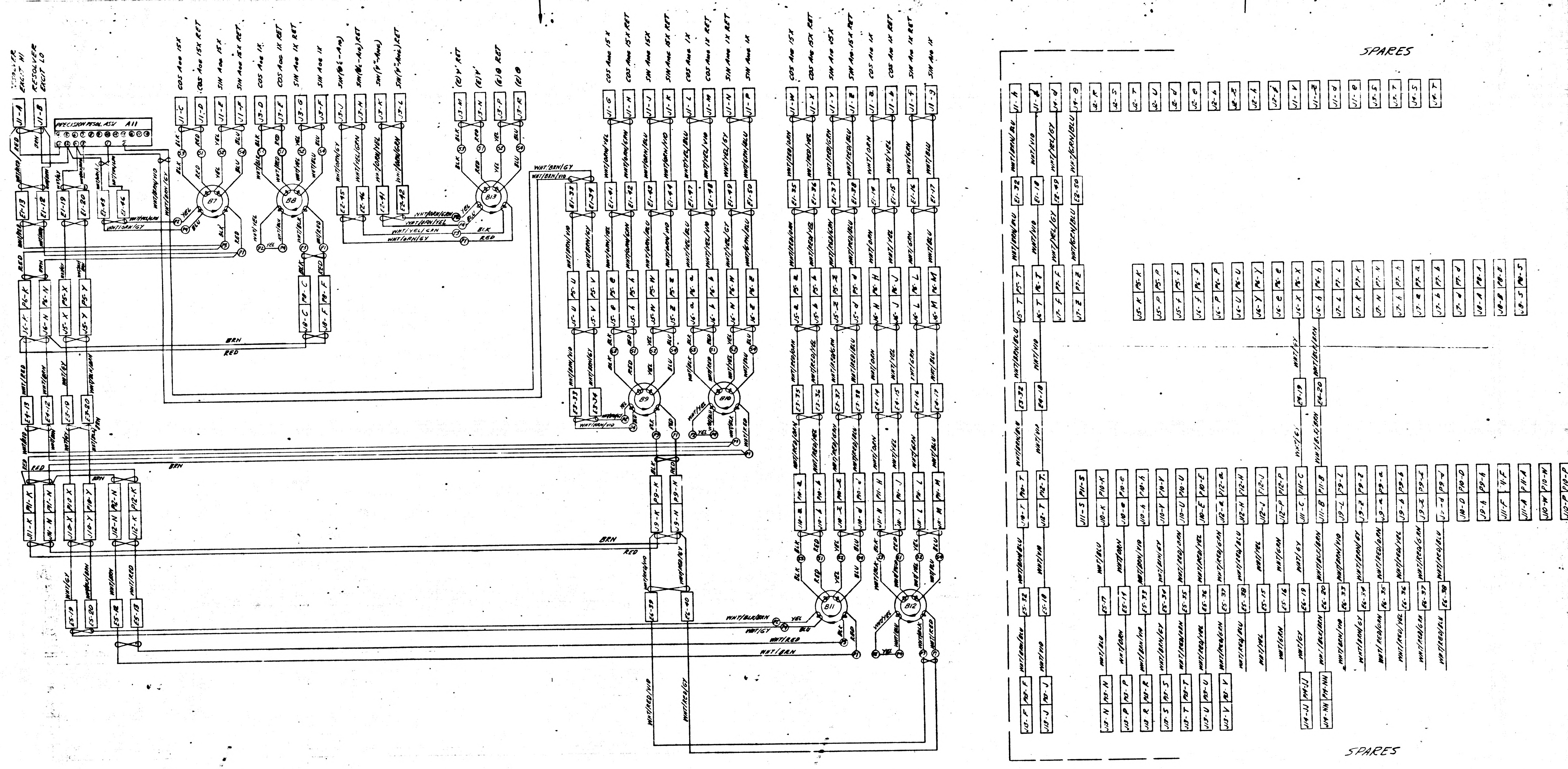
APOLLO I.M.U.
WIRING DIAGRAM

SCALE	UNIT WT	CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO R94383
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000017-A
SHEET 2 OF 2

1000017

1000017


RESOLVER EXCIT HI
RESOLVER EXCIT LO
PRECISION RESOL. ASY A11
COS AOG 15X
COS AOG 15X RET
SIN AOG 15X
SIN AOG 15X RET
COS AOG 1X
COS AOG 1X RET
SIN AOG 1X RET
SIN AOG 1X
SIN(Θc-AIG)
SIN(Θc-AIG) RET
SIN(ψ"-AMG)
SIN(ψ"-AMG) RET
(E)ψ' RET
(E)ψ'
(E)Θ RET
(E)Θ
COS AMG 15X
COS AMG 15X RET
SIN AMG 15X
SIN AMG 15X RET
COS AMG 1X
COS AMG 1X RET
SIN AMG 1X RET
SIN AMG 1X
COS AIG 15X
COS AIG 15X RET
SIN AIG 15X
SIN AIG 15X RET
COS AIG 1X
COS AIG 1X RET
SIN AIG 1X RET
SIN AIG 1X
B7
B8
B13
B9
B10
B11
B12
BRN
RED
SPARES
SPARES

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	COMPLETELY REVISED TO [illegible]	2-13 63	
B	COMPLETELY REVISED TDRR 01432	6-4-63 6-5-63	E.V.

	TITLE	NASA PART NUMBER	NUMBER REQUIRED
		1000013	3
		1000097	3
		1007022	2
	ADA PREAMP	1007025	1
	ADA PREAMP	1007024	1
	PREAMP		
	PRECISION RESOLVER ASSY	1007004	1
	EMERGENCY HEATER CONTROL	1007012	1
	28 V DC REGULATOR	1007013	1
	HEATER & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
	PIP PREAMP	1007015	3
	PRESSURE TRANSDUCER	1000272	1
	[illegible] SPEED CONTROL	1000266	2
	TORQUE MOTOR	1000075	6
	RESOLVER 16X	1000162	2
	RESOLVER 1X	1000030	3
	RESOLVER, PITCH YAW	1000031-2	1
	RESOLVER, GYRO ERROR	1000031-1	1
	BLOWER	1000219	2
	[illegible] 16X	1000161	1
	CAPACITOR	1010264-3E	2
	CLIP RING	1000038	2
	CLIP RING	1000037	4
	TERMINAL, LUG	MS25036-48	4
	TERMINAL INSULATED	1000100-1	2
	TERMINAL	1000100-	6
	CONNECTOR, PLUG	1000118-1	1
		1000118-2	1
		1000118-3	1
		1000118-4	1
J12		1000117	8
		1000120	2
		CONTINENTAL P/N MM26-22P6DS	3
	RECEPTACLE	1000122	3
	PLUG	1010472-1	1
J27	CONNECTOR, PLUG	1000222	2
J30		1010318-1	3
	IRI	1000012	3
	CONNECTOR, RECEPTACLE	1010318-2	3
P27	CONNECTOR,	1000221	2
P12	CONNECTOR	1000116	8
		1000119	2
		1000121	3
P30	PLUG	1000123	3
	RECEPTACLE	1010472-2	1
	RESISTOR-FIXED (130 Ω)	1010498-	1
	RESISTOR-FIXED	1010498-	1
		1010498-	1
		1010498-	1
	LIMIT SWITCH	1000211	1
	THERMOSTAT-SAFETY	1000266	2
	THERMOSTAT & HEATER ASSY	1000247	1
			1
	TERMINAL BOARD	1000253	1

ORS MARKED (REF) ARE INTEGRAL PARTS OF THEIR RESPECTIVE MODULES

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 00122 DATE 11-26-62

DRAWING FOR REF:
1000001 I.M.U. ASSY

MASTER

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9 153
DATE
APPROVED 6-19-62
CHECKED WINBERG 10-26-62
DRAWN 10-17-62
APPROVED FOR MSC
BY DIRECTION 28 NOV 62

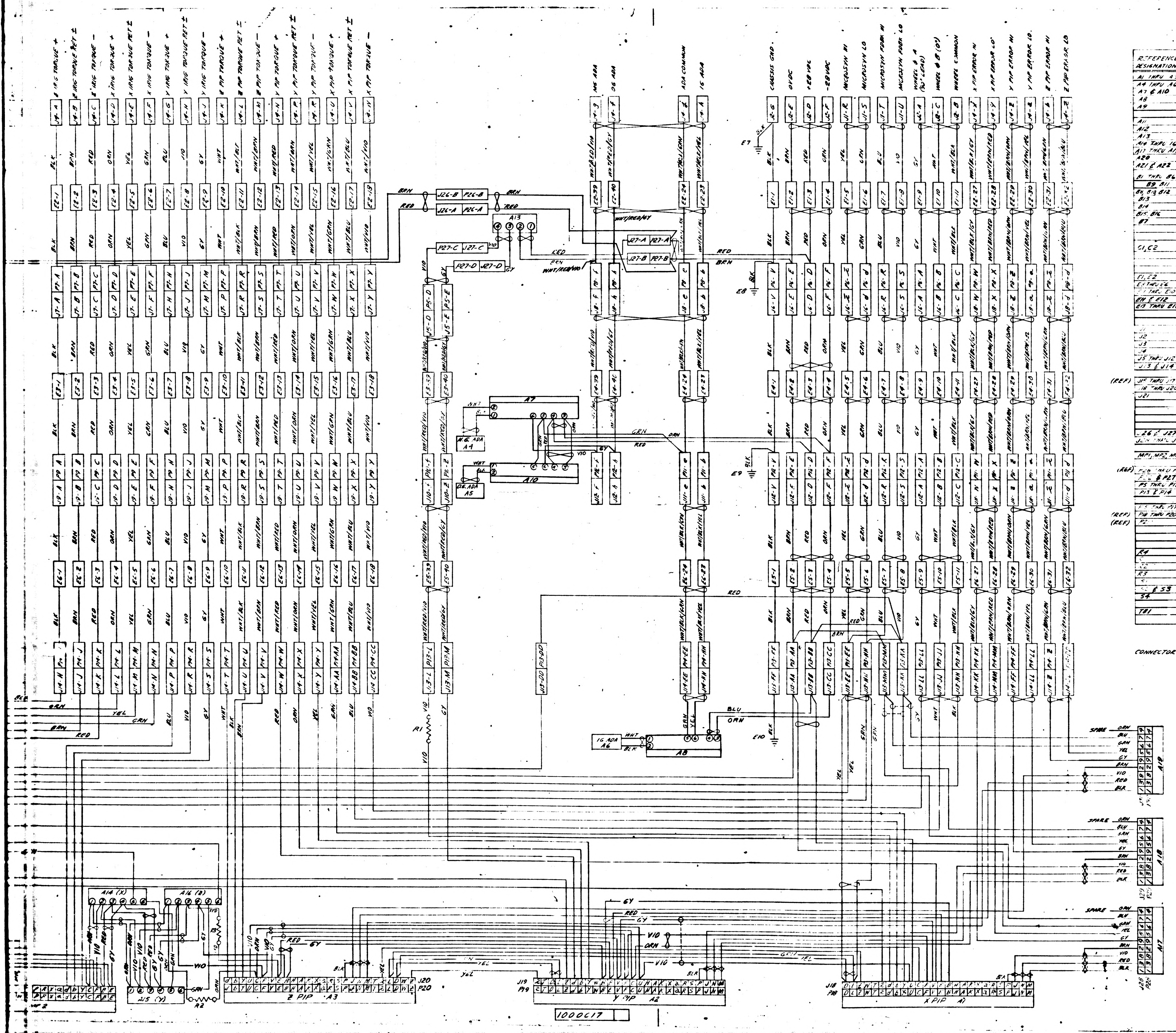
APOLLO I.M.U
WIRING DIAGRAM

SCALE
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO R-94383
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000017-B
SHEET 1 OF 2

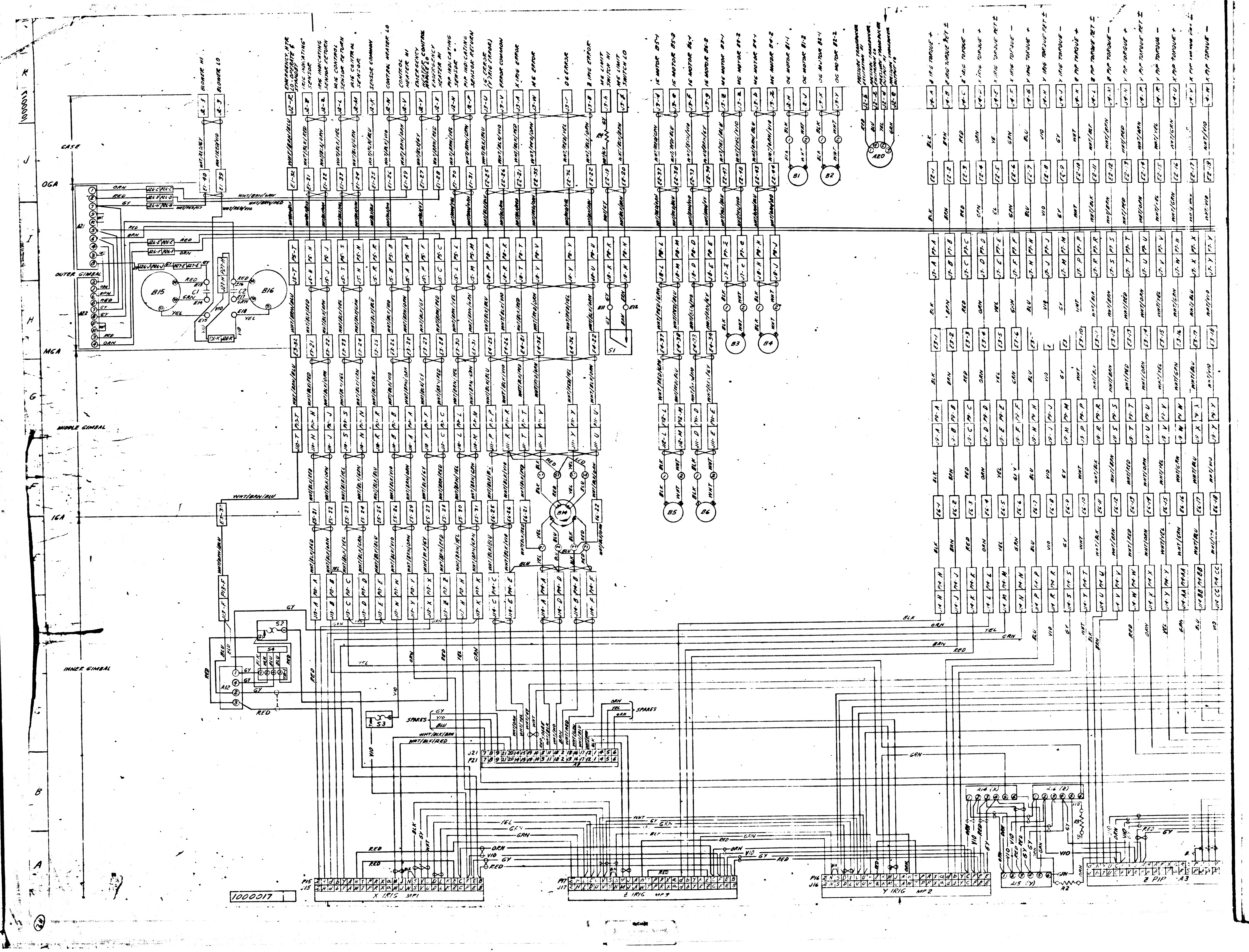
1000017

PHOTOGRAPHIC SCALE ONLY


Z IRIG TORQUE +
Z IRIG TORQUE RET ±
Z IRIG TORQUE −
X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET ±
Y IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE −
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE −
MG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND.
0VDC
+28 VDC
−28VDC
MICROSYN HI
MICROSYN LO
MICROSYN FDBK HI
MICROSYN FDBK LO
WHEEL Ø A (90° LEAD)
WHEEL Ø B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
A13
A7
A10
A8
MG ADA A4
OG ADA A5
IG ADA A6
E7
E8
E9
E10
R1
R2
A14 (X)
A16 (Z)
A15 (Y)
A17
A18
A19
SPARE
Z PIP - A3
Y PIP A2
X PIP A1
J20 P20
J19 P19
J18 P18
1000C17

REFERENCE DESIGNATIONS	TITLE	NASA PART NUMBER	NUMBER REQUIRED
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7 & A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007024	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 V DC REGULATOR	1007013	1
A14 THRU 16	HEATER & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21 & A22	BLOWER SPEED CONTROL	1000289	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B9 B11	RESOLVER 16X	1000162	2
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER, PITCH YAW	1000031-2	1
B14	RESOLVER, GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B7	RESOLVER 16X	1000161	1
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 & E12	TERMINAL, INSULATED	1000100-1	2
E13 THRU E18	TERMINAL	1000100-	6
J1	CONNECTOR, PLUG	1000118-1	1
J2		1000118-2	1
J3		1000118-3	1
J4		1000118-4	1
J5 THRU J12		1000117	8
J13 & J14		1000120	2
(REF) J15 THRU J17		CONTINENTAL P/N MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26 & J27	CONNECTOR, PLUG	1000222	2
J28 THRU J30		1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
(REF) P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
P26 & P27	CONNECTOR,	1000221	2
P5 THRU P12	CONNECTOR	1000116	8
P13 & P14		1000119	2
P15 THRU P17		1000121	3
(REF) P18 THRU P20	PLUG	1000123	3
(REF) P21	RECEPTACLE	1010472-2	1
R4	RESISTOR-FIXED (130 Ω)	1010498-	1
R1	RESISTOR-FIXED	1010498-	1
R2		1010498-	1
R3		1010498-	1
S1	LIMIT SWITCH	1000211	1
S2 & S3	THERMOSTAT-SAFETY	1000266	2
S4	THERMOSTAT & HEATER ASSY	1000247	1
			1
TB1	TERMINAL BOARD	1000253	1

CONNECTORS MARKED (REF) ARE INTEGRAL PARTS OF THEIR RESPECTIVE MODULES


1000017
K
J
I
H
G
F
E
D
C
B
A
CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
EMERGENCY HTR LO-OPERATE & STANDBY
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR RETURN
IRIG CONTROL SENSOR
SENSOR COMMON
CONTROL HEATER LO
CONTROL HEATER HI
EMERGENCY HEATER CONTROL MODULE LO
EMERGENCY HEATER HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
PRESSURE TRANSDUCER EXCITATION HI
PRESSURE TRANSDUCER EXCITATION LO
PRESSURE TRANSDUCER OUTPUT HI
PRESSURE TRANSDUCER OUTPUT LO
Z IRIG TORQUE +
Z IRIG TORQUE RET ±
Z IRIG TORQUE −
X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET ±
Y IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE −
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE −
A20
A21
A22
A12
B1
B2
B3
B4
B5
B6
B14
B15
B16
C1
C2
S1
S2
S3
S4
R4
R2
SPARES
J21
P21
A9
P15
J15
X IRIG MP1
P17
J17
Z IRIG MP3
P16
J16
Y IRIG MP2
A14 (X)
A16 (Z)
A15 (Y)
Z PIP
A3
BLK
BRN
RED
ORN
YEL
GRN
BLU
VIO
GY
WHT

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHT 1 FOR REVISIONS PER TDRR 0- 3?7	2-13-63	WR
B	TDRR 01432	5 Jun 63	WR

K
J
I
H
G
F
E
D
C
B
A

1000017

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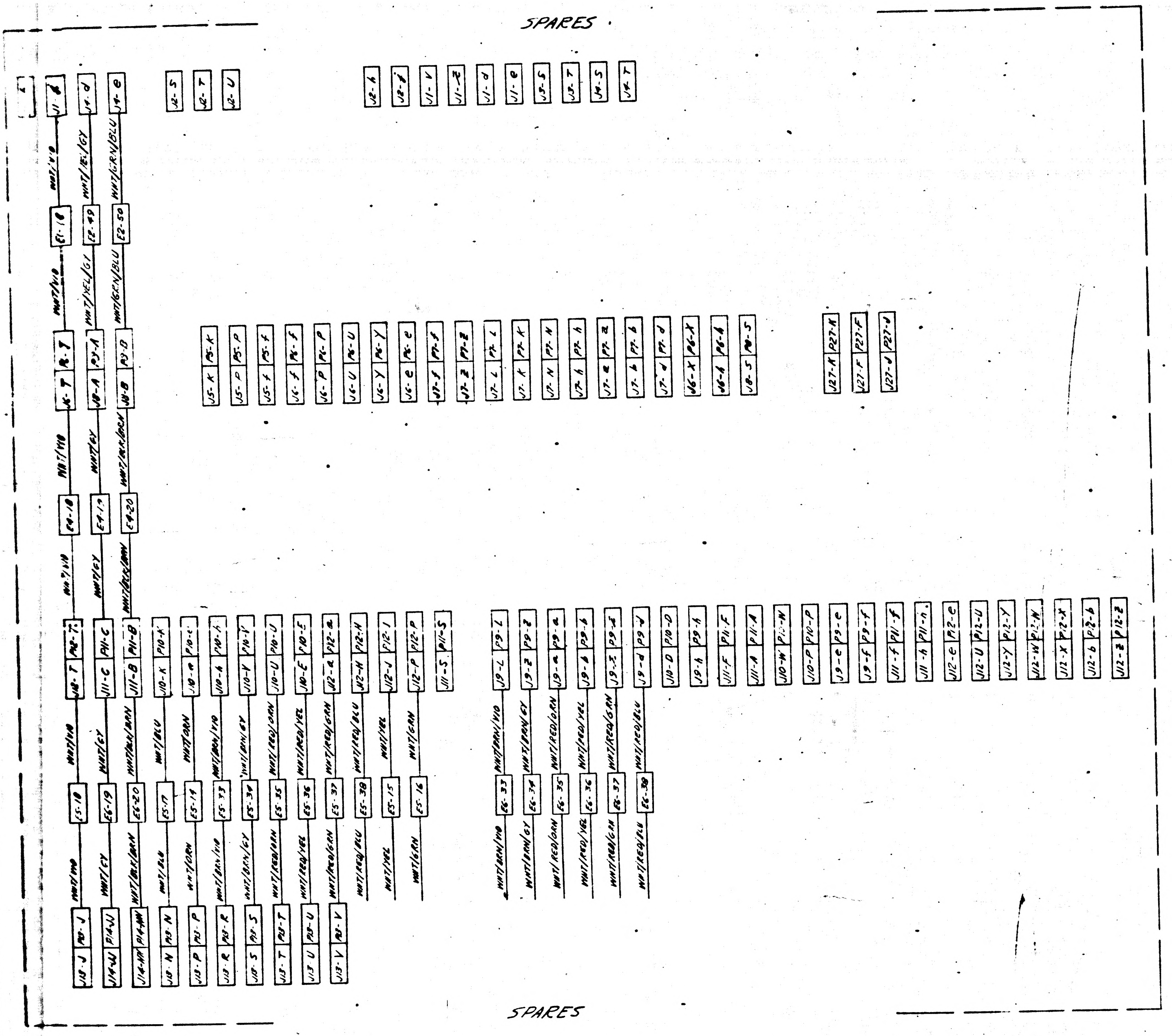
CLASS B RELEASE TDR No. 00122 DATE [illegible]-63

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE	APOLLO I.M.U. WIRING DIAGRAM	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS
APPROVED J. L. Nevins	11-26-62		DWG NO R94383
CHECKED Hybertie	11-26-62		MANNED SPACECRAFT CENTER HOUSTON TEXAS
DRAWN THEMO	11-17-62		NASA DRAWING NO 1000017-B
APPROVED FOR MSC		SCALE / UNIT WT / CODE IDENT	SHEET 2 OF 2
BY DIRECTION WS	29 NOV 62		

ASTER

(2A)

SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHT 1 FOR REVISIONS PER TDRR OC 377	8-13-63	
B	TDRR 01432		


SPARES
J1-a
J4-d
J4-e
J2-S
J2-T
J2-U
J2-h
J2-j
J1-V
J1-Z
J1-d
J1-e
J3-S
J3-T
J4-S
J4-T
WHT/VIO
WHT/YEL/GY
WHT/GRN/BLU
E1-18
E2-49
E2-50
K-T
R-T
J8-A
P3-A
J8-B
P3-B
WHT/GY
WHT/BLK/BRN
E4-18
E4-19
E4-20
J5-K
P5-K
J5-P
P5-P
J5-f
P5-f
J6-f
P6-f
J6-P
P6-P
J6-U
P6-U
J6-Y
P6-Y
J6-e
P6-e
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P7-f
J7-Z
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J27-J
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P18-T
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J11-B
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P10-V
J10-U
P10-U
J10-E
P10-E
J12-a
P12-a
J12-H
P12-H
J12-J
P12-J
J12-P
P12-P
J11-S
P11-S
WHT/BLU
WHT/ORN
WHT/BRN/VIO
WHT/BRN/GY
WHT/RED/ORN
WHT/RED/YEL
WHT/RED/GRN
WHT/RED/BLU
WHT/YEL
WHT/GRN
E5-18
E6-19
E6-20
E5-17
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E5-36
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E5-38
E5-15
E5-16
J13-J
P13-J
J14-JJ
P14-JJ
J14-AA
P14-AA
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P13-P
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P13-R
J13-S
P13-S
J13-T
P13-T
J13-U
P13-U
J13-V
P13-V
J9-L
P9-L
J9-Z
P9-Z
J9-a
P9-a
J9-b
P9-b
J9-Z
P9-Z
J9-d
P9-d
E6-33
E6-34
E6-35
E6-36
E6-37
E6-38
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P10-D
J9-h
P9-h
J11-F
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J11-A
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J10-P
P10-P
J9-e
P9-e
J9-f
P9-f
J11-f
P11-f
J11-h
P11-h
J12-e
P12-e
J12-U
P12-U
J12-Y
P12-Y
J12-W
P12-W
J12-X
P12-X
J12-b
P12-b
J12-Z
P12-Z
SPARES

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 00122 DATE

1000017

MASTER

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

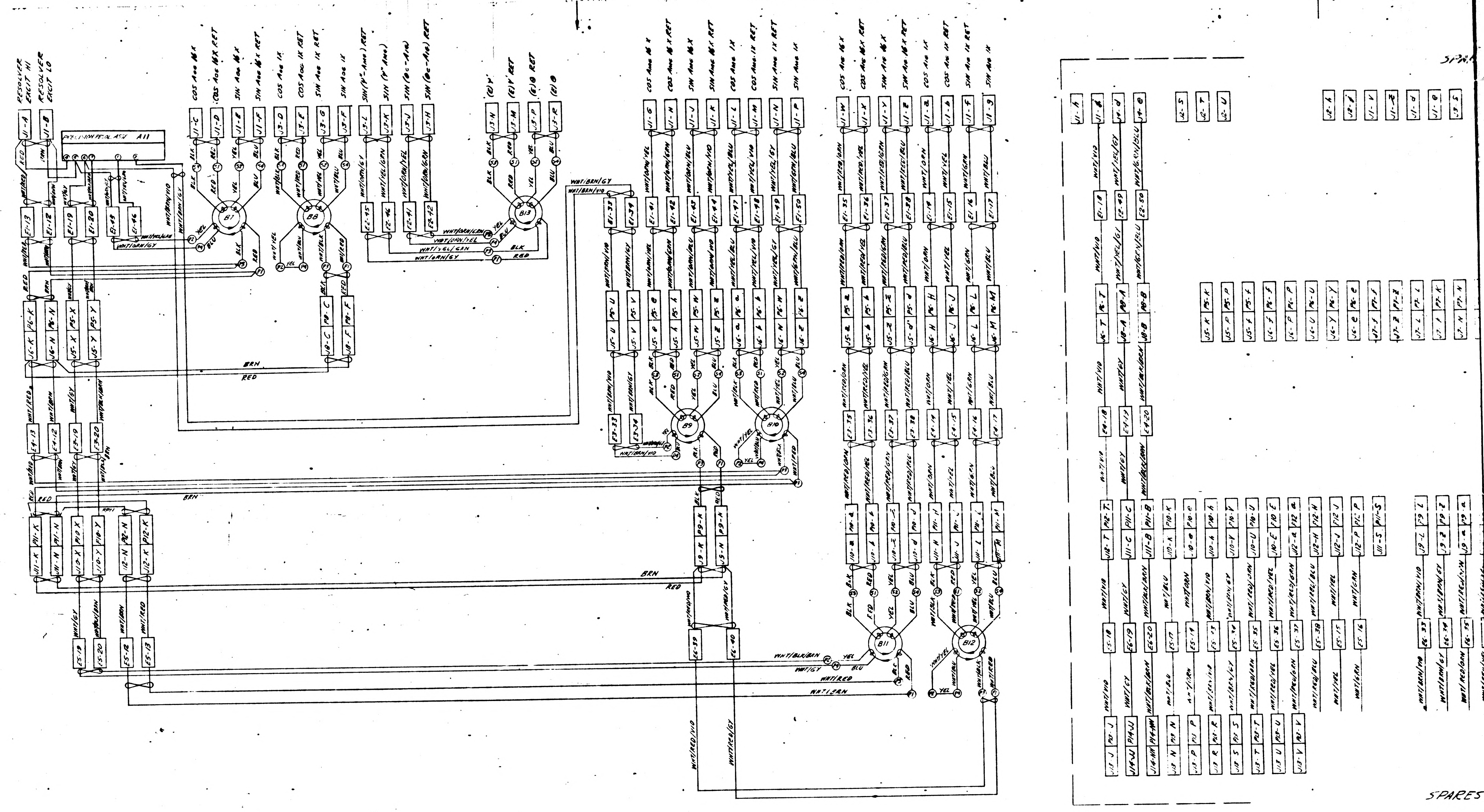
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
BY DIRECTION
25 NOV

APOLLO I.M.U.
WIRING DIAGRAM

SCALE	UNIT WT	CODE IDENT

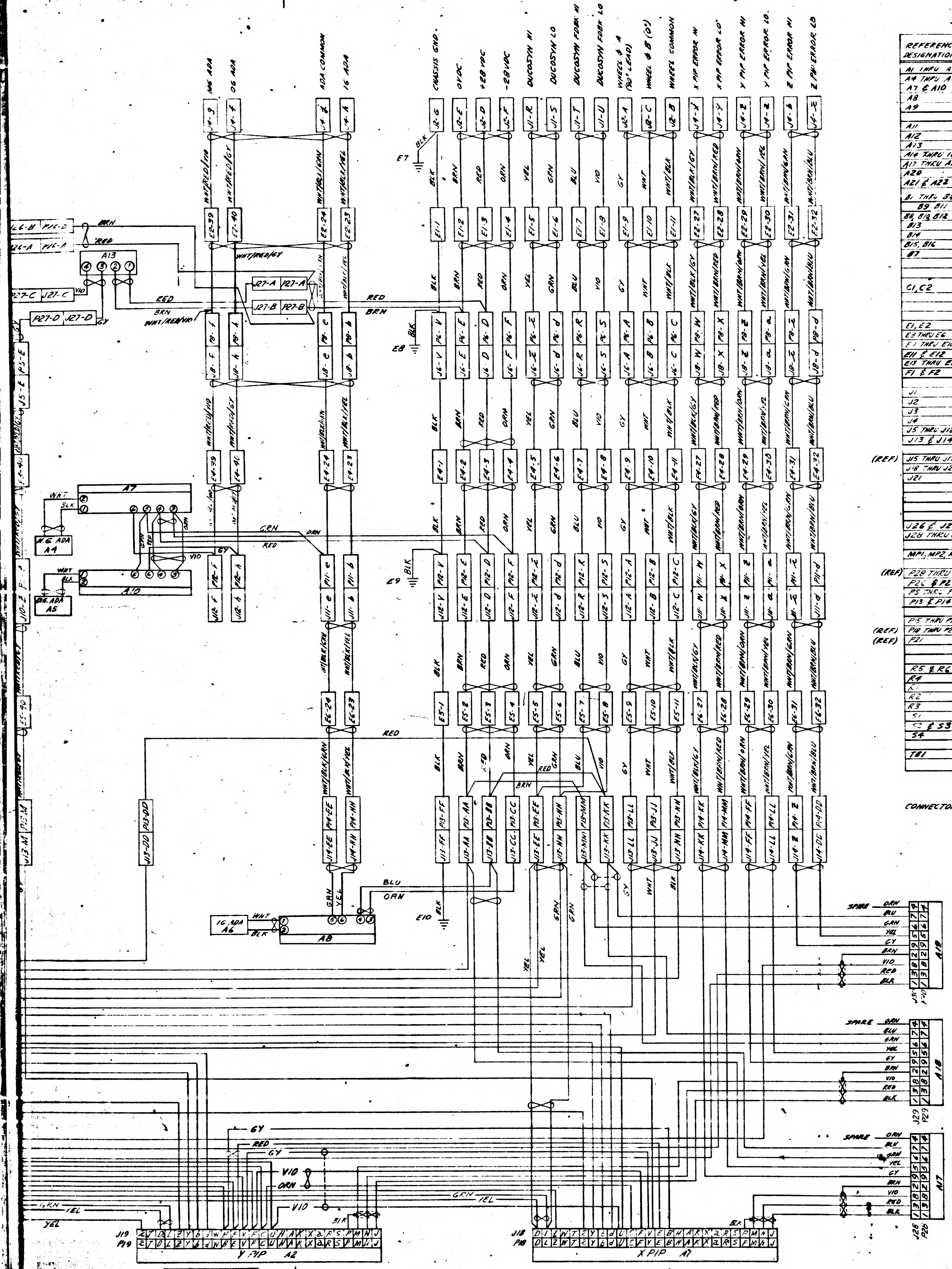
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO R94383
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000017-B
SHEET 2 OF 2

1000017


RESOLVER EXCIT HI
RESOLVER EXCIT LO
PRECISION RESOL. ASSY A11
COS AOG 16X
COS AOG 16X RET
SIN AOG 16X
SIN AOG 16X RET
COS AOG 1X
COS AOG 1X RET
SIN AOG 1X RET
SIN AOG 1X
SIN (Ψ″-AMG) RET
SIN (Ψ″ AMG)
SIN (θc-AIG)
SIN (θc-AIG) RET
(E)Ψ′
(E)Ψ′ RET
(E)θ RET
(E)θ
COS AMG 16X
COS AMG 16X RET
SIN AMG 16X
SIN AMG 16X RET
COS AMG 1X
COS AMG 1X RET
SIN AMG 1X RET
SIN AMG 1X
COS AIG 16X
COS AIG 16X RET
SIN AIG 16X
SIN AIG 16X RET
COS AIG 1X
COS AIG 1X RET
SIN AIG 1X RET
SIN AIG 1X
B1
B8
B13
B9
B10
B11
B12
BRN
RED
WHT/BRN/GY
WHT/BRN/VIO
SPARES

1000017

PHOTOGRAPHIC SCALE ONLY


MG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND.
OVDC
+28 VDC
-28 VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL Ø A (90° LEAD)
WHEEL Ø B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
A13
A7
A10
A8
MG ADA A4
OG ADA A5
IG ADA A6
E7
E8
E9
E10
RED
BRN
WHT/RED/VIO
WHT/RED/GY
GRN
ORN
BLU
YEL
SPARE
A19
A18
A17
J19 P19
Y PIP A2
J18 P18
X PIP A1
J20 P20
J29 P29
J28 P28

REFERENCE DESIGNATIONS	TITLE	NASA PART NUMBER	NUMBER REQUIRED
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7 & A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007024.	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 V DC REGULATOR	1007013	1
A14 THRU 16	HEATER & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21 & A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B9 B11	RESOLVER 16X	1000162	2
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER, PITCH YAW	1000031-2	1
B14	RESOLVER, GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B7	RESOLVER 16X	1000161	1
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 & E12	TERMINAL, INSULATED	1000100-1	2
E13 THRU E18	TERMINAL	1000100-1	6
F1 & F2	FUSE	1000170-10	2
J1	CONNECTOR, PLUG	1000118-1	1
J2		1000118-2	1
J3		1000118-3	1
J4		1000118-4	1
J5 THRU J12		1000117	8
J13 & J14		1000120	2
(REF) J15 THRU J17		CONTINENTAL P/N MM2C-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26 & J27	CONNECTOR. PLUG	1000222	2
J28 THRU J30		1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
(REF) P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
P26 & P27	CONNECTOR.	1000221	2
P5 THRU P12	CONNECTOR.	1000116	8
P13 & P14		1000119	2
P15 THRU P17		1000121	3
(REF) P18 THRU P20	PLUG	1000123	3
(REF) P21	RECEPTACLE	1010472-2	1
R5 & R6	RESISTOR-FIXED	1010325-500	2
R4		1010498-300	1
R1		1010498-	1
R2		1010498-	1
R3		1010498-	1
S1	LIMIT SWITCH	1000211	1
S2 & S3	THERMOSTAT-SAFETY	1000266	2
S4	THERMOSTAT & HEATER ASSY	1000247	1
			1
TB1	TERMINAL BOARD	1000253	1

CONNECTORS MARKED (REF) ARE INTEGRAL PARTS OF THEIR RESPECTIVE MODULES

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	COMPLETELY REVISED TDRR 00347	2-13-63	
B	COMPLETELY REVISED TDRR 01432	6-4-63 6-5-63	E.V.
C	ADDED F1 & F2 SIGNALS ON J1R, J1S, J1T, J1U, WERE "MICROSYN ADDED R5 & R6 REM'D J&P26-C & J&P26-F REVISED WIRING ON A21 & A22 ADDED -10" TO FUSES ADDED -"500" TO R5 & R6 ADDED -"1" TO E13 THRU E18 REVERSED PINS J & M & PINS d & Y ON J18 J19 & J20 REVISED WIRING ON A20 TDRR 02139	7-16-63	E.V. 7-17-63 WK 7/24/63

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 00122 DATE 11-25-62

DRAWING FOR REF:
1000201 I.M.U ASSY

C	C
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

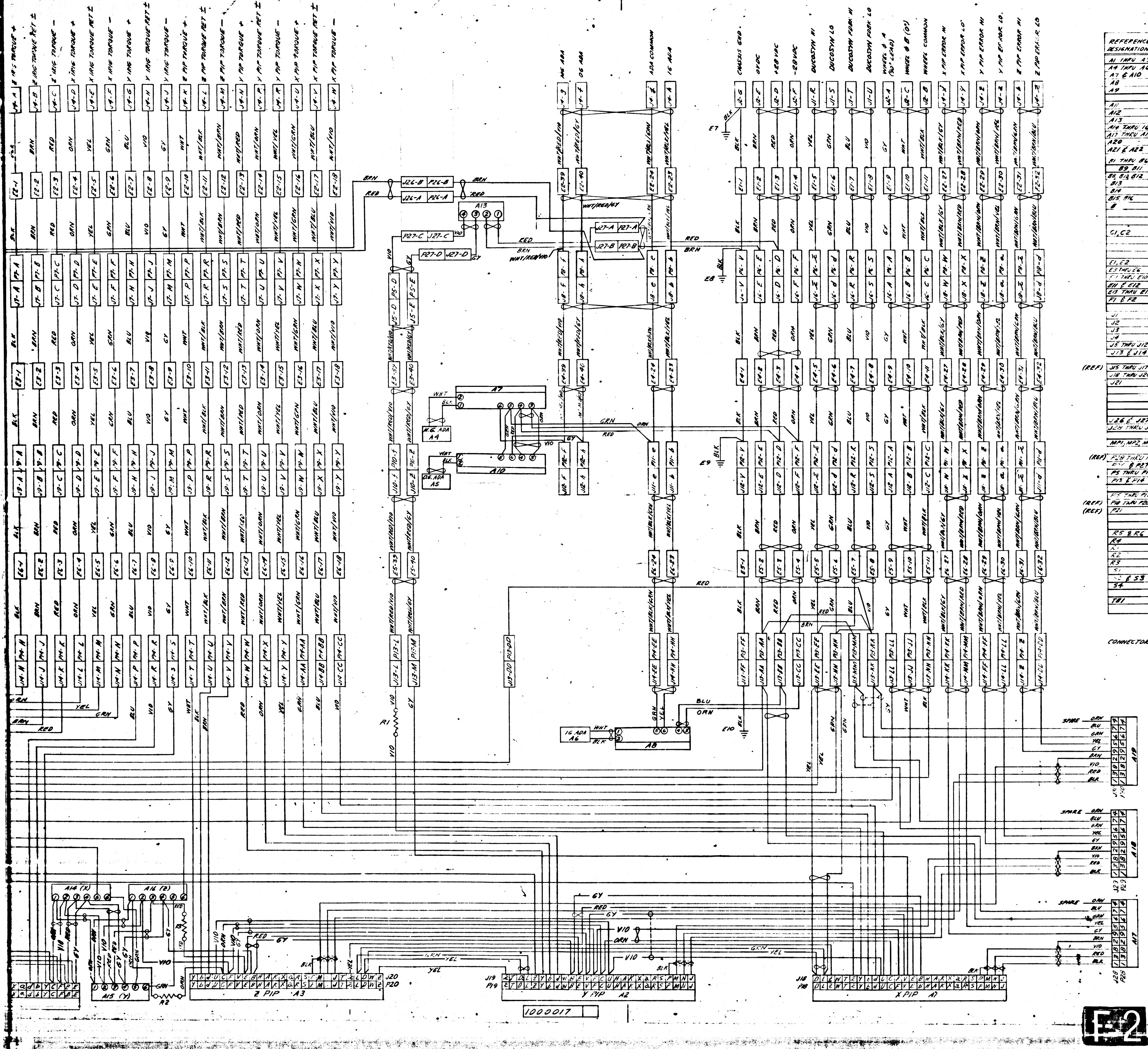
1000017

MIT INSTRUMENTATION LAB	APOLLO I.M.U WIRING DIAGRAM	MIT INSTRUMENTATION LABORATORY CAMBRIDGE MASS
NAS 9153		DWG NO R-94383
APPROVED J. Miller 11-30-62		MANNED SPACECRAFT CENTER HOUSTON TEXAS
CHECKED WINBERG 11-26-62		NASA DRAWING NO 1000017-
DRAWN THEN 10/17-62	SCALE / UNIT WT / CODE IDENT	SHEET 1 OF 2
APPROVED FOR MSC		
BY DIRECTION W. Kunkel 28 Nov 1962		

1000017

F3

PHOTOGRAPHIC SCALE ONLY


Z IRIG TORQUE +
Z IRIG TORQUE RET ±
Z IRIG TORQUE −
X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET ±
Y IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE −
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE −
MG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND.
0 VDC
+28 VDC
−28 VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL Ø A (90° LEAD)
WHEEL Ø B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
A13
A7
A10
A8
MG ADA A4
OG ADA A5
IG ADA A6
E7
E8
E9
E10
R1
R2
A14 (X)
A16 (Z)
A15 (Y)
Z PIP A3
Y PIP A2
X PIP A1
J20 P20
J19 P19
J18 P18
A19
A18
A17
J30 P30
J29 P29
J28 P28
SPARE
1000017

REFERENCE DESIGNATIONS	TITLE	NASA PART NUMBER	NUMBER REQUIRED
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7 & A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007024	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 V DC REGULATOR	1007013	1
A14 THRU 16	HEATER & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	[illegible]	1
A21 & A22	BLOWER SPEED CONTROL	[illegible]	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B9, B11	RESOLVER 16X	1000162	2
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER, PITCH YAW	1000031-2	1
B14	RESOLVER, GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B	RESOLVER 16X	1000161	1
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 & E12	TERMINAL, INSULATED	1000100-1	2
E13 THRU E18	TERMINAL	1000100-1	6
F1 & F2	FUSE	1000170-10	2
J1	CONNECTOR, PLUG	1000118-1	1
J2		1000118-2	1
J3		1000118-3	1
J4		1000118-4	1
J5 THRU J12		1000117	8
J13 & J14		1000120	2
(REF) J15 THRU J17		CONTINENTAL P/N MM2C-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26 & J27	CONNECTOR, PLUG	1000222	2
J28 THRU J30		1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
(REF) P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
P26 & P27	CONNECTOR	1000221	2
P5 THRU P12	CONNECTOR	1000116	8
P13 & P14		1000119	2
P15 THRU P17		1000121	3
(REF) P18 THRU P20	PLUG	1000123	3
(REF) P21	RECEPTACLE	1010472-2	1
R5 & R6	RESISTOR-FIXED	1010325-500	2
R4		1010498-300	1
R1		1010498-	1
R2		1010498-	1
R3		1010498-	1
S1	LIMIT SWITCH	1000211	1
S2 & S3	THERMOSTAT-SAFETY	1000266	2
S4	THERMOSTAT & HEATER ASSY	1000247	1
			1
TB1	TERMINAL BOARD	1000253	1

CONNECTORS MARKED (REF) ARE INTEGRAL PARTS OF THEIR RESPECTIVE MODULES

DRAWING FOR

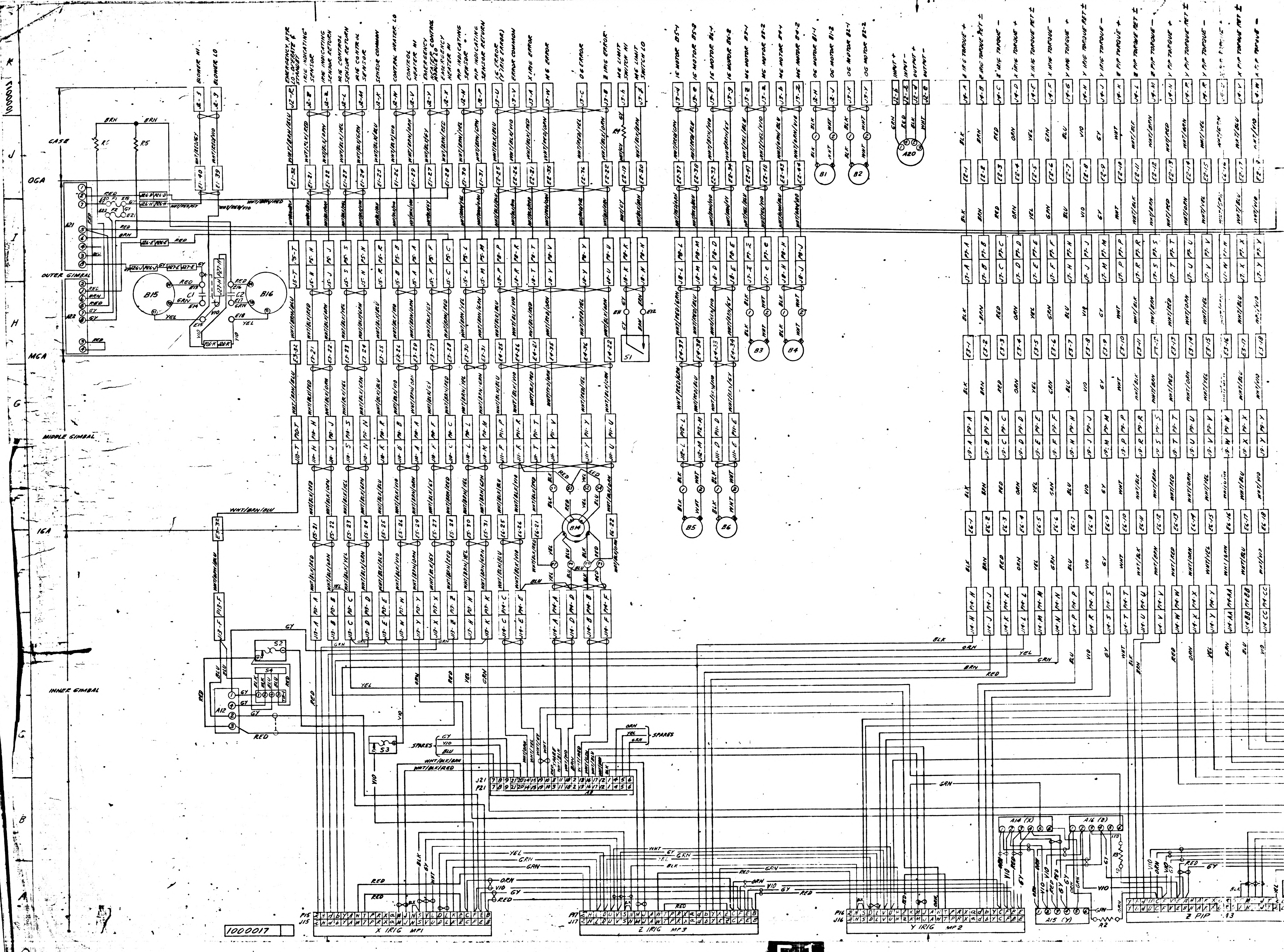
1000

C	C
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

E-2

PHOTOGRAPHIC SCALE ONLY

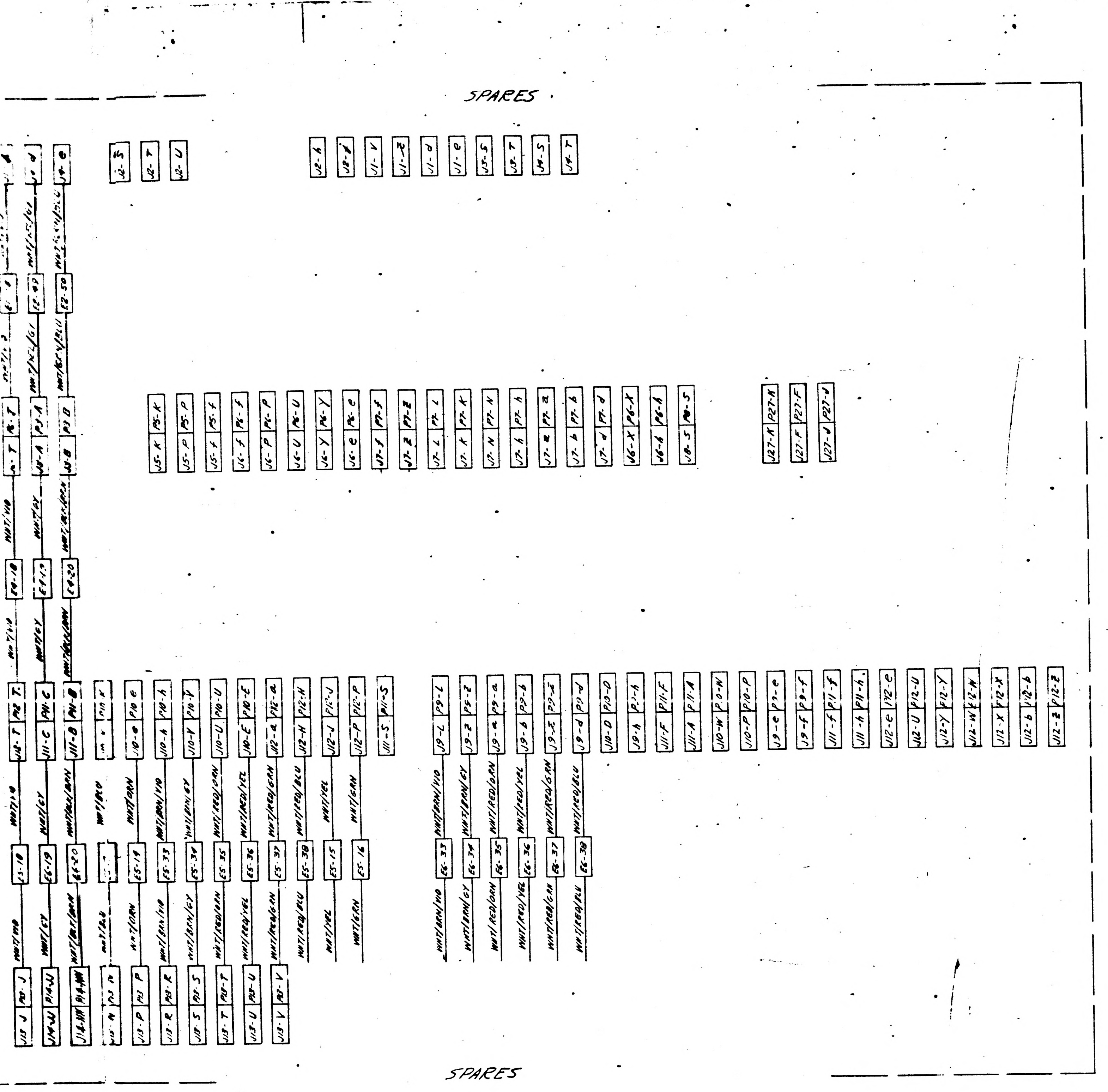


K
J
I
H
G
C
B
A
1000017
CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
EMERGENCY HTR LO-OPERATE & STANDBY
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR RETURN
IRIG CONTROL SENSOR
SENSOR COMMON
CONTROL HEATER LO
CONTROL HEATER HI
EMERGENCY HEATER CONTROL MODULE LO
EMERGENCY HEATER HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
INPUT +
INPUT −
OUTPUT +
OUTPUT −
Z IRIG TORQUE +
Z IRIG TORQUE RET ±
Z IRIG TORQUE −
X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET ±
Y IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE −
X PIP TORQUE RET ±
X PIP TORQUE −
B1
B2
B3
B4
B5
B6
B14
B15
B16
A12
A14 (X)
A15 (Y)
A16 (Z)
A20
A21
A22
C1
C2
F1
F2
R2
R3
R4
R5
R6
S1
S2
S3
S4
SPARES
J21
P21
P15
J15
X IRIG MP1
P17
J17
Z IRIG MP3
P16
J16
Y IRIG MP2
Z PIP
WHT
BLK
BRN
RED
ORN
YEL
GRN
BLU
VIO
GY

F-1

0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHT 1 FOR REVISIONS PER TDRR 0C367	8-13-63	WK
B	TDRR 01432	5 June 63	WK
C	TDRR 02139	7/16/63	WK 7/29/63



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 00122 DATE 11-26-62

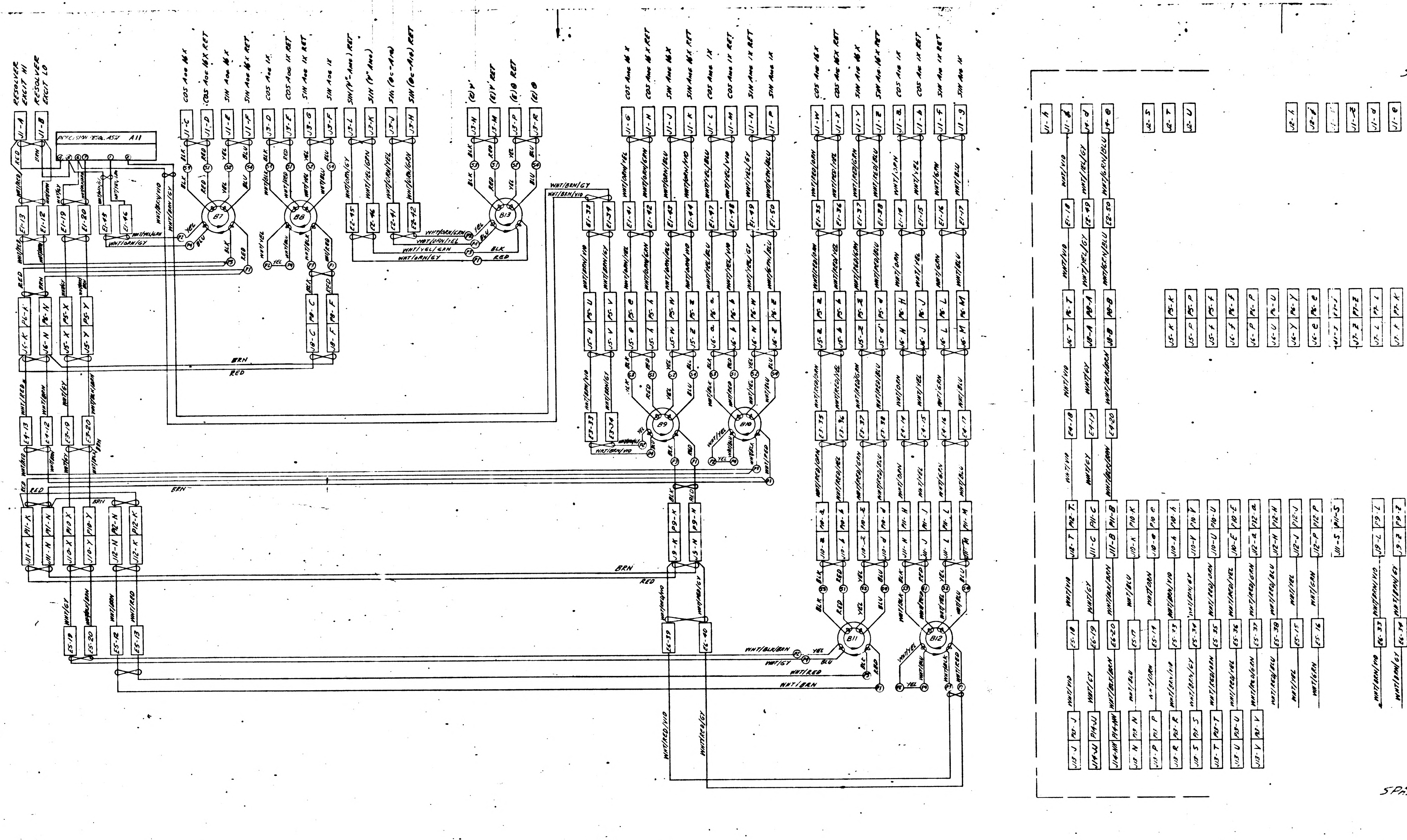
1000017

M I T INSTRUMENTATION LAB CONTRACT NAS 9 153	DATE	APOLLO I.M.U. WIRING DIAGRAM	M I T INSTRUMENTATION LABORATORY Cambridge, Mass
APPROVED	11-28-62		DWG NO R94383
CHECKED	10-26-62		MANNED SPACECRAFT CENTER HOUSTON TEXAS
DRAWN THENO	10-17-62		NASA DRAWING NO 1000017-B
APPROVED FOR MSC		SCALE	UNIT WT	CODE IDENT
BY DIRECTION W S	29 NOV 62		SHEET 2 OF 2

1000017

F-2

PHOTOGRAPHIC SCALE ONLY

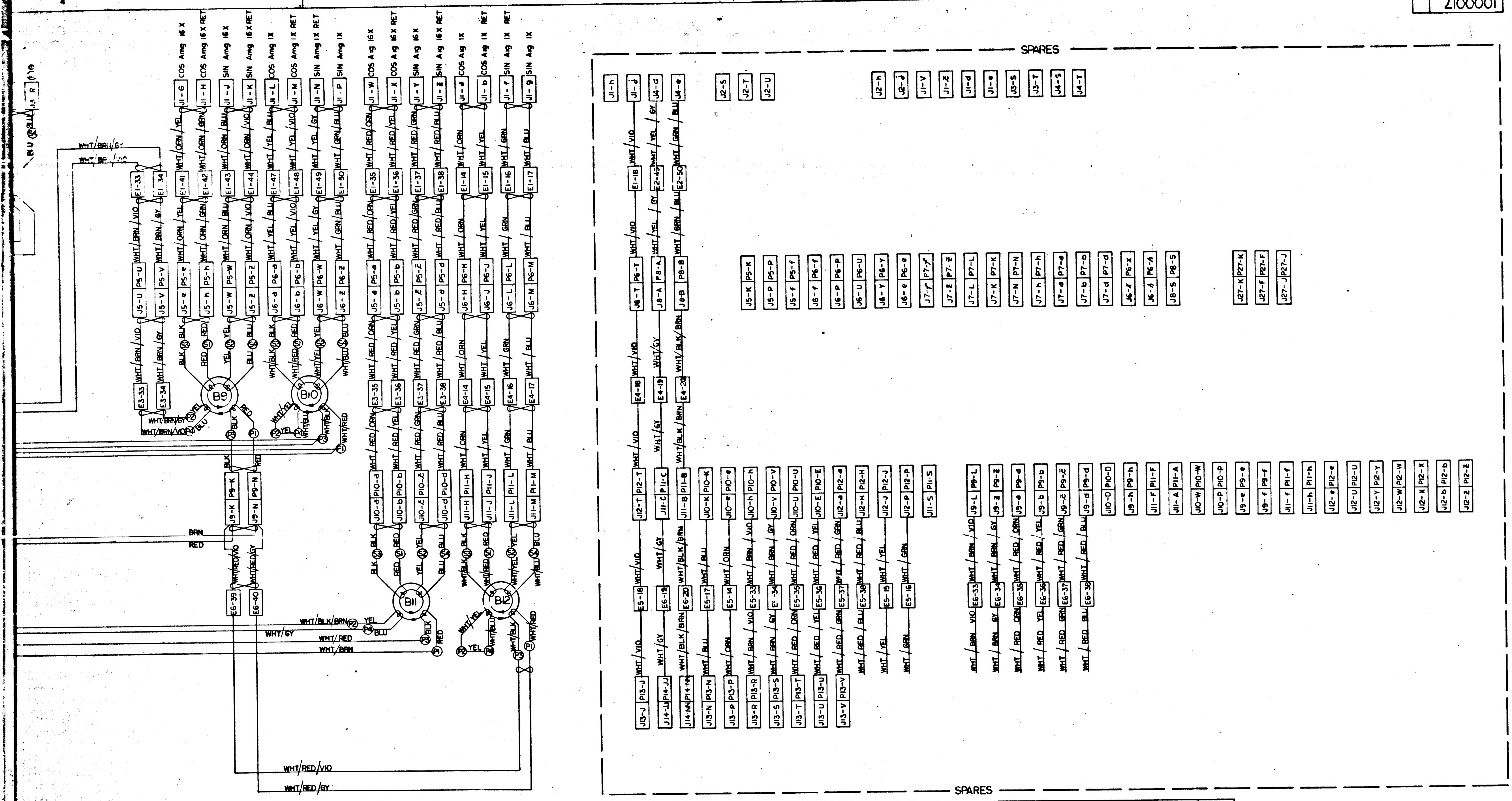

RESOLVER EXCIT HI
RESOLVER EXCIT LO
PRECISION 3-Ø ASSY A11
COS Ang 16 X
COS Ang 16X RET
SIN Ang 16 X
SIN Ang 16X RET
COS Ang 1X
COS Ang 1X RET
SIN Ang 1X RET
SIN Ang 1X
B7
B8
B9
B10
B11
B12
B13
BRN
RED
BLK
YEL
BLU

F-1

1000017

PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV. D WITH CHANGES. TDRR 03305	23 SEPT 1963	a.E.V. 9/23 63


COS Amg 16X
COS Amg 16X RET
SIN Amg 16X
SIN Amg 16X RET
COS Amg 1X
COS Amg 1X RET
SIN Amg 1X
SIN Amg 1X RET
COS Aig 16X
COS Aig 16X RET
SIN Aig 16X
SIN Aig 16X RET
COS Aig 1X
COS Aig 1X RET
SIN Aig 1X
SIN Aig 1X RET
SPARES
B9
B10
B11
B12
WHT/RED/VIO
WHT/RED/GY
WHT/BLK/BRN
WHT/GY
WHT/RED
WHT/BRN
BRN
RED
SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007024	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
F1, F2	FUSE.	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1000118-1	1
J2	PLUG	1000118-2	1
J3	PLUG	1000118-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT-SAFETY	1000266	2
S4	THERMOSTAT-MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

DRAWING FOR REFERENCE 1000201 IMU ASSEMBLY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1000201	1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN
DATE
CHECKED J. Thero
APPROVAL A.E. Vintag
APPROVAL
NASA APPROVAL 9/24/63
MIT APPROVAL 9/24/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

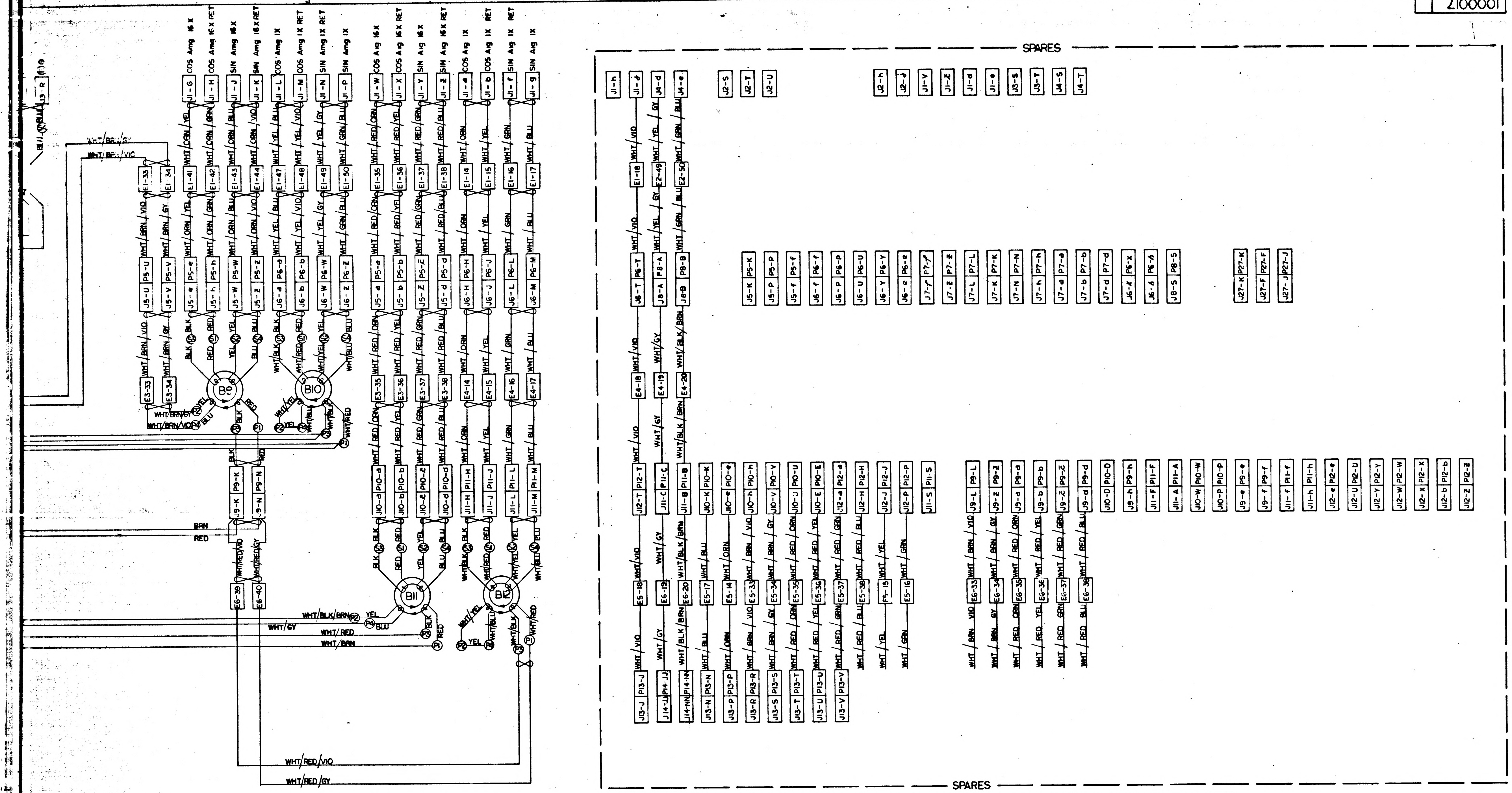
IMU WIRING DIAGRAM

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1000017
SCALE —
SHEET 1 OF 1

F4 1000017

1000017

SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV. D WITH CHANGES. TDRR 03305	23 SEPT 1963	a.E.V. 9/23/63



SPARES
I3-R (FI9)
COS Amg 16X
COS Amg 16X RET
SIN Amg 16X
SIN Amg 16X RET
COS Amg 1X
COS Amg 1X RET
SIN Amg 1X RET
SIN Amg 1X
COS Arg 16X
COS Arg 16X RET
SIN Arg 16X
SIN Arg 16X RET
COS Arg 1X
COS Arg 1X RET
SIN Arg 1X RET
SIN Arg 1X
B9
B10
B11
B12
BRN
RED
WHT/RED/VIO
WHT/RED/GY
WHT/BLK/BRN
WHT/GY
WHT/RED
WHT/BRN

SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007024	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
F1, F2	FUSE.	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1000118-1	1
J2	PLUG	1000118-2	1
J3	PLUG	1000118-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT - SAFETY	1000266	2
			1
S4	THERMOSTAT - MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

DRAWING FOR REFERENCE 1000201 IMU ASSEMBLY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000201	1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
DATE
CHECKED J. Thompson
APPROVAL A.E. Winkey
APPROVAL
NASA APPROVAL
MIT APPROVAL

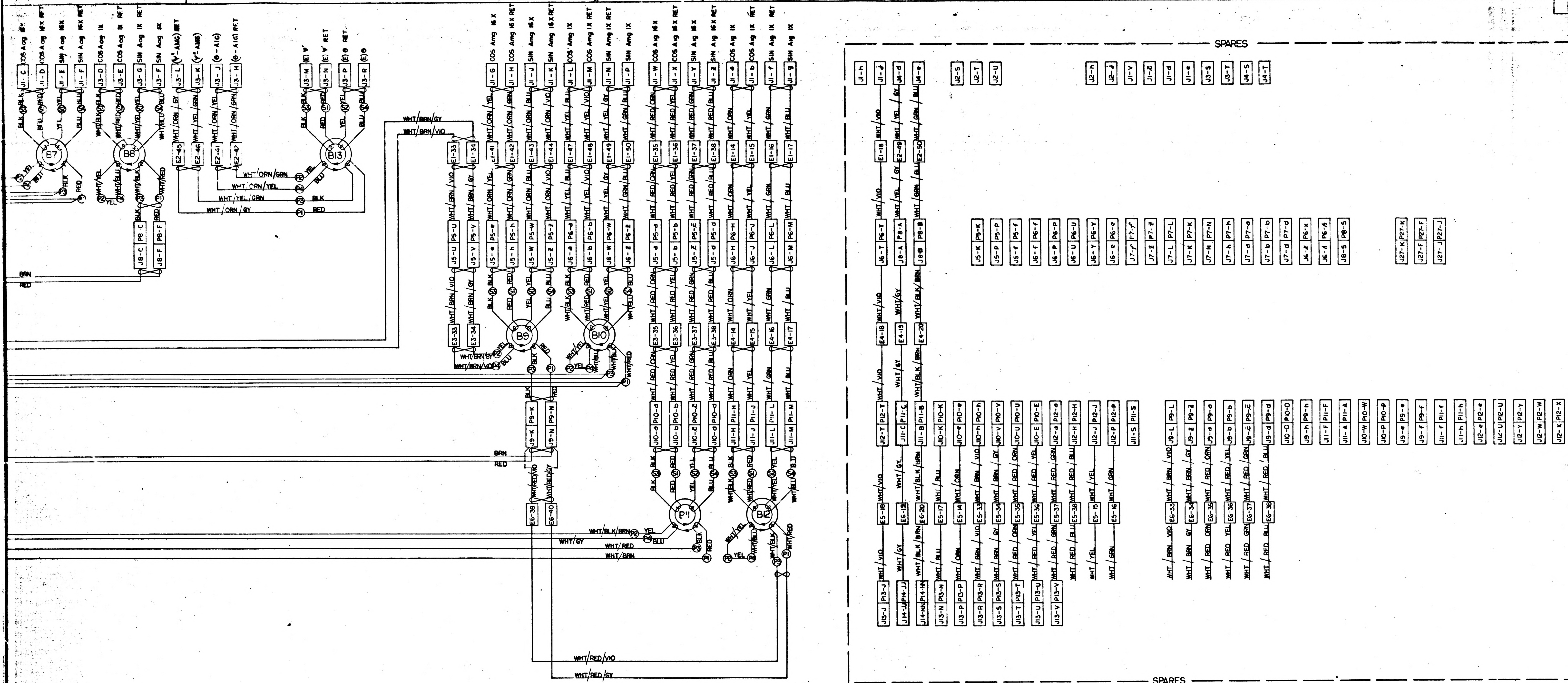
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IMU WIRING DIAGRAM

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1000017
SCALE —
WT
SHEET 1 OF 1

1000017

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY



SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007024	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR&TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
F1, F2	FUSE.	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1000118-1	1
J2	PLUG	1000118-2	1
J3	PLUG	1000118-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT - SAFETY	1000266	2
S4	THERMOSTAT - MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

MASTER

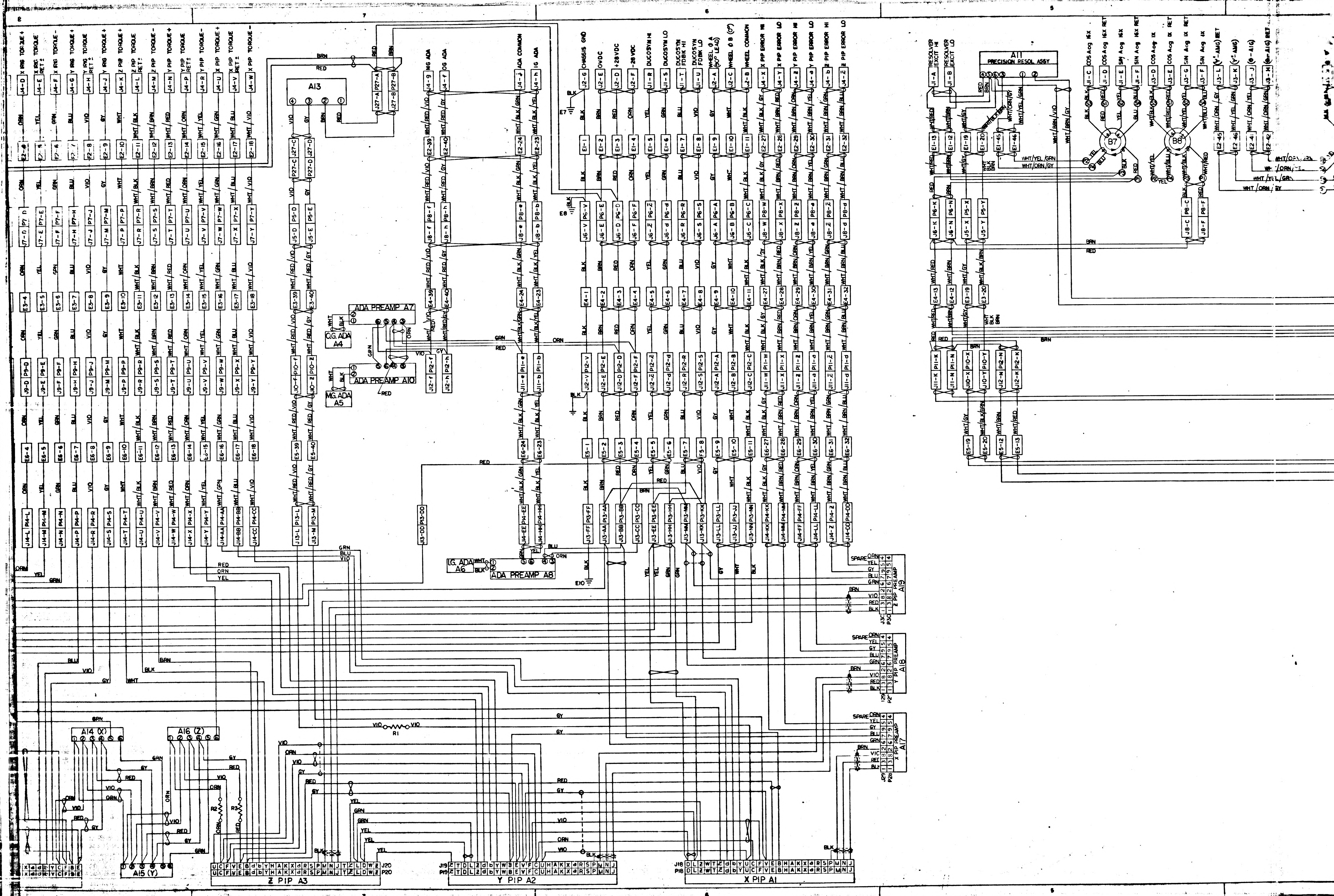
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING

1000201	1000201
NEXT ASSY	USED ON
APPLICATION	

INCHES
PHOTOGRAPHIC SCALE ONLY

F3

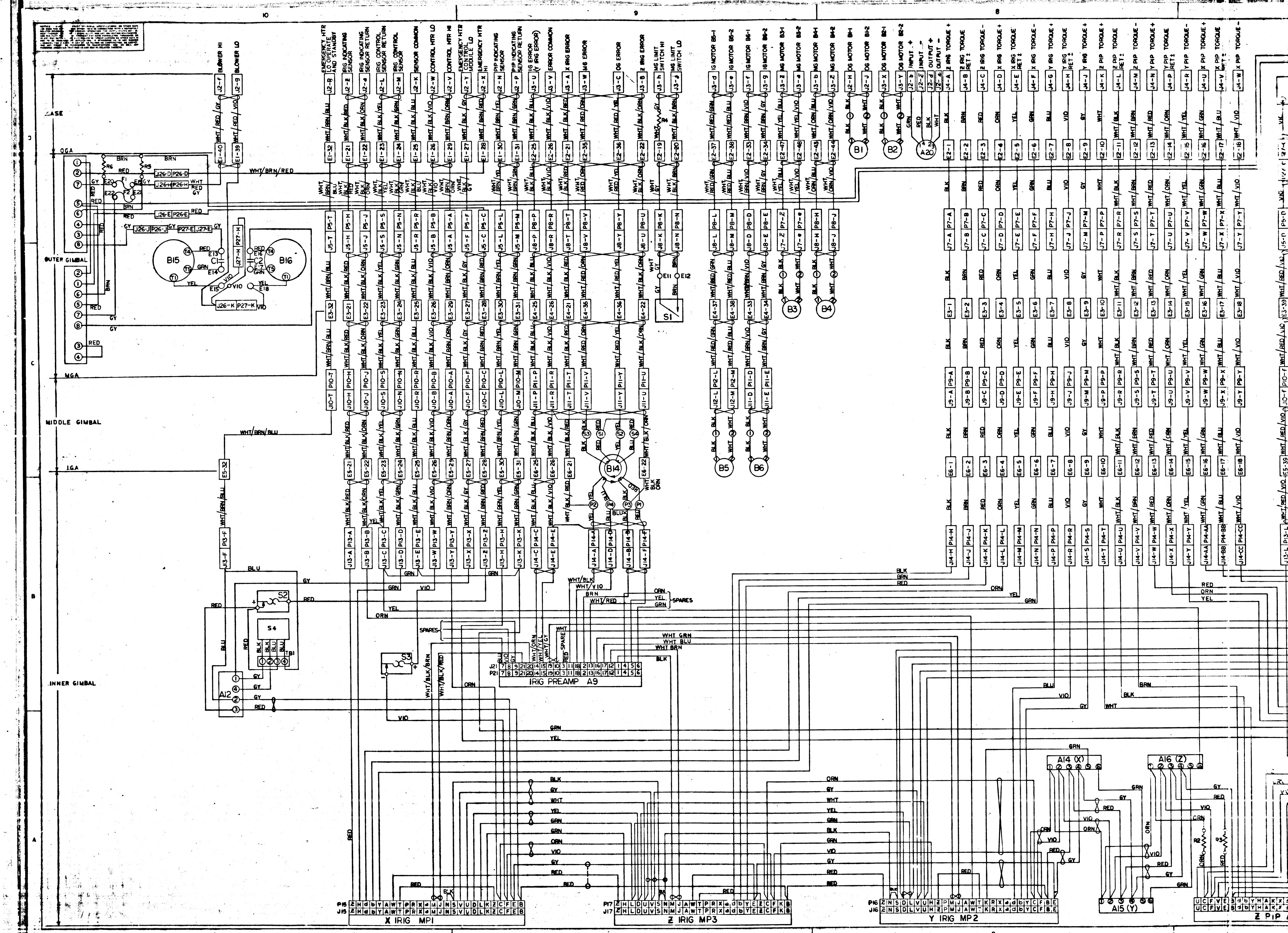
1000017


X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE -
Y IRIG TORQUE +
Y IRIG RET ±
Y IRIG TORQUE -
Z IRIG TORQUE +
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE -
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE -
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE -
MG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND
0VDC
+28VDC
-28VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL 0 A (90° LEAD)
WHEEL 0 B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
RESOLVER EXCIT HI
RESOLVER EXCIT LO
A11
PRECISION RESOL ASSY
COS Aαg 16X
COS Aαg 16X RET
SIN Aαg 16X
SIN Aαg 16X RET
COS Aαg 1X
COS Aαg 1X RET
SIN Aαg 1X
SIN Aαg 1X RET
B7
B8
A13
ADA PREAMP A7
O.G. ADA A4
ADA PREAMP A10
MG. ADA A5
I.G. ADA A6
ADA PREAMP A8
E7
E8
E10
SPARE
Z PIP PREAMP A19
Y PIP PREAMP A18
X PIP PREAMP A17
J30 P30
J29 P29
J28 P28
A14 (X)
A16 (Z)
A15 (Y)
R1
R2
R3
Z PIP A3
J20 P20
Y PIP A2
J19 P19
X PIP A1
J18 P18
8
7
6
5

INCHES
PHOTOGRAPHIC SCALE ONLY

E2

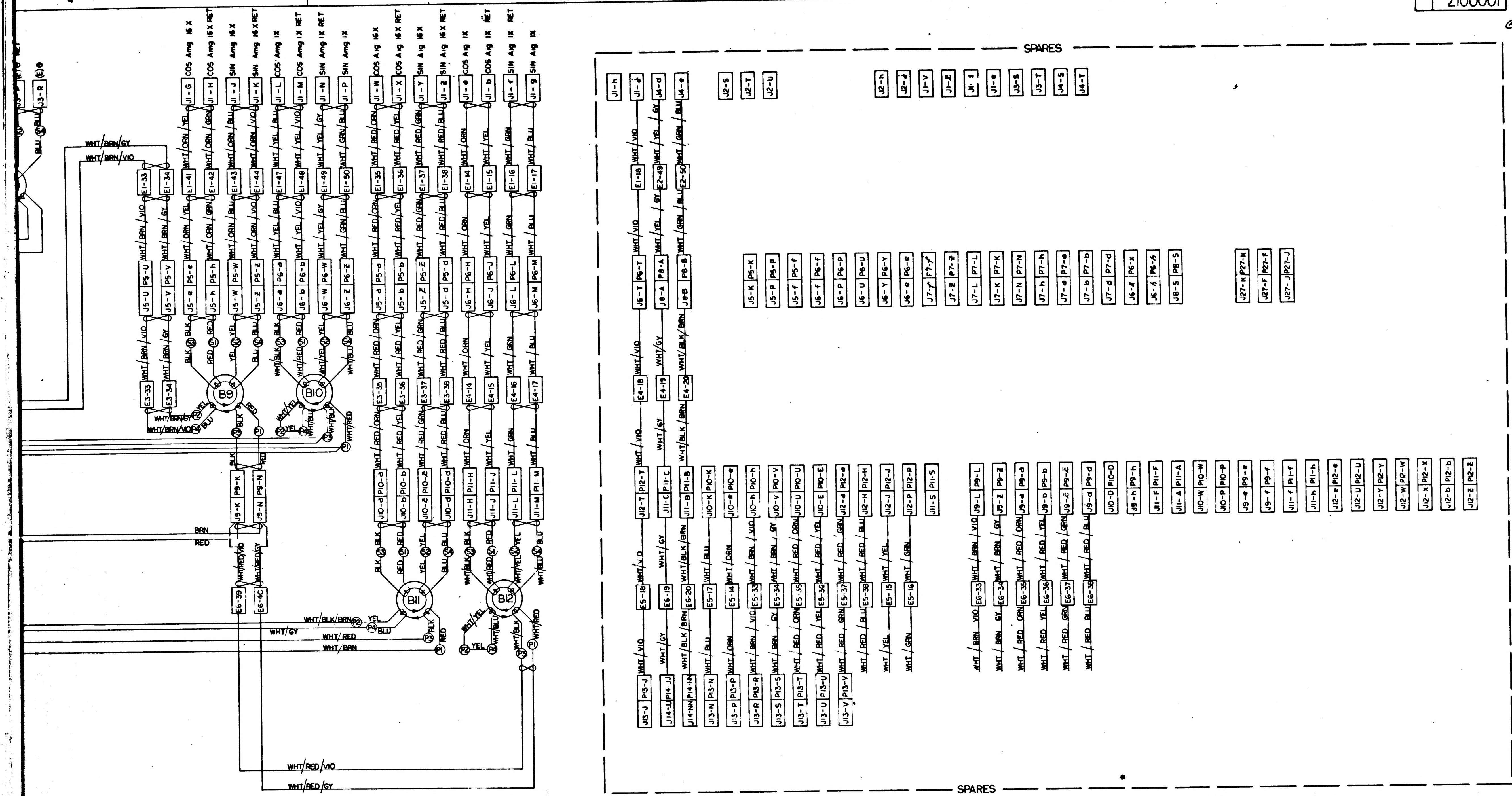
1000017


10
9
8
D
C
B
A
CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
EMERGENCY HTR LO OPERATE AND STANDBY
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR
IRIG CONTROL SENSOR RETURN
SENSOR COMMON
CONTROL HTR LO
CONTROL HTR HI
EMERGENCY HTR CONTROL MIDDLE LO
EMERGENCY HTR HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
INPUT +
INPUT −
OUTPUT +
OUTPUT −
Z IRIG TORQUE +
Z IRIG TORQUE RET ±
Z IRIG TORQUE −
X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET ±
Y IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE −
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE −
B1
B2
B3
B4
B5
B6
B14
B15
B16
A20
S1
S2
S3
S4
TB1
A12
SPARES
IRIG PREAMP A9
J21
P21
X IRIG MP1
P15
J15
Z IRIG MP3
P17
J17
Y IRIG MP2
P16
J16
A14 (X)
A15 (Y)
A16 (Z)
Z PIP
R2
R3
R5
R6
WHT/BRN/RED
WHT/BRN/BLU
INCHES
PHOTOGRAPHIC SCALE ONLY

F1 1000017

1000017

SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV. D WITH CHANGES. TDRR 03305	23 SEPT 1963	9/23/63
F	REVISED TDRR 04296	11-6-63	WK



SPARES
COS Amg 16X
COS Amg 16X RET
SIN Amg 16X
SIN Amg 16X RET
COS Amg 1X
COS Amg 1X RET
SIN Amg 1X RET
SIN Amg 1X
COS Aig 16X
COS Aig 16X RET
SIN Aig 16X
SIN Aig 16X RET
COS Aig 1X
COS Aig 1X RET
SIN Aig 1X RET
SIN Aig 1X
B9
B10
B11
B12
WHT/BRN/GY
WHT/BRN/VIO
WHT/RED/VIO
WHT/RED/GY
WHT/BLK/BRN
WHT/GY
WHT/RED
WHT/BRN
BRN
RED
SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
F1, F2	FUSE.	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N)	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT - SAFETY	1000266	2
			1
S4	THERMOSTAT - MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

DRAWING FOR REFERENCE 1000201 IMU ASSEMBLY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000201	1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED J. Thompson
APPROVAL A.E. Winkey
APPROVAL
NASA APPROVAL 9/24/63
MIT APPROVAL 9/24/63

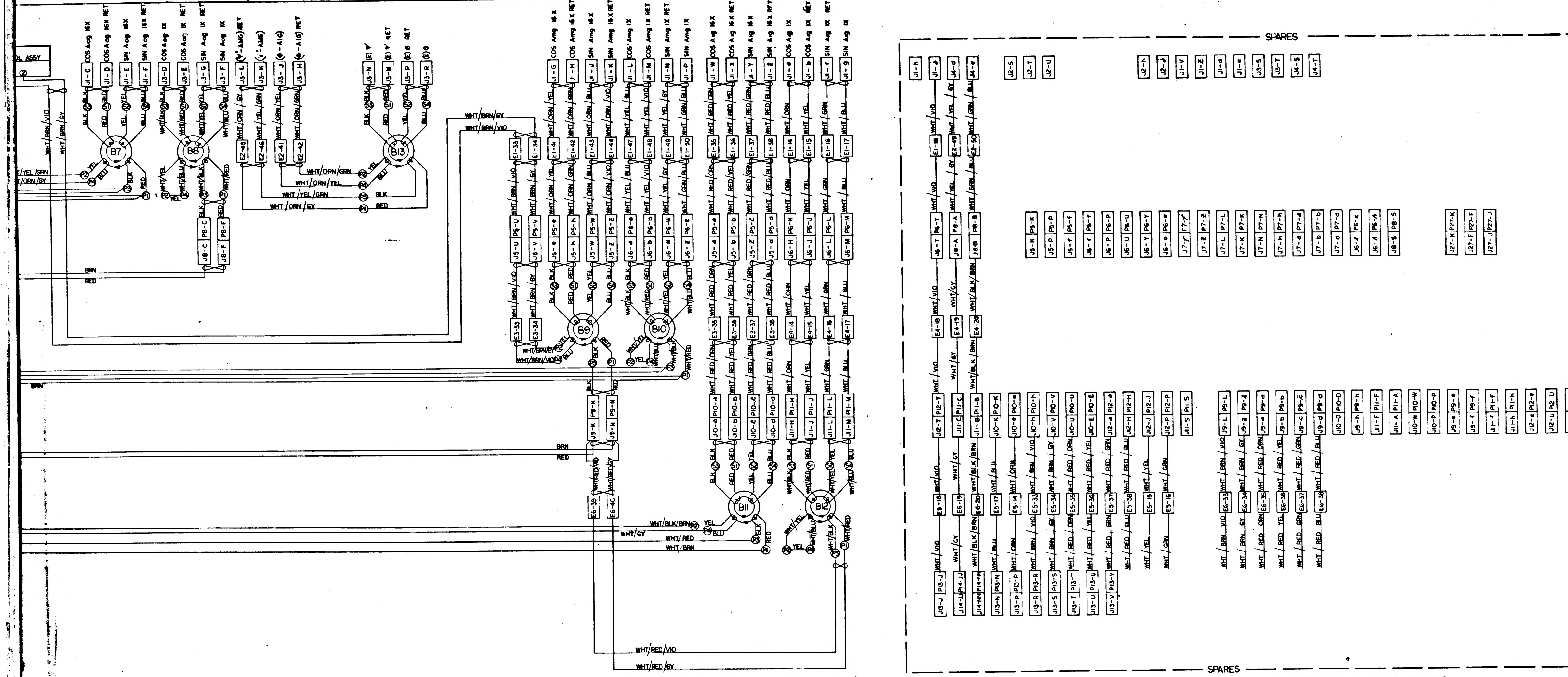
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IMU WIRING DIAGRAM

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1000017
SCALE —
WT
SHEET 1 OF 1

1000017

F4 1000017



SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG	MS25036-48	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
F1, F2	FUSE.	1000170-10	2

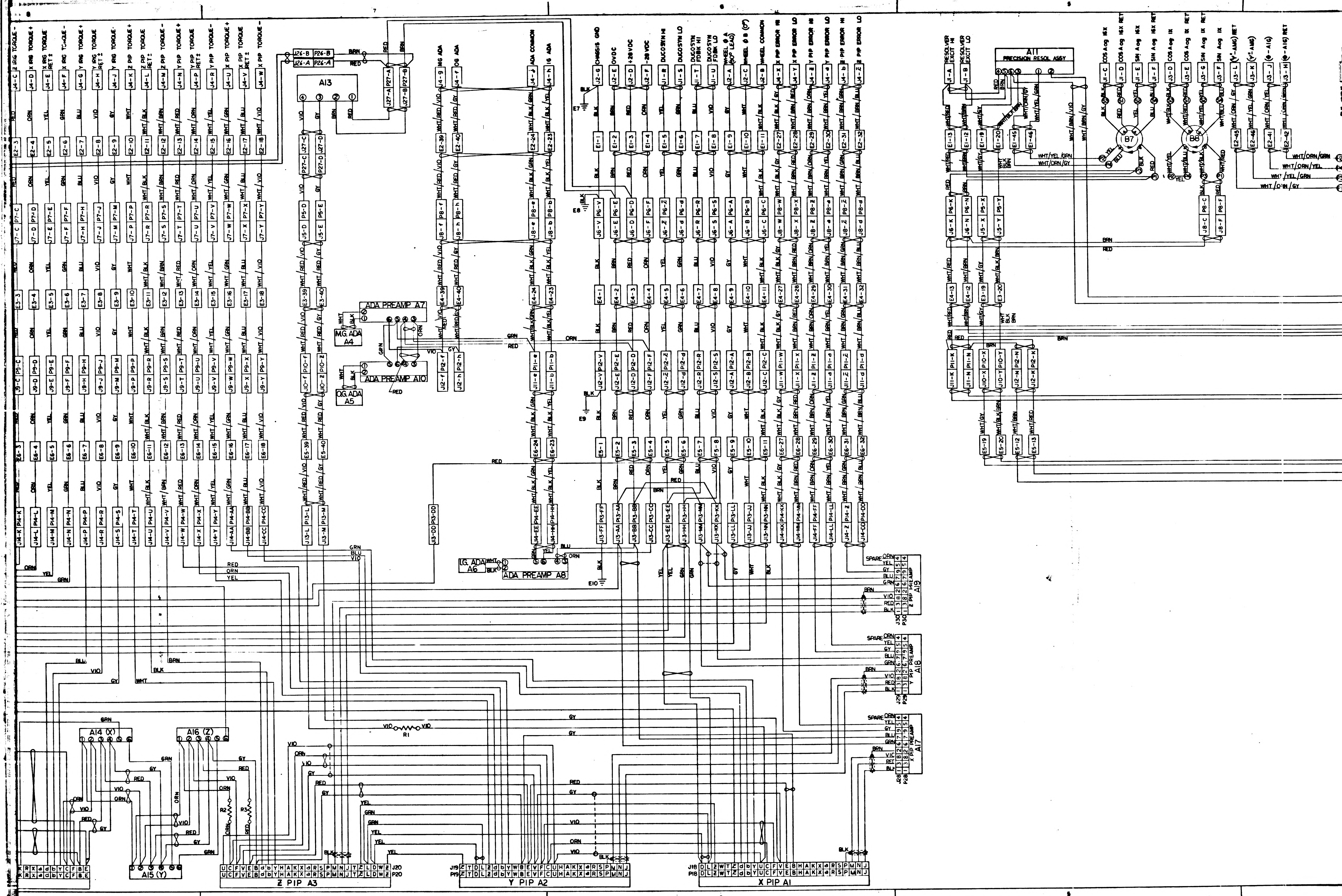
REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT - SAFETY	1000266	2
			1
S4	THERMOSTAT - MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

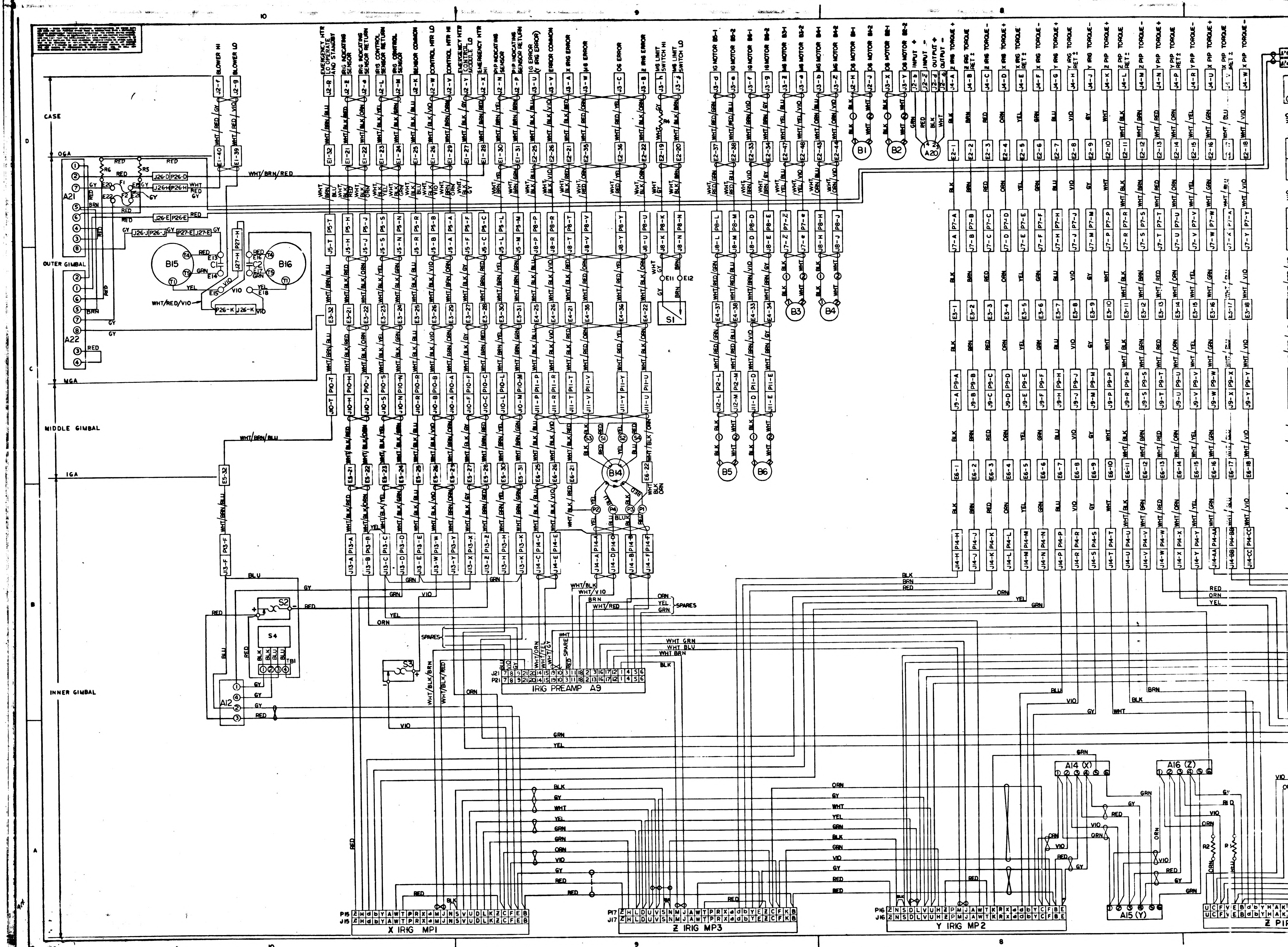
1000201	1000201
NEXT ASSY	USED ON
APPLICATION	

INCHES
PHOTOGRAPHIC SCALE ONLY

E3

1000017


Z IRG TORQUE -
X IRG TORQUE +
X IRG TORQUE RET ±
X IRG TORQUE -
Y IRG TORQUE +
Y IRG TORQUE RET ±
Y IRG TORQUE -
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE -
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE -
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE -
A13
IMG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND
OVDC
+28 VDC
-28 VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL ϕ A (90° LEAD)
WHEEL ϕ B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
RESOLVER EXCIT HI
RESOLVER EXCIT LO
A11 PRECISION RESOL ASSY
COS Ang 16X
COS Ang 16X RET
SIN Ang 16X
SIN Ang 16X RET
COS Ang 1X
COS Ang 1X RET
SIN Ang 1X
SIN Ang 1X RET
B7
B8
ADA PREAMP A7
IMG ADA A4
ADA PREAMP A10
OG ADA A5
IG ADA A6
ADA PREAMP A8
E7
E8
E9
E10
Z PIP PREAMP A19
Y PIP PREAMP A18
X PIP PREAMP A17
SPARE
R1
R2
R3
A14 (X)
A15 (Y)
A16 (Z)
Z PIP A3
Y PIP A2
X PIP A1
J20
P20
J19
P19
J18
P18
INCHES
PHOTOGRAPHIC SCALE ONLY


10
9
8
D
C
B
A
CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
A21
A22
R6
R5
F1
F2
E20
E21
E22
B15
B16
C1
C2
T4
T5
T1
E13
E14
E15
E16
E17
E18
WHT/RED/VIO
P26-K
J26-K
J26-D
P26-D
J26-H
P26-H
J26-E
P26-E
J26-J
P26-J
P27-E
J27-E
J27-H
P27-H
BLOWER HI
BLOWER LO
EMERGENCY HTR LO (OPERATE AND STANDBY)
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR RETURN
IRIG CONTROL SENSOR
SENSOR COMMON
CONTROL HTR LO
CONTROL HTR HI
EMERGENCY HTR CONTROL MIDDLE LO
EMERGENCY HTR HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
INPUT +
INPUT −
OUTPUT +
OUTPUT −
Z IRIG TORQUE +
Z IRIG TORQUE RET
X IRIG TORQUE +
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE −
X PIP TORQUE +
Z PIP TORQUE RET
Y PIP TORQUE +
Y PIP TORQUE −
X PIP TORQUE −
B1
B2
A20
B3
B4
B5
B6
S1
E11
E12
B14
S1
S2
S3
S4
P1
P2
P3
P4
WHT/BRN/RED
WHT/BRN/BLU
SPARES
S2
S3
S4
TB1
A12
J21
P21
IRIG PREAMP A9
P15
J15
X IRIG MP1
P17
J17
Z IRIG MP3
P16
J16
Y IRIG MP2
A14 (X)
A16 (Z)
A15 (Y)
R2
R
Z PIP

INCHES

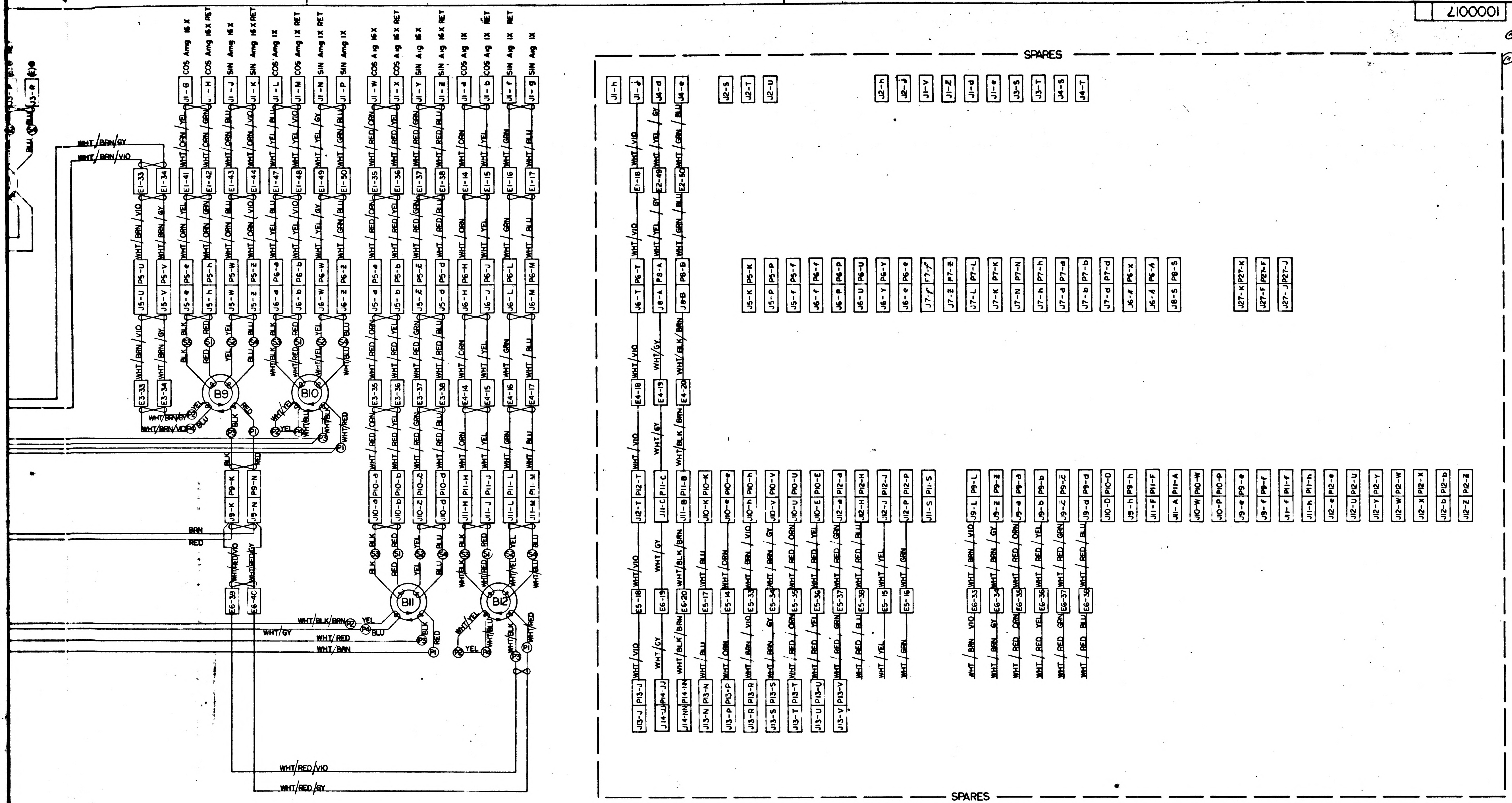
PHOTOGRAPHIC SCALE ONLY

F1

1000017

1000017

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV. D WITH CHANGES. TDRR 03305	23 SEPT 1963	9/23/63
F	*REVISED TDRR 04298*	11-6-63	WK
G	*REVISED TDRR 05170*	12-20-63	WK.



SPARES
B9
B10
B11
B12
COS Amg 16X
COS Amg 16X RET
SIN Amg 16X
SIN Amg 16X RET
COS Amg 1X
COS Amg 1X RET
SIN Amg 1X
SIN Amg 1X RET
COS Aig 16X
COS Aig 16X RET
SIN Aig 16X
SIN Aig 16X RET
COS Aig 1X
COS Aig 1X RET
SIN Aig 1X
SIN Aig 1X RET
WHT/BRN/GY
WHT/BRN/VIO
WHT/RED/VIO
WHT/RED/GY
WHT/GY
WHT/RED
WHT/BRN
BRN
RED

SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
E7 THRU E10 & E19 THRU E30	*TERMINAL, LUG*	*1010717-1*	*16*
F1, F2	FUSE.	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT-SAFETY	1000266	2
			1
S4	THERMOSTAT-MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

MASTER

DRAWING FOR REFERENCE 1000201 IMU ASSEMBLY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000201	1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN [illegible] DATE [illegible]
CHECKED J. Thompson
APPROVAL A.E. Winthrop
APPROVAL
NASA APPROVAL [illegible] 9/24/63
MIT APPROVAL [illegible] 9/24/63

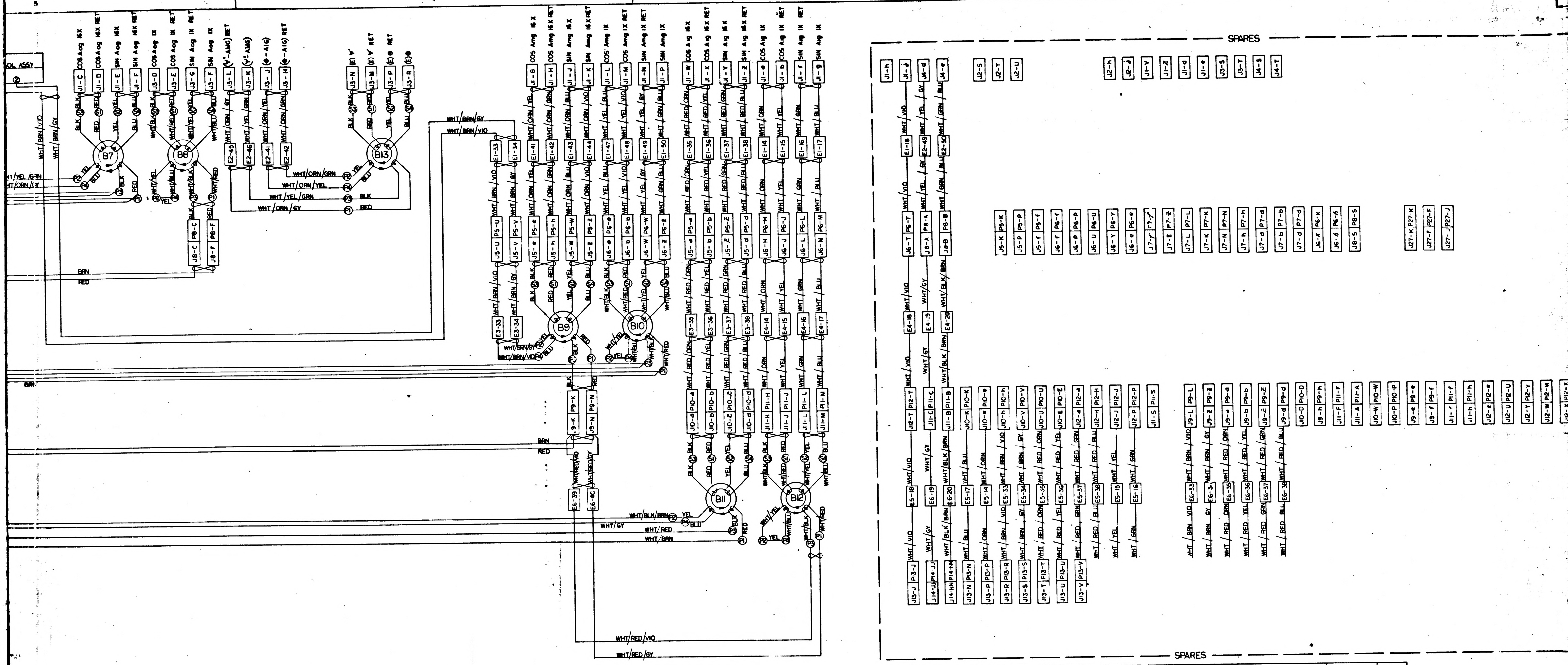
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IMU WIRING DIAGRAM

CODE IDENT NO. SIZE J NASA DRAWING NO. 1000017
SCALE — WT SHEET 1 OF 1

1000017

84

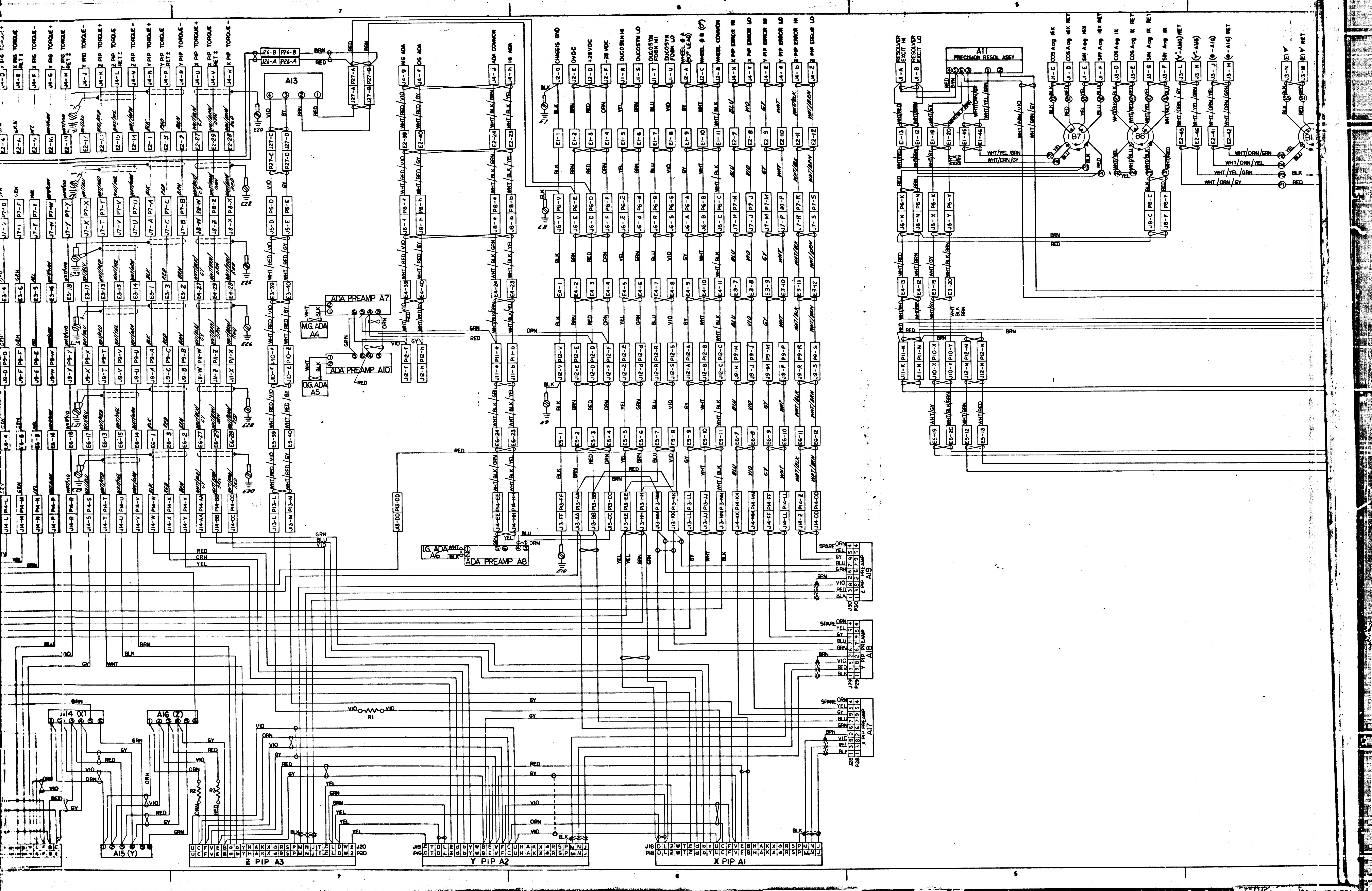


REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
E7 THRU E10 & E19 THRU E30	TERMINAL, LUG	1010717-1	16
F1, F2	FUSE.	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT-SAFETY	1000266	2
			1
S4	THERMOSTAT-MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

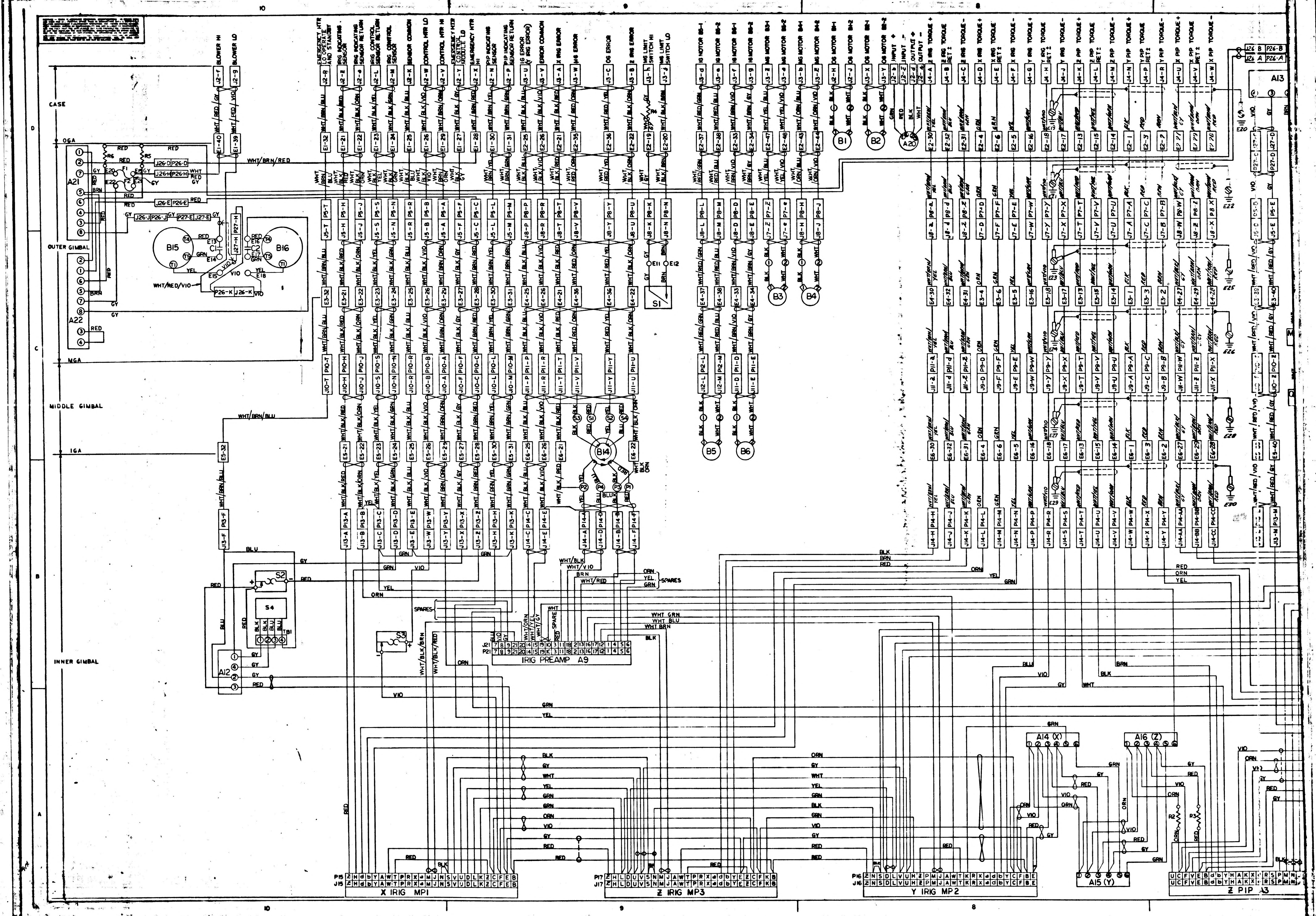
MASTER

1000201	1000201
NEXT ASSY	USED ON
APPLICATION	



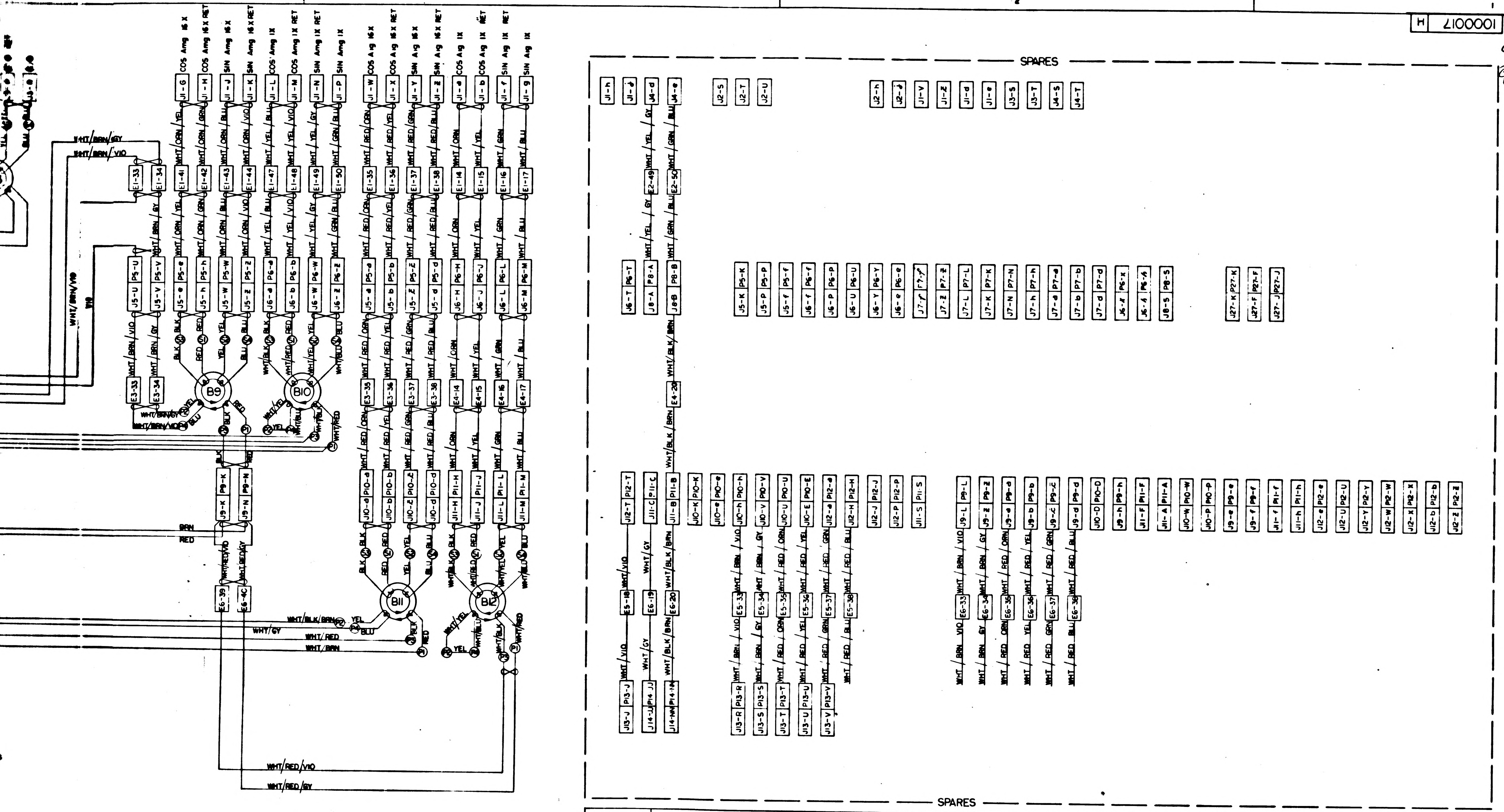
A13
ADA PREAMP A7
M.G. ADA A4
ADA PREAMP A10
O.G. ADA A5
I.G. ADA A6
ADA PREAMP A8
A11 PRECISION RESOL ASSY
B7
B8
A14 (X)
A16 (Z)
A15 (Y)
R1
R2
R3
Z PIP A3
Y PIP A2
X PIP A1
Z PIP PREAMP A19
Y PIP PREAMP A18
X PIP PREAMP A17
J20
P20
J19
P19
J16
P16
J30
P30
J29
P29
J28
P28
SPARE
CHASSIS GND
0VDC
+28VDC
-28VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL θ A (90° LEAD)
WHEEL θ B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
IMG ADA
OG ADA
ADA COMMON
IG ADA
RESOLVER EXCIT HI
RESOLVER EXCIT LO
COS Acq 16X
COS Acq 16X RET
SIN Acq 16X
SIN Acq 16X RET
COS Acq 1X
COS Acq 1X RET
SIN Acq 1X
SIN Acq 1X RET
X GIMBAL TORQUE +
X GIMBAL TORQUE RET
Y PIP TORQUE +
Y PIP TORQUE RET
Z PIP TORQUE +
Z PIP TORQUE RET
X PIP TORQUE +
X PIP TORQUE RET
X PIP TORQUE -
E7
E8
E9
E10
E20
E22
E25
E26
E28
E29
E30
WHT
BLK
RED
BRN
ORN
YEL
GRN
BLU
VIO
GY

7
6
5
INCHES
PHOTOGRAPHIC SCALE ONLY
E2
1000017


10
9
8
D
C
B
A
CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
EMERGENCY HTR LO OPERATE AND STANDBY
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR
IRIG CONTROL SENSOR RETURN
SENSOR COMMON
CONTROL HTR LO
CONTROL HTR HI
EMERGENCY HTR CONTROL
EMERGENCY HTR HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR
MG MOTOR
OG MOTOR
INPUT +
INPUT −
OUTPUT +
OUTPUT −
X IRIG TORQUE
Y IRIG TORQUE
Z IRIG TORQUE
X PIP TORQUE
Y PIP TORQUE
Z PIP TORQUE
RET
A21
A22
A12
A13
A20
B1
B2
B3
B4
B5
B6
B14
B15
B16
S1
S2
S3
S4
TB1
C1
C2
R2
R3
R5
R6
F1
IRIG PREAMP A9
SPARES
A14 (X)
A16 (Z)
A15 (Y)
X IRIG MP1
Z IRIG MP3
Y IRIG MP2
Z PIP A3
INCHES
PHOTOGRAPHIC SCALE ONLY

1000017 H

SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV. D WITH CHANGES. TDRR 03303	23 SEPT 1963	R.E.V. 9/23/63
F	REVISED TDRR 04295	11-6-63	WK
G	REVISED TDRR 05170	12-20-63	JR.
H	REVISED PER TDRR 07353		



REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
C3	CAPACITOR	1010279-245	1
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
E7 THRU E10 & E19 THRU E31	TERMINAL, LUG	1010717-1	19
F1, F2	FUSE.	1000170-10	2

SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MV26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT - SAFETY	1000266	2
			1
S4	THERMOSTAT - MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
TB2	TERMINAL BOARD	1001595	1

DRAWING FOR REFERENCE:
1000201 IMU ASSEMBLY

1000017

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000201	1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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FRACTIONS ± — DECIMALS ± — ANGLES ± —
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HEAT TREATMENT —
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DRAWN
DATE
CHECKED J. Thompson
APPROVAL R.E. Wintney
APPROVAL
NASA APPROVAL 9/24/63
MIT APPROVAL 9/24/63

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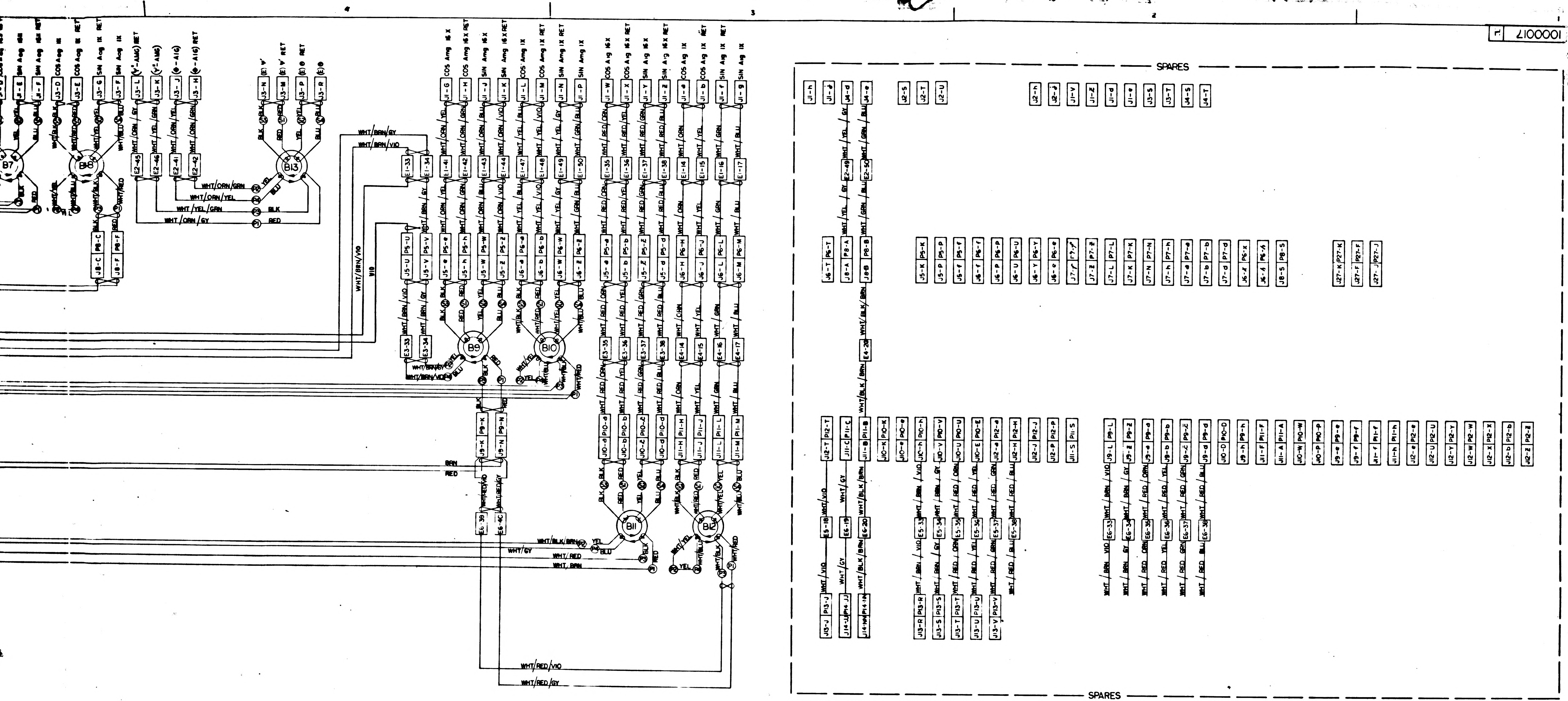
HOUSTON, TEXAS

IMU WIRING DIAGRAM

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1000017
SCALE —
WT
SHEET 1 OF 1

4/1000017



REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR & TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
C3	CAPACITOR	1010279-245	1
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
E7 THRU E10 & E19 THRU E31	*TERMINAL, LUG*	*1010717-1*	*19*
F1, F2	FUSE.	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT-SAFETY	1000266	2
			1
S4	THERMOSTAT-MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
TB2	TERMINAL BOARD	1001596	1

QTY REQD	PART OR IDENTIFYING NO.

NEXT ASSY	USED ON
1000201	1000201

APPLICATION

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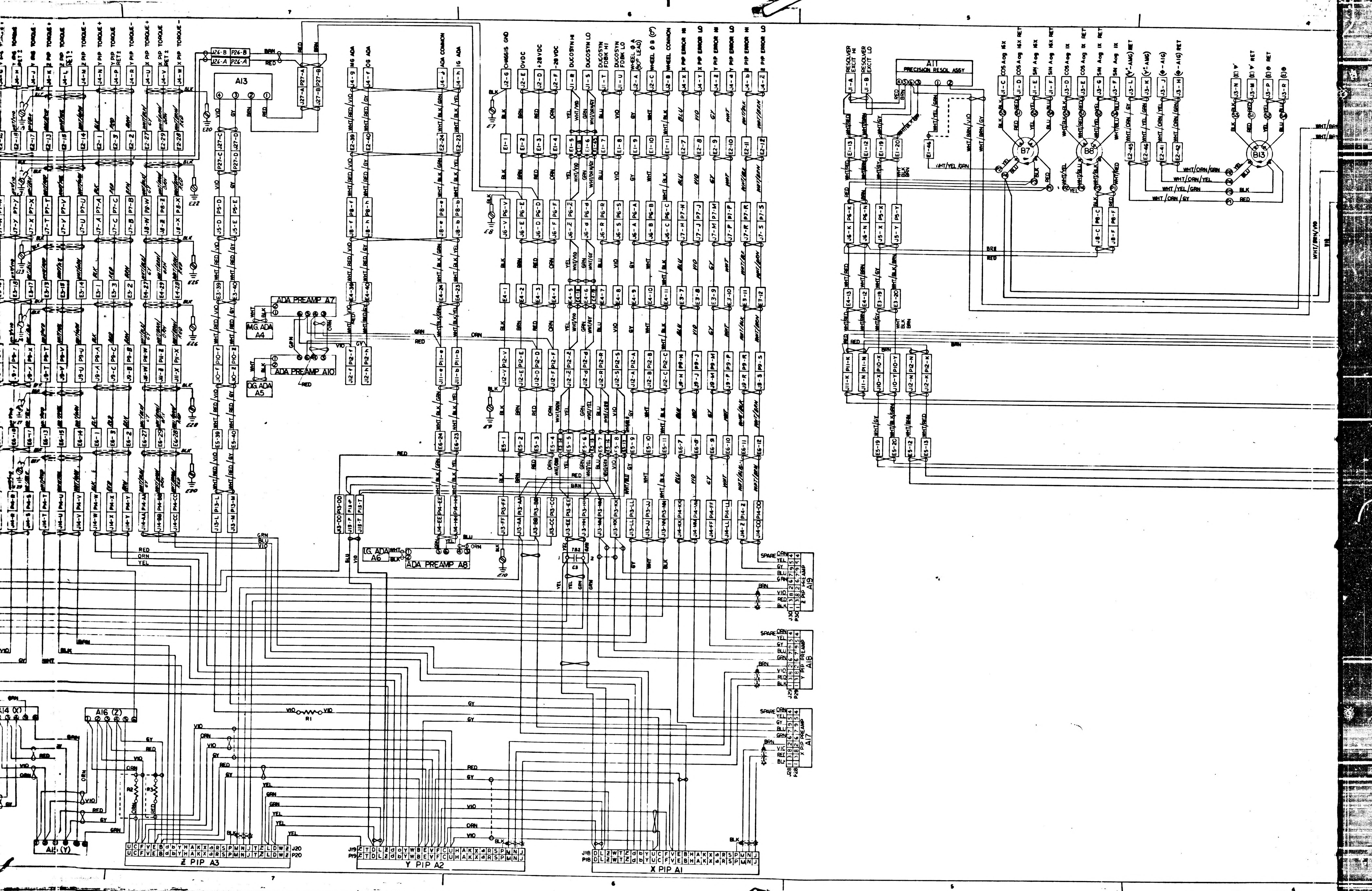
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN [illegible] DATE [illegible]
CHECKED J. Thompson
APPROVAL A.E. Winberg
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
CODE [illegible]
SCALE
IM

3/1000017


A13
ADA PREAMP A7
IMG. ADA A4
ADA PREAMP A10
OG. ADA A5
IG. ADA A6
ADA PREAMP A8
A11 PRECISION RESOL ASSY
B7
B8
B13
A14 (X)
A16 (Z)
A15 (Y)
Z PIP A3
Y PIP A2
X PIP A1
Z PIP PREAMP A19
Y PIP PREAMP A18
X PIP PREAMP A17
TB2
R1
R2
R3
CHASSIS GND
OVDC
+28VDC
-28VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL Ø A (90° LEAD)
WHEEL Ø B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
IMG ADA
OG ADA
ADA COMMON
IG ADA
Y PIP TORQUE
X PIP TORQUE +
Y PIP TORQUE -
Z PIP TORQUE +
Z PIP TORQUE -
X PIP TORQUE -
Y PIP RET 1
Z PIP RET 1
X PIP RET 1
RESOLVER EXCIT HI
RESOLVER EXCIT LO
COS Aog 16X
COS Aog 16X RET
SIN Aog 16X
SIN Aog 16X RET
COS Aog 1X
COS Aog 1X RET
SIN Aog 1X
SIN Aog 1X RET
(V²-AMG) RET
(V²-AMG)
(Θ-AIG)
(Θ-AIG) RET
(E) V RET
(E) V
(E) Θ RET
(E) Θ
SPARE
E1
E7
E8
E9
E10
E20
E22
E23
E25
E26
E28
E30
J18 P18
J19 P19
J20 P20
J28 P28
J29 P29
J30 P30
RED
BLK
GRN
YEL
ORN
BLU
VIO
GY
WHT
BRN
WHT/BRN/VIO
WHT/ORN/GRN
WHT/ORN/YEL
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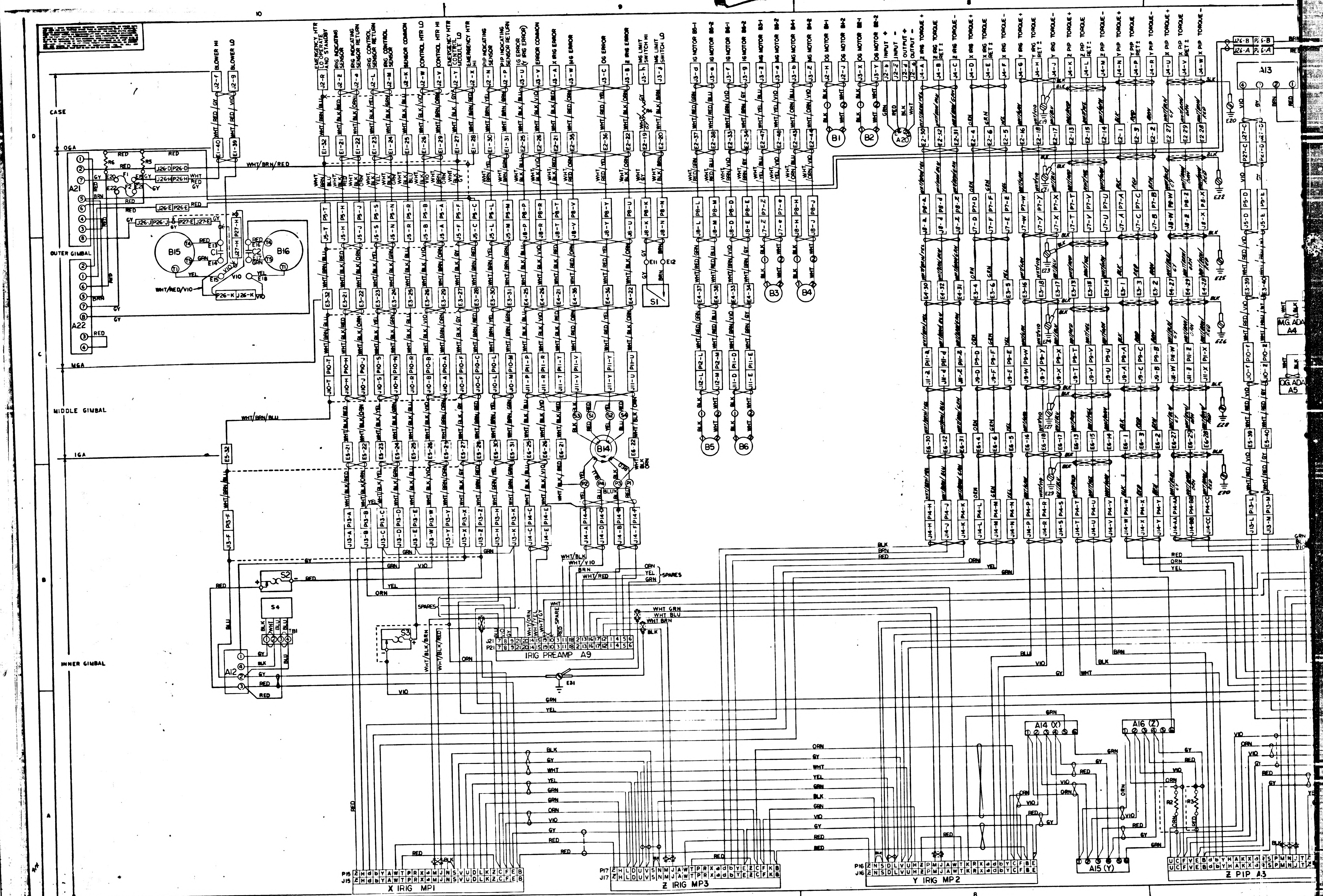
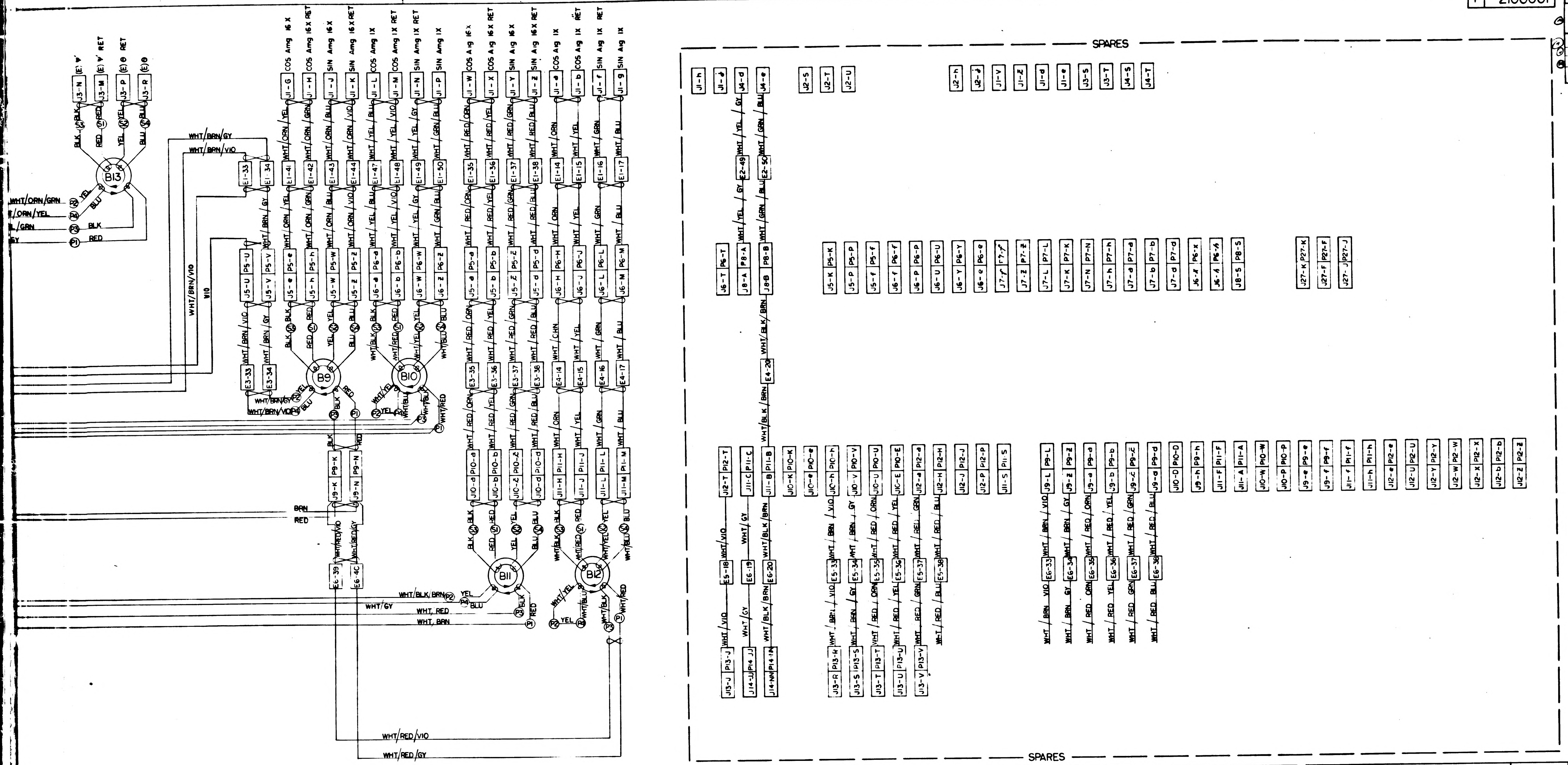
7
6
5
4


10
9
8
D
C
B
A
CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
EMERGENCY HTR LO OPERATE AND STANDBY
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR RETURN
IRIG CONTROL SENSOR
SENSOR COMMON
CONTROL HTR LO
CONTROL HTR HI
EMERGENCY HTR CONTROL MODULE LO
EMERGENCY HTR HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
INPUT +
INPUT -
OUTPUT +
OUTPUT -
Z IRIG TORQUE +
Z IRIG TORQUE RET
Z IRIG TORQUE -
X IRIG TORQUE +
X IRIG TORQUE RET
X IRIG TORQUE -
Y IRIG TORQUE +
Y IRIG TORQUE RET
Y IRIG TORQUE -
Z PIP TORQUE +
Z PIP TORQUE RET
Z PIP TORQUE -
Y PIP TORQUE +
Y PIP TORQUE RET
Y PIP TORQUE -
X PIP TORQUE +
X PIP TORQUE RET
X PIP TORQUE -
A21
A22
A12
A13
B1
B2
A20
B3
B4
B5
B6
B14
B15
B16
S1
S2
S3
S4
TB1
E31
IMG ADA A4
OG ADA A5
IRIG PREAMP A9
A14 (X)
A15 (Y)
A16 (Z)
SPARES
X IRIG MP1
Z IRIG MP3
Y IRIG MP2
Z PIP A3

1/100001-7

J 1000017

SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV. D WITH CHANGES. TDRR 03305	23 SEPT 1963	9/23/63
F	REVISED TDRR 04295	3	WK
G	REVISED TDRR 05170	12-20-63	WR.
H	REVISED PER TDRR 07953	27 MAY 64	
J	REVISED PER TDRR 10497	8 JUL 64	GG



SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR&TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
C3	CAPACITOR	1010279-245	1
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
E7 THRU E10 & E19 THRU E32	TERMINAL, LUG	1010717-1	23
E33 THRU E39	TIE POINT		7
F1, F2	FUSE	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT-SAFETY	1000266	2
			1
S4	THERMOSTAT-MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
TB2	TERMINAL BOARD	1001595	1

DRAWING FOR REFERENCE:
1000201 IMU ASSEMBLY

1000017

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000201	1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

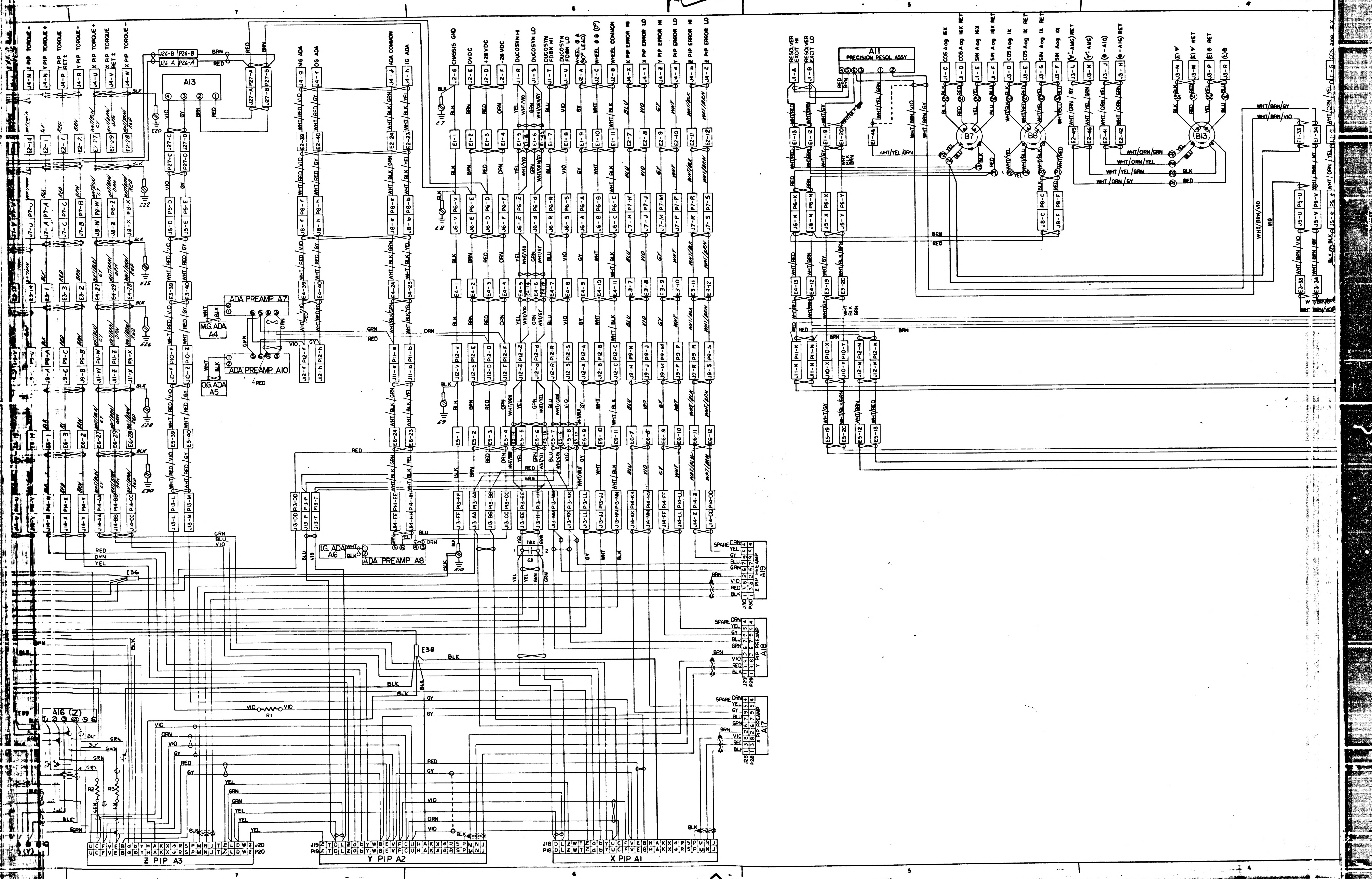
M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE
CHECKED J. Thompson
APPROVAL A.E. Winkler
APPROVAL
NASA APPROVAL 9/24/63
MIT APPROVAL 9/24/63

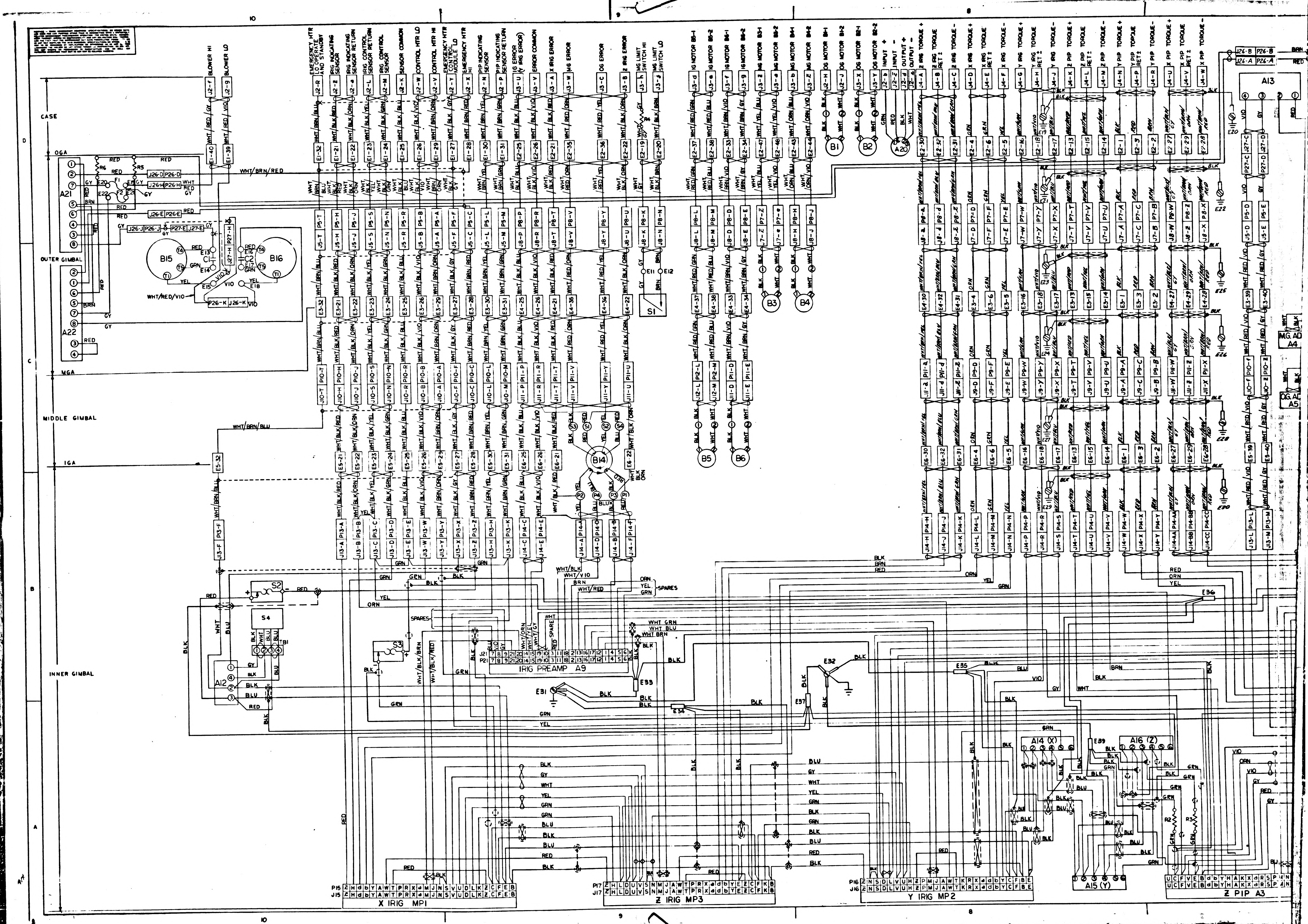
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IMU WIRING DIAGRAM

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1000017
SCALE —
WT
SHEET 1 OF 1

3Z1000017

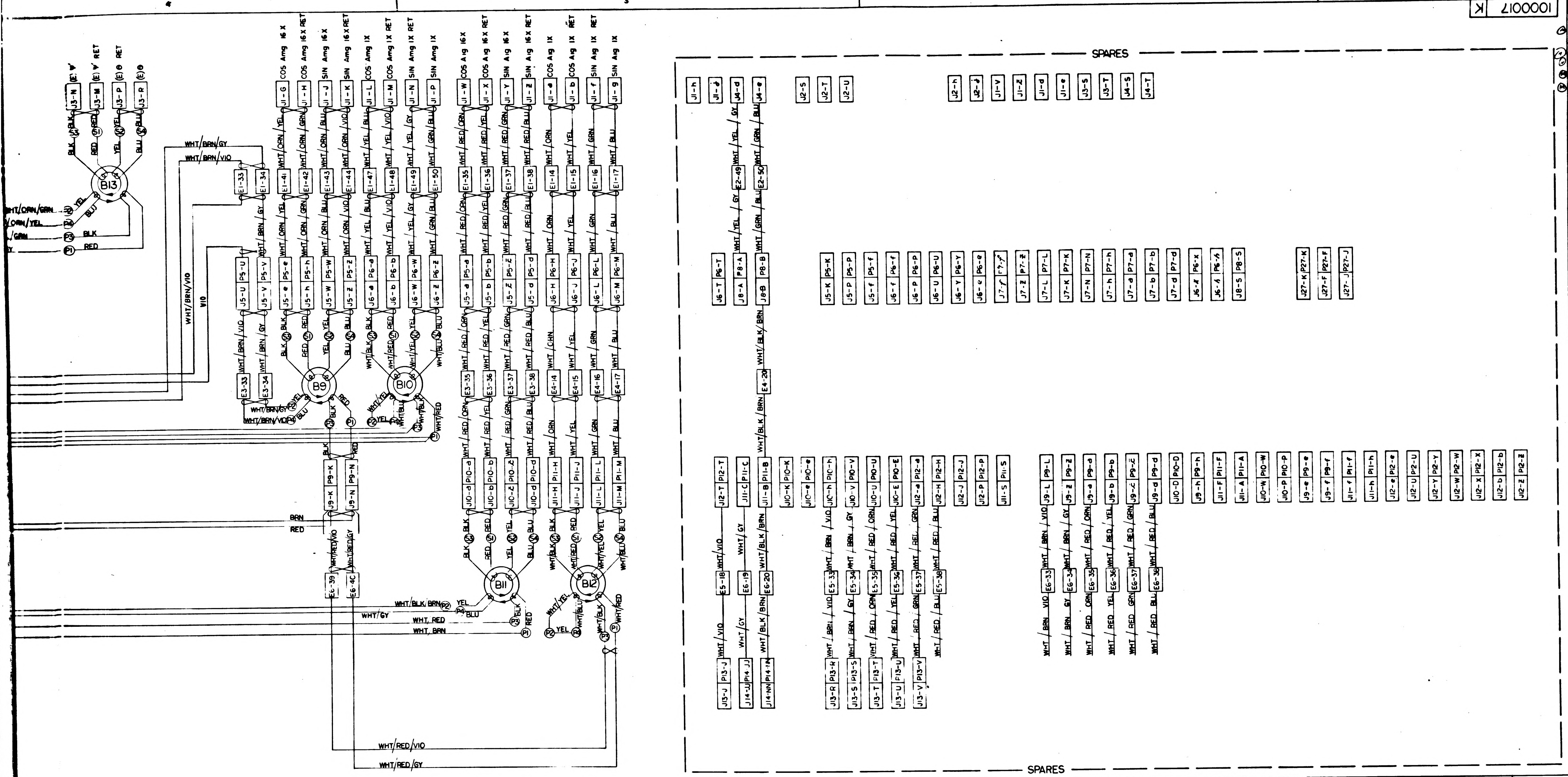

Z PIP TORQUE +
Y PIP TORQUE +
Y PIP TORQUE RET 2
Y PIP TORQUE -
X PIP TORQUE +
X PIP TORQUE RET 2
X PIP TORQUE -
A13
IMG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND
OVDC
+28VDC
-28VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL Φ A
WHEEL Φ B
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
RESOLVER EXCIT HI
RESOLVER EXCIT LO
A11
PRECISION RESOL ASSY
COS Aαg 16X
COS Aαg 16X RET
SIN Aαg 16X
SIN Aαg 16X RET
COS Aαg 1X
COS Aαg 1X RET
SIN Aαg 1X
SIN Aαg 1X RET
B7
B6
B13
ADA PREAMP A7
M.G. ADA A4
ADA PREAMP A10
O.G. ADA A5
I.G. ADA A6
ADA PREAMP A8
TB2
C8
E36
E38
R1
R2
R3
A16 (Z)
Z PIP PREAMP A19
Y PIP PREAMP A18
X PIP PREAMP A17
SPARE
Z PIP A3
Y PIP A2
X PIP A1
J20
P20
J19
P19
J18
P18
7
6
5
4


CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
EMERGENCY HTR LO OPERATE OR STANDBY
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR
IRIG CONTROL SENSOR RETURN
SENSOR COMMON
CONTROL HTR LO
CONTROL HTR HI
EMERGENCY HTR CONTROL MODULE LO
EMERGENCY HTR HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
Z IRIG ERROR
OG ERROR
MG ERROR
IRIG LIMIT SWITCH HI
IRIG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
INPUT +
INPUT -
OUTPUT +
OUTPUT -
X IRIG TORQUE +
X IRIG RET ±
X IRIG TORQUE -
Y IRIG TORQUE +
Y IRIG RET ±
Y IRIG TORQUE -
Z IRIG TORQUE +
Z IRIG RET ±
Z IRIG TORQUE -
X PIP TORQUE +
X PIP RET ±
X PIP TORQUE -
Y PIP TORQUE +
Y PIP RET ±
Y PIP TORQUE -
Z PIP TORQUE +
Z PIP RET ±
Z PIP TORQUE -
A21
A22
A12
A13
A14 (X)
A15 (Y)
A16 (Z)
A20
B1
B2
B3
B4
B5
B6
B14
B15
B16
S1
S2
S3
S4
TB1
C1
C2
R2
R3
R5
R6
F1
F2
E31
E32
E33
E34
E35
E36
E37
E39
MG AD A4
OG AD A5
IRIG PREAMP A9
SPARES
X IRIG MP1
Z IRIG MP3
Y IRIG MP2
Z PIP A3
J15
P15
J16
P16
J17
P17
J21
P21
WHT/BRN/RED
WHT/BRN/BLU
RED
GY
BRN
VIO
YEL
GRN
BLK
BLU
WHT
ORN
10
9
8
D
C
B
A

1/1000017

1000017 K

SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV. D WITH CHANGES. TDRR 03305	23 SEPT 1963	R.E.W. 9/23/63
F	REVISED TDRR 04295	11-6-63	WK
G	REVISED TDRR 05170	12-20-63	WK.
H	REVISED PER TDRR 07953	27 MAY 64	
J	REVISED PER TDRR 0497	8 JUL 64	GG
K	REVISED PER TDRR .89.	3 SEP 65	



SPARES

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
A1 THRU A3	PIP	1000013	3
A4 THRU A6	ADA	1000097	3
A7, A10	ADA PREAMP	1007022	2
A8	ADA PREAMP	1007025	1
A9	IRIG PREAMP	1007031	1
A11	PRECISION RESOLVER ASSY	1007004	1
A12	EMERGENCY HEATER CONTROL	1007012	1
A13	28 VDC REGULATOR	1007013	1
A14 THRU A16	HTR&TAPERED MOUNT ASSY, 25 IRIG	1000126	3
A17 THRU A19	PIP PREAMP	1007015	3
A20	PRESSURE TRANSDUCER	1000272	1
A21, A22	BLOWER SPEED CONTROL	1000288	2
B1 THRU B6	TORQUE MOTOR	1000075	6
B7	RESOLVER 16X	1000161	1
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER PITCH YAW	1000031-2	1
B14	RESOLVER GYRO ERROR	1000031-1	1
B15, B16	BLOWER	1000219	2
B9, B11	RESOLVER 16X	1000162	2
C1, C2	CAPACITOR	1010264-38	2
C3	CAPACITOR	1010279-245	1
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E11 THRU E18	TERMINAL, INSULATED	1000100-1	8
E7 THRU E10 & E19 THRU E32	TERMINAL, LUG	1010717-1	23
E33 THRU E39	TIE POINT		7
F1, F2	FUSE	1000170-10	2

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
J1	CONNECTOR, PLUG	1001492-1	1
J2	PLUG	1001492-2	1
J3	PLUG	1001492-3	1
J4	PLUG	1000118-4	1
J5 THRU J12	PLUG	1000117	8
J13, J14	PLUG	1000120	2
J15 THRU J17	PLUG (CONTINENTAL P/N	MM26-22PGDS	3
J18 THRU J20	RECEPTACLE	1000122	3
J21	PLUG	1010472-1	1
J26, J27	PLUG	1000222	2
J28 THRU J30	CONNECTOR, PLUG	1010318-1	3
MP1, MP2, MP3	IRIG	1000012	3
P5 THRU P12	CONNECTOR, RECEPTACLE	1000116	8
P13 P14	RECEPTACLE	1000119	2
P15 THRU P17	RECEPTACLE	1000121	3
P18 THRU P20	PLUG	1000123	3
P21	RECEPTACLE	1010472-2	1
P26, P27	CONNECTOR RECEPTACLE	1000221	2
P28 THRU P30	CONNECTOR, RECEPTACLE	1010318-2	3
R1	RESISTOR, FIXED	1010498	1
R2			1
R3			1
R4		-300	1
R5, R6		1010325-500	2
S1	SWITCH, LIMIT	1000211	1
S2, S3	THERMOSTAT-SAFETY	1000266	2
			1
S4	THERMOSTAT-MERCURY	1000247	1
TB1	TERMINAL BOARD	1000253	1

REFERENCE DESIGNATIONS	TITLE	NASA PART NO.	REQD
~~TB2~~	~~TERMINAL BOARD~~	~~1001595~~	~~1~~

DRAWING FOR REFERENCE:
1000201 IMU ASSEMBLY

1000017

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000201	1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

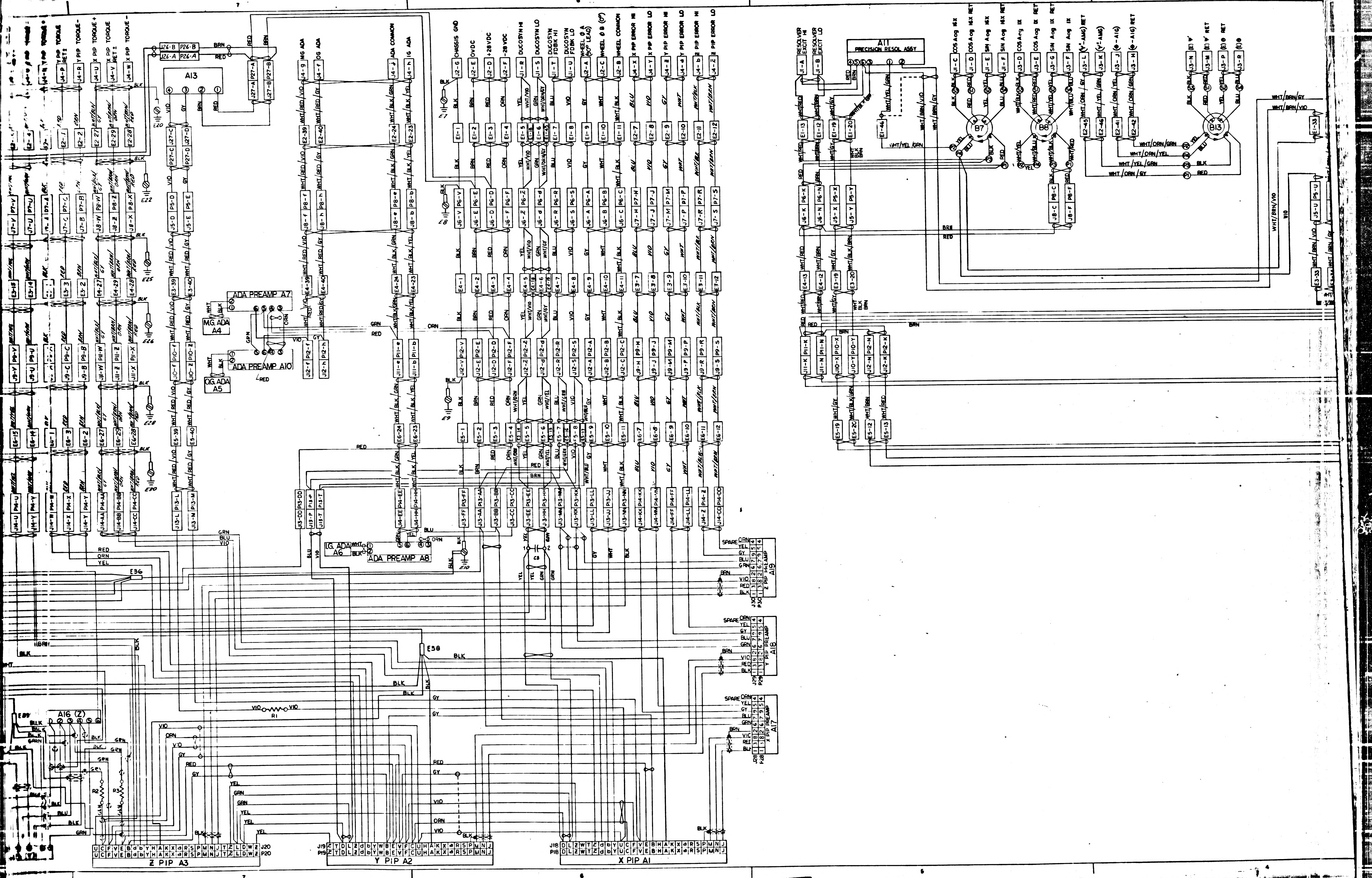
DRAWN
CHECKED J. Thompson
APPROVAL A.E. Winthrop
APPROVAL
NASA APPROVAL 9/24/63
MIT APPROVAL 9/24/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

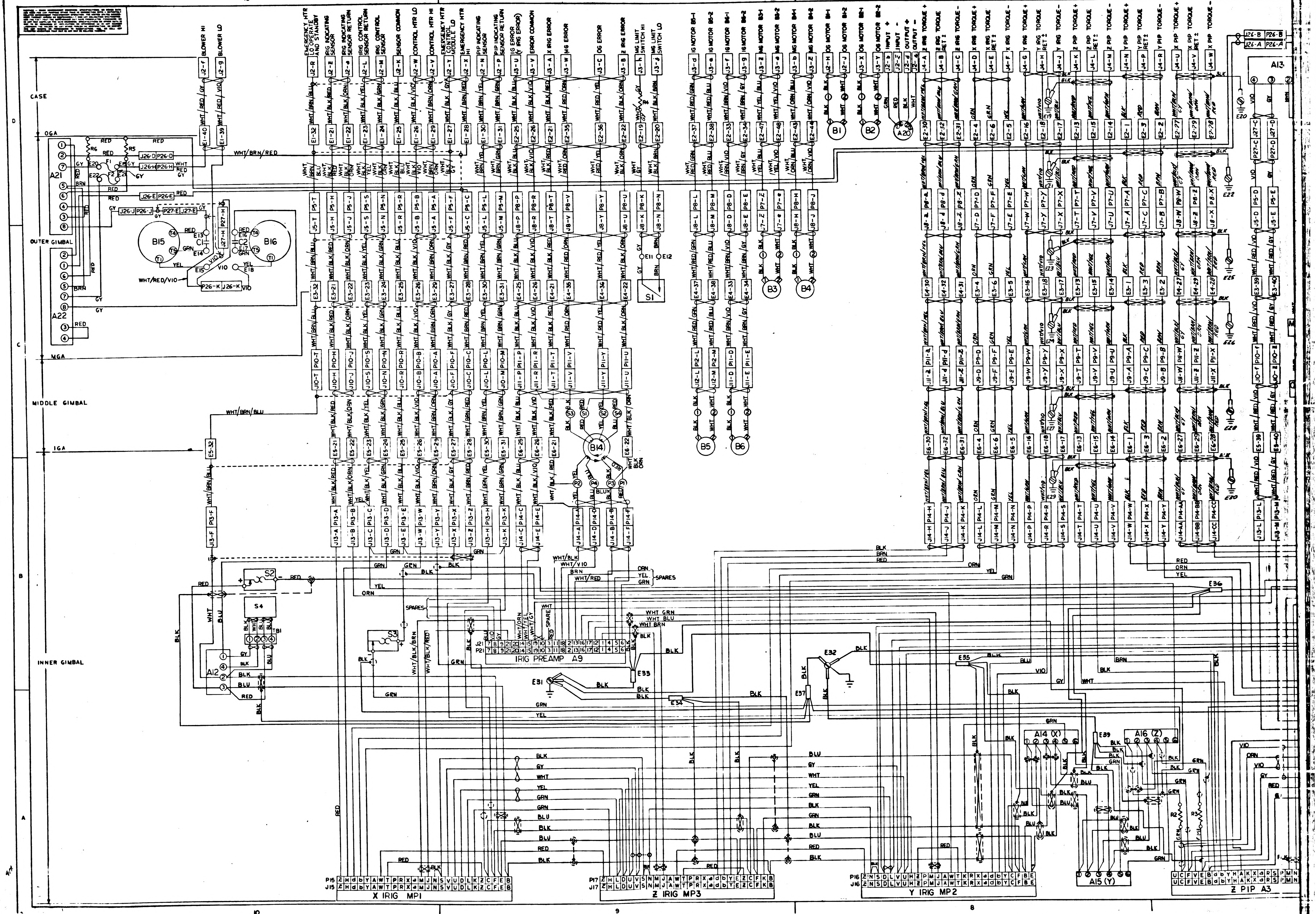
IMU WIRING DIAGRAM

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1000017
SCALE —
WT
SHEET 1 OF 1

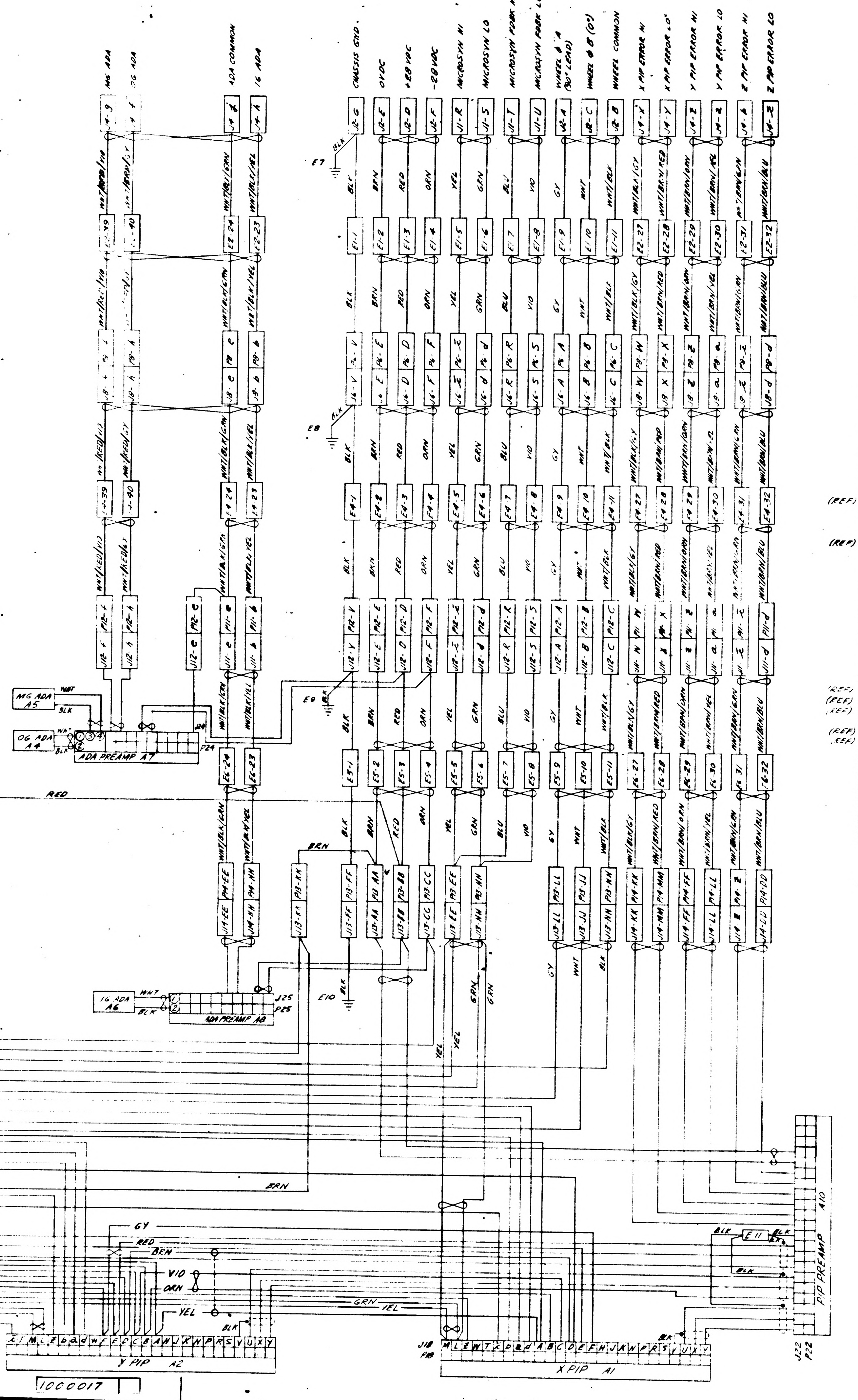
371000017



Y PIP TORQUE
Y PIP TORQUE RET
X PIP TORQUE +
X PIP TORQUE RET
X PIP TORQUE -
A13
J26-B P26-B
J26-A P26-A
MG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND
OVDC
+28VDC
-28VDC
DUCOSYN HI
DUCOSYN LO
DUCOSYN FDBK HI
DUCOSYN FDBK LO
WHEEL Ø A (90° LEAD)
WHEEL Ø B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
ADA PREAMP A7
M.G. ADA A4
ADA PREAMP A10
OG. ADA A5
I.G. ADA A6
ADA PREAMP A8
RESOLVER EXCIT HI
RESOLVER EXCIT LO
A11 PRECISION RESOL ASSY
B7
B8
B13
E36
E38
R1
R2
R3
C8
A16 (Z)
Z PIP PREAMP A19
Y PIP PREAMP A18
X PIP PREAMP A17
Z PIP A3
Y PIP A2
X PIP A1


10
9
8
D
C
B
A
CASE
OGA
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
EMERGENCY HTR OPERATE AND STANDBY
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR RETURN
IRIG CONTROL SENSOR
SENSOR COMMON
CONTROL HTR LO
CONTROL HTR HI
EMERGENCY HTR CONTROL MODULE LO
EMERGENCY HTR HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
INPUT +
INPUT −
OUTPUT +
OUTPUT −
X IRIG TORQUE +
X IRIG TORQUE RET
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET
Y IRIG TORQUE −
Z IRIG TORQUE +
Z IRIG TORQUE RET
Z IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP RET
Y PIP TORQUE −
X PIP TORQUE +
X PIP TORQUE RET
X PIP TORQUE −
A21
A22
A12
A13
A20
B1
B2
B3
B4
B5
B6
B14
B15
B16
C1
C2
S1
S2
S3
S4
TB1
R5
R6
R2
R3
F1
F2
IRIG PREAMP A9
A14 (X)
A15 (Y)
A16 (Z)
SPARES
X IRIG MP1
Z IRIG MP3
Y IRIG MP2
Z PIP A3
P15
J15
P17
J17
P16
J16
J21
P21
WHT
RED
BLK
BLU
GRN
YEL
ORN
GY
VIO
BRN

1/1000017


MG ADA
OG ADA
ADA COMMON
IG ADA
CHASSIS GND
0 VDC
+28 VDC
-28 VDC
MICROSYN HI
MICROSYN LO
MICROSYN FORK HI
MICROSYN FORK LO
WHEEL θ A (90° LEAD)
WHEEL θ B (0°)
WHEEL COMMON
X PIP ERROR HI
X PIP ERROR LO
Y PIP ERROR HI
Y PIP ERROR LO
Z PIP ERROR HI
Z PIP ERROR LO
E7
E8
E9
E10
MG ADA A5
OG ADA A4
ADA PREAMP A7
P24
IG ADA A6
ADA PREAMP A8
J25
P25
RED
BRN
GY
VIO
ORN
YEL
GRN
BLK
WHT
E11
PIP PREAMP A10
J19
P19
X PIP A2
J18
P18
X PIP A1
J22
P22
1000017

REFERENCE DESIGNATIONS	TITLE	NASA PART NUMBER	NUMBER REQUIRED
A1 THRU A3	PIP		3
A4 THRU A6	ADA	1000097	3
A7	OG & MG ADA PREAMP		1
A8	IG ADA PREAMP		1
A9	IRIG PREAMP		1
A10	PIP PREAMP		1
A11	PRECISION RESOLVER ASSY		1
A12	EMERGENCY HEATER CONTROL		1
A13	28 V DC REGULATOR		1
A14 THRU 16	HEATER & TAPERED MOUNT ASSY, 25 [illegible]	1000126	3
B1 THRU B6	TORQUE MOTOR	1000075	6
B7, B9, B11	RESOLVER 15X	1000078	3
B8, B10, B12	RESOLVER 1X	1000030	3
B13	RESOLVER, PITCH YAW	1000031-2	1
B14	RESOLVER, GYRO ERROR	1000031-1	1
B15, B16	BLOWER		2
C1, C2	CAPACITOR		2
E1, E2	SLIP RING	1000038	2
E3 THRU E6	SLIP RING	1000037	4
E7 THRU E10	TERMINAL, LUG		4
E11	SPLICE REDUCER		1
J1	CONNECTOR PLUG	1000118-1	1
J2		1000118-2	1
J3		1000118-3	1
J4		1000118-4	1
J5 THRU J12		1000117	8
J13 & J14		1000120	2
(REF) J15 THRU J17			3
J18 THRU J20	RECEPTACLE		3
J21			1
J22			1
(REF) J23	PLUG		1
J24	RECEPTACLE		1
J25			1
MP1, MP2, MP3	IRIG		3
P5 THRU P12	CONNECTOR RECEPTACLE	1000116	8
P13 & P14		1000119	2
P15 THRU P17			3
(REF) P18 THRU P20	PLUG		3
(REF) P21			1
(REF) P22			1
P23	RECEPTACLE		1
(REF) P24	PLUG		1
(REF) P25			1
S	MICRO SWITCH		1
S2	SWITCH-THERMOSTATIC		1
S3			1
S4			1

CONNECTORS MARKED (REF) ARE INTEGRAL PARTS OF THEIR RESPECTIVE MODULES

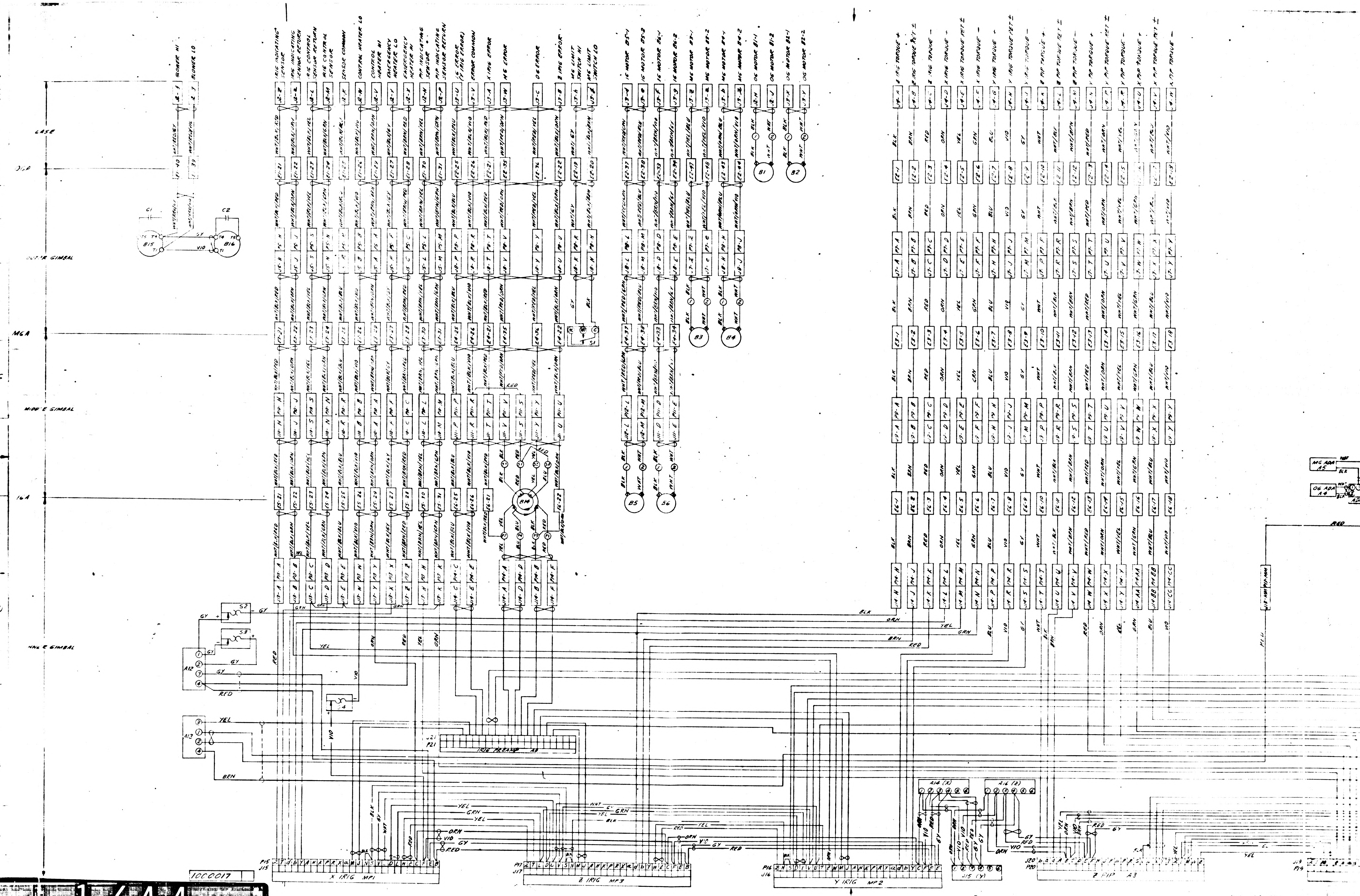
FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 00122 DATE 11-26-62

DRAWING FOR REF:
I.M.U ASSY

M.I.T. INSTRUMENTATION LAB	APOLLO I.M.U WIRING DIAGRAM	M.I.T. INSTRUMENTATION LABORATORY
		DWG. NO. R-24383
		MANNED SPACECRAFT CENTER HOUSTON TEXAS
	SCALE / UNIT WT / CODE IDENT	NASA DRAWING NO. 1000017
		SHEET 1 OF 2

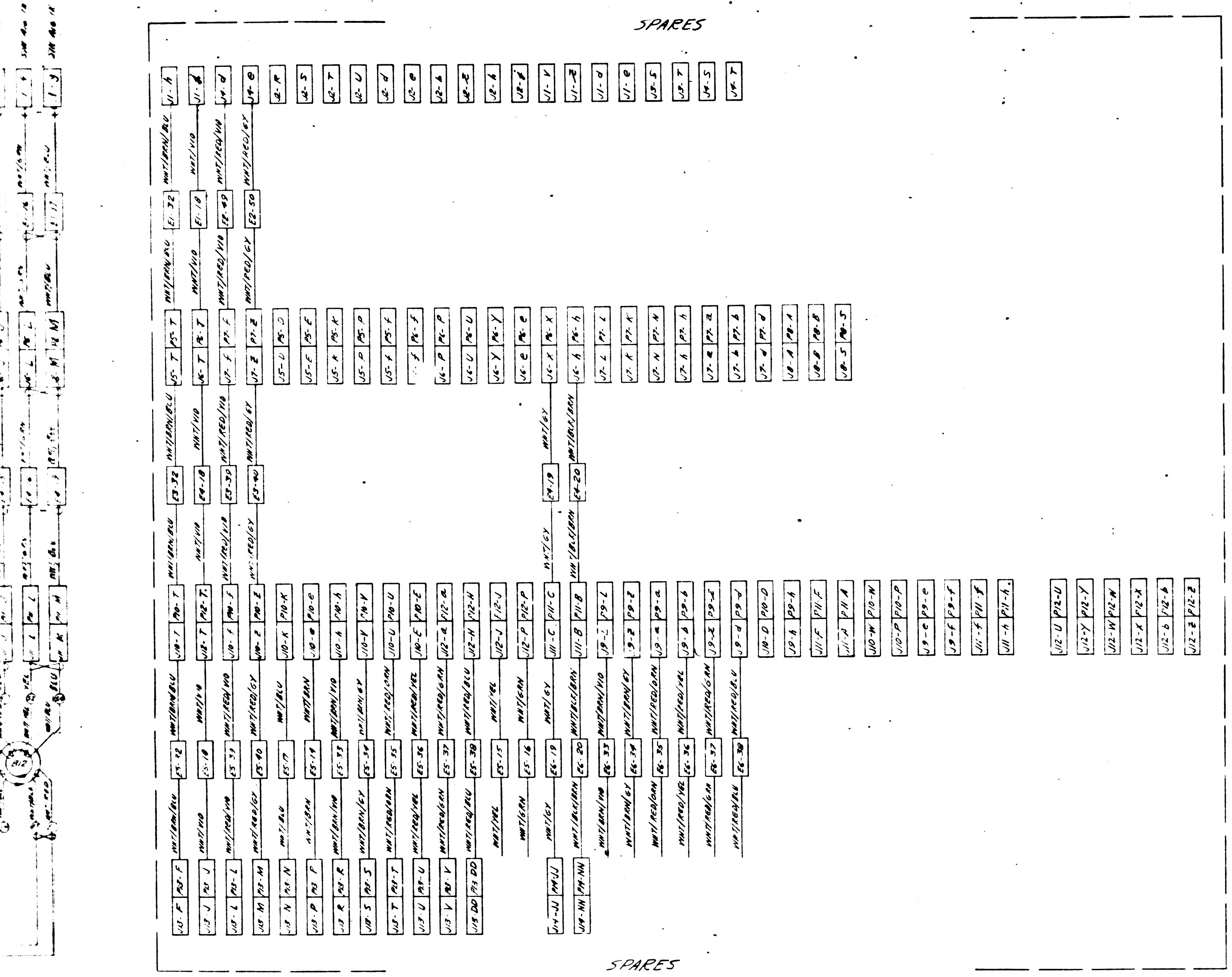
12/44


CASE
OUTER GIMBAL
MGA
MIDDLE GIMBAL
IGA
INNER GIMBAL
BLOWER HI
BLOWER LO
B15
B16
C1
C2
IRIG INDICATING SENSOR
IRIG INDICATING SENSOR RETURN
IRIG CONTROL SENSOR RETURN
IRIG CONTROL SENSOR
SENSOR COMMON
CONTROL HEATER LO
CONTROL HEATER HI
EMERGENCY HEATER LO
EMERGENCY HEATER HI
PIP INDICATING SENSOR
PIP INDICATING SENSOR RETURN
IG ERROR (Y IRIG ERROR)
ERROR COMMON
X IRIG ERROR
MG ERROR
OG ERROR
Z IRIG ERROR
MG LIMIT SWITCH HI
MG LIMIT SWITCH LO
IG MOTOR B5-1
IG MOTOR B5-2
IG MOTOR B6-1
IG MOTOR B6-2
MG MOTOR B3-1
MG MOTOR B3-2
MG MOTOR B4-1
MG MOTOR B4-2
OG MOTOR B1-1
OG MOTOR B1-2
OG MOTOR B2-1
OG MOTOR B2-2
B1
B2
B3
B4
B5
B6
S1
RM
Z IRIG TORQUE +
Z IRIG TORQUE RET ±
Z IRIG TORQUE −
X IRIG TORQUE +
X IRIG TORQUE RET ±
X IRIG TORQUE −
Y IRIG TORQUE +
Y IRIG TORQUE RET ±
Y IRIG TORQUE −
Z PIP TORQUE +
Z PIP TORQUE RET ±
Z PIP TORQUE −
Y PIP TORQUE +
Y PIP TORQUE RET ±
Y PIP TORQUE −
X PIP TORQUE +
X PIP TORQUE RET ±
X PIP TORQUE −
MG ADA A5
OG ADA A4
S2
S3
S4
A12
A13
J21
P21
IRIG PREAMP A8
A14 (X)
A16 (Z)
P15
J15
X IRIG MP1
P17
J17
Z IRIG MP3
P16
J16
Y IRIG MP2
J15 (Y)
J20
P20
Z PIP A3
J19
P19
BLK
BRN
RED
ORN
YEL
GRN
BLU
VIO
GY
WHT

1000017

1/44

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHT 1 FOR REVISIONS		



FOR INFORMATION ONLY

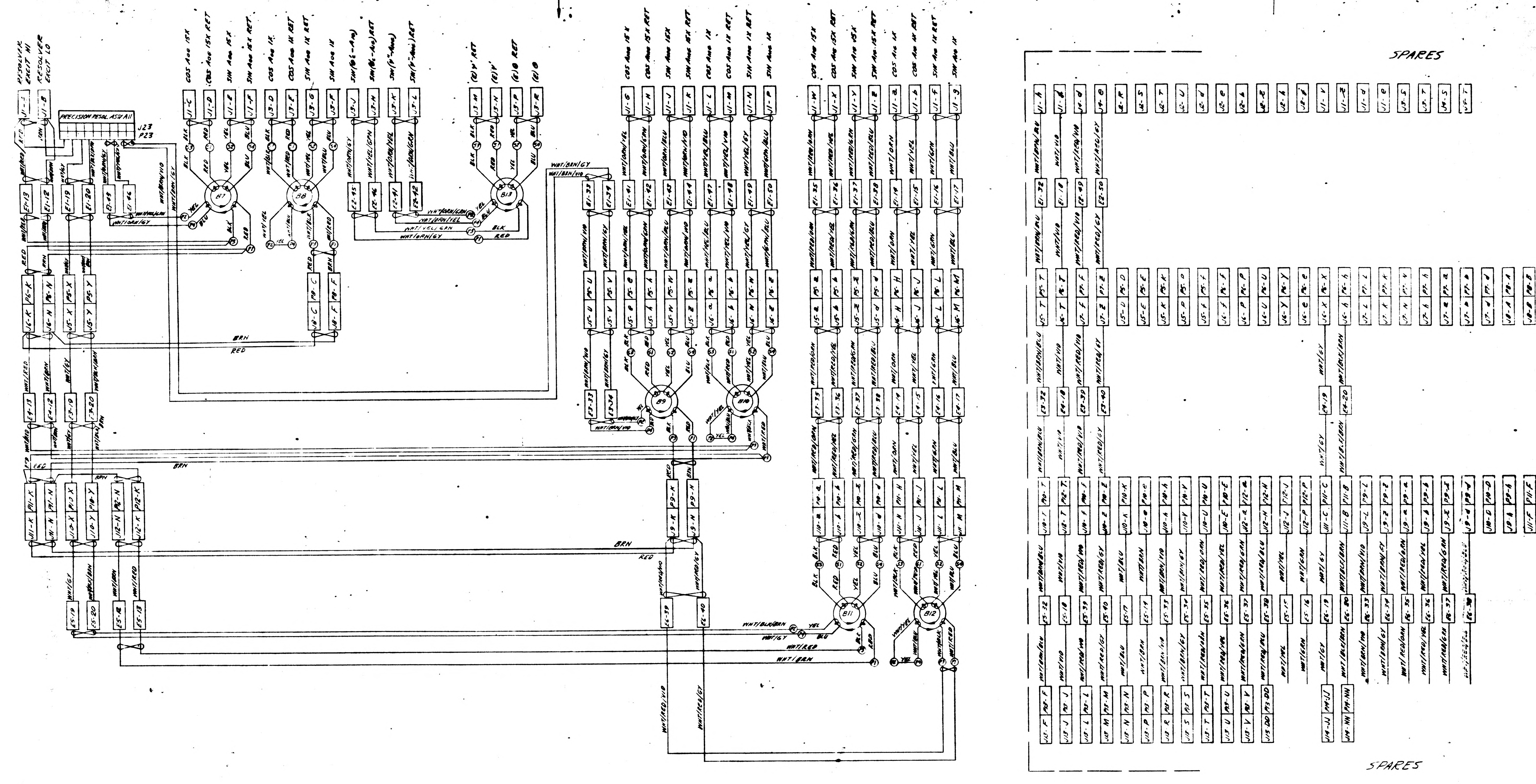
CLASS B RELEASE TDR No. 00122 DATE 11-25-62

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED J. E. Miller 11-20-62
CHECKED 12-2-62
DRAWN THEM 10-17-62
APPROVED FOR MSC

APOLLO I.M.U.
WIRING DIAGRAM

SCALE | UNIT WT | CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO R94393
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000017
SHEET 2 OF 2

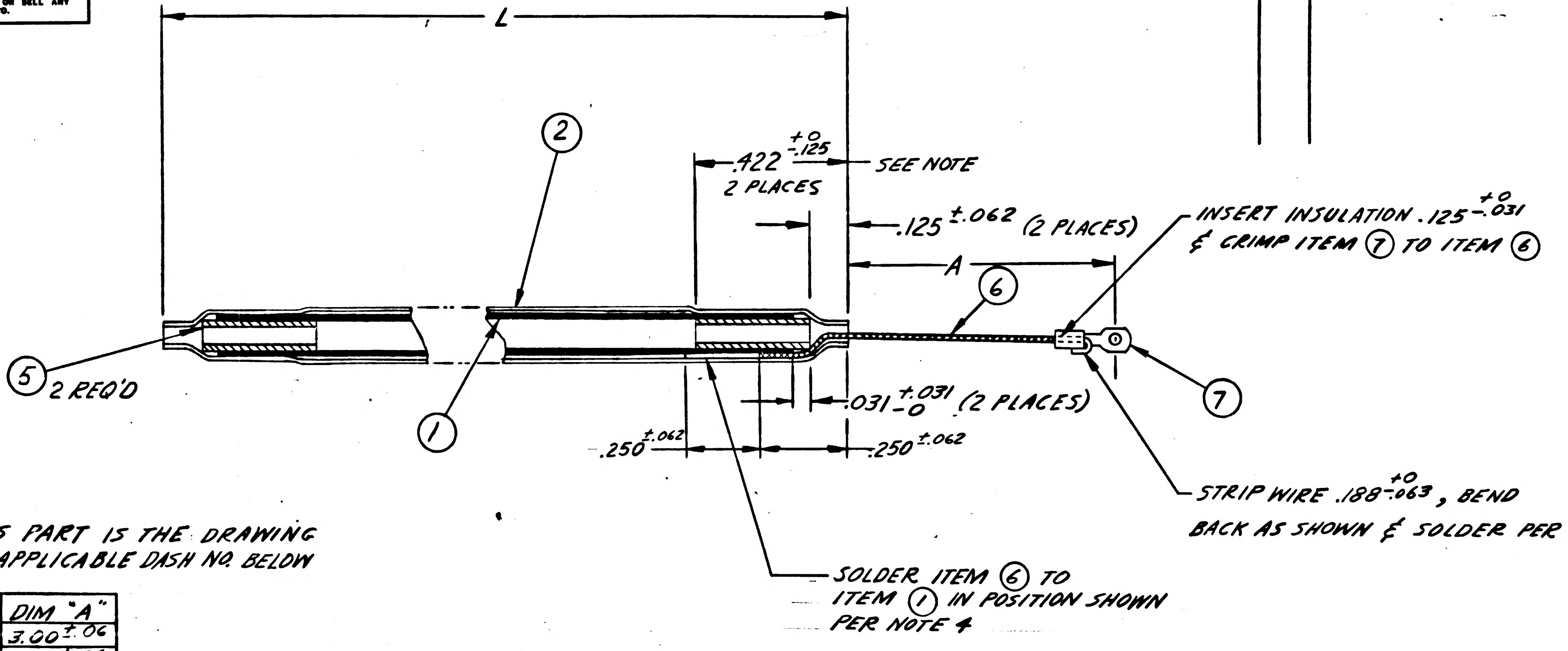

RESOLVER EXCIT HI
RESOLVER EXCIT LO
PRECISION RESOL. ASSY A11
J23
P23
COS Aog 15X
COS Aog 15X RET
SIN Aog 15X
SIN Aog 15X RET
COS Aog 1X
COS Aog 1X RET
SIN Aog 1X RET
SIN Aog 1X
(E)ψ' RET
(E)ψ'
(E)θ RET
(E)θ
B7
B8
B13
B9
B10
B11
B12
COS Ang 15X
COS Ang 15X RET
SIN Ang 15X
SIN Ang 15X RET
COS Ang 1X
COS Ang 1X RET
SIN Ang 1X RET
SIN Ang 1X
BLK
RED
YEL
BLU
BRN
WHT/ORN/GY
WHT/YEL/GRN
WHT/ORN/YEL
WHT/ORN/GRN
WHT/BRN/GY
WHT/BRN/VIO
WHT/BLK/GRN
WHT/GY
WHT/RED
WHT/BRN
WHT/RED/VIO
WHT/RED/GY
SPARES
SPARES

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1000020

REVISIONS TDRR 04941

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 05949	1-31-6?	WK.


L
2
.422 +0 -.125
2 PLACES
SEE NOTE
.125 ±.062 (2 PLACES)
INSERT INSULATION .125 +0 -.031 & CRIMP ITEM 7 TO ITEM 6
A
6
5 2 REQ'D
1
.031 +.031 -0 (2 PLACES)
7
.250 ±.062
.250 ±.062
STRIP WIRE .188 +0 -.063, BEND BACK AS SHOWN & SOLDER PER NOTE 4
SOLDER ITEM 6 TO ITEM 1 IN POSITION SHOWN PER NOTE 4

THE NUMBER OF THIS PART IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NO. BELOW

DASH NO.	LENGTH "L"	DIM "A"
-1	3.25 ±.06	3.00 ±.06
-2	3.75 ±.06	3.00 ±.06
-3	8.50 ±.06	4.50 ±.06

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CUT TO REQUIRED LENGTH.
3. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., & REVISION LETTER PER NO 1002019.
4. SOLDER PER MIL-STD-440 USING ITEM ⑧
5. SHRINK ITEM ② TO DIM SHOWN, BOTH ENDS.

SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	QQ-S-571 (SN60 WARP 2)	SOLDER	8
1	1010717-1	TERMINAL, LUG	7
AR	MIL-W-16878 E28	WIRE, 28 AWG BLACK	6
2	1000243-5	FERRULE-INNER	5
			4
			3
1	1010490-950	SLEEVING-HEAT SHRINK	2
AR	QQ-B-575 (3/64 I.D. 36 AWG)	SHIELD, STRANDED WIRE	1

LIST OF MATERIALS

MASTER

MULTIPLE USAGE	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN THENO DATE 11-20
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL
NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL 12-3-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD & GROUND ASSY

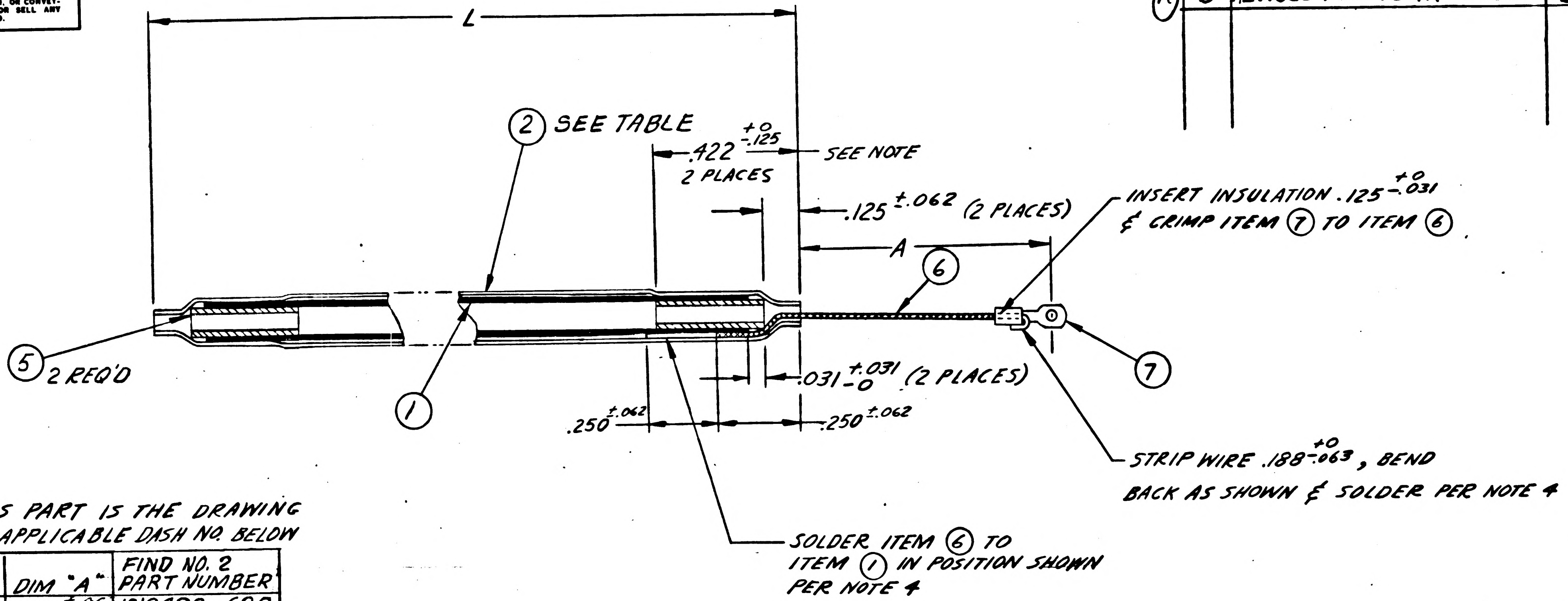
CODE IDENT NO. SIZE C NASA DRAWING NO. 1000020
SCALE NONE WT SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 1000020

REVISIONS TDRR 04941

SYM	DESCRIPTION	DATE	APPROVAL	
A	REVISED PER TDRR 05949	1-31-64		WK.
B	REVISED PER TDRR 11450	24 AUG 64		


L
② SEE TABLE
.422 +0 -.125 2 PLACES
SEE NOTE
.125 ±.062 (2 PLACES)
A
⑥
INSERT INSULATION .125 +0 -.031 & CRIMP ITEM ⑦ TO ITEM ⑥.
⑦
⑤ 2 REQ'D
①
.031 +.031 -0 (2 PLACES)
.250 ±.062
.250 ±.062
STRIP WIRE .188 +0 -.063, BEND BACK AS SHOWN & SOLDER PER NOTE 4
SOLDER ITEM ⑥ TO ITEM ① IN POSITION SHOWN PER NOTE 4

THE NUMBER OF THIS PART IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NO. BELOW

DASH NO.	LENGTH "L"	DIM "A"	FIND NO. 2 PART NUMBER
-1	3.25 ±.06	3.00 ±.06	1010490-620
-2	3.75 ±.06	3.00 ±.06	-680
-3	8.50 ±.06	4.50 ±.06	-950

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CUT TO REQUIRED LENGTH.
3. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., & REVISION LETTER PER NO 1002019.
4. SOLDER PER MIL-STD-490 USING ITEM ⑧
5. SHRINK ITEM ② TO DIM SHOWN, BOTH ENDS.

SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	QQ-S-571 (SN60 WARP 2)	SOLDER	8
1	1010717-1	TERMINAL, LUG	7
AR	MIL-W-16878 E28	WIRE, 28 AWG BLACK	6
2	1000243-5	FERRULE-INNER	5
			4
			3
1	SEE TABLE	SLEEVING-HEAT SHRINK	2
AR	QQ-B-575 (3/64 I.D. 36 AWG)	SHIELD, STRANDED WIRE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
MULTIPLE	
USAGE	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN THENO DATE 11-20
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL
NASA APPROVAL W. J. 12-3-63
MIT APPROVAL 12-3-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD & GROUND ASSY

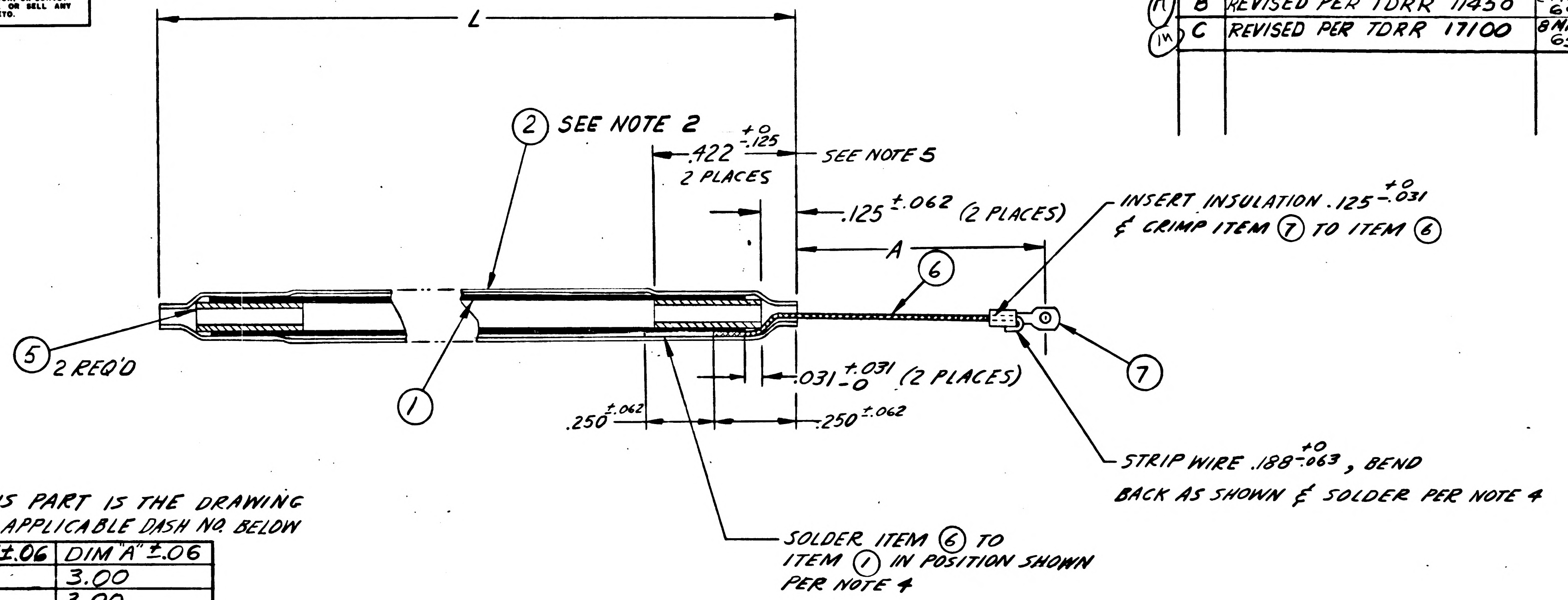
CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000020
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1000020 C

REVISIONS TDRR 04741

SYM	DESCRIPTION	DATE	APPROVAL	
A	REVISED PER TDRR 05949	1-31-64		W.K.
B	REVISED PER TDRR 11450	24 AUG 64	JWP	
C	REVISED PER TDRR 17100	8 MAR 65	R.W.T.	W.D.


L
② SEE NOTE 2
.422 +0 −.125 2 PLACES
SEE NOTE 5
.125 ±.062 (2 PLACES)
INSERT INSULATION .125 +0 −.031 & CRIMP ITEM ⑦ TO ITEM ⑥
A
⑥
⑤ 2 REQ'D
①
⑦
.031 +.031 −0 (2 PLACES)
.250 ±.062
.250 ±.062
STRIP WIRE .188 +0 −.063, BEND BACK AS SHOWN & SOLDER PER NOTE 4
SOLDER ITEM ⑥ TO ITEM ① IN POSITION SHOWN PER NOTE 4

THE NUMBER OF THIS PART IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NO. BELOW

DASH NO.	LENGTH "L" ±.06	DIM "A" ±.06
-1	3.25	3.00
-2	3.75	3.00
-3	8.50	4.50
-4	3.25	1.75
-5	2.00	1.75
-6	2.50	1.75
-7	5.00	1.75
-8	4.00	1.75
-9	6.50	2.00

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CUT TO REQUIRED LENGTH.
3. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., & REVISION LETTER PER ND 1002019.
4. SOLDER PER ND 1002071 USING ITEM ⑧
5. SHRINK ITEM ② TO DIM SHOWN, BOTH ENDS.

SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	QQ-S-571 (SN60 WARP 2)	SOLDER	8
1	1010717-1	TERMINAL, LUG	7
AR	1010416-1	WIRE, ELECTRICAL. BLACK	6
2	1000243-5	FERRULE-INNER	5
			4
			3
AR	1010490-983	SLEEVING-HEAT SHRINK	2
AR	QQ-B-575 (7/64 I.D. 36 AWG)	SHIELD, STRANDED WIRE	1

LIST OF MATERIALS

	2018601
MULTIPLE	1001500
USAGE	1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO. CONTRACT

DRAWN THENO DATE 11-20
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL
NASA APPROVAL W J 12-3-63
MIT APPROVAL 12-3-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD & GROUND ASSY

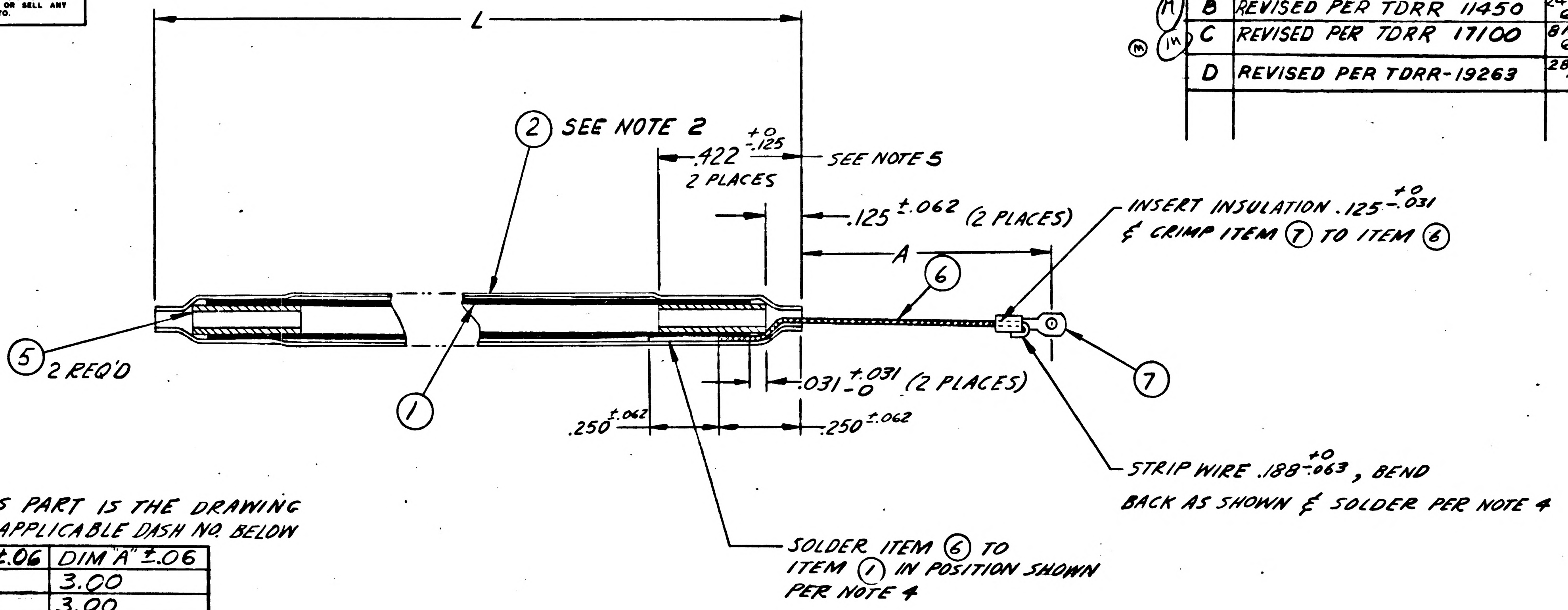
CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1000020
SCALE NONE | WT | SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1000020 D

REVISIONS TDRR 04741

SYM	DESCRIPTION	DATE	APPROVAL	
A	REVISED PER TDRR 05949	1-31-64		W.K.
B	REVISED PER TDRR 11450	24 AUG 64	JWP	
C	REVISED PER TDRR 17100	8 MAR 65	R.H.T.	W.D.
D	REVISED PER TDRR-19263	28-MAY-65	B	


L
② SEE NOTE 2
.422 +0 -.125
2 PLACES
SEE NOTE 5
.125 ±.062 (2 PLACES)
INSERT INSULATION .125 +0 -.031
& CRIMP ITEM ⑦ TO ITEM ⑥
A
⑥
⑤ 2 REQ'D
①
⑦
.031 +.031 -0 (2 PLACES)
.250 ±.062
.250 ±.062
STRIP WIRE .188 +0 -.063, BEND
BACK AS SHOWN & SOLDER PER NOTE 4
SOLDER ITEM ⑥ TO
ITEM ① IN POSITION SHOWN
PER NOTE 4

THE NUMBER OF THIS PART IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NO. BELOW

DASH NO.	LENGTH "L" ±.06	DIM "A" ±.06
-1	3.25	3.00
-2	3.75	3.00
-3	8.50	4.50
-4	3.25	1.75
-5	2.00	1.75
-6	2.50	1.75
-7	5.00	1.75
-8	4.00	1.75
-9	6.50	2.00
-10	5.75	1.75

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CUT TO REQUIRED LENGTH.
3. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., & REVISION LETTER PER ND 1002019.
4. SOLDER PER ND 1002071 USING ITEM ⑧.
5. SHRINK ITEM ② TO DIM SHOWN, BOTH ENDS.

SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	QQ-S-571 (SN60 WARP 2)	SOLDER	8
1	1010717-1	TERMINAL, LUG	7
AR	1010416-1	WIRE, ELECTRICAL, BLACK	6
2	1000243-5	FERRULE-INNER	5
			4
			3
AR	1010490-983	SLEEVING-HEAT SHRINK	2
AR	QQ-B-575 (7/64 I.D. 36 AWG)	SHIELD, STRANDED WIRE	1

LIST OF MATERIALS

	18601
MULTIPLE	1001500
USAGE	1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN THENO DATE 11-20
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL
NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL 12-3-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD & GROUND ASSY

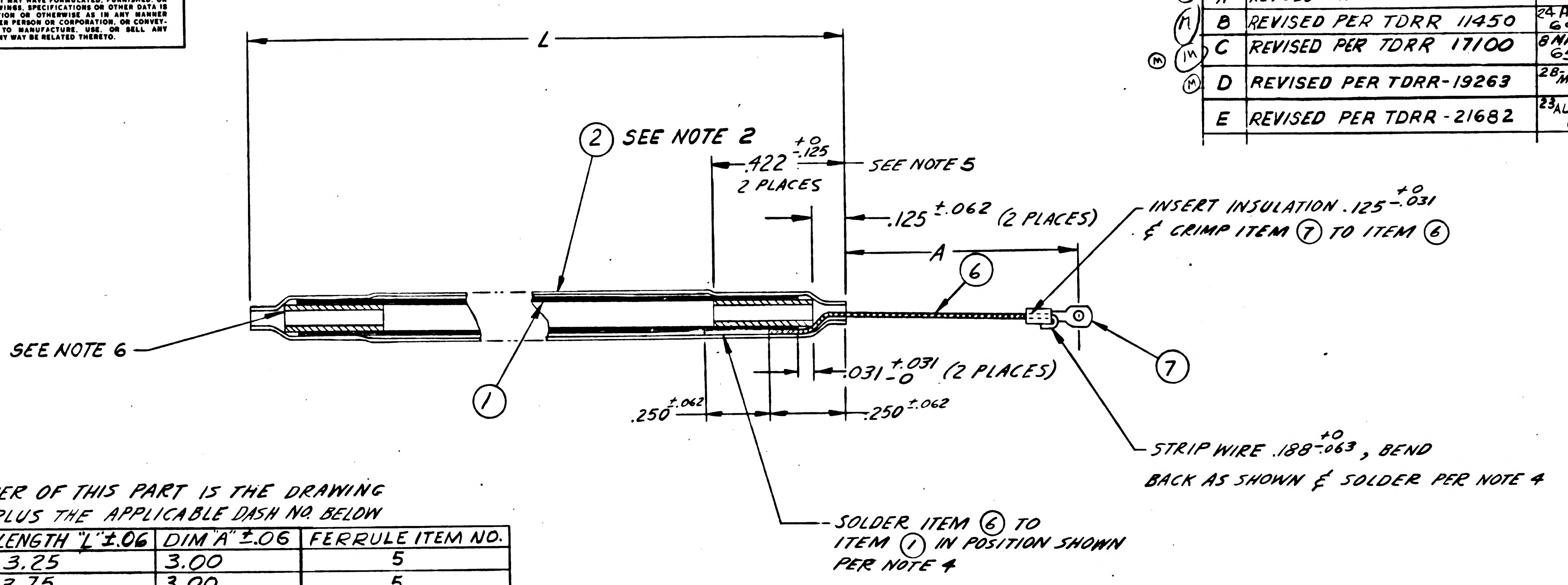
CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1000020
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1000020 E

REVISIONS TDRR 04741

SYM	DESCRIPTION	DATE	APPROVAL	
A	REVISED PER TDRR 05949	1-31-64		W.K.
B	REVISED PER TDRR 11450	24 AUG 64	JWP	
C	REVISED PER TDRR 17100	8 MAR 65	R.W.T.	W.D.
D	REVISED PER TDRR-19263	28-MAY-65	B	
E	REVISED PER TDRR - 21682	23 AUG 65	J.H.P.	



THE NUMBER OF THIS PART IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NO. BELOW

DASH NO.	LENGTH "L" ±.06	DIM "A" ±.06	FERRULE ITEM NO.
-1	3.25	3.00	5
-2	3.75	3.00	5
-3	8.50	4.50	5
-4	3.25	1.75	5
-5	2.00	1.75	5
-6	2.50	1.75	5
-7	5.00	1.75	5
-8	4.00	1.75	5
-9	6.50	2.00	5
-10	5.75	1.75	5
-11	3.25	1.75	4
-12	3.37	1.75	4
-13	2.50	1.75	4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CUT TO REQUIRED LENGTH.
3. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., & REVISION LETTER PER ND 1002019.
4. SOLDER PER ND 1002071 USING ITEM ⑧
5. SHRINK TO ITEM ② TO DIM. SHOWN, BOTH ENDS.
6. SEE CHART TO SELECT ITEM ④ OR ITEM ⑤ PER THE APPICABLE DASH NUMBER.

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	AR	QQ-S-571 (SN60 WARP 2)	SOLDER	8
	1	1010717-1	TERMINAL, LUG	7
	AR	1010416-1	WIRE, ELECTRICAL, BLACK	6
	2	1000243-5	FERRULE-INNER	5
SEE NOTE 6	2	1000243-7	FERRULE-INNER	4
				3
SEE NOTE 2	AR	1010490-983	SLEEVING-HEAT SHRINK	2
	AR	QQ-B-575 (7/64 I.D. 36 AWG)	SHIELD, STRANDED WIRE	1

LIST OF MATERIALS

	NEXT ASSY	USED ON
		2018601
MULTIPLE		1001500
USAGE		1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN THENO DATE 11-20
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL Hoff
NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL 12-3-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

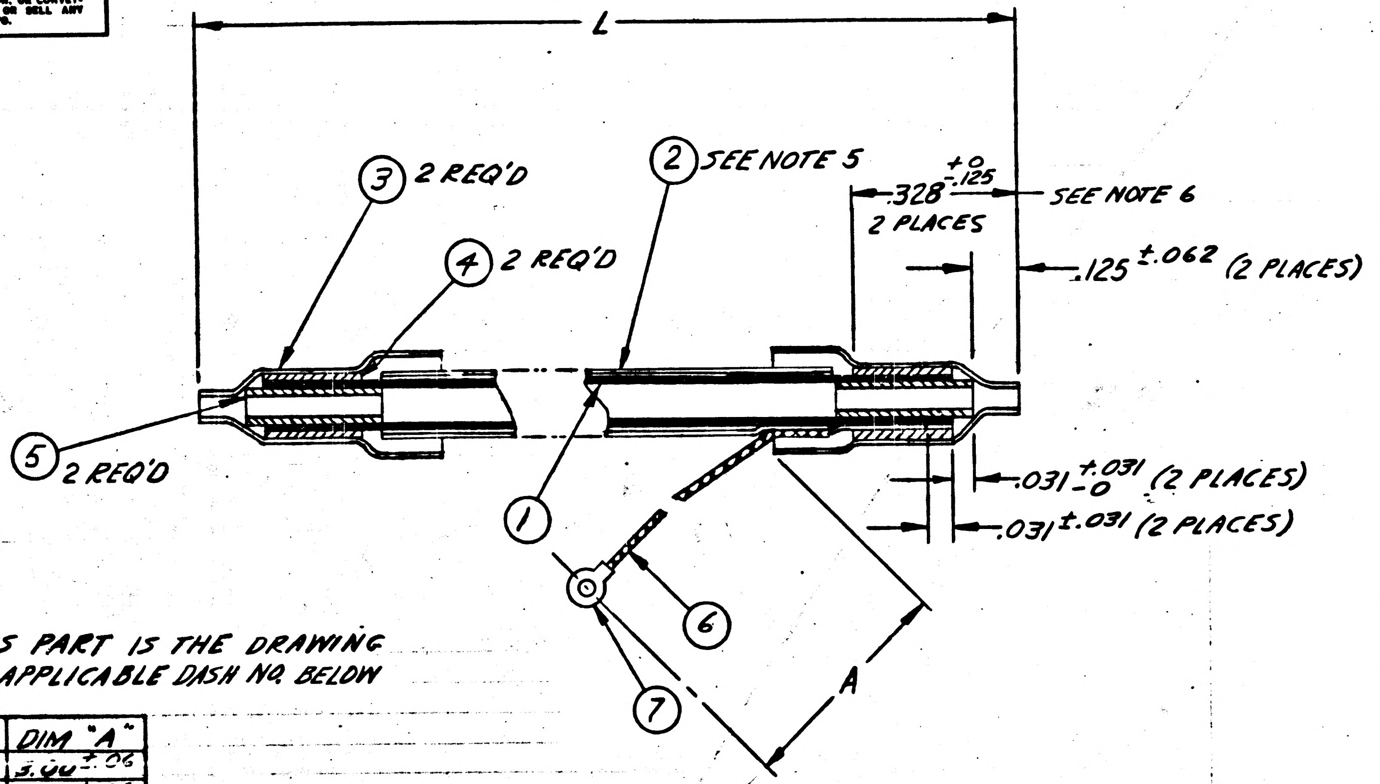
SHIELD & GROUND ASSY

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 1000020
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1000020

REVISIONS TDRR 04941			
SYM	DESCRIPTION	DATE	APPROVAL



THE NUMBER OF THIS PART IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NO. BELOW

DASH NO.	LENGTH "L"	DIM "A"
-1	3.25 ±.06	3.00 ±.06
-2	3.75 ±.06	3.00 ±.06
-3	8.50 ±.06	4.50 ±.06

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. USE AS REQUIRED.
3. CRIMP ITEMS ①, ④, ⑤, & ⑥ IN POSITION SHOWN.
4. CRIMP & SOLDER ITEM ⑦ TO ITEM ⑥. SOLDER PER MIL-STD-440 USING ITEM ⑧.
5. DO NOT SHRINK ITEM ②.
6. SHRINK ITEM ③ TO DIM SHOWN 2 PLACES.

SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	QQ-S-571 (SN60 WARP 2)	SOLDER	8
1	1010717-1	TERMINAL, LUG	7
AR	MIL-W-16878 E28	WIRE, 28 AWG BLACK	6
2	1000243-5	FERRULE - INNER	5
2	1000242-5	FERRULE - OUTER	4
2	1010491-136	SLEEVING - HEAT SHRINK	3
1	1010490-920	SLEEVING - HEAT SHRINK	2
AR	QQ-B-575 (3/64 I.D. 36 AWG)	SHIELD, STRANDED WIRE	1

LIST OF MATERIALS

MASTER

MULTIPLE USAGE	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN THENO DATE 11-20
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL
NASA APPROVAL W. J. Rhine 12-3-63
MIT APPROVAL 12-3-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

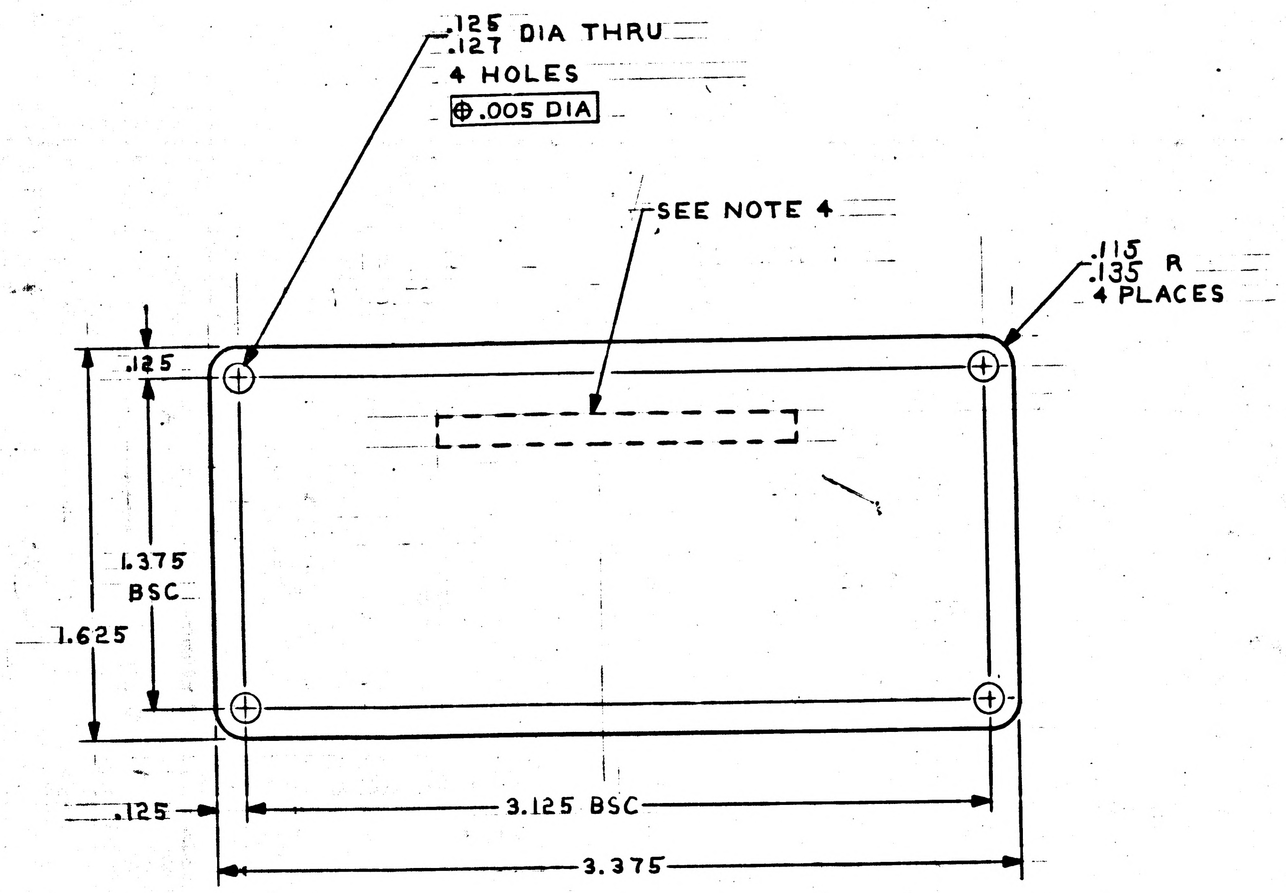
SHIELD & GROUND ASSY

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000020
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REVISED & RELEASED TDRR 11066	5/20/64	



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER MANUFACTUERS SYMBOL OR NAME PER ND1002019
3. MATERIAL: AL ALY SH, 1100 TEMP O. ALT. SPEC QQ-A-561, TEMP O THICKNESS $^{.030}_{.020}$
4. SEE NAMEPLATE APOLLO G&N STANDARDS. NASA DWG 1004260-1 FOR FORMAT AND CONTENTS
5. PLATE MUST CONFORM TO REQUIREMENTS AS OUTLINED IN MIL-P-15024 TYPE A OR TYPE H

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2018601	DL2018601
1001500	DL1001500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		2/20/64
CHECKED		
DRAWN	B.G.M.	10-15-63
APPROVED FOR MSC	W J Rhine	7-21-64
MIT/IL APPROVAL	W T Snyder	2 Jul 64

PLATE, IDENTIFICATION

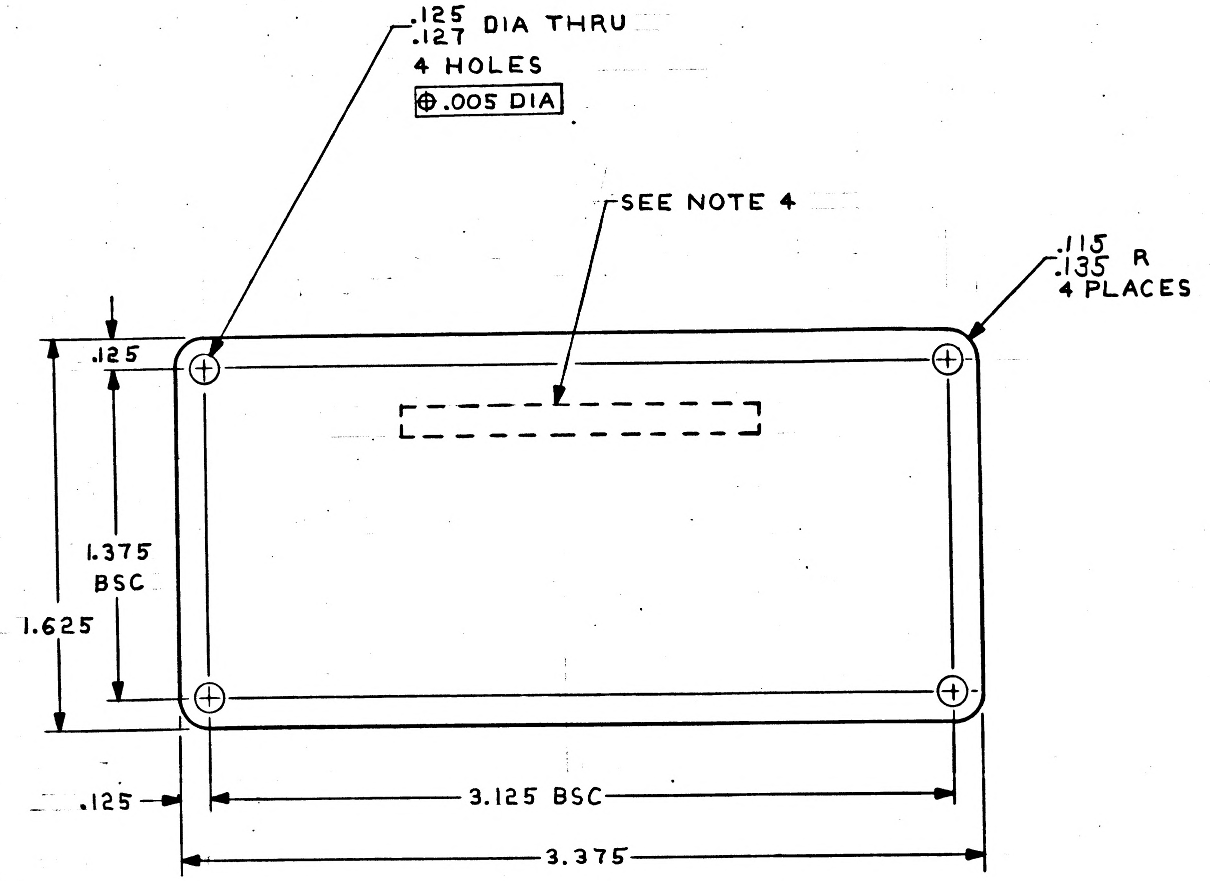
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000021

SCALE	UNIT WT.	CODE IDENT.
2/1		

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
REVISIONS					
	A	REVISED & RELEASED TDRR 11066	5/20/64		
	B	REVISED TDRR 13971	11/5/64		WK



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER MANUFACTURERS SYMBOL OR NAME PER ND1002019
3. MATERIAL: AL ALY SH, 1100 TEMP O. ALT. SPEC QQ-A-250/1 TEMP O THICKNESS $^{.030}_{.020}$
4. SEE NAMEPLATE APOLLO G&N STANDARDS NASA DWG 1004260-1 FOR FORMAT AND CONTENTS
5. PLATE MUST CONFORM TO REQUIREMENTS AS OUTLINED IN MIL-P-15024 TYPE A OR TYPE H

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
~~2018601~~	~~DL2018601~~
1001500	DL1001500
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		20Jul64
CHECKED		
DRAWN	B.G.M.	10-15-63
APPROVED FOR MSC	W J Rhine	7-21-64
MIT/IL APPROVAL		DATE

PLATE, IDENTIFICATION

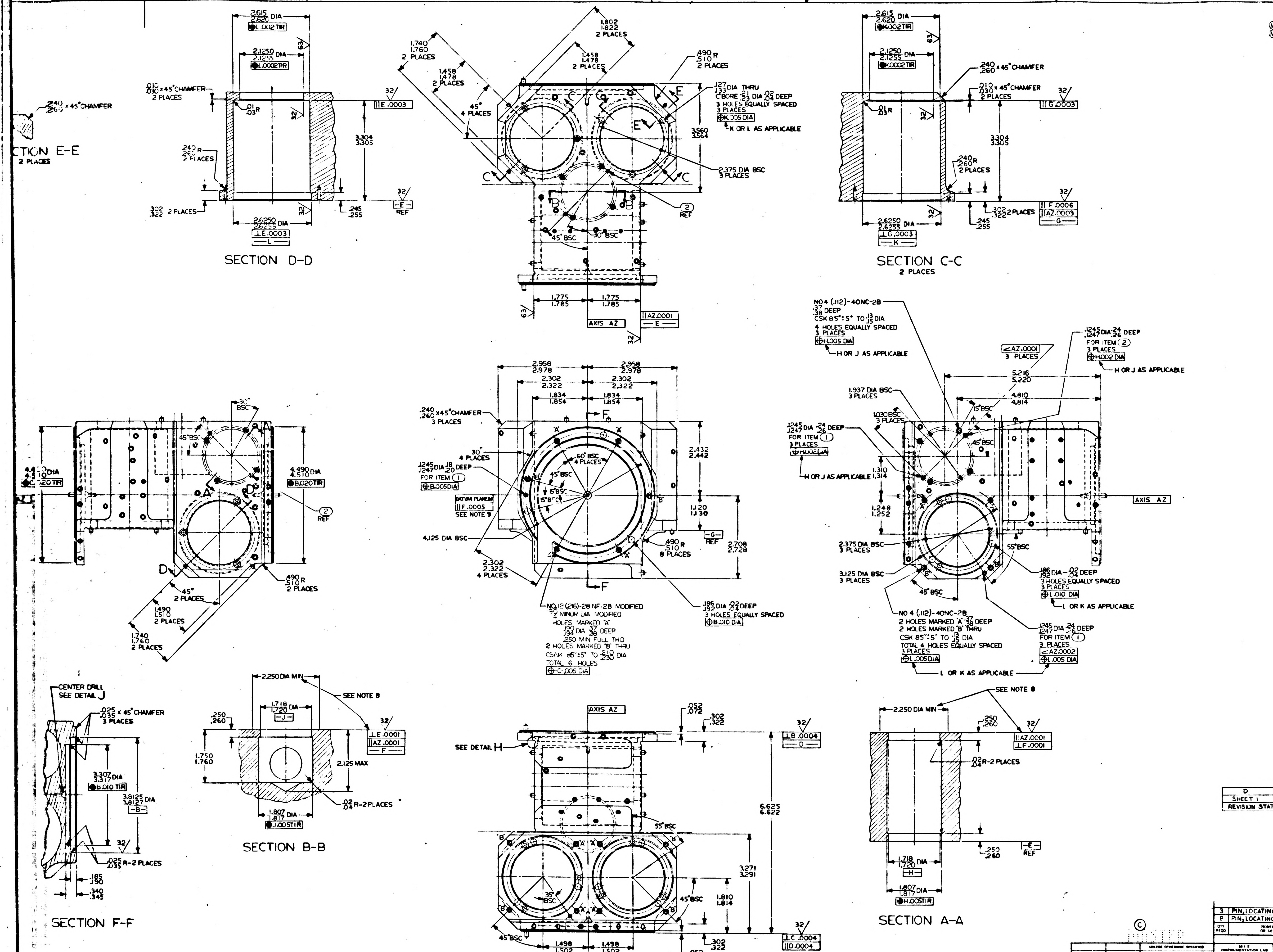
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000021
SHEET 1 OF 1

1000021 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00025				
SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL CHANGES	6/1/62		
Ⓜ B	GENERAL CHANGES	7/25/62		
Ⓜ C	TDRR 00276	1-22-63		
D	ADDED SHEET 2 OF 2 TDRR 00611	3-13-63		



SECTION E-E
2 PLACES
.240 x 45° CHAMFER
SECTION D-D
SECTION C-C
2 PLACES
SECTION F-F
SECTION B-B
SECTION A-A
CENTER DRILL SEE DETAIL J
SEE DETAIL H
SEE NOTE 8
AXIS AZ
DATUM PLANE M
SEE NOTE 9
2.615 / 2.620 DIA
2.1250 / 2.1255 DIA
2.6250 / 2.6255 DIA
3.304 / 3.305
2.375 DIA BSC 3 PLACES
4.125 DIA BSC
1.937 DIA BSC 3 PLACES
3.125 DIA BSC 3 PLACES
4.490 / 4.510 DIA
2.958 / 2.978
2.302 / 2.322
1.834 / 1.854
5.216 / 5.220
4.810 / 4.814
6.625 / 6.622
3.271 / 3.291
1.498 / 1.502
1.775 / 1.785
2.250 DIA MIN
2.125 MAX
1.718 / 1.720 DIA
1.807 / 1.817 DIA
3.307 / 3.317 DIA
3.8125 / 3.8127 DIA
NO 4 (.112)-40NC-2B
NO.12 (.216)-28 NF-2B MODIFIED
H OR J AS APPLICABLE
L OR K AS APPLICABLE
K OR L AS APPLICABLE

D	D
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL1000001
1000085	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DRAWN G. QUINN 3-29-62

HOUSING
STABLE MEMBER
IMU

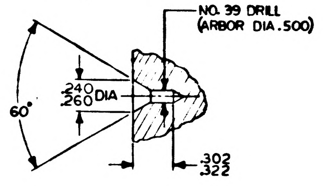
SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS

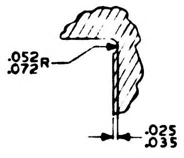
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 1 OF 2

1000025 D 1

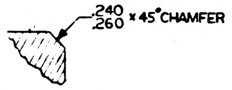
PHOTOGRAPHIC SCALE ONLY


NO. 39 DRILL
(ARBOR DIA .500)
60°
.240
.260 DIA
.302
.322

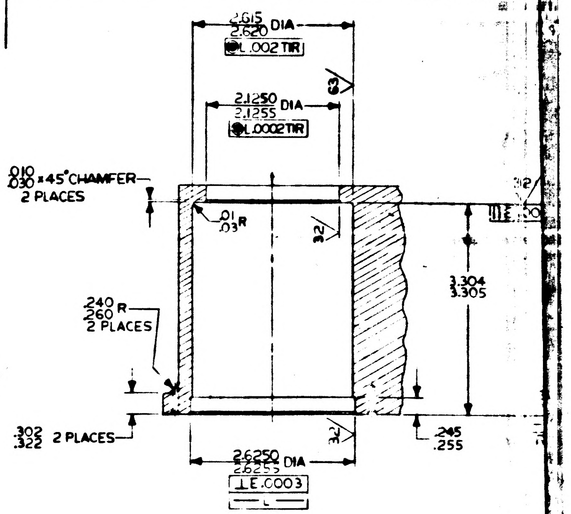
DETAIL J
SCALE 2/1
2 PLACES


.052
.072 R
.025
.035

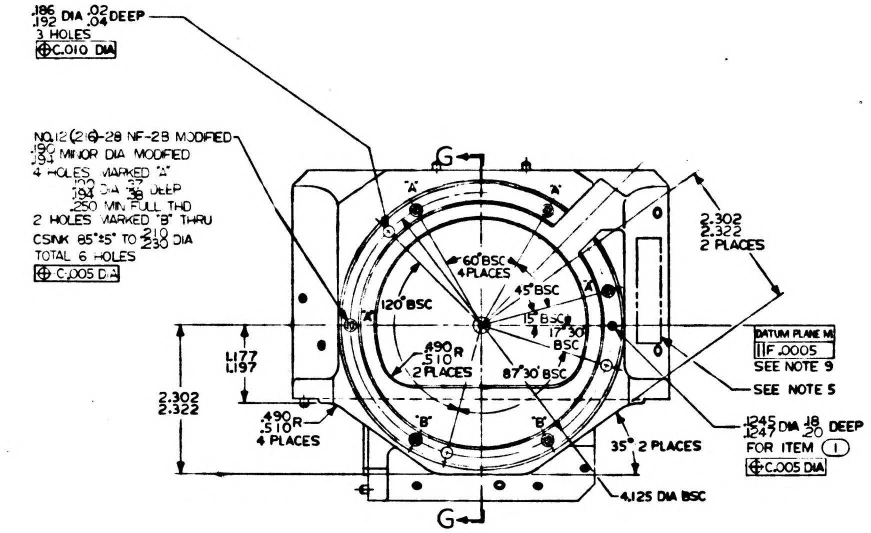
DETAIL H
SCALE 2/1
6 PLACES

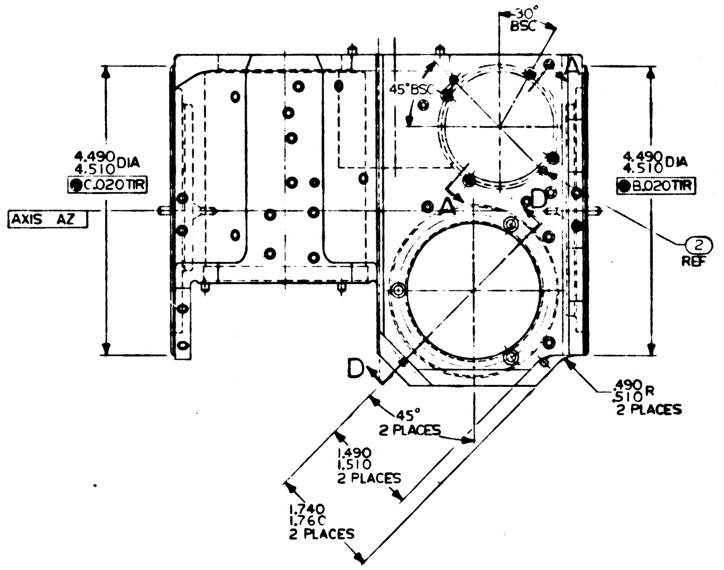

.240
.260 × 45° CHAMFER

SECTION E-E
2 PLACES


.615
.620 DIA
.002 TIR
2.1250
2.1255 DIA
.0002 TIR
.010
.020 × 45° CHAMFER
2 PLACES
.01
.03 R
32
.240
.260 R
2 PLACES
3.304
3.305
.302
.322 2 PLACES
2.6250
2.6255 DIA
E .0003
.245
.255

SECTION D-D


.186
.192 DIA .02
.04 DEEP
3 HOLES
C.010 DIA
NO.12 (.216)-28 NF-2B MODIFIED
MINOR DIA MODIFIED
4 HOLES MARKED "A"
DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSINK 85° ±5° TO DIA
TOTAL 6 HOLES
C.005 D
G
A
B
120° BSC
60° BSC
4 PLACES
45° BSC
15° BSC
17° 30' BSC
87° 30' BSC
.490
.510 R
2 PLACES
1.177
1.197
2.302
2.322
.490
.510 R
4 PLACES
2.302
2.322
2 PLACES
DATUM PLANE M
F .0005
SEE NOTE 9
SEE NOTE 5
1.245
1.247 DIA .18
.20 DEEP
FOR ITEM 1
C.005 DIA
35° 2 PLACES
4.125 DIA BSC

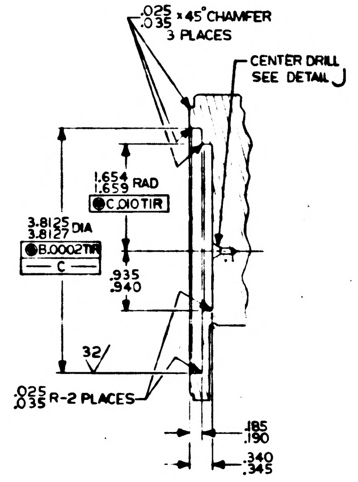

30°
BSC
45° BSC
4.490
4.510 DIA
C.020 TIR
AXIS AZ
A
B
D
4.490
4.510 DIA
B.020 TIR
2
REF
.490
.510 R
2 PLACES
45°
2 PLACES
1.490
1.510
2 PLACES
1.740
1.760
2 PLACES

NOTES

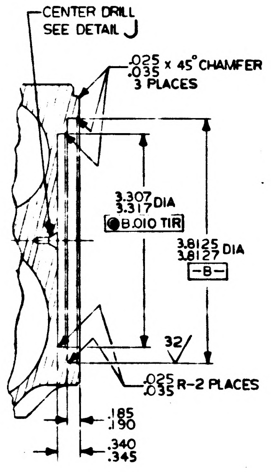
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓒ

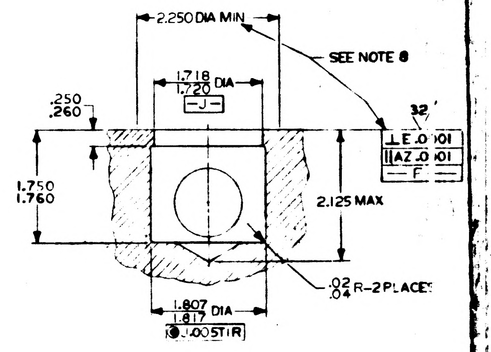
3. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE $\frac{.052}{.072}$ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ ⌰ ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET


.025
.035 × 45° CHAMFER
3 PLACES
CENTER DRILL
SEE DETAIL J
1.654
1.659 RAD
C.010 TIR
3.8125
3.8127 DIA
B.0002 TIR
-C-
.935
.940
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

SECTION G-G


CENTER DRILL
SEE DETAIL J
.025
.035 × 45° CHAMFER
3 PLACES
3.307
3.317 DIA
B.010 TIR
3.8125
3.8127 DIA
-B-
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

SECTION F-F

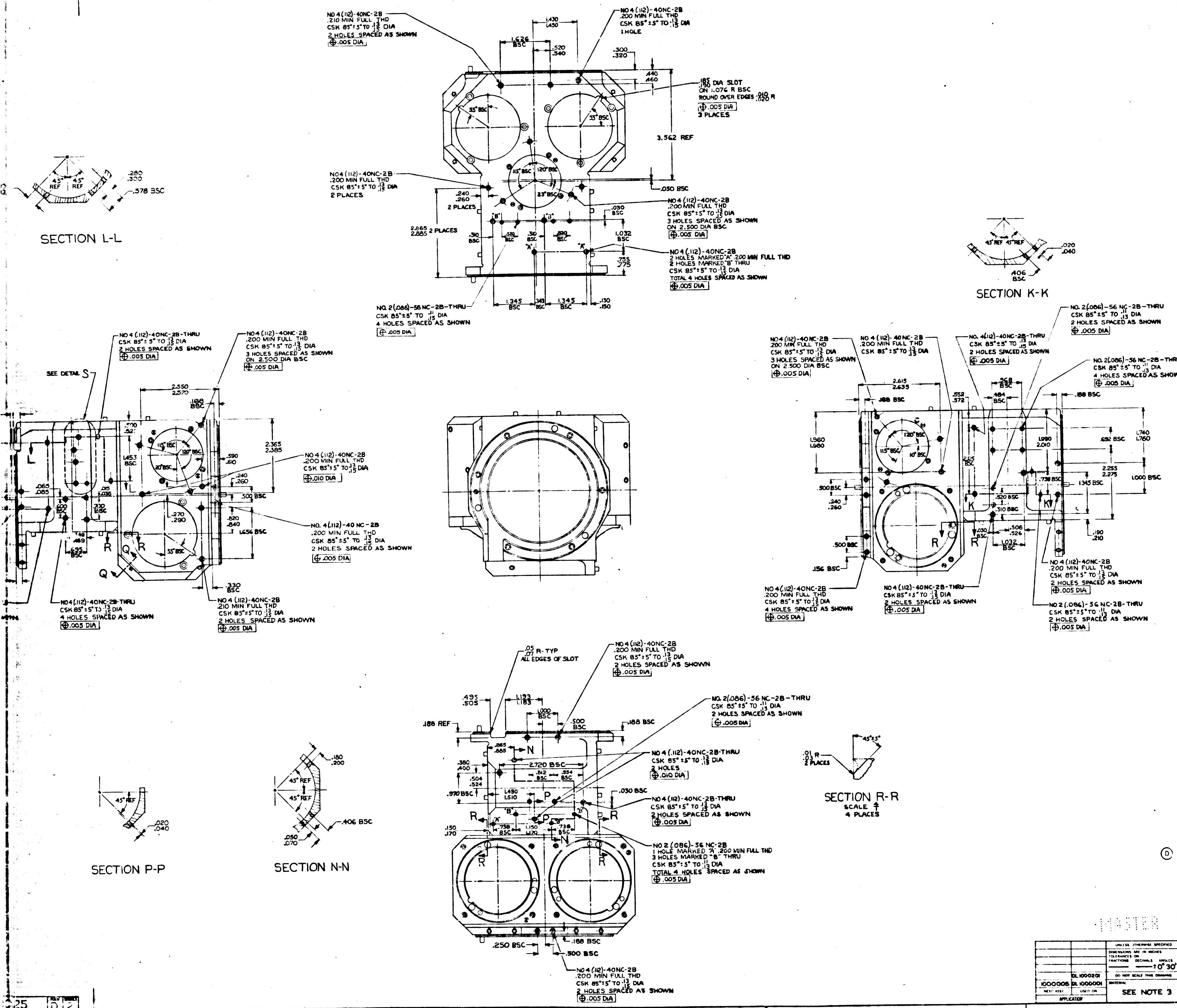

2.250 DIA MIN
SEE NOTE 8
1.718
1.720 DIA
-J-
.250
.260
32
E.001
AZ.001
-F-
1.750
1.760
2.125 MAX
.02
.04 R-2 PLACES
1.807
1.817 DIA
.005 TIR

SECTION B-B

1000025 REV D SH 1

1000025 D

SYM	DESCRIPTION	DATE	APPROVAL	
D	THIS SHEET ADDED TDRR 00611	3-13-63	ajb	WK



NO 4 (.112)-40NC-2B .210 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 1 HOLE
.185/.190 DIA SLOT ON 1.076 R BSC ROUND OVER EDGES .010/.020 R ⊕ .005 DIA 3 PLACES
3.562 REF
.050 BSC
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 PLACES
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕ .005 DIA
NO 4 (.112)-40NC-2B 2 HOLES MARKED "A" .200 MIN FULL THD 2 HOLES MARKED "B" THRU CSK 85°±5° TO .13/.15 DIA TOTAL 4 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 4 HOLES SPACED AS SHOWN ⊕ .005 DIA
SECTION L-L
SECTION K-K
SEE DETAIL S
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA ⊕ .010 DIA
NO. 4 (.112)-40 NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 4 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B .210 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA
NO. 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 4 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 4 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
.05/.07 R-TYP ALL EDGES OF SLOT
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES ⊕ .010 DIA
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 2 (.086)-56 NC-2B 1 HOLE MARKED "A" .200 MIN FULL THD 3 HOLES MARKED "B" THRU CSK 85°±5° TO .13/.15 DIA TOTAL 4 HOLES SPACED AS SHOWN ⊕ .005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕ .005 DIA
2.720 BSC
.250 BSC
.500 BSC
.188 BSC
.188 REF
SECTION P-P
SECTION N-N
SECTION R-R SCALE 4/1 4 PLACES
.01/.03 R 2 PLACES
45°±5°
.406 BSC

Ⓓ THIS SHEET ADDED

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED DATE 3-20-63
CHECKED
DRAWN G QUINN 12/62
APPROVED
BY MIT
20 March 63

HOUSING,
STABLE MEMBER

SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 2 OF 2

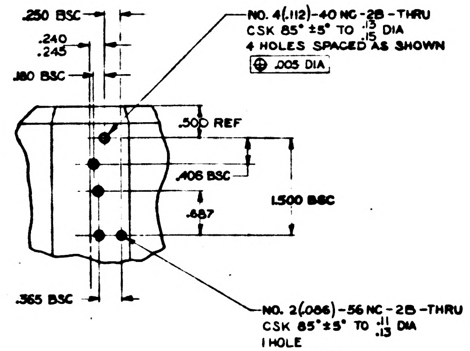
D 1000025

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

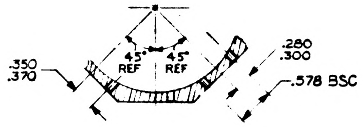
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⌖ .005 DIA

NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 PLACES

NO. 2 (.086)-56NC-2B
CSK 85° ± 5° TO .11/.13
4 HOLES SPACED AS SHOWN
⌖ .005 DIA

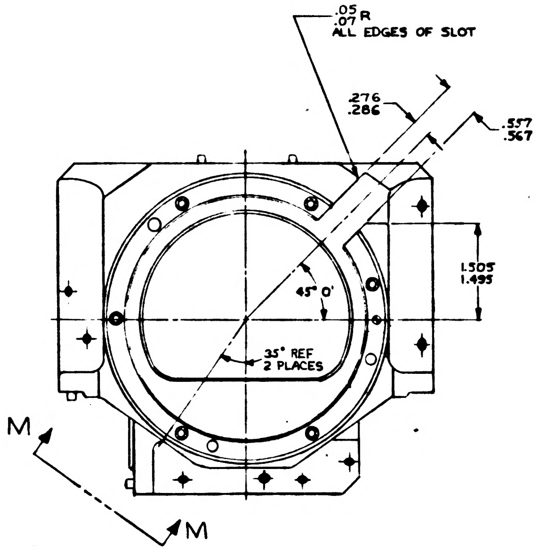

.250 BSC
.240
.245
.180 BSC
NO. 4 (.112)-40 NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⌖ .005 DIA
.500 REF
.406 BSC
1.500 BSC
.687
.365 BSC
NO. 2 (.086)-56 NC-2B-THRU
CSK 85° ± 5° TO .11/.13 DIA
1 HOLE
⌖ .005 DIA

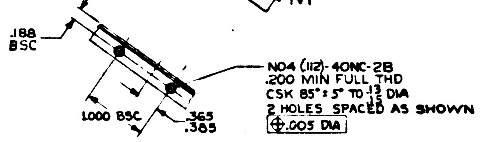
DETAIL S


45° REF
45° REF
.350
.370
.280
.300
.578 BSC

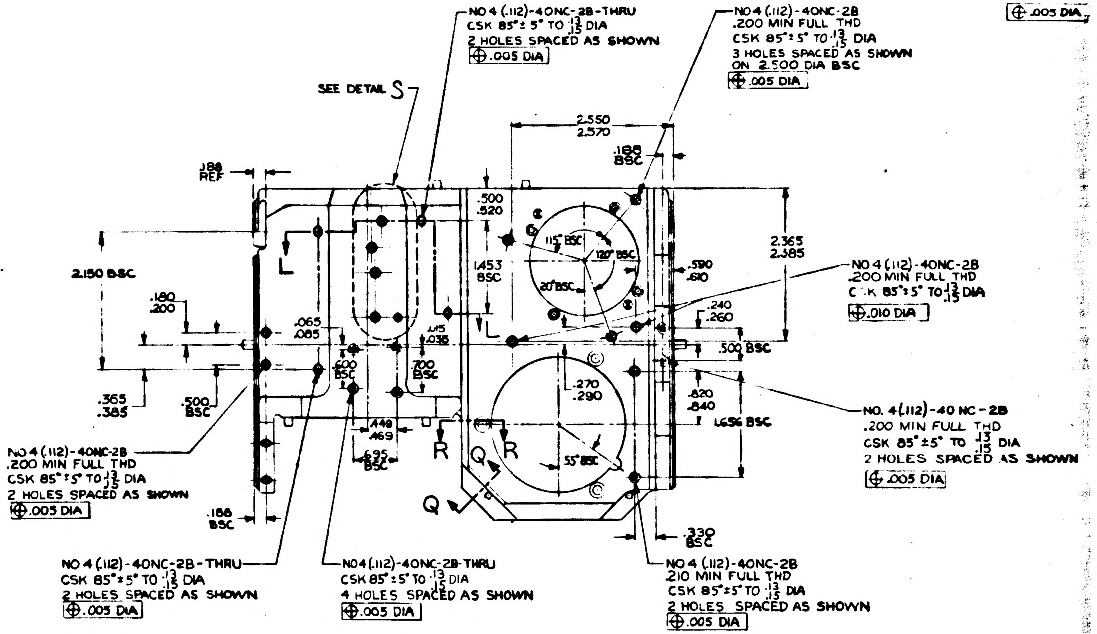
SECTION L-L

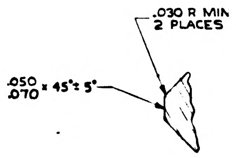
NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 REMOVE BURRS & BREAK ALL SHARP EDGES .005/.010
3 FOR MATERIAL & MACHINING PRIOR TO THIS DRAWING SEE NASA DRAWING NO. 1000025 SHEET 1


.05/.07 R
ALL EDGES OF SLOT
.276
.286
.557
.567
1.505
1.495
45° 0'
35° REF
2 PLACES
M
M

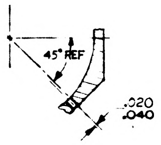

.188
BSC
1.000 BSC
.365
.385
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⌖ .005 DIA

VIEW M-M
2 PLACES

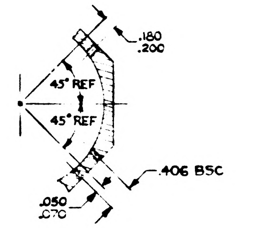

SEE DETAIL S
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⌖ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⌖ .005 DIA
2.550
2.570
.188
BSC
.188
REF
.500
.520
115° BSC
120° BSC
20° BSC
1.453
BSC
2.365
2.385
.590
.610
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
⌖ .010 DIA
.240
.260
.500 BSC
2.150 BSC
.180
.200
.065
.085
.015
.035
.600
BSC
.700
BSC
.270
.290
.820
.840
1.656 BSC
NO. 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⌖ .005 DIA
.365
.385
.500
BSC
.449
.469
.695
BSC
55° BSC
L
L
R
R
Q
Q
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⌖ .005 DIA
.188
BSC
.330
BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⌖ .005 DIA
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⌖ .005 DIA
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⌖ .005 DIA


.030 R MIN
2 PLACES
.050/.070 × 45° ± 5°

SECTION Q-Q
SCALE 4/1

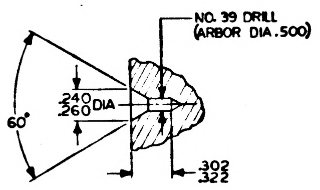

45° REF
.020
.040

SECTION P-P

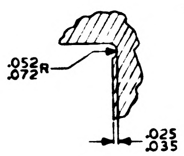

.180
.200
45° REF
45° REF
.406 BSC
.050
.070

SECTION N-N

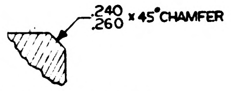
1000025 REV D SHEET 2


NO. 39 DRILL
(ARBOR DIA .500)
60°
.240 .260 DIA
.302 .322

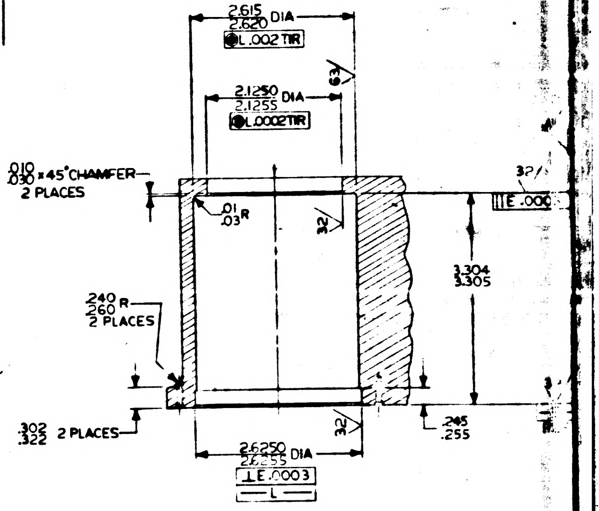
DETAIL J
SCALE 2/1
2 PLACES


.052 .072 R
.025 .035

DETAIL H
SCALE 2/1
6 PLACES


.240 .260 x 45° CHAMFER

SECTION E-E
2 PLACES


2.615 2.620 DIA
L .002 TIR
63
2.1250 2.1255 DIA
L .0002 TIR
.010 .030 x 45° CHAMFER
2 PLACES
.01 .03 R
32
∥ E .000
3.304 3.305
.240 .260 R
2 PLACES
.302 .322 2 PLACES
32
.245 .255
2.6250 2.6255 DIA
⊥ E .0003
— L —

SECTION D-D

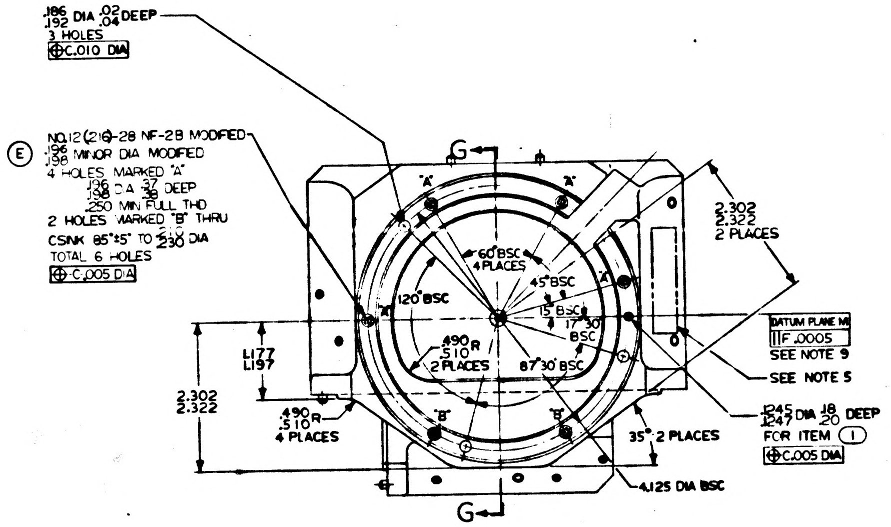
NOTES

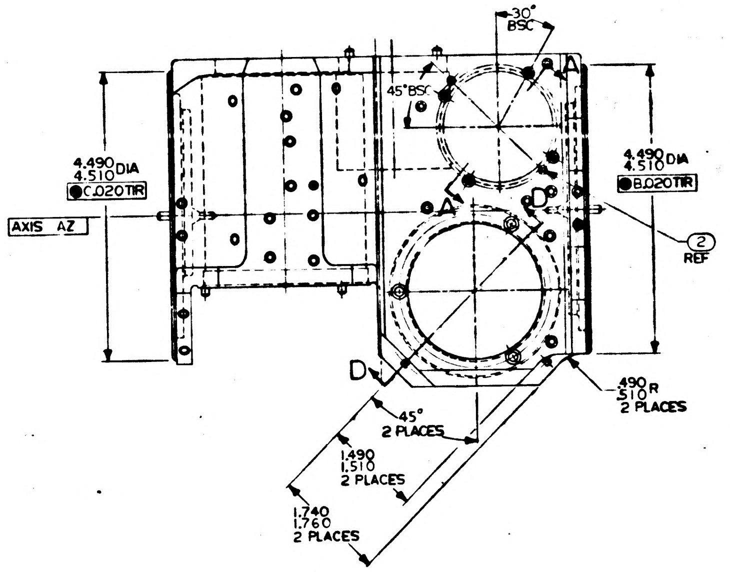
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

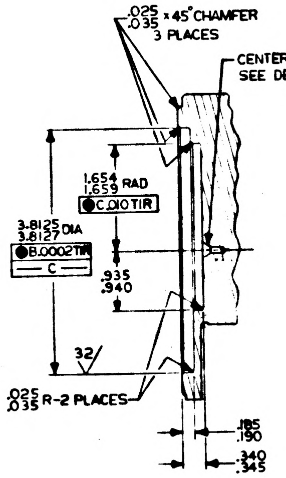
Ⓒ

3. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE $\substack{.052\\.072}$ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES $\substack{.005\\.015}$ R
7. LINE THRU CENTERS OF —B— AND —C— ESTABLISHES AXIS AZ
8. ∥ & ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

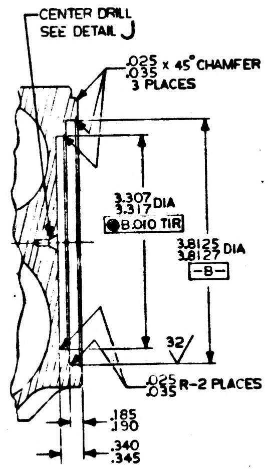
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET


.186 .192 DIA .02 .04 DEEP
3 HOLES
⊕ C .010 DIA
Ⓔ
NO.12 (216)-28 NF-2B MODIFIED
.196 .198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.196 .198 DIA .37 .38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSINK 85°±5° TO .210 .230 DIA
TOTAL 6 HOLES
⊕ C .005 DIA
G
"A"
"A"
"A"
"A"
60° BSC
4 PLACES
120° BSC
45° BSC
15° BSC
17° 30' BSC
.490 .510 R
2 PLACES
87° 30' BSC
2.302 2.322
2 PLACES
DATUM PLANE M
∥ F .0005
SEE NOTE 9
SEE NOTE 5
1.177 1.197
2.302 2.322
.490 .510 R
4 PLACES
"B"
"B"
35° 2 PLACES
.1245 .1247 DIA .18 .20 DEEP
FOR ITEM ①
⊕ C .005 DIA
4.125 DIA BSC
G

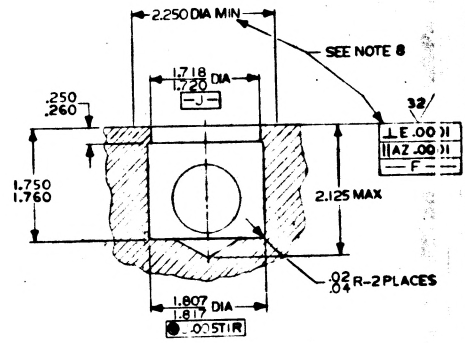

30° BSC
45° BSC
A
A
D
4.490 4.510 DIA
C .020 TIR
AXIS AZ
4.490 4.510 DIA
B .020 TIR
②
REF
D
.490 .510 R
2 PLACES
45°
2 PLACES
1.490 1.510
2 PLACES
1.740 1.760
2 PLACES


.025 .035 x 45° CHAMFER
3 PLACES
CENTER DRILL
SEE DETAIL J
1.654 1.659 RAD
C .010 TIR
3.8125 3.8127 DIA
B .0002 TIR
— C —
.935 .940
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

SECTION G-G

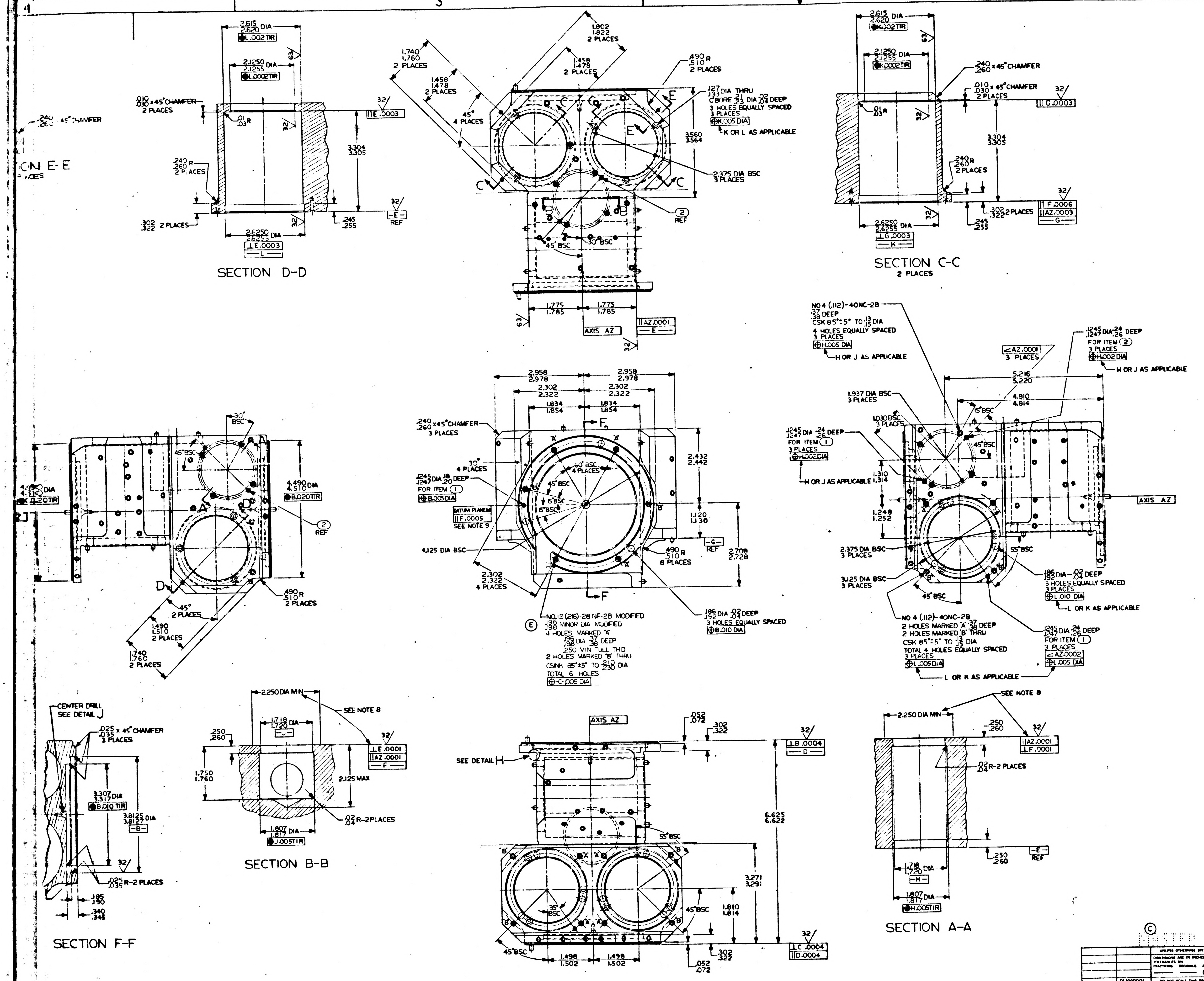

CENTER DRILL
SEE DETAIL J
.025 .035 x 45° CHAMFER
3 PLACES
3.307 3.317 DIA
B .010 TIR
3.8125 3.8127 DIA
—B—
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
—J—
.250 .260
32
⊥ E .001
∥ AZ .001
— F —
1.750 1.760
2.125 MAX
.02 .04 R-2 PLACES
1.807 1.817 DIA
.005 TIR

SECTION B-B

REVISIONS TDRR 00028			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL CHANGES	6/1/62	
Ⓜ B	GENERAL CHANGES	7/25/62	ajb WHK
Ⓜ C	TDRR 00276	1-22-63	ajb wk
D	ADDED SHEET 2 OF 2 TDRR 00611	3-13-63	ajb wk
E	TDRR 00705	4-3-63	ajb WK



SECTION D-D
SECTION C-C
2 PLACES
SECTION E-E
SECTION B-B
SECTION F-F
SECTION A-A
AXIS AZ
SEE DETAIL H
CENTER DRILL SEE DETAIL J
SEE NOTE 8
SEE NOTE 9
DATUM PLANE Ⓜ
.240 .260 x 45° CHAMFER
.010 .030 x 45° CHAMFER 2 PLACES
2.615 2.620 DIA
2.1250 2.1255 DIA
3.304 3.305
2.6250 2.6255 DIA
1.740 1.760 2 PLACES
1.802 1.822 2 PLACES
1.458 1.478 2 PLACES
.490 R .510 2 PLACES
.127 .133 DIA THRU C'BORE .21 .23 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES
K OR L AS APPLICABLE
2.375 DIA BSC 3 PLACES
3.560 3.564
45° BSC
30° BSC
1.775 1.785
2.958 2.978
2.302 2.322
1.834 1.854
2.432 2.442
1.120 1.130
2.708 2.728
4.125 DIA BSC
60° BSC 4 PLACES
15° BSC
.1245 .1247 DIA .18 .20 DEEP FOR ITEM ①
NO.12 (.216)-28 NF-2B MODIFIED .196 .198 MINOR DIA MODIFIED 4 HOLES MARKED "A" .196 .198 DIA .37 .38 DEEP .250 MIN FULL THD 2 HOLES MARKED "B" THRU CSINK 85°±5° TO .210 .230 DIA TOTAL 6 HOLES
.186 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED
NO 4 (.112)-40NC-2B .37 .38 DEEP CSK 85°±5° TO .13 .15 DIA 4 HOLES EQUALLY SPACED
H OR J AS APPLICABLE
5.216 5.220
4.810 4.814
1.937 DIA BSC 3 PLACES
1.030 BSC 3 PLACES
1.310 1.314
1.248 1.252
2.375 DIA BSC 3 PLACES
3.125 DIA BSC 3 PLACES
55° BSC
NO 4 (.112)-40NC-2B 2 HOLES MARKED "A" .37 .38 DEEP 2 HOLES MARKED "B" THRU CSK 85°±5° TO .13 .15 DIA TOTAL 4 HOLES EQUALLY SPACED 3 PLACES
L OR K AS APPLICABLE
4.490 4.510 DIA
2.250 DIA MIN
1.718 1.720 DIA
1.807 1.817 DIA
2.125 MAX
3.307 3.317 DIA
3.8125 3.8127 DIA
.025 .035 x 45° CHAMFER 3 PLACES
6.625 6.622
3.271 3.291
1.810 1.814
1.498 1.502
35° BSC

E	D
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
LIST OF PARTS AND MATERIALS					

	DL1000001
1000085	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN S. QUINN
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 4/13/62

HOUSING
STABLE MEMBER
IMU

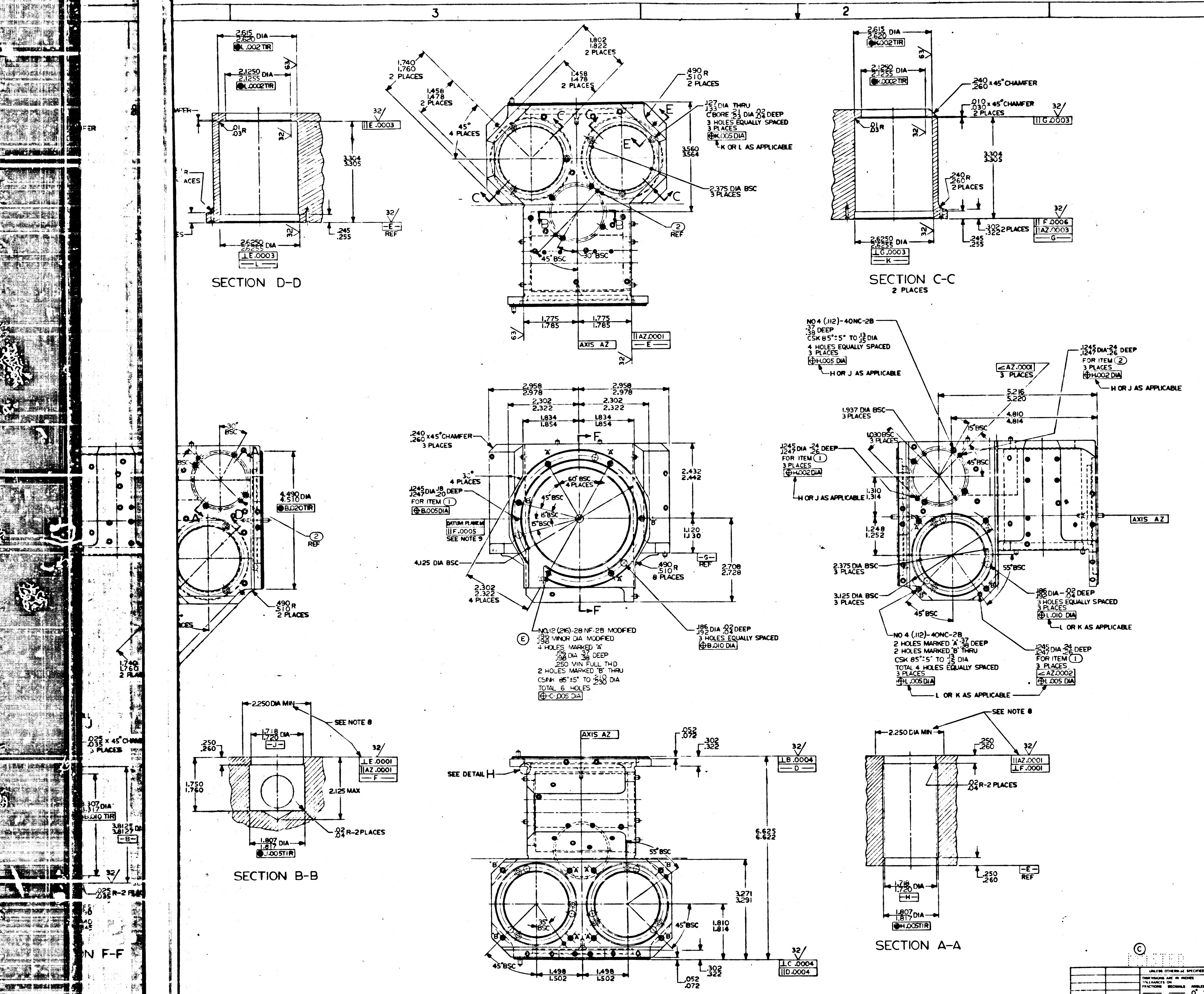
SCALE 1/1
UNIT WT.
CODE IDENT

MIT INSTRUMENTATION LABORATORY Cambridge Mass
DWG NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 1 OF 2

1000025 E 1

PHOTOGRAPHIC SCALE

	REVISIONS TDRR 00028			
SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL CHANGES	6/1/62		
B	GENERAL CHANGES	7/25/62	ajb	WK
C	TDRR 00276	1-22-63	ajb	wk
D	ADDED SHEET 2 OF 2 TDRR 00611	3-15-63	ajb	wk
E	TDRR 00705	4-3-63	ajb	WK
F	TDRR 00777	4-9-63	ajb	WK



SECTION D-D
SECTION C-C
2 PLACES
SECTION B-B
SECTION A-A
SECTION F-F
2.615 2.620 DIA
2.1250 2.1255 DIA
2.6250 2.6255 DIA
3.304 3.305
.245 .255
.240 .260 x 45° CHAMFER
.010 .030 x 45° CHAMFER 2 PLACES
.240 R .260 2 PLACES
.302 .322 2 PLACES
1.740 1.760 2 PLACES
1.802 1.822 2 PLACES
1.458 1.478 2 PLACES
.490 R .510 2 PLACES
.127 .133 DIA THRU C'BORE .21 .23 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES
K OR L AS APPLICABLE
2.375 DIA BSC 3 PLACES
3.560 3.564
45° 4 PLACES
45° BSC
30° BSC
1.775 1.785
AXIS AZ
2.958 2.978
2.302 2.322
1.834 1.854
2.432 2.442
1.120 1.130
2.708 2.728
4.125 DIA BSC
.490 R .510 8 PLACES
60° BSC 4 PLACES
15° BSC
DATUM PLANE M
SEE NOTE 9
NO.12 (.216)-28 NF-2B MODIFIED
.189 .192 MINOR DIA MODIFIED
4 HOLES MARKED "A"
2 HOLES MARKED "B" THRU
TOTAL 6 HOLES
.186 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED
NO 4 (.112)-40NC-2B
4 HOLES EQUALLY SPACED
H OR J AS APPLICABLE
1.245 1.247 DIA .24 .26 DEEP FOR ITEM ② 3 PLACES
5.216 5.220
4.810 4.814
1.937 DIA BSC 3 PLACES
1.030 BSC 3 PLACES
1.310 1.314
1.248 1.252
3.125 DIA BSC 3 PLACES
55° BSC
L OR K AS APPLICABLE
2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
1.750 1.760
2.125 MAX
1.807 1.817 DIA
.02 .04 R-2 PLACES
SEE DETAIL H
6.625 6.622
3.271 3.291
1.810 1.814
1.498 1.502
.052 .072
35° BSC
45° BSC
.250 .260

F	F
E	D
D	D
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000001
1000005	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN G. QUINN
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 9/13/62

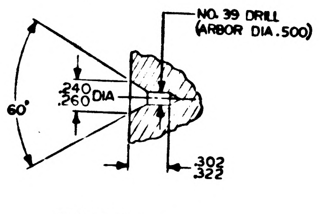
HOUSING
STABLE MEMBER
IMU

SCALE 1/1
UNIT WT
CODE IDENT

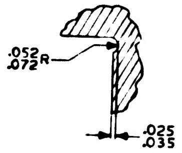
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 1 OF 2

1000025 F

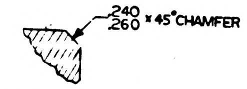
PHOTOGRAPHIC SCALE ONLY


NO. 39 DRILL
(ARBOR DIA .500)
.240
.260 DIA
60°
.302
.322

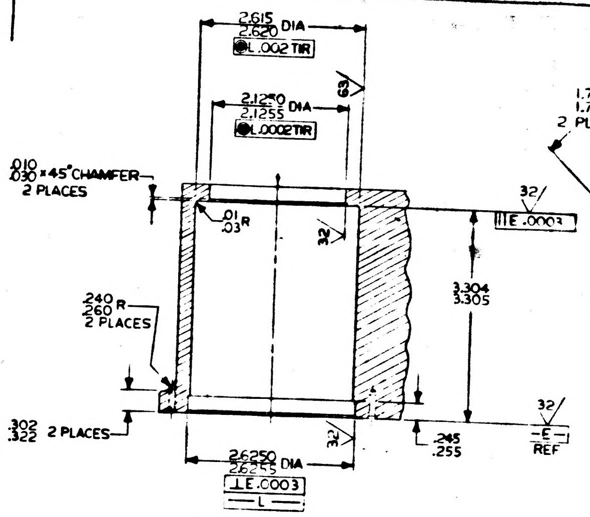
DETAIL J
SCALE 2/1
2 PLACES


.052
.072 R
.025
.035

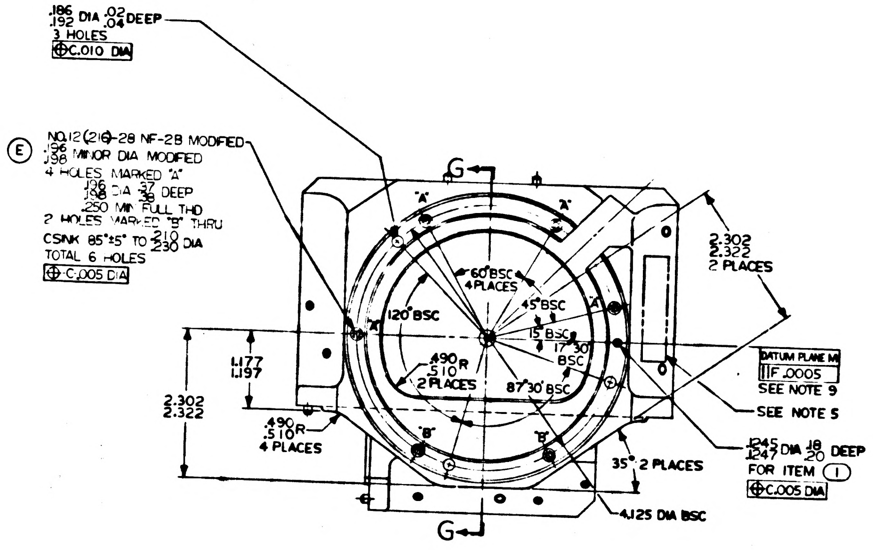
DETAIL H
SCALE 2/1
6 PLACES

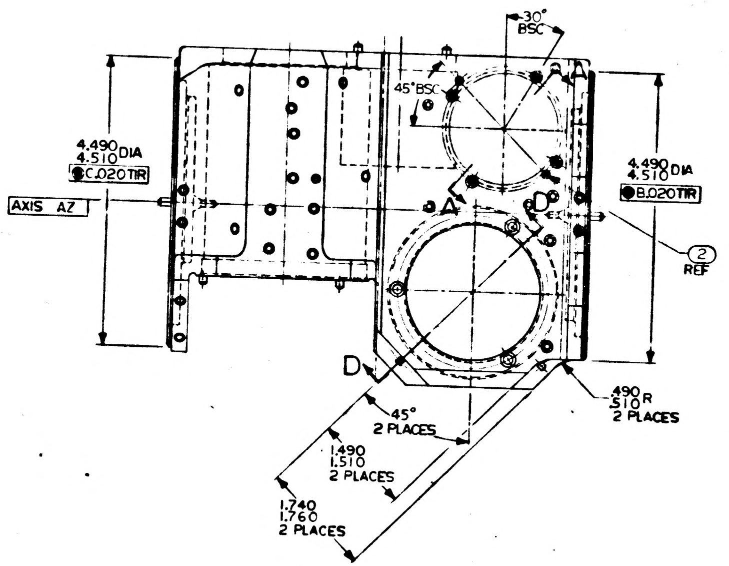

.240
.260 x 45° CHAMFER

SECTION E-E
2 PLACES


2.615
2.620 DIA
L .002 TIR
63
2.1250
2.1255 DIA
L .0002 TIR
1.740
1.760
2 PLACES
.010
.030 x 45° CHAMFER
2 PLACES
.01
.03 R
32
32
E .0003
3.304
3.305
.240
.260 R
2 PLACES
.302
.322 2 PLACES
32
.245
.255
32
E
REF
2.6250
2.6255 DIA
E .0003
L

SECTION D-D


.186
.192 DIA .02
.04 DEEP
3 HOLES
C .010 DIA
(E)
NO. 12 (216)-28 NF-2B MODIFIED
.196
.198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.196
.198 DIA .37
.38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSINK 85° ±5° TO .210
.230 DIA
TOTAL 6 HOLES
C .005 DIA
G
"A"
"A"
"A"
"A"
60° BSC
4 PLACES
45° BSC
120° BSC
15° BSC
17° 30'
BSC
.490
.510 R
2 PLACES
87° 30' BSC
2.302
2.322
2 PLACES
1.177
1.197
2.302
2.322
.490
.510 R
4 PLACES
"B"
"B"
35° 2 PLACES
DATUM PLANE M
F .0005
SEE NOTE 9
SEE NOTE 5
.1245
.1247 DIA .18
.20 DEEP
FOR ITEM (1)
C .005 DIA
4.125 DIA BSC
G

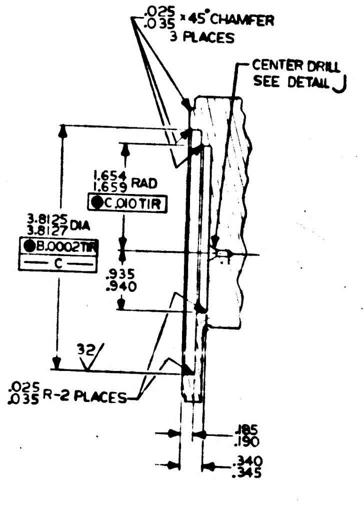

30°
BSC
45° BSC
4.490
4.510 DIA
C .020 TIR
AXIS AZ
A
A
D
4.490
4.510 DIA
B .020 TIR
(2)
REF
D
.490
.510 R
2 PLACES
45°
2 PLACES
1.490
1.510
2 PLACES
1.740
1.760
2 PLACES

NOTES

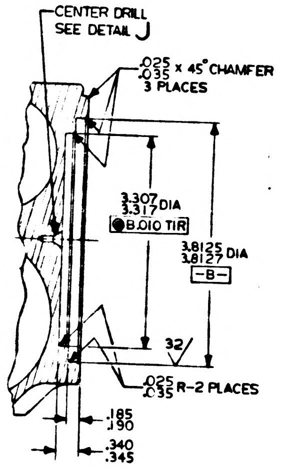
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

(C)

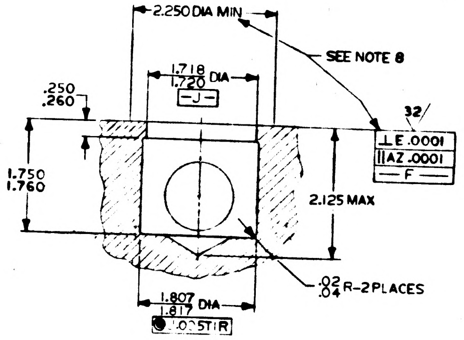
3. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE $\frac{.052}{.072}$ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ ⌭ ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM (1) ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
(D) 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET


.025
.035 x 45° CHAMFER
3 PLACES
CENTER DRILL
SEE DETAIL J
1.654
1.659 RAD
C .010 TIR
3.8125
3.8127 DIA
B .0002 TIR
C
.935
.940
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

SECTION G-G


CENTER DRILL
SEE DETAIL J
.025
.035 x 45° CHAMFER
3 PLACES
3.307
3.317 DIA
B .010 TIR
3.8125
3.8127 DIA
B
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

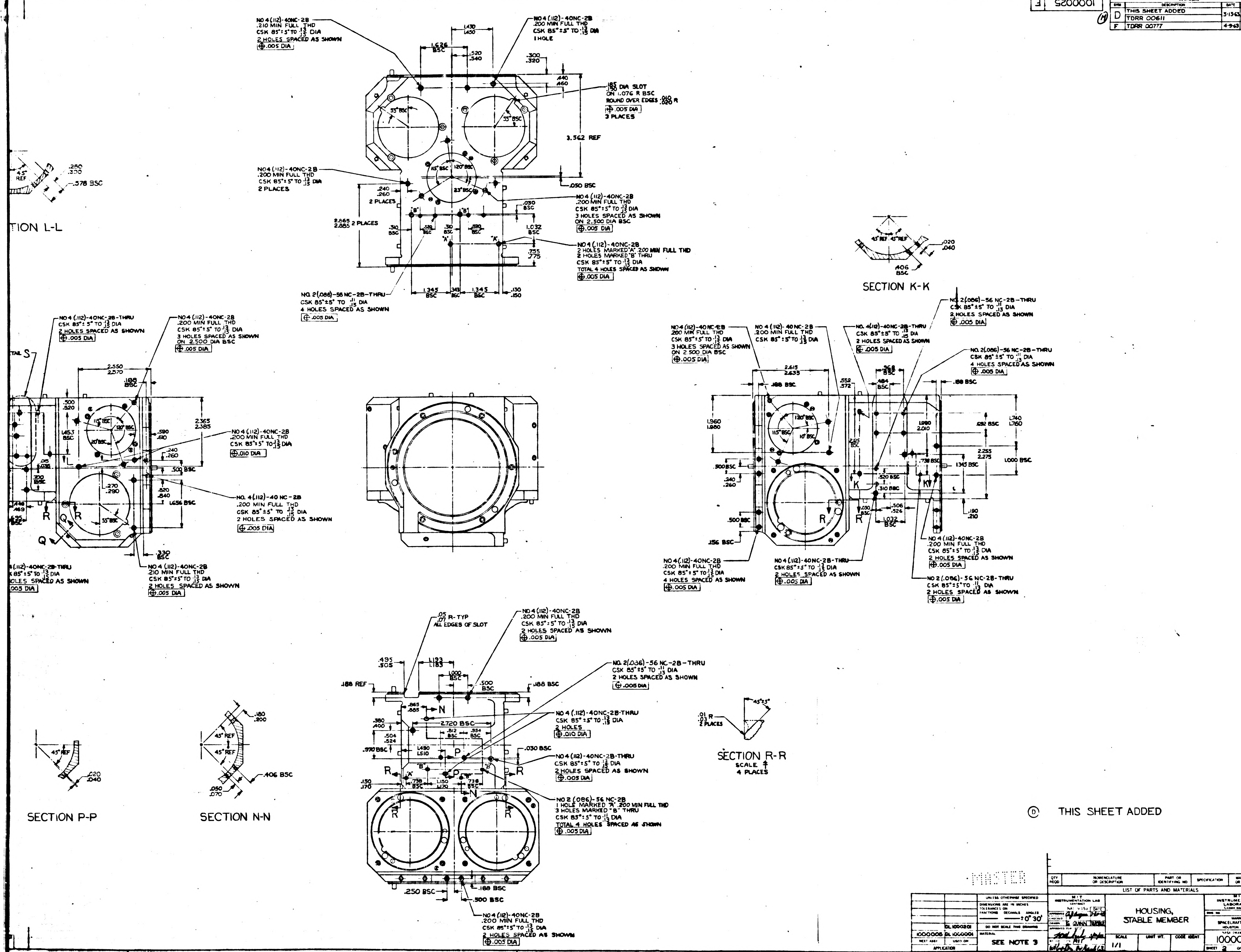
SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718
1.720 DIA
J
.250
.260
32
E .0001
AZ .0001
F
1.750
1.760
2.125 MAX
.02
.04 R-2 PLACES
1.807
1.817 DIA
.005 TIR

SECTION B-B

1000025 F

SYM	DESCRIPTION	DATE	APPROVAL	
D	THIS SHEET ADDED TDRR 00611	3-13-63	4/6	WK
F	TDRR 00777	4-9-63	4/6	WK



NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
1 HOLE
1.430
1.450
1.626 BSC
.520
.540
.300
.320
.440
.460
.185/.190 DIA SLOT
ON 1.076 R BSC
ROUND OVER EDGES .010/.020 R
⊕ .005 DIA
3 PLACES
55° BSC
115° BSC
120° BSC
23° BSC
3.562 REF
.050 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 PLACES
.240
.260
2 PLACES
2.865
2.885 2 PLACES
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
.030 BSC
1.032 BSC
NO 4 (.112)-40NC-2B
2 HOLES MARKED "A" .200 MIN FULL THD
2 HOLES MARKED "B" THRU
CSK 85°±5° TO .13/.15 DIA
TOTAL 4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.755
.775
NO 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11/.13 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
1.345 BSC
.343 BSC
1.345 BSC
.130
.150
.250
.300
45° REF
.378 BSC
SECTION L-L
45° REF 45° REF
.020
.040
.406 BSC
SECTION K-K
DETAIL S
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
2.550
2.570
.188 BSC
.500
.520
2.365
2.385
1.453 BSC
.590
.610
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
⊕ .010 DIA
.240
.260
.500 BSC
.270
.290
.820
.840
1.656 BSC
NO. 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.330 BSC
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
R
Q
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
NO. 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11/.13 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11/.13 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
2.615
2.635
.188 BSC
.552
.572
.268 BSC
.484 BSC
.188 BSC
1.960
1.980
1.990
2.010
.692 BSC
1.740
1.760
2.255
2.275
1.000 BSC
1.345 BSC
.738 BSC
.500 BSC
.240
.260
.520 BSC
.310 BSC
.430 BSC
.506
.526
1.032 BSC
.190
.210
.500 BSC
.156 BSC
K
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11/.13 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.05/.07 R-TYP
ALL EDGES OF SLOT
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.495
.505
1.173
1.183
1.000 BSC
.500 BSC
.188 REF
.188 BSC
NO. 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11/.13 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.865
.885
N
2.720 BSC
.380
.400
.504
.524
.812 BSC
.354 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13/.15 DIA
2 HOLES
⊕ .010 DIA
.970 BSC
1.490
1.510
P
.030 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.150
.170
.738 BSC
1.150
1.170
.738 BSC
NO 2 (.086)-56 NC-2B
1 HOLE MARKED "A" .200 MIN FULL THD
3 HOLES MARKED "B" THRU
CSK 85°±5° TO .11/.13 DIA
TOTAL 4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.250 BSC
.188 BSC
.500 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
45° REF
.020
.040
SECTION P-P
.180
.200
45° REF
45° REF
.050
.070
.406 BSC
SECTION N-N
.01/.03 R
2 PLACES
45°±3°
SECTION R-R
SCALE 4/1
4 PLACES
Ⓓ THIS SHEET ADDED

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

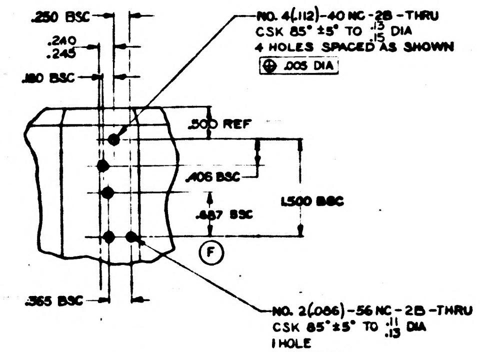
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN G QUINN
APPROVED FOR MSC
BY DIR. MIT

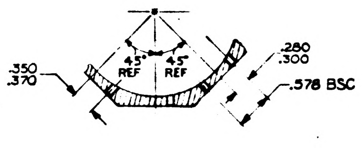
HOUSING,
STABLE MEMBER

SCALE 1/1
UNIT WT.
CODE IDENT.

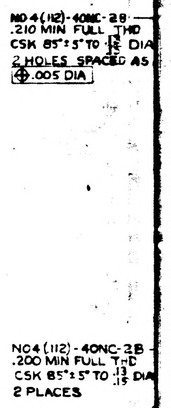
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 2 OF 2

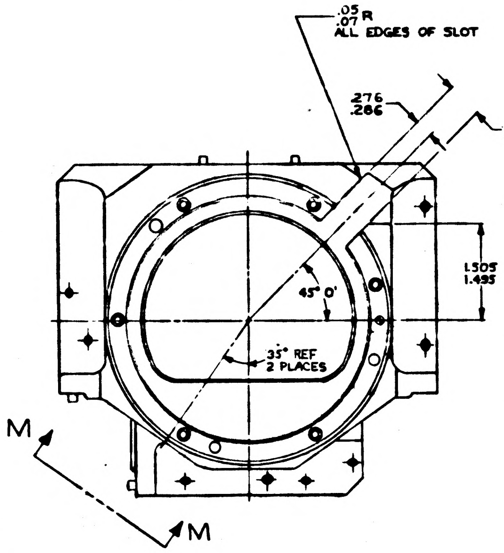

.250 BSC
.240
.245
.180 BSC
NO. 4(.112)-40 NC-2B-THRU
CSK 85° ±5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.500 REF
.406 BSC
1.500 BSC
.687 BSC
F
.365 BSC
NO. 2(.086)-56 NC-2B-THRU
CSK 85° ±5° TO .11/.13 DIA
1 HOLE
⊕ .005 DIA

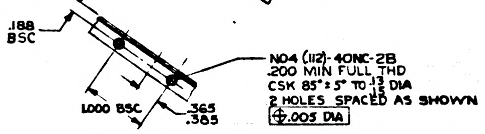
DETAIL S


45° REF
45° REF
.350
.370
.280
.300
.578 BSC

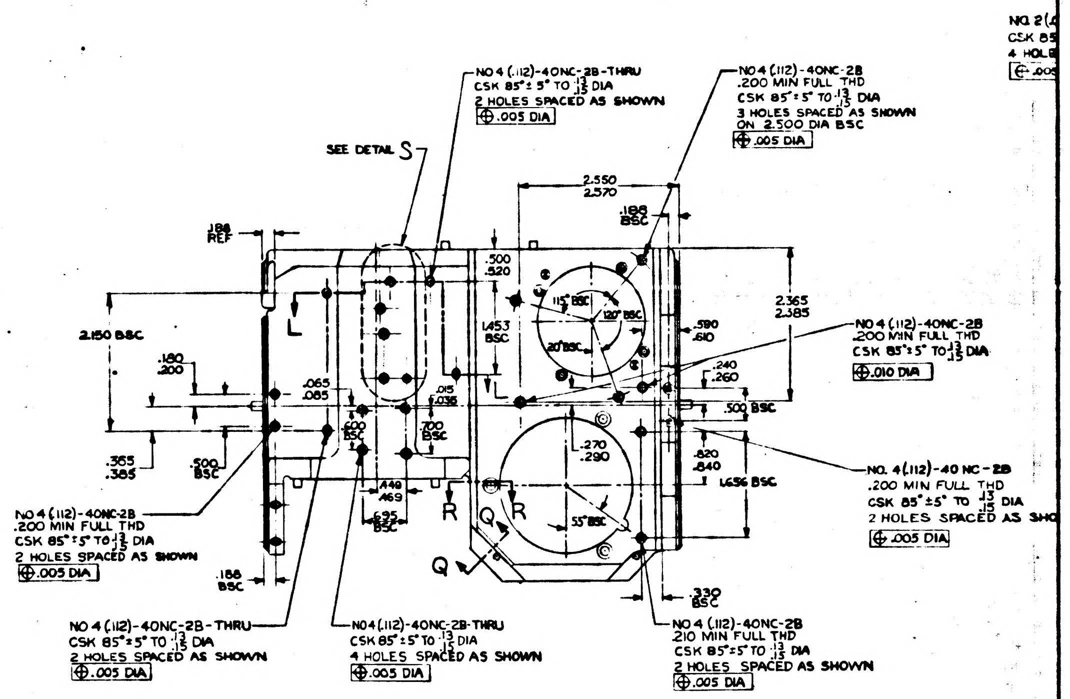
SECTION L-L


NO 4(.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS
⊕ .005 DIA
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 PLACES

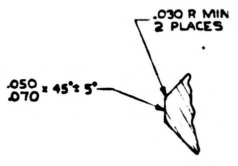

.05/.07 R
ALL EDGES OF SLOT
.276
.286
.557
.567
1.505
1.495
45° 0'
35° REF
2 PLACES
M
M


.188
BSC
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
1.000 BSC
.365
.385

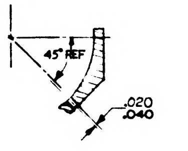
VIEW M-M
2 PLACES


NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
SEE DETAIL S
2.550
2.570
.188
BSC
.188
REF
.500
.520
1.453
BSC
115° BSC
120° BSC
20° BSC
2.365
2.385
.590
.610
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
⊕ .010 DIA
.240
.260
2.150 BSC
.180
.200
L
L
.065
.085
.015
.035
.500 BSC
.600
BSC
.700
BSC
.270
.290
.820
.840
1.656 BSC
NO. 4(.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHO
⊕ .005 DIA
.365
.385
.500
BSC
.449
.469
.695
BSC
R
R
Q
Q
55° BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.188
BSC
.330
BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO. 2(
CSK 85
4 HOLE
⊕ .00

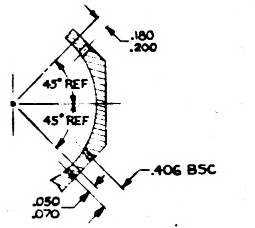
NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 REMOVE BURRS ∮ BREAK ALL SHARP EDGES $^{.005}_{.010}$
3 FOR MATERIAL ∮ MACHINING PRIOR TO THIS DRAWING SEE NASA DRAWING NO. 1000025 SHEET 1


.030 R MIN
2 PLACES
.050/.070 x 45° ± 5°

SECTION Q-Q
SCALE 4


45° REF
.020
.040

SECTION P-P

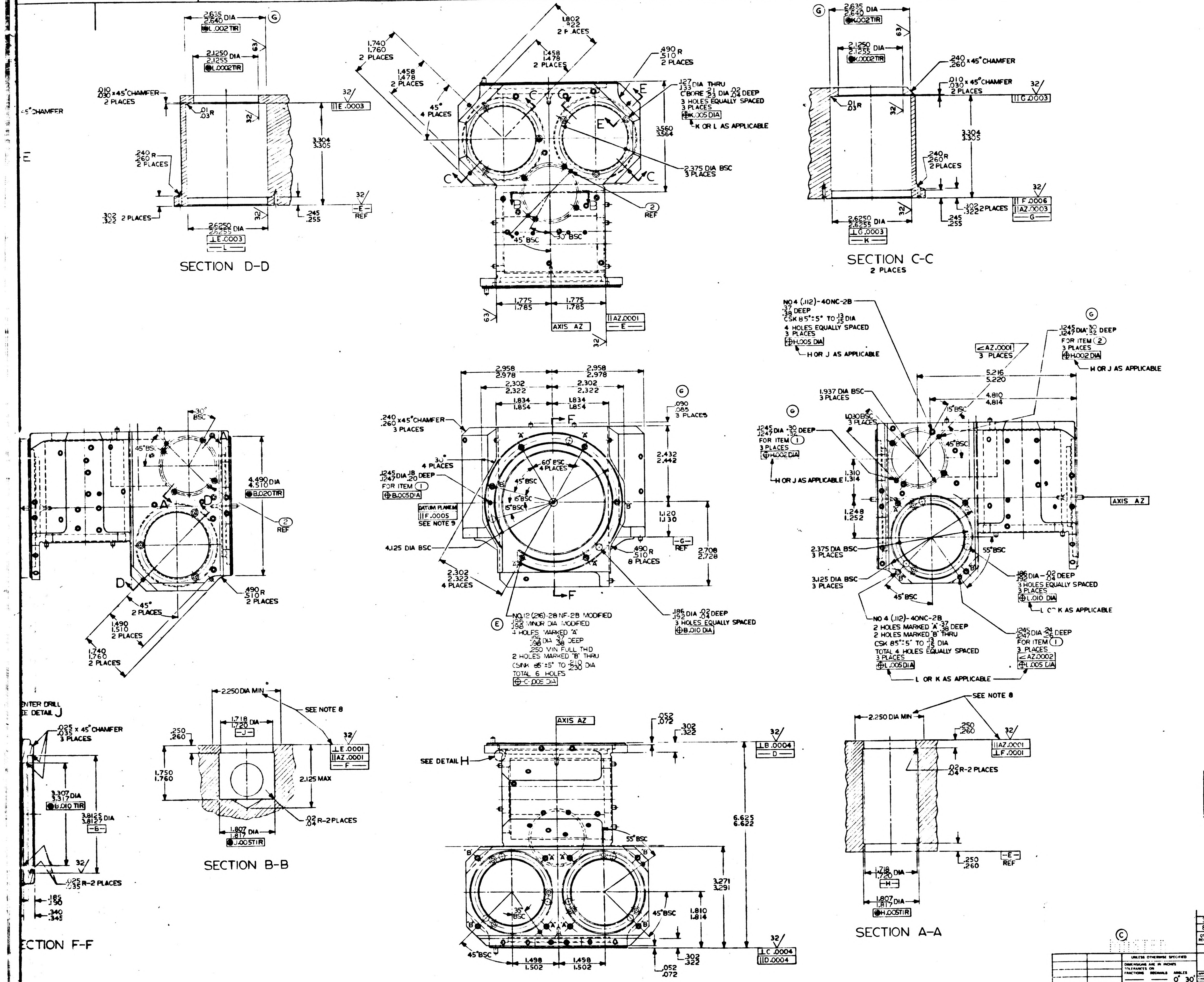

.180
.200
45° REF
45° REF
.406 BSC
.050
.070

SECTION N-N

1000025 REV F SHEET 2

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDRR 00026			
A	GENERAL CHANGES	6/1/62		
B	GENERAL CHANGES	7/25/62	ajb	WK
C	TDRR 00276	1-22-63	ajb	WK
D	ADDED SHEET 2 OF 2 TDRR 00611	3-13-63	ajb	WK
E	TDRR 00705	4-3-63	ajb	WK
F	TDRR 00777	4-9-63	ajb	WK
G	TDRR 01053	4-30-63	ajb	WK


SECTION D-D
SECTION C-C
2 PLACES
SECTION B-B
SECTION A-A
SECTION F-F
AXIS AZ
SEE DETAIL H
SEE NOTE 8
SEE NOTE 9
DATUM PLANE M
2.635 / 2.640 DIA
2.1250 / 2.1255 DIA
.010 / .030 x 45° CHAMFER 2 PLACES
.240 / .260 x 45° CHAMFER
3.304 / 3.305
.240 / .260 R 2 PLACES
.302 / .322 2 PLACES
2.6250 / 2.6255 DIA
1.740 / 1.760 2 PLACES
1.458 / 1.478 2 PLACES
1.802 / .922 2 PLACES
45° 4 PLACES
.490 / .510 R 2 PLACES
.127 / .133 DIA THRU C'BORE .21 / .23 DIA .02 / .04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES
K OR L AS APPLICABLE
3.560 / 3.564
2.375 DIA BSC 3 PLACES
45° BSC
30° BSC
1.775 / 1.785
2.958 / 2.978
2.302 / 2.322
1.834 / 1.854
4.490 / 4.510 DIA
4.125 DIA BSC
2.432 / 2.442
1.120 / 1.130
2.708 / 2.728
.490 / .510 R 8 PLACES
.1245 / .1247 DIA .18 / .20 DEEP FOR ITEM ①
NO.12 (.216)-28 NF-2B MODIFIED
.186 / .192 DIA .02 / .04 DEEP 3 HOLES EQUALLY SPACED
NO 4 (.112)-40NC-2B
H OR J AS APPLICABLE
L OR K AS APPLICABLE
5.216 / 5.220
4.810 / 4.814
1.937 DIA BSC 3 PLACES
1.030 BSC 3 PLACES
1.310 / 1.314
1.248 / 1.252
3.125 DIA BSC 3 PLACES
55° BSC
2.250 DIA MIN
1.718 / 1.720 DIA
1.750 / 1.760
2.125 MAX
1.807 / 1.817 DIA
.02 / .04 R-2 PLACES
6.625 / 6.622
3.271 / 3.291
1.810 / 1.814
1.498 / 1.502
.052 / .072
.302 / .322
3.307 / 3.317 DIA
3.8125 / 3.8127 DIA
.025 / .035 x 45° CHAMFER 3 PLACES
.025 / .035 R-2 PLACES
.250 / .260
REF

G	F
F	F
E	D
D	D
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

FIND NO	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES
2	3	PIN, LOCATING	1000089		
1	8	PIN, LOCATING	1000088-2		

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000001
1000005	DL1000201

APPLICATION

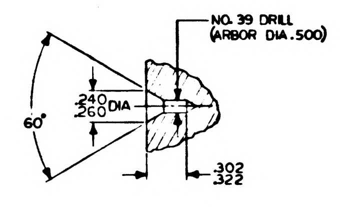
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM, BRUSH
SPEC M-100-T

M I T INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN G. QUINN
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 9/13/62

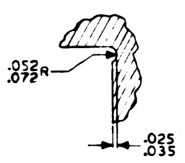
HOUSING STABLE MEMBER IMU

SCALE 1/1
UNIT WT
CODE IDENT

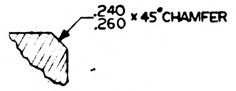
M I T INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000025
SHEET 1 OF 2


NO. 39 DRILL
(ARBOR DIA .500)
60°
.240 .260 DIA
.302 .322

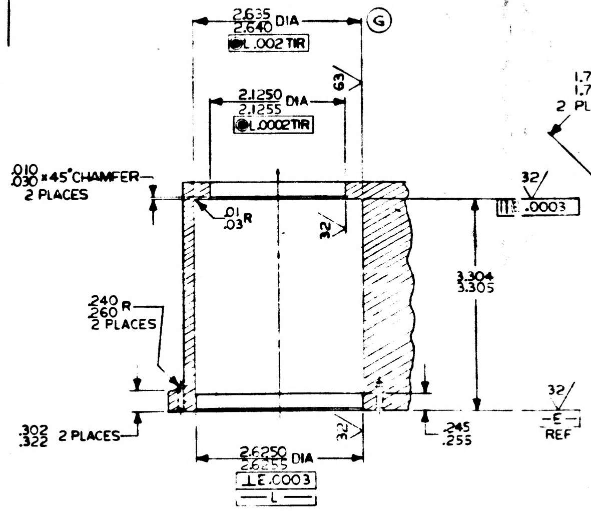
DETAIL J
SCALE 2/1
2 PLACES


.052 .072 R
.025 .035

DETAIL H
SCALE 2/1
6 PLACES

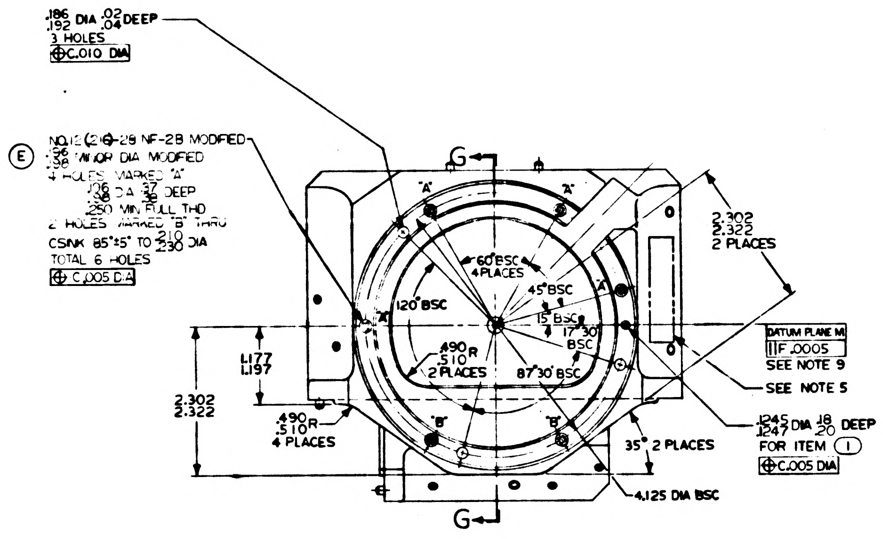

.240 .260 x 45° CHAMFER

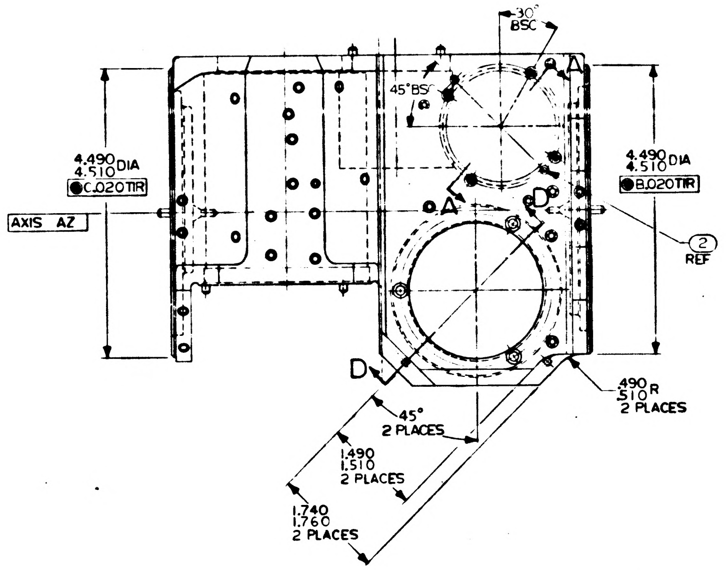
SECTION E-E
2 PLACES


2.635 2.640 DIA
L .002 TIR
G
63
2.1250 2.1255 DIA
L .0002 TIR
.010 .030 x 45° CHAMFER
2 PLACES
.01 .03 R
32
.0003
3.304 3.305
.240 .260 R
2 PLACES
.302 .322 2 PLACES
.245 .255
-E- REF
2.6250 2.6255 DIA
⊥E .0003
—L—

SECTION D-D

1.740 1.760 2 PLACES
.240 .260 x4
3 PL
.1245 .1247 DIA
FOR ITE
B.005
4.125 D


.186 .192 DIA .02 .04 DEEP
3 HOLES
⊕C.010 DIA
E
NO.12 (.216)-28 NF-2B MODIFIED
.196 .198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.106 .38 DIA .37 .38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSINK 85°±5° TO .210 .230 DIA
TOTAL 6 HOLES
⊕C.005 DIA
G
"A"
60° BSC 4 PLACES
45° BSC
120° BSC
15° BSC
17° 30' BSC
.490 .510 R
2 PLACES
87° 30' BSC
1.177 1.197
2.302 2.322
.490 .510 R
4 PLACES
"B"
2.302 2.322
2 PLACES
DATUM PLANE M
∥F .0005
SEE NOTE 9
SEE NOTE 5
.1245 .1247 DIA .18 .20 DEEP
FOR ITEM 1
⊕C.005 DIA
35° 2 PLACES
4.125 DIA BSC


30° BSC
45° BSC
A
D
4.490 4.510 DIA
C.020 TIR
AXIS AZ
4.490 4.510 DIA
B.020 TIR
2
REF
.490 .510 R
2 PLACES
45°
2 PLACES
1.490 1.510
2 PLACES
1.740 1.760
2 PLACES

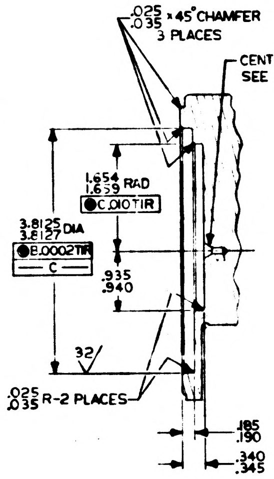
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

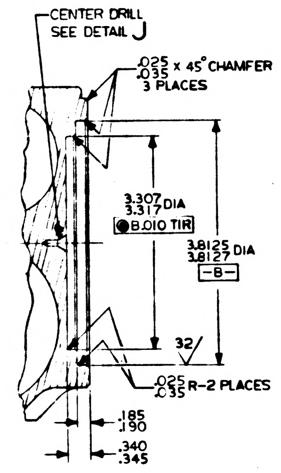
Ⓒ

3. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE .052/.072 UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES .005/.015 R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ ∕ ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

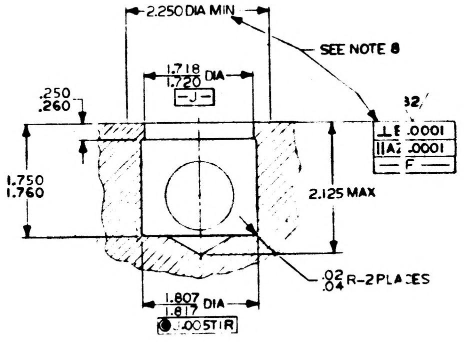
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET


.025 .035 x 45° CHAMFER
3 PLACES
CENTER DRILL
SEE DETAIL J
1.654 1.659 RAD
C.010 TIR
3.8125 3.8127 DIA
B.0002 TIR
—C—
.935 .940
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

SECTION G-G


CENTER DRILL
SEE DETAIL J
.025 .035 x 45° CHAMFER
3 PLACES
3.307 3.317 DIA
B.010 TIR
3.8125 3.8127 DIA
-B-
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

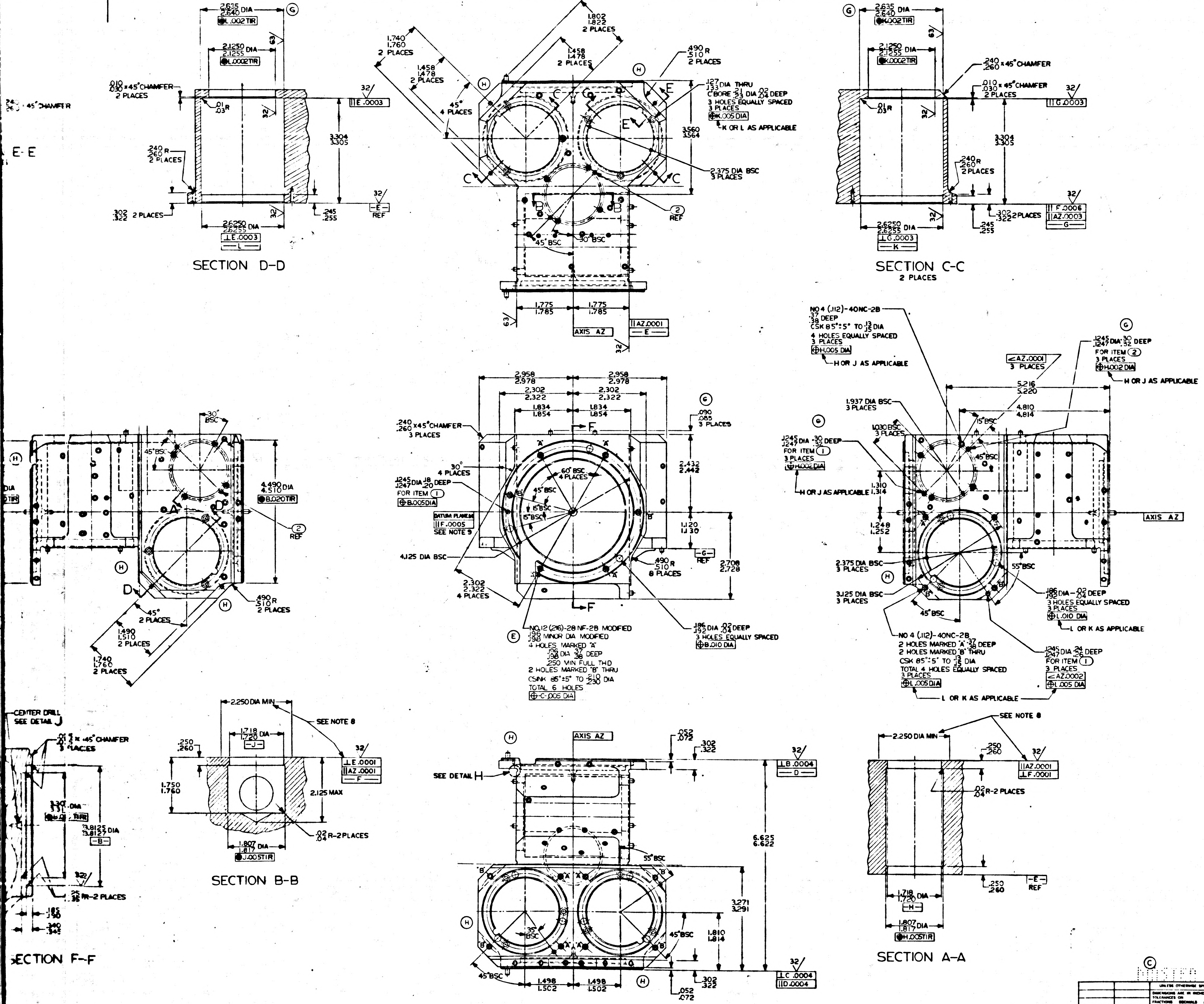
SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
-J-
.250 .260
32
⊥E .0001
∥AZ .0001
—F—
1.750 1.760
2.125 MAX
.02 .04 R-2 PLACES
1.807 1.817 DIA
J .005 TIR

SECTION B-B

1000025 REV G SH 1

REVISIONS TDRR 00085				
SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL CHANGES	6/1/62		
B	GENERAL CHANGES	7/25/62	ajb	WK
C	TDRR 00276	1-22-63	ajb	wk
D	ADDED SHEET 2 OF 2 TDRR 00611	3-15-63	ajb	wk
E	TDRR 00705	4-3-63	ajb	wk
F	TDRR 00777	4-9-63	ajb	wk
G	TDRR 01053	4-30-63	ajb	wk
H	TDRR 01440	5-22-63	ajb	wk


SECTION D-D
SECTION C-C
2 PLACES
SECTION B-B
SECTION A-A
SECTION F-F
E-E
2.635
2.640 DIA
L .002 TIR
2.1250
2.1255 DIA
L .0002 TIR
.010
.030 x 45° CHAMFER
2 PLACES
.01
.03 R
.240
.260 R
2 PLACES
3.304
3.305
.302
.322 2 PLACES
.245
.255
2.6250
2.6255 DIA
E .0003
L
K .0002 TIR
.240 x 45° CHAMFER
G .0003
F .0006
AZ .0003
G
K
1.802
1.822
2 PLACES
1.740
1.760
2 PLACES
1.458
1.478
2 PLACES
45°
4 PLACES
.490 R
.510
2 PLACES
.127 DIA THRU
.133
C'BORE .21 DIA .02 DEEP
.23 .04
3 HOLES EQUALLY SPACED
3 PLACES
K .005 DIA
K OR L AS APPLICABLE
3.560
3.564
2.375 DIA BSC
3 PLACES
REF
45° BSC
30° BSC
1.775
1.785
AXIS AZ
AZ .0001
E
2.958
2.978
2.302
2.322
1.834
1.854
.240
.260 x 45° CHAMFER
3 PLACES
30°
4 PLACES
.1245
.1247 DIA .18 DEEP
.20
FOR ITEM 1
B .005 DIA
DATUM PLANE
F .0005
SEE NOTE 9
60° BSC
4 PLACES
45° BSC
15° BSC
6° BSC
.090
.085
3 PLACES
2.432
2.442
1.120
1.130
2.708
2.728
.490 R
.510
8 PLACES
4.125 DIA BSC
2.302
2.322
4 PLACES
NO 12 (.216)-28 NF-2B MODIFIED
.188 MINOR DIA MODIFIED
.192
4 HOLES MARKED 'A'
.250 MIN FULL THD
2 HOLES MARKED 'B' THRU
TOTAL 6 HOLES
C .005 DIA
.186
.192 DIA .02 DEEP
.04
3 HOLES EQUALLY SPACED
B .010 DIA
30° BSC
45° BSC
4.490
4.510 DIA
B .020 TIR
2 REF
45°
2 PLACES
1.490
1.510
2 PLACES
1.740
1.760
2 PLACES
.490
.510 R
2 PLACES
NO 4 (.112)-40NC-2B
.37
.38 DEEP
CSK 85° ± 5° TO .13 DIA
.15
4 HOLES EQUALLY SPACED
3 PLACES
H .005 DIA
H OR J AS APPLICABLE
AZ .0001
3 PLACES
.1245
.1247 DIA .30 DEEP
.32
FOR ITEM 2
3 PLACES
H .002 DIA
5.216
5.220
4.810
4.814
1.937 DIA BSC
3 PLACES
1.030 BSC
3 PLACES
15° BSC
45° BSC
1.310
1.314
1.248
1.252
2.375 DIA BSC
3 PLACES
3.125 DIA BSC
3 PLACES
55° BSC
45° BSC
.186
.192 DIA .02 DEEP
.04
3 HOLES EQUALLY SPACED
3 PLACES
L .010 DIA
L OR K AS APPLICABLE
NO 4 (.112)-40NC-2B
2 HOLES MARKED 'A' .37 DEEP
.38
2 HOLES MARKED 'B' THRU
CSK 85° ± 5° TO .13 DIA
.15
TOTAL 4 HOLES EQUALLY SPACED
3 PLACES
L .005 DIA
.1245
.1247 DIA .24 DEEP
.26
FOR ITEM 1
3 PLACES
AZ .0002
L .005 DIA
L OR K AS APPLICABLE
CENTER DRILL
SEE DETAIL J
x 45° CHAMFER
3 PLACES
3.8125 DIA
3.8127
B
R-2 PLACES
2.250 DIA MIN
1.718
1.720 DIA
J
SEE NOTE 8
.250
.260
1.750
1.760
2.125 MAX
E .0001
AZ .0001
F
1.807
1.817 DIA
J .005 TIR
.02
.04 R-2 PLACES
SEE DETAIL H
.052
.072
.302
.322
B .0004
D
6.625
6.622
55° BSC
35° BSC
45° BSC
3.271
3.291
1.810
1.814
1.498
1.502
C .0004
D .0004
AZ .0001
F .0001
.250
.260
H
H .005 TIR
32
63
1000025

H	H
G	F
F	F
E	D
D	D
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1

LIST OF PARTS AND MATERIALS

	DL1000001
1000085	DL1000201
NEXT ASSY	USED ON
APPLICATION	

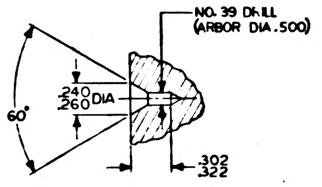
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED DATE
CHECKED
DRAWN G. QUINN
APPROVED FOR MSC
BY DIRECTION
MIT 9/13/62

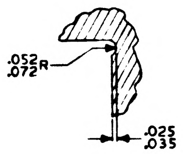
HOUSING
STABLE MEMBER
IMU

SCALE 1/1
UNIT WT
CODE IDENT

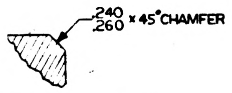
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 1 OF 2


NO. 39 DRILL (ARBOR DIA .500)
60°
.240 .260 DIA
.302 .322

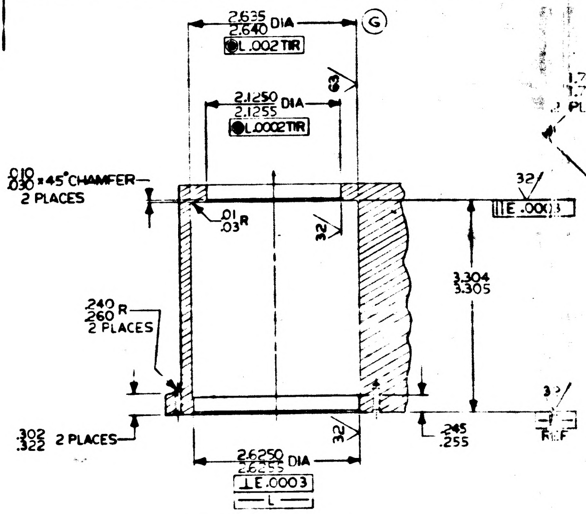
DETAIL J
SCALE 4/1
2 PLACES


.052 .072 R
.025 .035

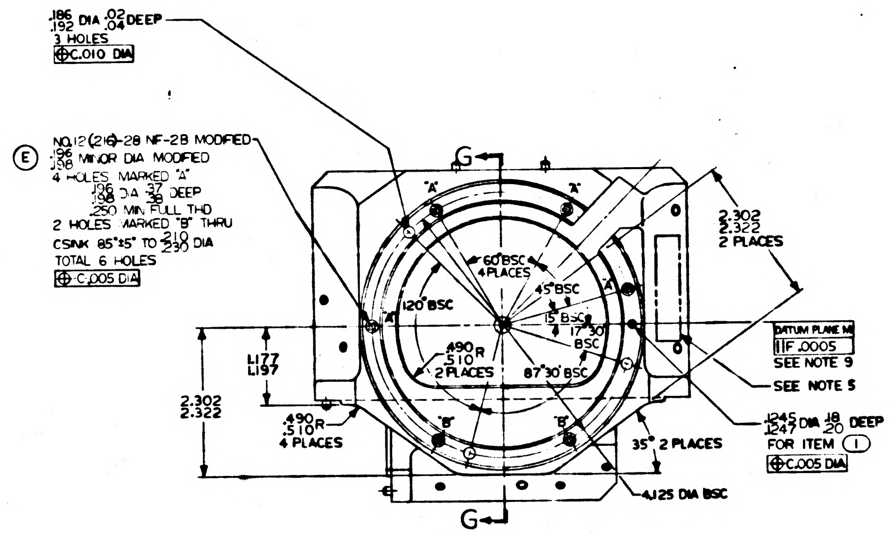
DETAIL H
SCALE 4/1
6 PLACES

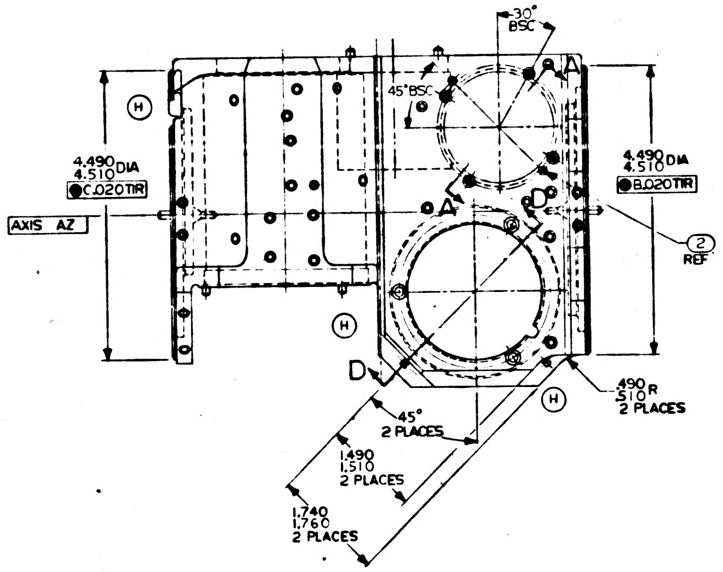

.240 .260 x 45° CHAMFER

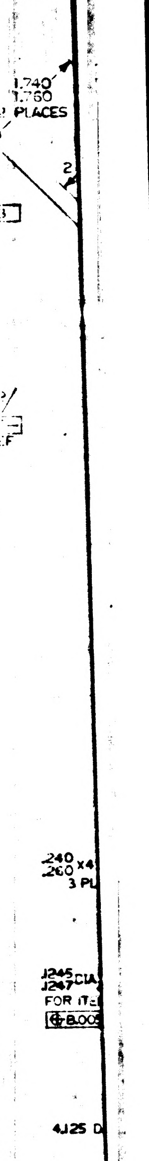
SECTION E-E
2 PLACES


2.635 2.640 DIA
L .002 TIR
G
2.1250 2.1255 DIA
L .0002 TIR
63
.010 .030 x 45° CHAMFER 2 PLACES
.01 .03 R
32
E .0003
3.304 3.305
.240 .260 R 2 PLACES
.302 .322 2 PLACES
.245 .255
2.6250 2.6255 DIA
E .0003
L
REF

SECTION D-D


.186 .192 DIA .02 .04 DEEP
3 HOLES
C .010 DIA
E
NO. 12 (216)-28 NF-2B MODIFIED
.196 .198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.196 .198 DIA .37 .38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSINK 85° ±5° TO .210 .230 DIA
TOTAL 6 HOLES
C .005 DIA
G
"A"
"B"
60° BSC 4 PLACES
45° BSC
15° BSC
17° 30' BSC
120° BSC
.490 .510 R 2 PLACES
87° 30' BSC
2.302 2.322 2 PLACES
DATUM PLANE M
F .0005
SEE NOTE 9
SEE NOTE 5
1.177 1.197
2.302 2.322
.490 .510 R 4 PLACES
35° 2 PLACES
.1245 .1247 DIA .18 .20 DEEP FOR ITEM 1
C .005 DIA
4.125 DIA BSC


30° BSC
45° BSC
H
4.490 4.510 DIA
C .020 TIR
AXIS AZ
A
D
4.490 4.510 DIA
B .020 TIR
2 REF
.490 .510 R 2 PLACES
45° 2 PLACES
1.490 1.510 2 PLACES
1.740 1.760 2 PLACES


1.740 1.760 2 PLACES
.240 .260 x4
3 PL
.1245 .1247 DIA
FOR IT
B .005
4.125 D

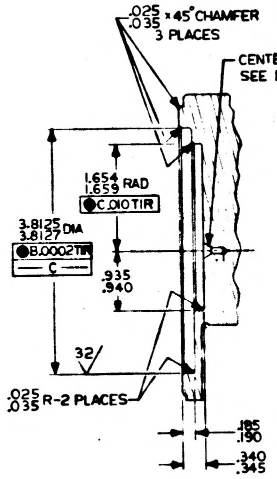
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

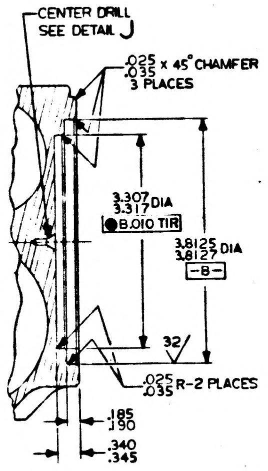
Ⓒ

3. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE .052 .072 UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES .005 .015 R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ & ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

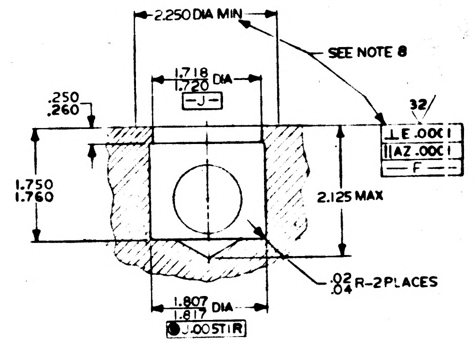
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET


.025 .035 x 45° CHAMFER 3 PLACES
CENTER DRILL SEE DETAIL J
1.654 1.659 RAD
C .010 TIR
3.8125 3.8127 DIA
B .0002 TIR
C
.935 .940
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

SECTION G-G


CENTER DRILL SEE DETAIL J
.025 .035 x 45° CHAMFER 3 PLACES
3.307 3.317 DIA
B .010 TIR
3.8125 3.8127 DIA
-B-
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

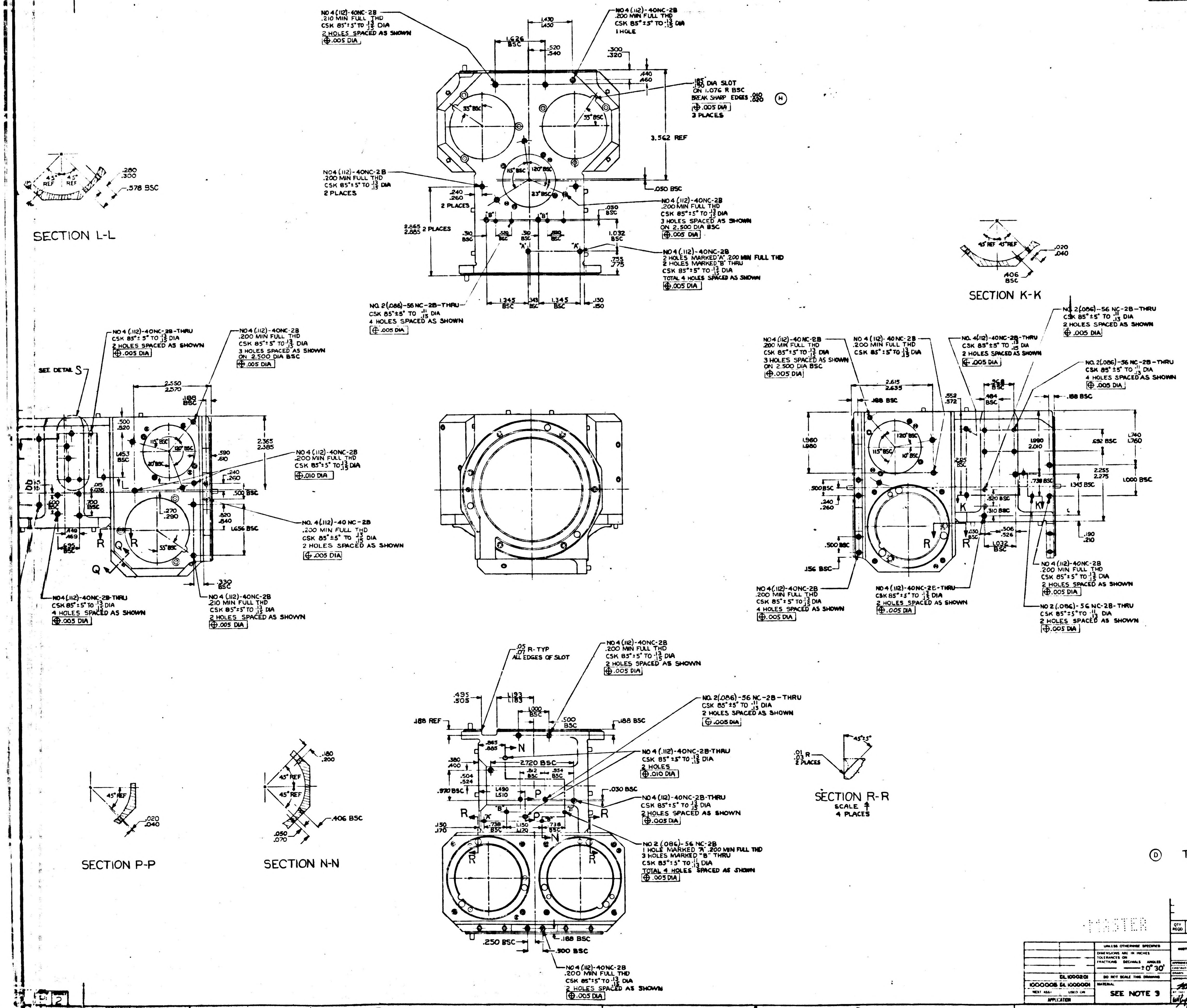
SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
-J-
.250 .260
32
E .0001
AZ .0001
-F-
1.750 1.760
2.125 MAX
.02 .04 R-2 PLACES
1.807 1.817 DIA
J .005 TIR

SECTION B-B

H 1000025

SYM	DESCRIPTION	DATE	APPROVAL	
D	THIS SHEET ADDED TDRR 00611	3-13-63	4/16	WK
F	TDRR 00777	4-9-63	4/16	WK
H	TDRR 01440	5-22-63	2/16	WK



NO 4 (.112)-40NC-2B .210 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 1 HOLE
1.430 1.450
1.626 BSC
.520 .540
.300 .320
.440 .460
.185 .190 DIA SLOT ON 1.076 R BSC BREAK SHARP EDGES .010 .020 Ⓗ ⊕.005 DIA 3 PLACES
55° BSC
55° BSC
3.562 REF
115° BSC
120° BSC
23° BSC
.050 BSC
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 2 PLACES
.240 .260 2 PLACES
2.865 2.885 2 PLACES
.310 BSC
.520 BSC
.310 BSC
.520 BSC
.030 BSC
1.032 BSC
.755 .775
"A" "B"
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕.005 DIA
NO4 (.112)-40NC-2B 2 HOLES MARKED "A" .200 MIN FULL THD 2 HOLES MARKED "B" THRU CSK 85°±5° TO .13 .15 DIA TOTAL 4 HOLES SPACED AS SHOWN ⊕.005 DIA
NO. 2 (.086)-56NC-2B-THRU CSK 85°±5° TO .11 .13 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
1.345 BSC
.343 BSC
1.345 BSC
.130 .150
45° REF 45° REF
.280 .300
.578 BSC
SECTION L-L
45° REF 45° REF
.020 .040
.406 BSC
SECTION K-K
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕.005 DIA
SEE DETAIL S
2.550 2.570
.188 BSC
.500 .520
1.453 BSC
115° BSC
120° BSC
20° BSC
2.365 2.385
.590 .610
.240 .260
.500 BSC
.015 .035
.065 .085
.600 BSC
.700 BSC
.270 .290
.820 .840
1.656 BSC
.449 .469
.695 BSC
55° BSC
R R Q Q
.330 BSC
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA ⊕.010 DIA
NO. 4 (.112)-40 NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13 .15 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
NO 4 (.112)-40NC-2B .210 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11 .13 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕.005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA
NO. 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO. 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11 .13 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
2.615 2.635
.188 BSC
.552 .572
.968 BSC
.484 BSC
.188 BSC
1.960 1.980
120° BSC
115° BSC
10° BSC
2.25 BSC
1.990 2.010
.692 BSC
1.740 1.760
2.255 2.275
1.000 BSC
.738 BSC
1.345 BSC
.500 BSC
.240 .260
.520 BSC
.310 BSC
K K
.030 BSC
.506 .526
1.032 BSC
.190 .210
.500 BSC
.156 BSC
R R
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11 .13 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
.05 .07 R-TYP ALL EDGES OF SLOT
NO 4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
.495 .505
1.193 1.183
1.000 BSC
.500 BSC
.188 REF
.188 BSC
NO. 2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11 .13 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
.865 .885
N
2.720 BSC
.380 .400
.812 BSC
.954 BSC
.504 .524
.970 BSC
1.490 1.510
P P
.030 BSC
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13 .15 DIA 2 HOLES ⊕.010 DIA
NO 4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
R R
"A" "B" "B" "B"
.150 .170
.738 BSC
1.150 1.170
.738 BSC
N
R R
NO 2 (.086)-56 NC-2B 1 HOLE MARKED "A" .200 MIN FULL THD 3 HOLES MARKED "B" THRU CSK 85°±5° TO .11 .13 DIA TOTAL 4 HOLES SPACED AS SHOWN ⊕.005 DIA
.250 BSC
.188 BSC
.500 BSC
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13 .15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
45° REF
.020 .040
SECTION P-P
.180 .200
45° REF
45° REF
.050 .070
.406 BSC
SECTION N-N
.01 .03 R 2 PLACES
45°±5°
SECTION R-R
SCALE 4 PLACES

Ⓓ THIS SHEET ADDED

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED C.J. Morgan 3-20-63
CHECKED
DRAWN G QUINN 12/19/62
APPROVED FOR MSC
BY DIRECTION MIT
W. Griffith 20 March 63

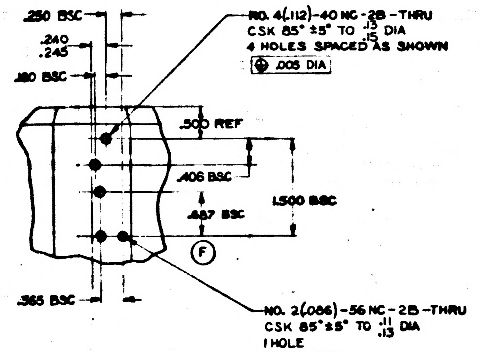
HOUSING,
STABLE MEMBER

SCALE 1/1
UNIT WT
CODE IDENT

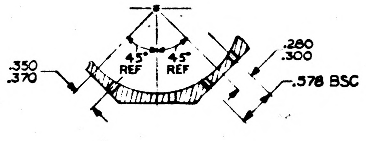
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 2 OF 2

INCHES
PHOTOGRAPHIC SCALE ONLY

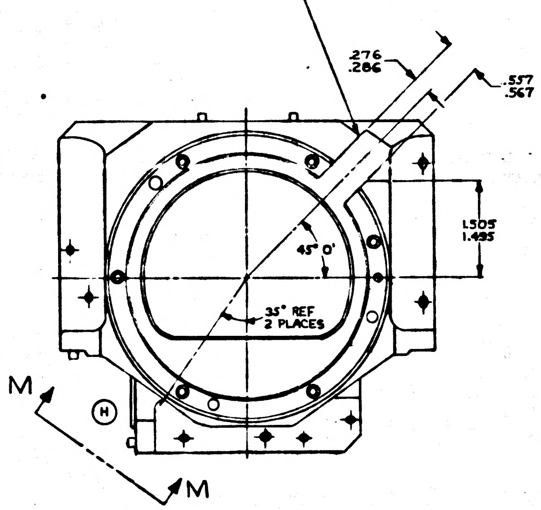
H 1000025

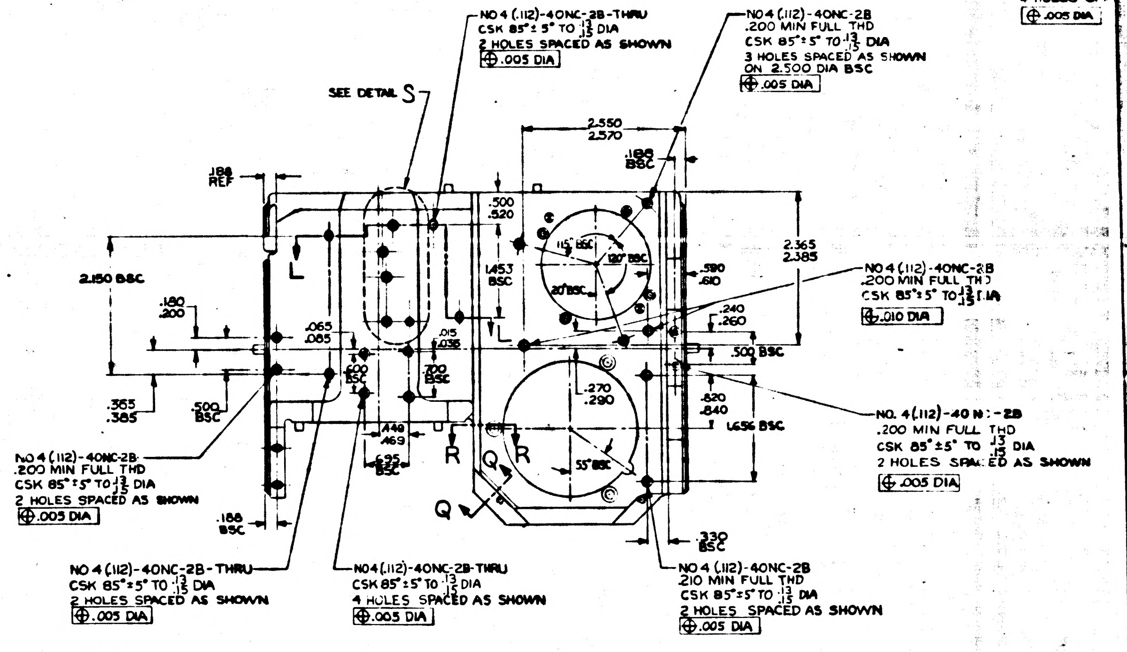

.250 BSC
.240
.245
.180 BSC
NO. 4(.112)-40 NC-2B-THRU
CSK 85° ±5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.500 REF
.406 BSC
1.500 BSC
.687 BSC
F
.365 BSC
NO. 2(.086)-56 NC-2B-THRU
CSK 85° ±5° TO .11/.13 DIA
1 HOLE
⊕ .005 DIA

DETAIL S


.350
.370
45° REF
45° REF
.280
.300
.578 BSC

SECTION L-L


.05
.07 R
ALL EDGES OF SLOT
.276
.286
.557
.567
1.505
1.495
45° 0'
35° REF
2 PLACES
M
H
M

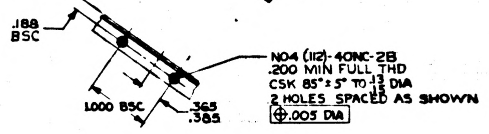

NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
SEE DETAIL S
2.550
2.570
.188 BSC
.188 REF
.500
.520
2.365
2.385
2.150 BSC
.180
.200
1.453 BSC
L
L
120° BSC
.590
.610
.240
.260
.065
.085
.05
.038
.500 BSC
.365
.385
.500 BSC
.270
.290
.620
.640
1.656 BSC
.440
.469
R
Q
R
55° BSC
Q
.188 BSC
.330 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
⊕ .010 DIA
NO. 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

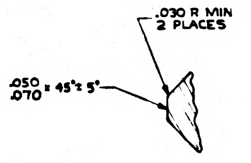
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° 5° TO .13/.15 DIA
2 PLACES

NO. 2(.086)-56
CSK 85° ±5° T
4 HOLES SPA
⊕ .005 DIA

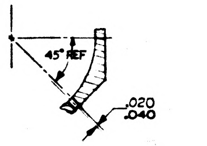
NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
Ⓗ 2 REMOVE BURRS & BREAK ALL SHARP EDGES .005/.015
3 FOR MATERIAL & MACHINING PRIOR TO THIS DRAWING SEE NASA DRAWING NO. 1000025 SHEET 1


.188 BSC
1.000 BSC
.365
.385
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

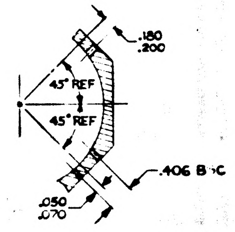
VIEW M-M
2 PLACES


.030 R MIN
2 PLACES
.050/.070 × 45° ± 5°

SECTION Q-Q
SCALE 4


45° REF
.020
.040

SECTION P-P

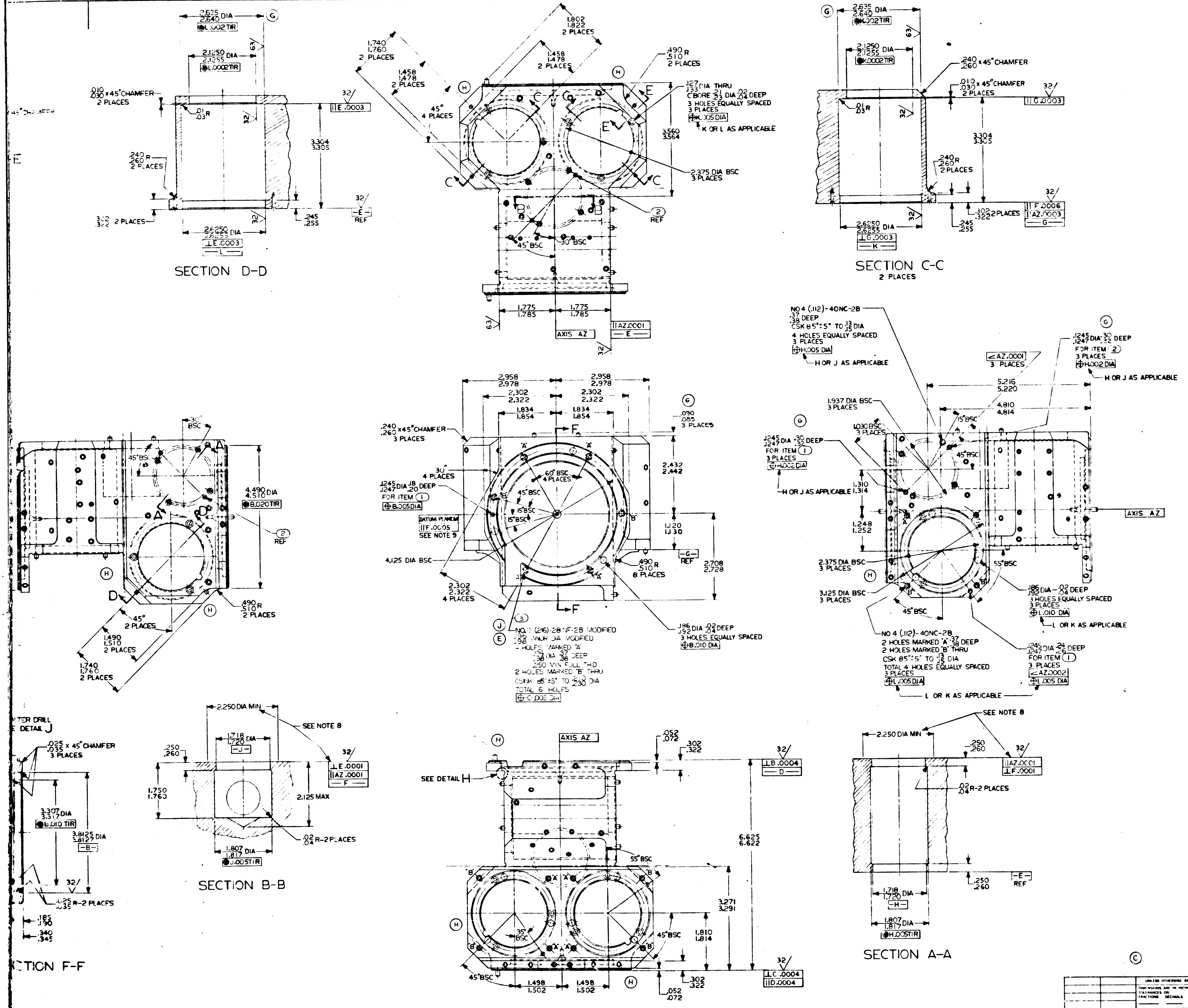

.180
.200
45° REF
45° REF
.406 BSC
.050
.070

SECTION N-N

1000025 REV H SHEET 2

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00026				
SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL CHANGES	6/1/62		
B	GENERAL CHANGES	7/25/62	ajb	WK
C	TDRR 00276	1-22-63	ajb	wK
D	ADDED SHEET 2 OF 2 TDRR 00611	3-13-63	ajb	wK
E	TDRR 00705	4-3-63	ajb	wK
F	TDRR 00777	4-9-63	ajb	wK
G	TDRR 01053	4-30-63	ajb	wK
H	TDRR 01440	5-22-63	ajb	wK
J	TDRR 01529	6-6-63	ajb	RKB


3
2
1
D
C
B
A
2.635 2.640 DIA
⊚ L.002 TIR
2.1250 2.1255 DIA
⊚ L.0002 TIR
.010 .030 x 45° CHAMFER 2 PLACES
.01 .03 R
32
// E .0003
3.304 3.305
.240 .260 R 2 PLACES
.245 .255
-E- REF
2.6250 2.6255 DIA
⊥ E.0003
-L-
1.740 1.760 2 PLACES
1.802 1.822 2 PLACES
1.458 1.478 2 PLACES
45° 4 PLACES
.490 .510 R 2 PLACES
.127 .133 DIA THRU C'BORE .21 .23 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES
⊕ K.005 DIA
K OR L AS APPLICABLE
3.560 3.564
2.375 DIA BSC 3 PLACES
45° BSC
30° BSC
1.775 1.785
AXIS AZ
// AZ.0001
-E-
63
G
H
SECTION C-C 2 PLACES
.240 .260 x 45° CHAMFER
.010 .030 x 45° CHAMFER 2 PLACES
// G.0003
.302 .322 2 PLACES
// F.0006
// AZ.0003
-G-
⊥ G.0003
-K-
NO 4 (.112)-40NC-2B .37 .38 DEEP CSK 85°±5° TO .13 .15 DIA 4 HOLES EQUALLY SPACED 3 PLACES
⊕ H.005 DIA
H OR J AS APPLICABLE
∠ AZ.0001 3 PLACES
.1245 .1247 DIA .30 .32 DEEP FOR ITEM ② 3 PLACES
⊕ H.002 DIA
5.216 5.220
4.810 4.814
1.937 DIA BSC 3 PLACES
1.030 BSC 3 PLACES
15° BSC
1.310 1.314
1.248 1.252
2.375 DIA BSC 3 PLACES
3.125 DIA BSC 3 PLACES
55° BSC
.186 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES
⊕ L.010 DIA
L OR K AS APPLICABLE
NO 4 (.112)-40NC-2B 2 HOLES MARKED "A" .37 .38 DEEP 2 HOLES MARKED "B" THRU CSK 85°±5° TO .13 .15 DIA TOTAL 4 HOLES EQUALLY SPACED 3 PLACES
⊕ L.005 DIA
.1245 .1247 DIA .24 .26 DEEP FOR ITEM ① 3 PLACES
∠ AZ.0002
⊕ L.005 DIA
2.958 2.978
2.302 2.322
1.834 1.854
.240 .260 x 45° CHAMFER 3 PLACES
.090 .095 3 PLACES
2.432 2.442
1.120 1.130
2.708 2.728
30° 4 PLACES
60° BSC 4 PLACES
.1245 .1247 DIA .18 .20 DEEP FOR ITEM ①
⊕ B.005 DIA
DATUM PLANE M
// F.0005
SEE NOTE 9
4.125 DIA BSC
2.302 2.322 4 PLACES
.490 .510 R 8 PLACES
NO. 12 (.216)-28 NF-2B MODIFIED .375 MINOR DIA MODIFIED 4 HOLES MARKED "A" .36 .38 DIA .37 .38 DEEP .250 MIN FULL THD 2 HOLES MARKED "B" THRU CSK 85°±5° TO .28 .30 DIA TOTAL 6 HOLES
⊕ C.005 DIA
.186 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED
⊕ B.010 DIA
4.490 4.510 DIA
⊚ B.020 TIR
.490 .510 R 2 PLACES
1.490 1.510 2 PLACES
1.740 1.760 2 PLACES
45° 2 PLACES
F
D
E
J
.025 .035 x 45° CHAMFER 3 PLACES
CENTER DRILL SEE DETAIL J
3.307 3.317 DIA
⊚ B.010 TIR
3.8125 3.8127 DIA
-B-
.025 .035 R-2 PLACES
.185 .190
.340 .345
SECTION F-F
2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
-J-
.250 .260
1.750 1.760
⊥ E.0001
// AZ.0001
-F-
2.125 MAX
1.807 1.817 DIA
⊚ J.005 TIR
.02 .04 R-2 PLACES
AXIS AZ
SEE DETAIL H
.052 .072
.302 .322
⊥ B.0004
-D-
6.625 6.622
55° BSC
3.271 3.291
35° BSC
45° BSC
1.810 1.814
1.498 1.502
⊥ C.0004
// D.0004
2.250 DIA MIN
SEE NOTE 8
.250 .260
// AZ.0001
⊥ F.0001
.02 .04 R-2 PLACES
.250 .260
-E- REF
1.718 1.720 DIA
-H-
1.807 1.817 DIA
⊚ H.005 TIR

SECTION D-D

SECTION C-C
2 PLACES

SECTION B-B

SECTION F-F

SECTION A-A

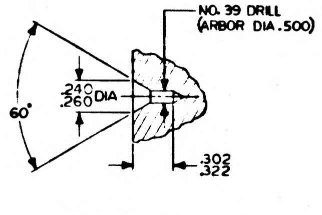
J	H
H	H
G	F
F	F
E	D
D	D
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

©

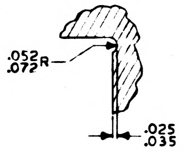
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	INSERT, THREADED, SELF LOCKING	1000115-3			3
3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1
LIST OF PARTS AND MATERIALS					

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS — ANGLES 0° 30'	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153 APPROVED DATE CHECKED DRAWN G. QUINN 3-29-62	HOUSING STABLE MEMBER IMU	MIT INSTRUMENTATION LABORATORY CAMBRIDGE MASS MANNED SPACECRAFT CENTER HOUSTON TEXAS
	DL1000001	DO NOT SCALE THIS DRAWING	APPROVED FOR MSC	SCALE 1/1	NASA DRAWING NO 1000025
1000065	DL1000201	MATERIAL BERYLLIUM, BRUSH SPEC M-100-T	MIT APPROVAL	UNIT WT	SHEET 1 OF 2
NEXT ASSY	USED ON			CODE IDENT	
APPLICATION					

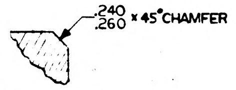
1000025


NO. 39 DRILL
(ARBOR DIA .500)
60°
.240
.260 DIA
.302
.322

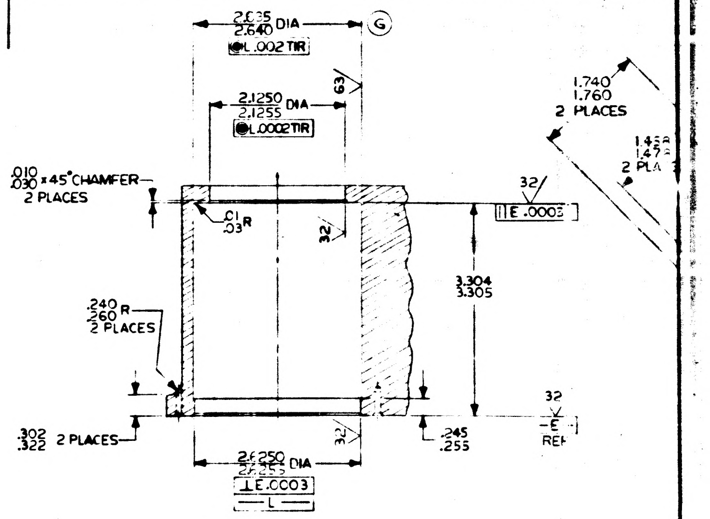
DETAIL J
SCALE 2
2 PLACES


.052
.072 R
.025
.035

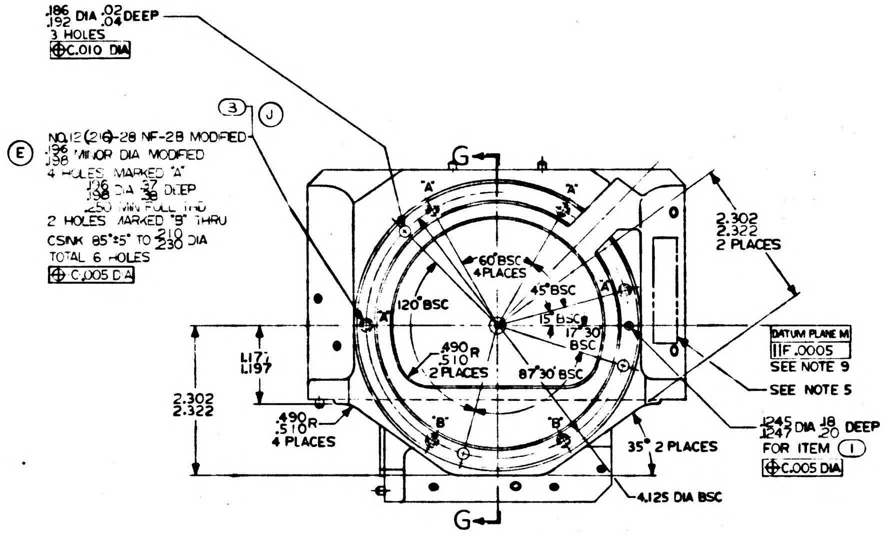
DETAIL H
SCALE 2
6 PLACES

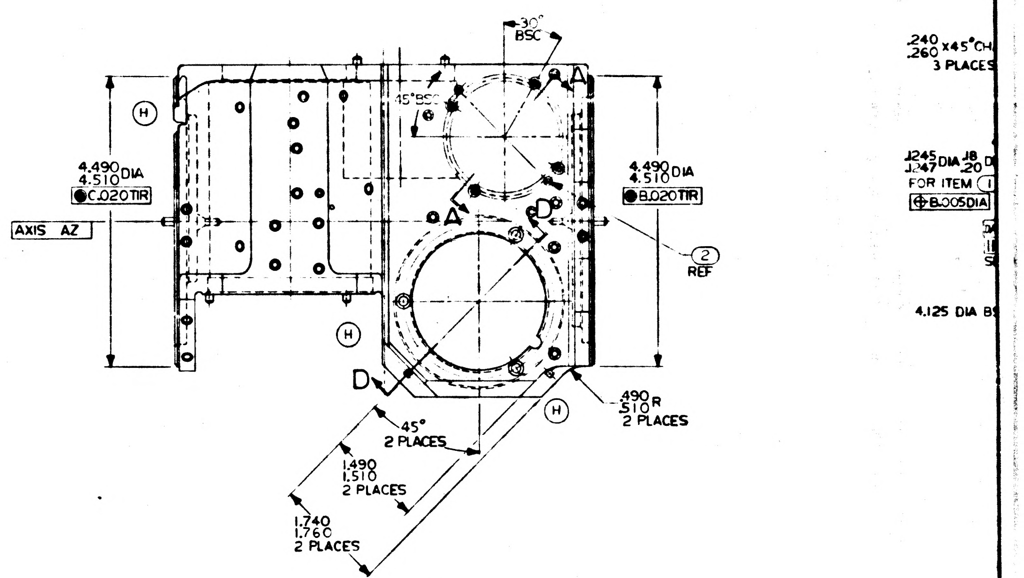

.240
.260 x 45° CHAMFER

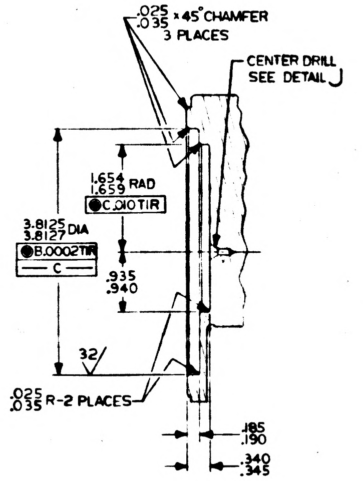
SECTION E-E
2 PLACES


2.635
2.640 DIA
G
.002 TIR
2.1250
2.1255 DIA
.0002 TIR
.010
.030 x 45° CHAMFER
2 PLACES
.01
.03 R
32
.240
.260 R
2 PLACES
3.304
3.305
.302
.322 2 PLACES
2.1250
2.1255 DIA
⊥ E .0003
L
.245
.255
E
REF
1.740
1.760
2 PLACES
2 PLA
⊥ E .000

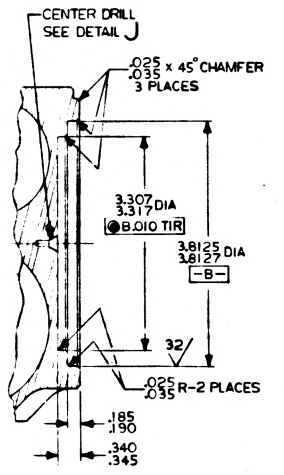
SECTION D-D


.186
.192 DIA .02
.04 DEEP
3 HOLES
⊕ C .010 DIA
3
J
E
NO.12 (.216)-28 NF-2B MODIFIED
.196
.198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
2 HOLES MARKED "B" THRU
CSINK 85° ±5° TO .210
.230 DIA
TOTAL 6 HOLES
⊕ C .005 DIA
G
"A"
"B"
2.302
2.322
2 PLACES
60° BSC
4 PLACES
45° BSC
120° BSC
15° BSC
17°30' BSC
87°30' BSC
.490
.510 R
2 PLACES
1.177
1.197
2.302
2.322
.490
.510 R
4 PLACES
DATUM PLANE M
∥ F .0005
SEE NOTE 9
SEE NOTE 5
.1245
.1247 DIA .18
.20 DEEP
FOR ITEM 1
⊕ C .005 DIA
35° 2 PLACES
4.125 DIA BSC

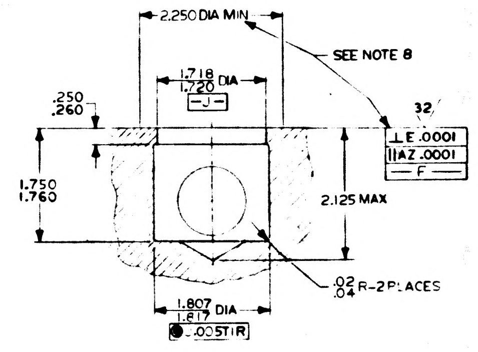

30°
BSC
15° BSC
A
H
4.490
4.510 DIA
◎ C .020 TIR
AXIS AZ
4.490
4.510 DIA
◎ B .020 TIR
2
REF
D
45°
2 PLACES
1.490
1.510
2 PLACES
1.740
1.760
2 PLACES
.490
.510 R
2 PLACES
.240
.260 x 45° CH
3 PLACES
.1245
.1247 DIA .18
.20
FOR ITEM 1
⊕ B .005 DIA
4.125 DIA B


.025
.035 x 45° CHAMFER
3 PLACES
CENTER DRILL
SEE DETAIL J
1.654
1.659 RAD
◎ C .010 TIR
3.8125
3.8127 DIA
◎ B .0002 TIR
C
.935
.940
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

SECTION G-G


CENTER DRILL
SEE DETAIL J
.025
.035 x 45° CHAMFER
3 PLACES
3.307
3.317 DIA
◎ B .010 TIR
3.8125
3.8127 DIA
B
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718
1.720 DIA
J
.250
.260
32
⊥ E .0001
∥ AZ .0001
F
1.750
1.760
2.125 MAX
.02
.04 R-2 PLACES
1.807
1.817 DIA
◎ .005 TIR

SECTION B-B

NOTES

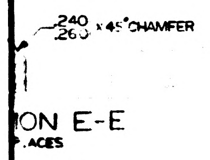
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

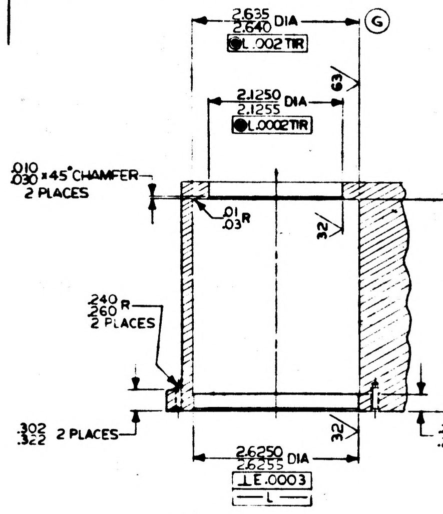
Ⓒ

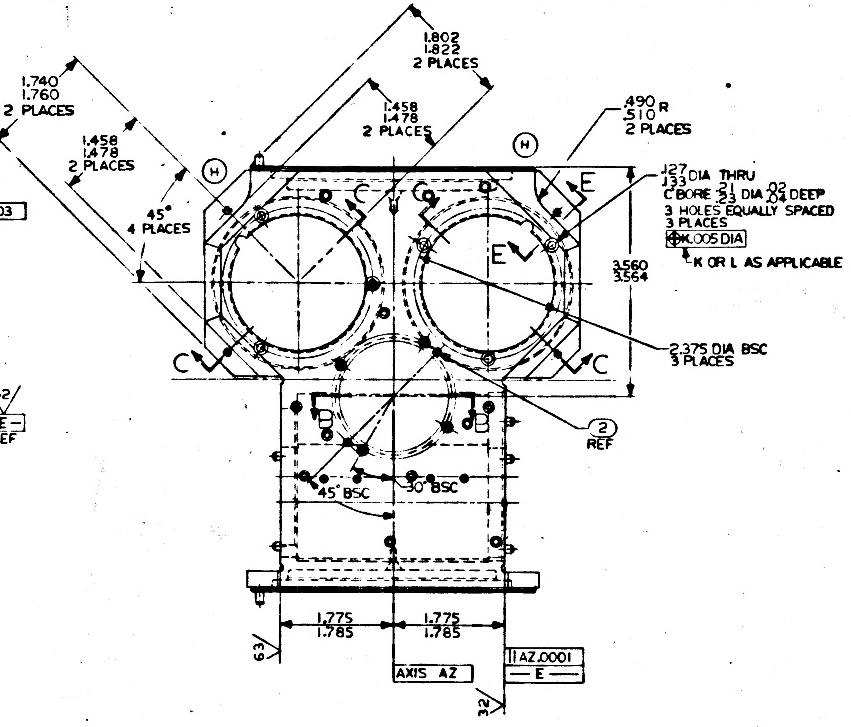
3. 125∕ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE .052 .072 UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES .005 .015 R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ ⫽ ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET

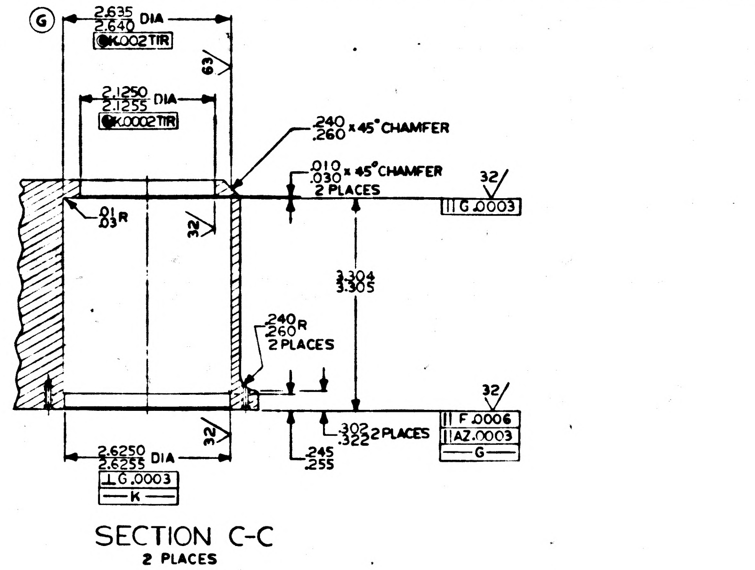
1000025 | REV | SH 1

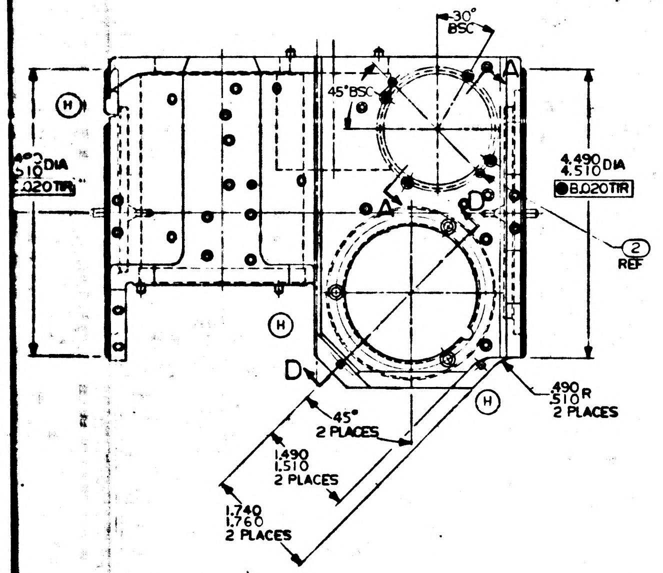
REVISIONS TDRR 00026			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL CHANGES	6/1/62	
B	GENERAL CHANGES	7/25/62	ajb WK
C	TDRR 00276	1-22-63	ajb WK
D	ADDED SHEET 2 OF 2 TDRR 00611	3-15-63	ajb WK
E	TDRR 00705	4-3-63	ajb WK
F	TDRR 00777	4-9-63	ajb WK
G	TDRR 01053	4-30-63	ajb WK
H	TDRR 01440	5-22-63	ajb WK
J	TDRR 01529	6-6-63	ajb WKB
K	TDRR 01672	6-19-63	ajb WK

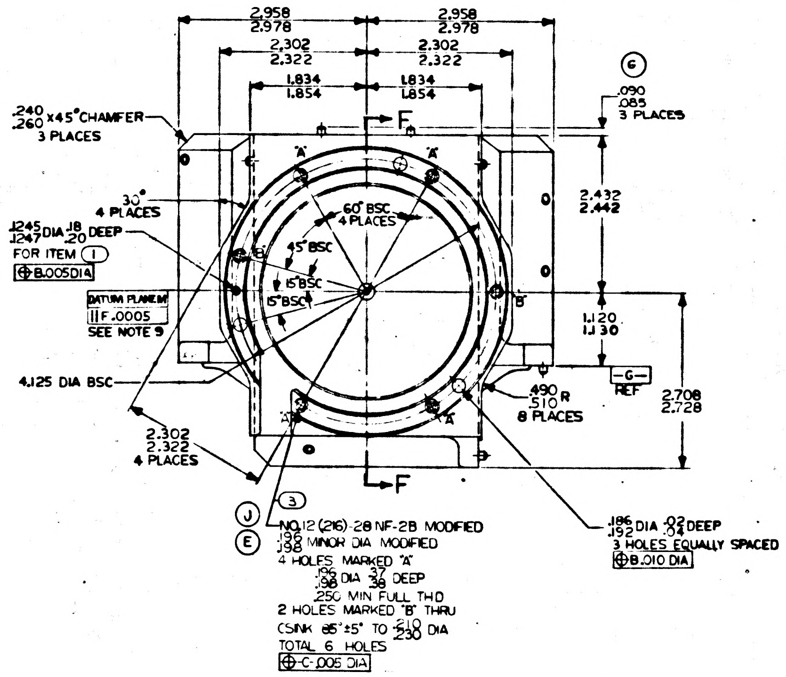

.240/.260 x45° CHAMFER
ION E-E
.ACES

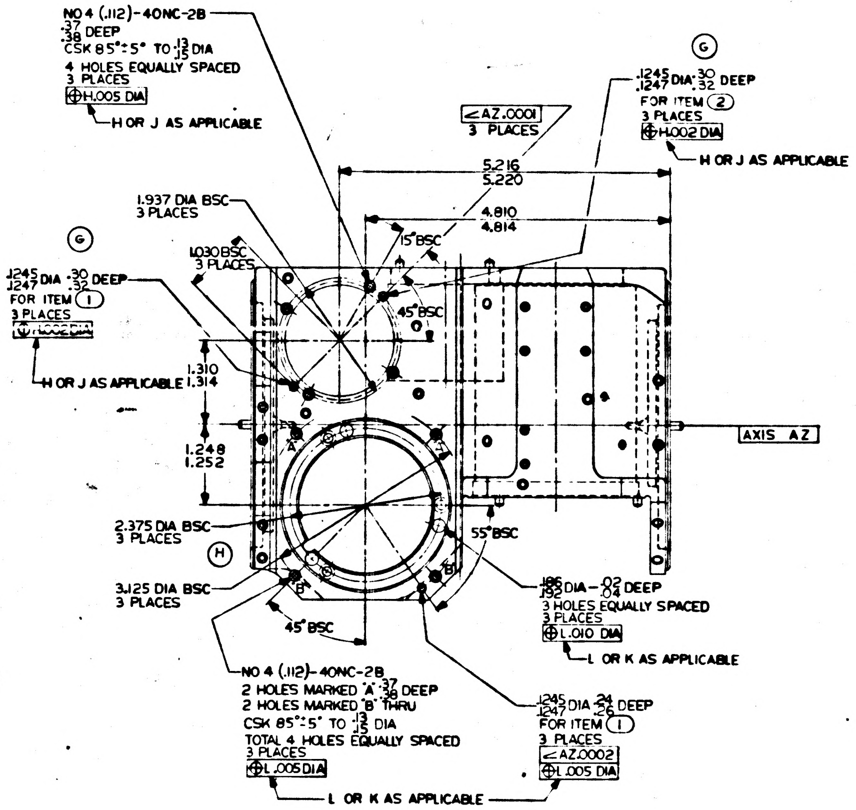

2.635/2.640 DIA
L .002 TIR
G
2.1250/2.1255 DIA
L .0002 TIR
.010/.030 x45° CHAMFER 2 PLACES
.01/.03 R
32
63
E .0003
3.304/3.305
.240/.260 R 2 PLACES
.302/.322 2 PLACES
.245/.255
E REF
2.6250/2.6255 DIA
E .0003
L
SECTION D-D

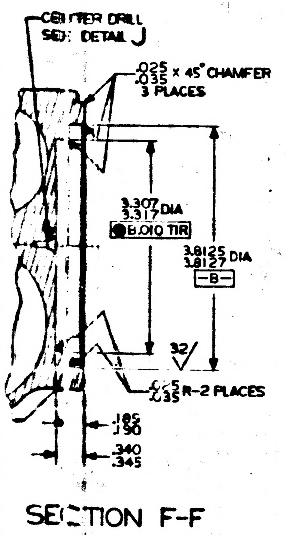

1.802/1.822 2 PLACES
1.740/1.760 2 PLACES
1.458/1.478 2 PLACES
1.458/1.478 2 PLACES
45° 4 PLACES
.490/.510 R 2 PLACES
.127/.133 DIA THRU C'BORE .21/.23 DIA .02/.04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES K .005 DIA
K OR L AS APPLICABLE
3.560/3.564
2.375 DIA BSC 3 PLACES
2 REF
H
C
E
D
B
45° BSC
30° BSC
1.775/1.785
1.775/1.785
63
AXIS AZ
AZ .0001
E
32

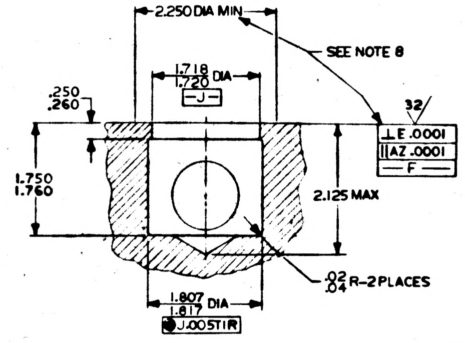

G
2.635/2.640 DIA
K .002 TIR
2.1250/2.1255 DIA
K .0002 TIR
63
.240/.260 x45° CHAMFER
.010/.030 x45° CHAMFER 2 PLACES
32
G .0003
.01/.03 R
3.304/3.305
.240/.260 R 2 PLACES
F .0006
AZ .0003
G
.302/.322 2 PLACES
.245/.255
2.6250/2.6255 DIA
G .0003
K
SECTION C-C
2 PLACES

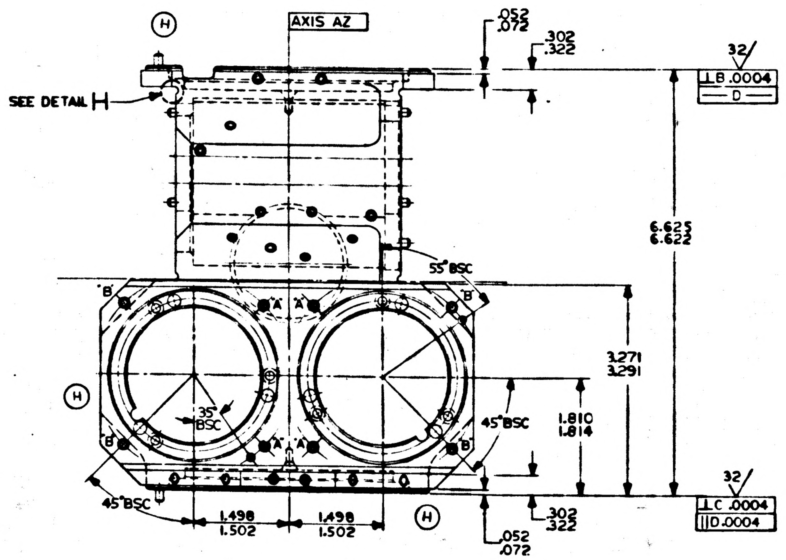

30° BSC
45° BSC
H
4.490/4.510 DIA
B .020 TIR
.020 TIR
2 REF
A
D
H
45° 2 PLACES
.490/.510 R 2 PLACES
1.490/1.510 2 PLACES
1.740/1.760 2 PLACES

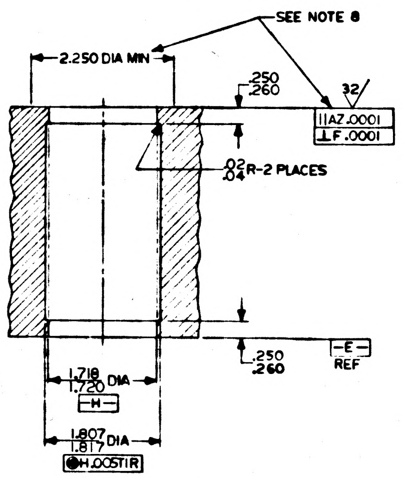

2.958/2.978
2.958/2.978
2.302/2.322
2.302/2.322
1.834/1.854
1.834/1.854
G
.090/.085 3 PLACES
.240/.260 x45° CHAMFER 3 PLACES
30° 4 PLACES
.1245/.1247 DIA .18/.20 DEEP FOR ITEM 1 B .005 DIA
DATUM PLANE B F .0005 SEE NOTE 9
60° BSC 4 PLACES
45° BSC
15° BSC
15° BSC
2.432/2.442
1.120/1.130
G REF
2.708/2.728
4.125 DIA BSC
.490/.510 R 8 PLACES
2.302/2.322 4 PLACES
F
F
J 3
E
NO.12 (.216)-28 NF-2B MODIFIED .194/.198 MINOR DIA MODIFIED 4 HOLES MARKED "A" .15/.18 DIA .37/.39 DEEP .250 MIN FULL THD 2 HOLES MARKED "B" THRU CSINK 85°±5° TO .270/.290 DIA TOTAL 6 HOLES C .005 DIA
.186/.192 DIA .02/.04 DEEP 3 HOLES EQUALLY SPACED B .010 DIA


NO 4 (.112)-40NC-2B .37/.38 DEEP CSK 85°±5° TO .13/.15 DIA 4 HOLES EQUALLY SPACED 3 PLACES H .005 DIA
H OR J AS APPLICABLE
G
.1245/.1247 DIA .30/.32 DEEP FOR ITEM 2 3 PLACES H .002 DIA
H OR J AS APPLICABLE
AZ .0001 3 PLACES
5.216/5.220
4.810/4.814
1.937 DIA BSC 3 PLACES
1.030 BSC 3 PLACES
15° BSC
45° BSC
G
.1245/.1247 DIA .30/.32 DEEP FOR ITEM 1 3 PLACES
H OR J AS APPLICABLE
1.310/1.314
1.248/1.252
AXIS AZ
2.375 DIA BSC 3 PLACES
H
3.125 DIA BSC 3 PLACES
55° BSC
45° BSC
.186/.192 DIA .02/.04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES L .010 DIA
L OR K AS APPLICABLE
NO 4 (.112)-40NC-2B 2 HOLES MARKED "A" .37/.39 DEEP 2 HOLES MARKED "B" THRU CSK 85°±5° TO .13/.15 DIA TOTAL 4 HOLES EQUALLY SPACED 3 PLACES L .005 DIA
.1245/.1247 DIA .24/.26 DEEP FOR ITEM 1 3 PLACES AZ .0002 L .005 DIA
L OR K AS APPLICABLE


CENTER DRILL SEE DETAIL J
.025/.035 x 45° CHAMFER 3 PLACES
3.307/3.317 DIA
B .010 TIR
3.8125/3.8127 DIA
B
32
.25/.35 R-2 PLACES
.185/.190
.340/.345
SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718/1.720 DIA
J
.250/.260
32
E .0001
AZ .0001
F
1.750/1.760
2.125 MAX
.02/.04 R-2 PLACES
1.807/1.817 DIA
J .005 TIR
SECTION B-B


H
AXIS AZ
.052/.072
.302/.322
32
B .0004
D
SEE DETAIL H
6.625/6.622
55° BSC
3.271/3.291
H
35° BSC
45° BSC
1.810/1.814
A
B
45° BSC
1.498/1.502
1.498/1.502
H
.302/.322
.052/.072
C .0004
D .0004


SEE NOTE 8
2.250 DIA MIN
.250/.260
AZ .0001
F .0001
.02/.04 R-2 PLACES
.250/.260
E REF
1.718/1.720 DIA
H
1.807/1.817 DIA
H .005 TIR
SECTION A-A

K	K
J	H
H	H
G	F
F	F
E	D
D	D
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

12	INSERT, THREADED, SELF LOCKING	1000115-3			3
3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
LIST OF PARTS AND MATERIALS					

	DL1000001
1000085	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

M.I.T. INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN G. QUINN
APPROVED FOR MSC
BY DIRECTION
M.I.T. APPROVAL 9/13/62

HOUSING
STABLE MEMBER
IMU

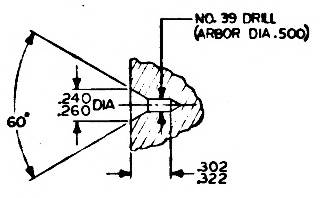
SCALE 1/1
UNIT WT
CODE IDENT

M.I.T.
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000025
SHEET 1 OF 2

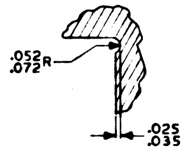
1000025 K

00025 K 1

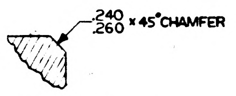
F-2


NO. 39 DRILL
(ARBOR DIA .500)
.240
.260 DIA
60°
.302
.322

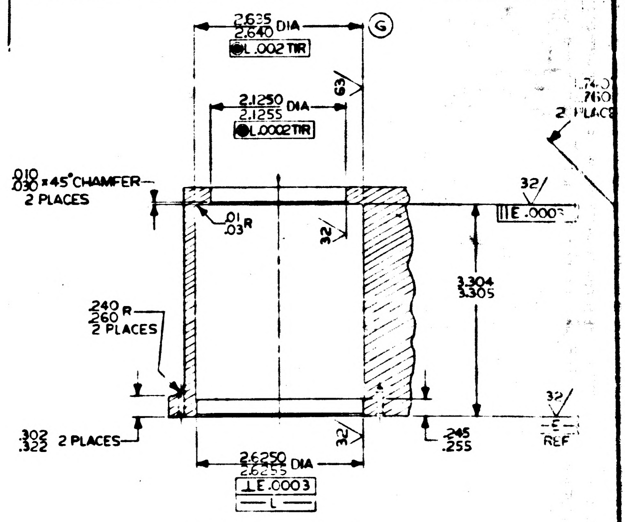
DETAIL J
SCALE 2/1
2 PLACES


.052
.072 R
.025
.035

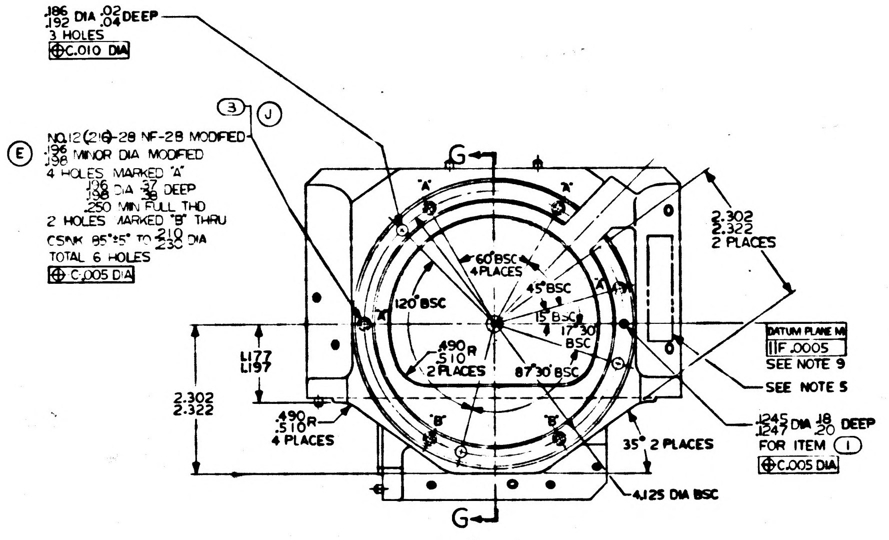
DETAIL H
SCALE 2/1
6 PLACES

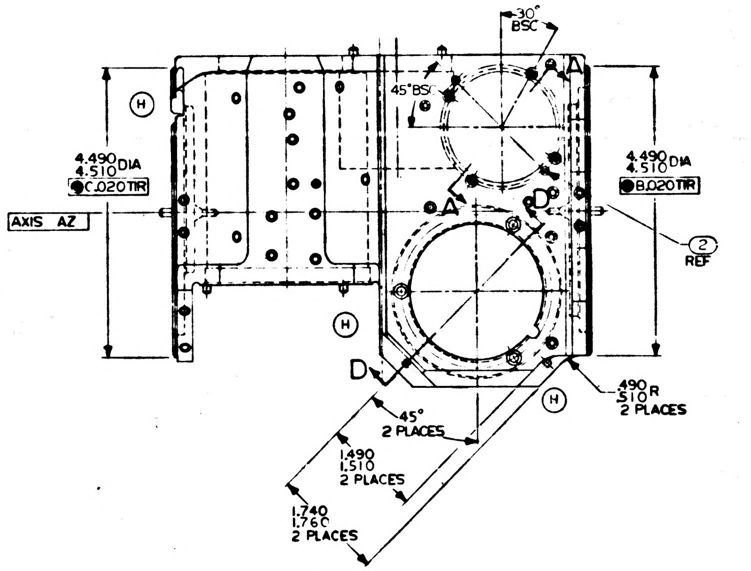

.240
.260 x 45° CHAMFER

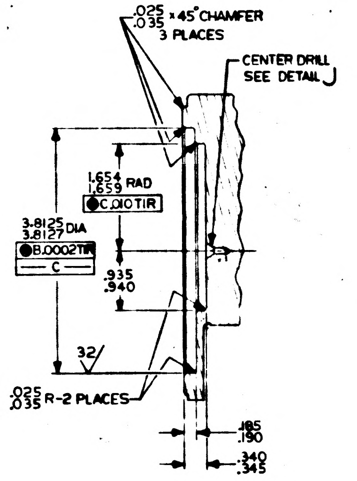
SECTION E-E
2 PLACES


2.635
2.640 DIA
.002 TIR
G
2.1250
2.1255 DIA
.0002 TIR
.010
.020 x 45° CHAMFER
2 PLACES
.01
.03 R
32
E .0003
3.304
3.305
.240
.260 R
2 PLACES
.302
.322 2 PLACES
2.6250
2.6255 DIA
⊥E .0003
L
.245
.255
REF

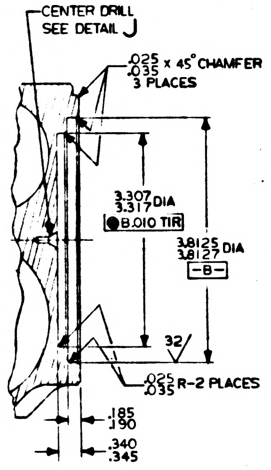
SECTION D-D


.186
.192 DIA .02
.04 DEEP
3 HOLES
⊕C.010 DIA
3
J
E
NO.12 (.216)-28 NF-2B MODIFIED
.196
.198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.216
.198 DIA .37
.38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSNK 85°±5° TO .210
.230 DIA
TOTAL 6 HOLES
⊕C.005 DIA
G
60°BSC
4 PLACES
45°BSC
120°BSC
15°BSC
17°30'
BSC
.490
.510 R
2 PLACES
87°30' BSC
2.302
2.322
2 PLACES
DATUM PLANE M
F .0005
SEE NOTE 9
SEE NOTE 5
1.177
1.197
2.302
2.322
.490
.510 R
4 PLACES
35° 2 PLACES
.1245
.1247 DIA .18
.20 DEEP
FOR ITEM 1
⊕C.005 DIA
4.125 DIA BSC
G

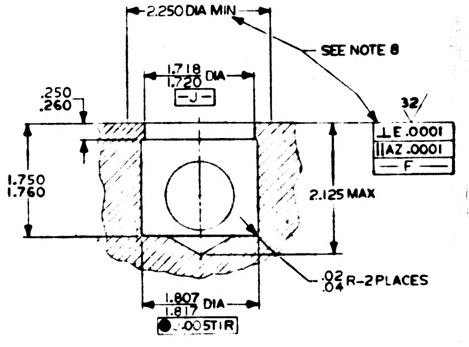

30°
BSC
45°BSC
A
H
4.490
4.510 DIA
C.020 TIR
AXIS AZ
4.490
4.510 DIA
B.020 TIR
2
REF
H
D
H
45°
2 PLACES
1.490
1.510
2 PLACES
1.740
1.760
2 PLACES
.490
.510 R
2 PLACES


.025
.035 x 45° CHAMFER
3 PLACES
CENTER DRILL
SEE DETAIL J
1.654
1.659 RAD
C.010 TIR
3.8125
3.8127 DIA
B.0002 TIR
C
.935
.940
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

SECTION G-G


CENTER DRILL
SEE DETAIL J
.025
.035 x 45° CHAMFER
3 PLACES
3.307
3.317 DIA
B.010 TIR
3.8125
3.8127 DIA
B
32
.025
.035 R-2 PLACES
.185
.190
.340
.345

SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718
1.720 DIA
J
.250
.260
32
⊥E .0001
∥AZ .0001
F
1.750
1.760
2.125 MAX
.02
.04 R-2 PLACES
1.807
1.817 DIA
.005 TIR

SECTION B-B

NOTES

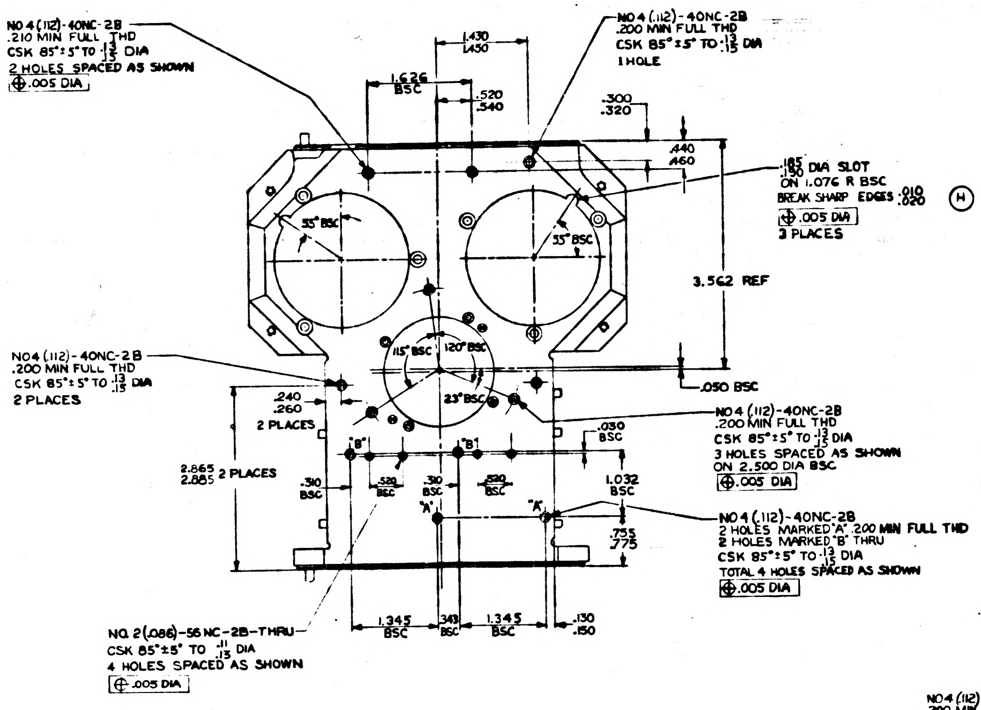
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓒ

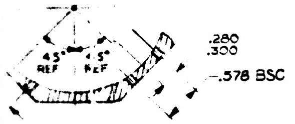
3. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE $^{.052}_{.072}$ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES $^{.005}_{.015}$ R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ ⫽ ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
11. Ⓓ SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET

1000025 K

SYM	DESCRIPTION	DATE	APPROVAL	
REVISIONS				
D	THIS SHEET ADDED TDRR 00611	3-13-63	a/b	WK
F	TDRR 00777	4-9-63	a/b	WK
H	TDRR 01440	5-22-63	a/b	WK
K	TDRR 01672	6-19-63	a/b	WK

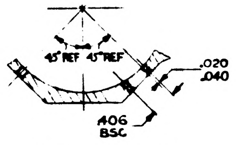


NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
1.430 1.450
1.626 BSC
.520 .540
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
1 HOLE
.300 .320
.440 .460
.185 .190 DIA SLOT
ON 1.076 R BSC
BREAK SHARP EDGES .010 .020
⊕.005 DIA
3 PLACES
H
55° BSC
55° BSC
3.562 REF
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
2 PLACES
115° BSC
120° BSC
23° BSC
.050 BSC
.240 .260
2 PLACES
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕.005 DIA
.030 BSC
"B"
"B"
2.865 2.885 2 PLACES
.310 BSC
.520 BSC
.310 BSC
.520 BSC
1.032 BSC
"A"
"A"
NO 4 (.112)-40NC-2B
2 HOLES MARKED "A" .200 MIN FULL THD
2 HOLES MARKED "B" THRU
CSK 85°±5° TO .13 .15 DIA
TOTAL 4 HOLES SPACED AS SHOWN
⊕.005 DIA
.755 .775
NO. 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11 .13 DIA
4 HOLES SPACED AS SHOWN
⊕.005 DIA
1.345 BSC
.343 BSC
1.345 BSC
.130 .150



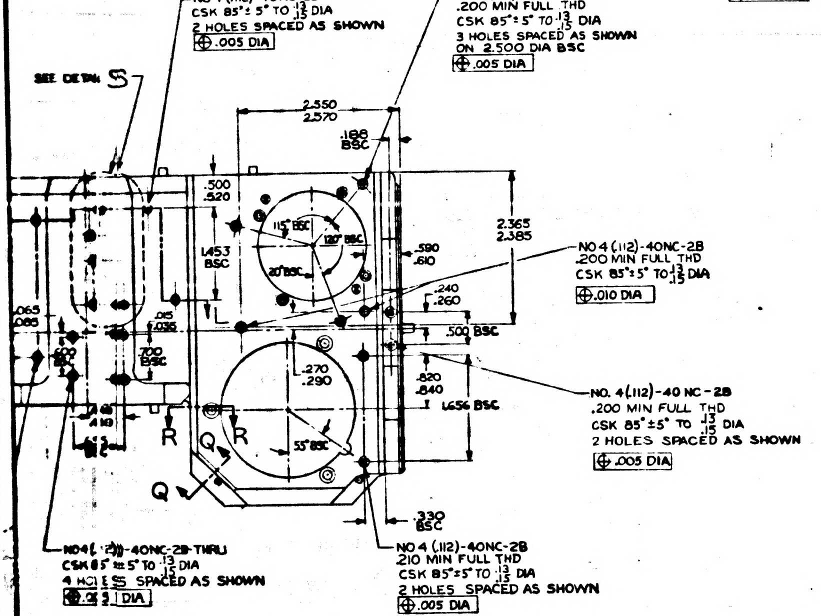
45° REF
45° REF
.280 .300
.578 BSC

SECTION L-L

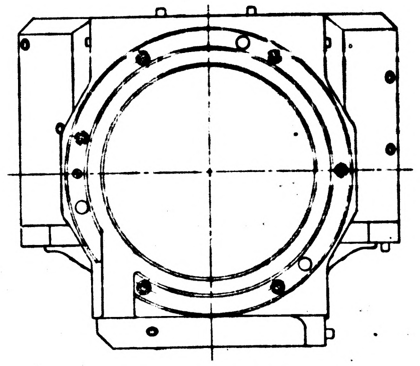


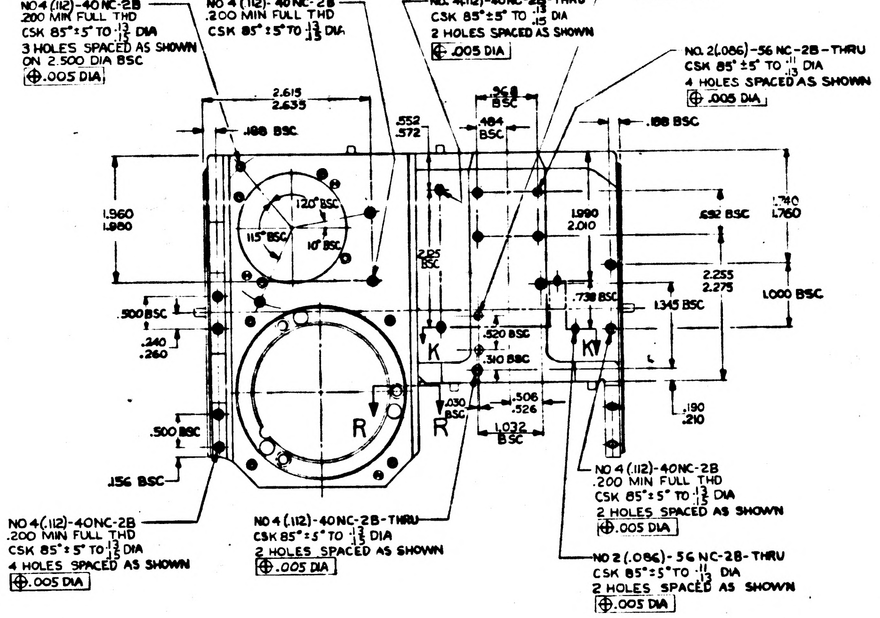
45° REF
45° REF
.020 .040
.406 BSC

SECTION K-K

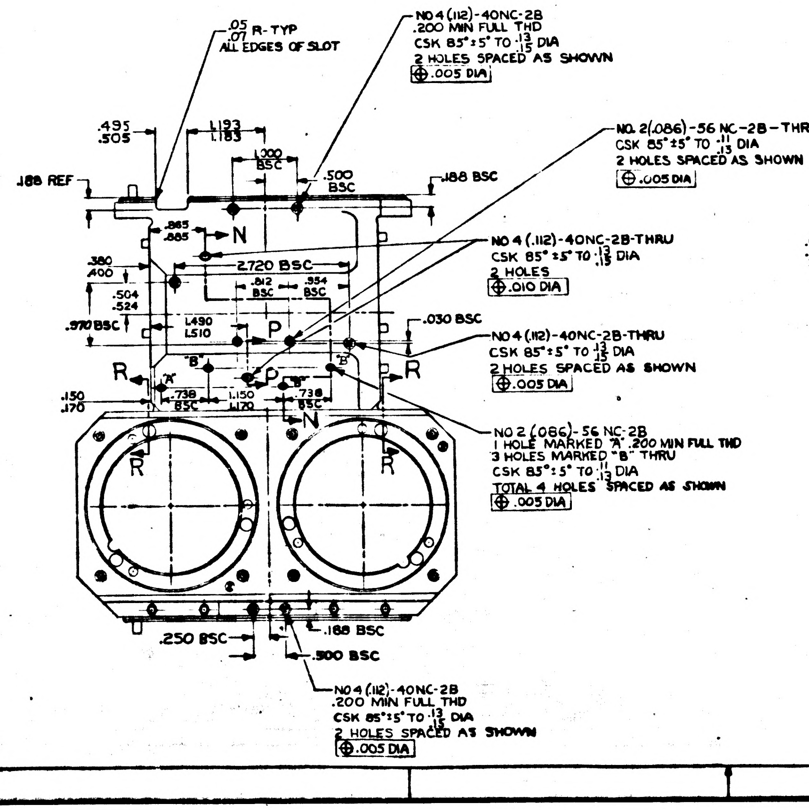


NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕.005 DIA
SEE DETAIL S
2.550 2.570
.188 BSC
.500 .520
115° BSC
120° BSC
20° BSC
1.453 BSC
2.365 2.385
.590 .610
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
⊕.010 DIA
.240 .260
.500 BSC
.065 .085
.015 .035
.600 BSC
.700 BSC
.270 .290
.820 .840
1.656 BSC
NO. 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
.410 .419
R
Q
R
55° BSC
Q
.330 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA

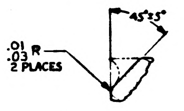




NO. 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11 .13 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
NO 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕.005 DIA
NO 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
NO. 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
NO. 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11 .13 DIA
4 HOLES SPACED AS SHOWN
⊕.005 DIA
2.615 2.635
.188 BSC
.552 .572
.968 BSC
.484 BSC
.188 BSC
1.960 1.980
120° BSC
115° BSC
10° BSC
2.125 BSC
1.990 2.010
.692 BSC
1.740 1.760
2.255 2.275
1.000 BSC
.738 BSC
1.345 BSC
.500 BSC
.240 .260
.520 BSC
.310 BSC
K
K
.030 BSC
.506 .526
1.032 BSC
.190 .210
R
R
.500 BSC
.156 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
⊕.005 DIA
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
NO 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11 .13 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA

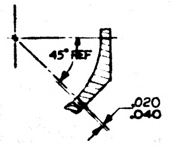


.05 .07 R-TYP
ALL EDGES OF SLOT
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
.495 .505
1.193 1.183
1.000 BSC
.500 BSC
.188 REF
.188 BSC
NO. 2 (.086)-56 NC-2B-THRU
CSK 85°±5° TO .11 .13 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
.865 .885
N
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13 .15 DIA
2 HOLES
⊕.010 DIA
.380 .400
2.720 BSC
.812 BSC
.354 BSC
.504 .524
.970 BSC
1.490 1.510
P
.030 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA
R
"B"
"A"
P
"B"
"B"
R
.150 .170
.738 BSC
1.150 1.170
.738 BSC
N
NO 2 (.086)-56 NC-2B
1 HOLE MARKED "A" .200 MIN FULL THD
3 HOLES MARKED "B" THRU
CSK 85°±5° TO .11 .13 DIA
TOTAL 4 HOLES SPACED AS SHOWN
⊕.005 DIA
R
R
.250 BSC
.188 BSC
.500 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕.005 DIA



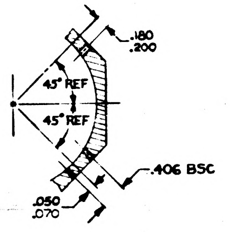
.01 .03 R
2 PLACES
45°±3°

SECTION R-R
SCALE 1
4 PLACES



45° REF
.020 .040

SECTION P-P



.180 .200
45° REF
45° REF
.406 BSC
.050 .070

SECTION N-N

Ⓓ THIS SHEET ADDED

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000261
1000005	DL 1000081
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN E QUINN
APPROVED FOR MSC

HOUSING,
STABLE MEMBER

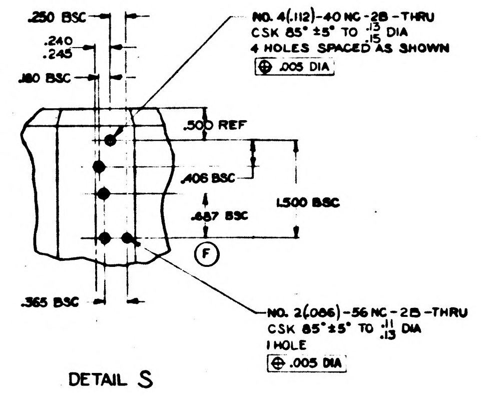
SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
Cambridge Mass
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 2 OF 2

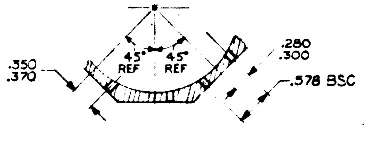
1000025 K

INCHES
PHOTOGRAPHIC SCALE ONLY

E-2


.250 BSC
.240
.245
.180 BSC
NO. 4(.112)-40 NC-2B-THRU
CSK 85° ±5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.500 REF
.406 BSC
1.500 BSC
.687 BSC
F
.365 BSC
NO. 2(.086)-56 NC-2B-THRU
CSK 85° ±5° TO .11 .13 DIA
1 HOLE
⊕ .005 DIA

DETAIL S

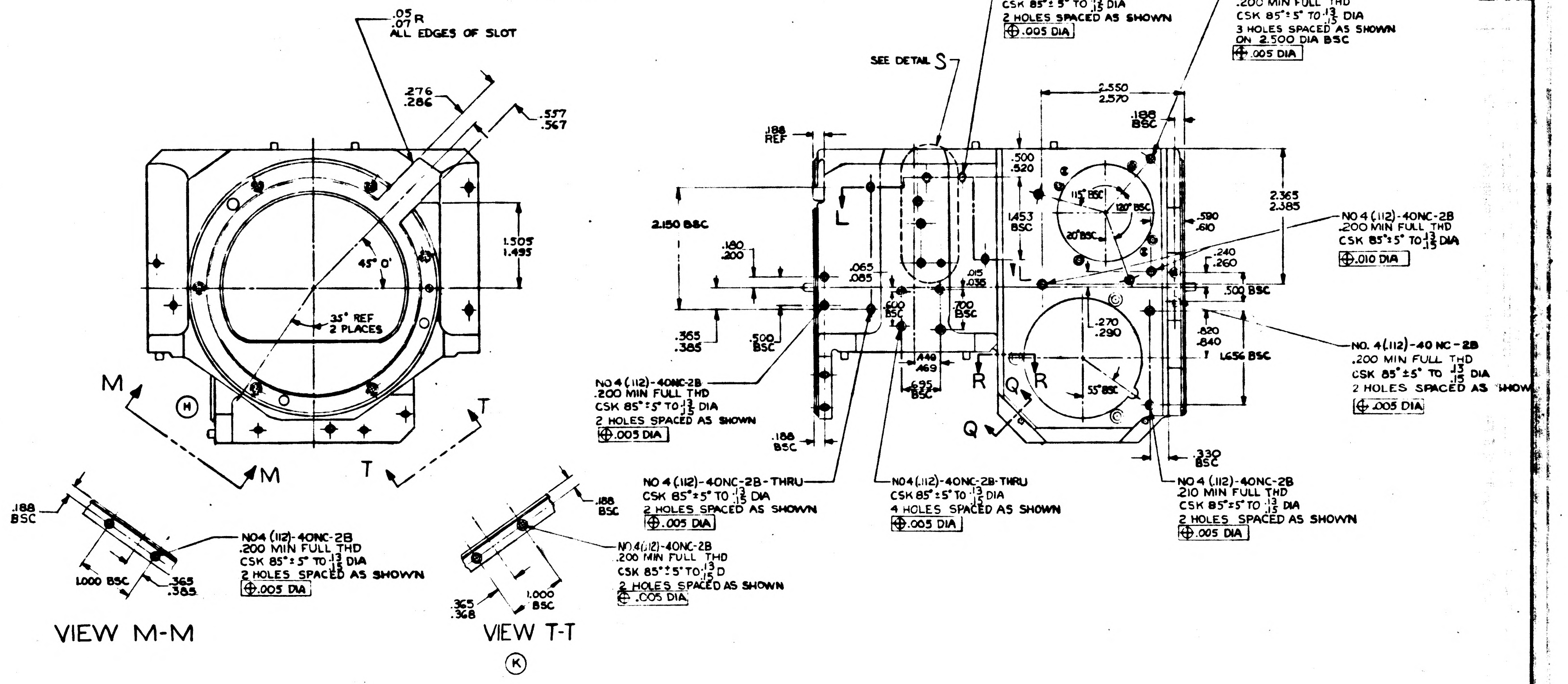

45° REF
45° REF
.350
.370
.280
.300
.578 BSC

SECTION L-L

NO 4 (.112)-40NC-2B
.210 MIN FULL TH D
CSK 85° ± 5° TO .13 .15 DIA
2 HOLES SPACED AS SH
⊕ .005 DIA

NO4 (.112)-40NC-2B
.200 MIN FULL TH
CSK 85° ± 5° TO .13 .15 DIA
2 PLACES

NO. 2(.08
CSK 85°
4 HOLES
⊕ .005 D


.05 .07 R
ALL EDGES OF SLOT
.276
.286
.557
.567
1.505
1.495
45° 0'
35° REF
2 PLACES
M
M
T
T
H
.188 BSC
1.000 BSC
.365
.385
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.188 BSC
.365
.368
1.000 BSC
NO.4(.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13 .15 D
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
SEE DETAIL S
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13 .15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
.188 REF
2.550
2.570
.188 BSC
.500
.520
1.453 BSC
115° BSC
120° BSC
20° BSC
2.365
2.385
.590
.610
.240
.260
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13 .15 DIA
⊕ .010 DIA
2.150 BSC
.180
.200
.065
.085
.015
.035
.600 BSC
.700 BSC
.270
.290
.500 BSC
.820
.840
1.656 BSC
.365
.385
.500 BSC
.440
.469
.695 BSC
L
L
R
R
Q
Q
55° BSC
NO. 4(.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.188 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.330 BSC
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

VIEW M-M

VIEW T-T

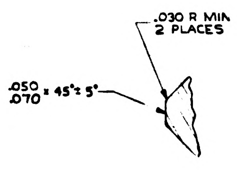
Ⓚ

NOTES

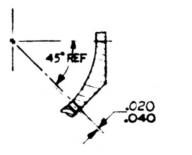
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓗ 2 REMOVE BURRS & BREAK ALL SHARP EDGES $^{.005}_{.015}$

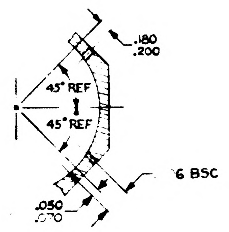
3 FOR MATERIAL & MACHINING PRIOR TO THIS DRAWING SEE NASA DRAWING NO. 1000025 SHEET 1


.030 R MIN
2 PLACES
.050 .070 × 45° ± 5°

SECTION Q-Q
SCALE 4


45° REF
.020
.040

SECTION P-P

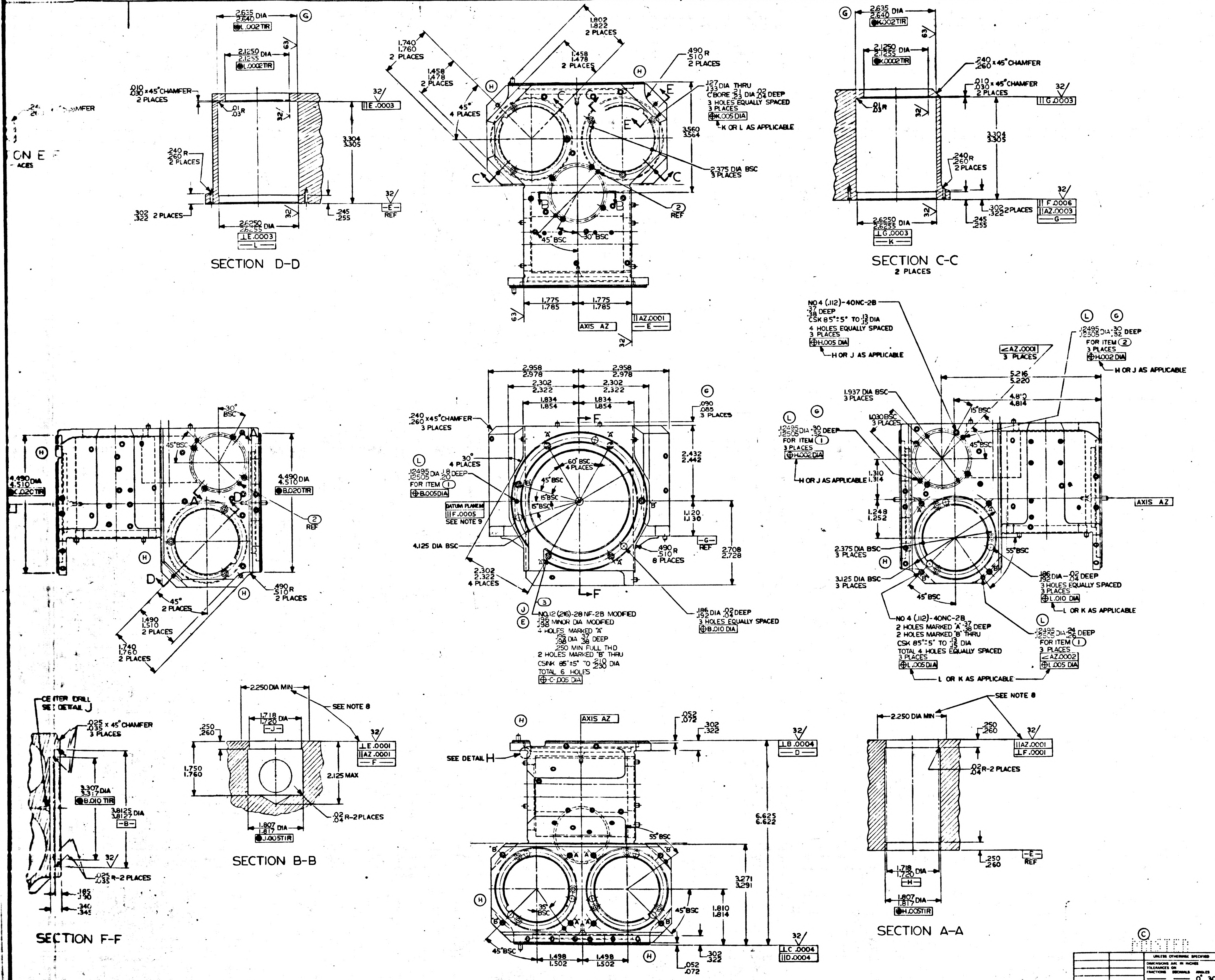

.180
.200
45° REF
45° REF
6 BSC
.050
.070

SECTION N-N

1000025 REV K SHEET 2

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED	
	REVISIONS TDRR 00026			
A	GENERAL CHANGES	6/1/62		
B	GENERAL CHANGES	7/25/62	ajb	WK
C	TDRR 00276	1-22-63	ajb	WK
D	ADDED SHEET 2 OF 2 TDRR 00611	3-15-63	ajb	WK
E	TDRR 00705	4-3-63	ajb	WK
F	TDRR 00777	4-9-63	ajb	WK
G	TDRR 01053	4-30-63	ajb	WK
H	TDRR 01440	5-22-63	ajb	WK
J	TDRR 01529	6-6-63	ajb	WKB
K	TDRR 01672	6-19-63	ajb	WK
L	TDRR 01807	7-1-63	ajb	WK


SECTION D-D
SECTION C-C
2 PLACES
SECTION F-F
SECTION B-B
SECTION A-A
AXIS AZ
SEE DETAIL H
SEE NOTE 8
SEE NOTE 9
DATUM PLANE M
CENTER DRILL SEE DETAIL J
2.635 2.640 DIA
2.1250 2.1255 DIA
2.6250 2.6255 DIA
3.304 3.305
.010 .030 x 45° CHAMFER 2 PLACES
.240 .260 R 2 PLACES
.302 .322 2 PLACES
.245 .255
.240 .260 x 45° CHAMFER
1.740 1.760 2 PLACES
1.802 1.822 2 PLACES
1.458 1.478 2 PLACES
45° 4 PLACES
.490 .510 R 2 PLACES
.127 .133 DIA THRU C'BORE .23 .25 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED 3 PLACES
K OR L AS APPLICABLE
3.560 3.564
2.375 DIA BSC 3 PLACES
1.775 1.785
2.958 2.978
2.302 2.322
1.834 1.854
2.432 2.442
1.120 1.130
2.708 2.728
4.125 DIA BSC
.490 .510 R 8 PLACES
.090 .085 3 PLACES
60° BSC 4 PLACES
45° BSC
15° BSC
30° 4 PLACES
.12495 .12505 DIA .18 .20 DEEP FOR ITEM ①
.186 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED
NO.12 (.216)-28 NF-2B MODIFIED .185 .188 MINOR DIA MODIFIED 4 HOLES MARKED "A" .23 .25 DIA .36 .38 DEEP .250 MIN FULL THD 2 HOLES MARKED "B" THRU CSINK 85° ±5° TO .210 .230 DIA TOTAL 6 HOLES
NO 4 (.112)-40NC-2B .37 .38 DEEP CSK 85° ±5° TO .13 .15 DIA 4 HOLES EQUALLY SPACED 3 PLACES
H OR J AS APPLICABLE
.12495 .12505 DIA .30 .32 DEEP FOR ITEM ② 3 PLACES
5.216 5.220
4.810 4.814
1.937 DIA BSC 3 PLACES
1.030 BSC 3 PLACES
1.310 1.314
1.248 1.252
2.375 DIA BSC 3 PLACES
3.125 DIA BSC 3 PLACES
55° BSC
NO 4 (.112)-40NC-2B 2 HOLES MARKED "A" .37 .38 DEEP 2 HOLES MARKED "B" THRU CSK 85° ±5° TO .13 .15 DIA TOTAL 4 HOLES EQUALLY SPACED 3 PLACES
L OR K AS APPLICABLE
4.490 4.510 DIA
1.490 1.510 2 PLACES
.025 .035 x 45° CHAMFER 3 PLACES
3.307 3.317 DIA
3.8125 3.8127 DIA
.025 .035 R-2 PLACES
2.250 DIA MIN
1.718 1.720 DIA
1.807 1.817 DIA
1.750 1.760
2.125 MAX
.02 .04 R-2 PLACES
.052 .072
6.625 6.622
3.271 3.291
1.810 1.814
1.498 1.502
35° BSC
.250 .260
REF

L	K
K	K
J	H
H	H
G	F
F	F
E	D
D	D
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
12	INSERT, THREADED, SELF LOCKING	1000115-3			3
3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL1000001
1000065	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS — DECIMALS — ANGLES 0° 30'
DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

M I T INSTRUMENTATION LAB
CONTRACT NAS 9 153
DRAWN G. QUINN

HOUSING
STABLE MEMBER
IMU

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

SCALE 1/1

NASA DRAWING NO
1000025
SHEET 1 OF 2

F-2

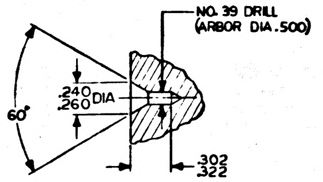
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

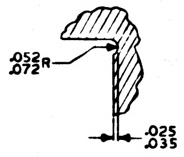
Ⓒ

3. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE $^{.052}_{.072}$ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES $^{.005}_{.015}$ R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ & ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM (1) ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

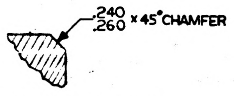
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET


NO. 39 DRILL (ARBOR DIA .500)
60°
.240 .260 DIA
.302 .322

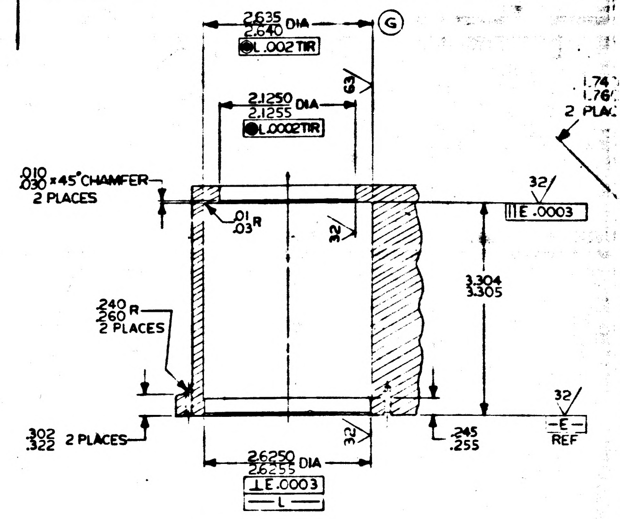
DETAIL J
SCALE 2/1
2 PLACES


.052 .072 R
.025 .035

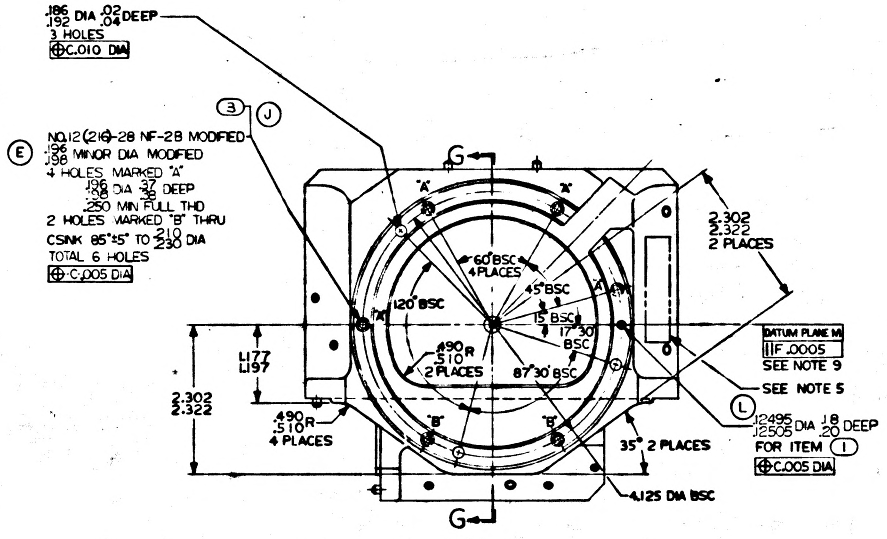
DETAIL H
SCALE 2/1
6 PLACES

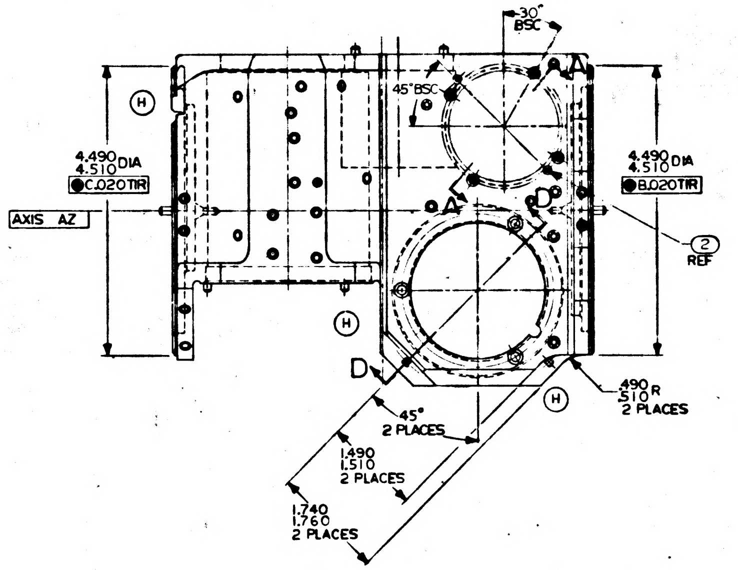

.240 .260 × 45° CHAMFER

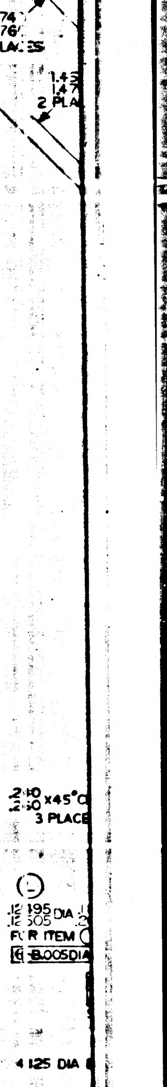
SECTION E-E
2 PLACES

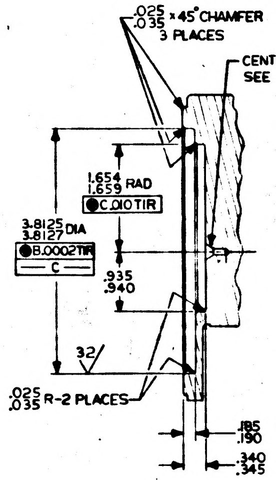

2.635 2.640 DIA
G
L .002 TIR
63
2.1250 2.1255 DIA
L .0002 TIR
.010 .030 × 45° CHAMFER 2 PLACES
.01 .03 R
32
∥ E .0003
.240 .260 R 2 PLACES
3.304 3.305
32
-E- REF
.302 .322 2 PLACES
.245 .255
32
2.6250 2.6255 DIA
⊥ E .0003
-L-

SECTION D-D

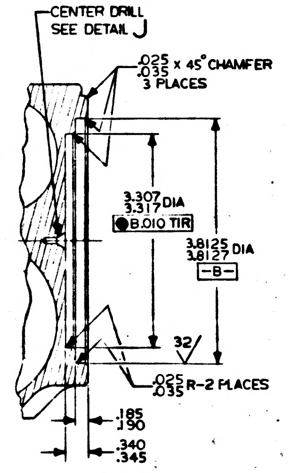

.186 .192 DIA .02 .04 DEEP 3 HOLES
⊕ C .010 DIA
3
J
E
NO.12 (216)-28 NF-2B MODIFIED
.196 .198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.196 .198 DIA .37 .38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSINK 85°±5° TO .210 .230 DIA
TOTAL 6 HOLES
⊕ C .005 DIA
G
"A"
"A"
60° BSC 4 PLACES
45° BSC
120° BSC
15° BSC
17°30' BSC
.490 .510 R 2 PLACES
87°30' BSC
2.302 2.322 2 PLACES
DATUM PLANE M
∥ F .0005
SEE NOTE 9
SEE NOTE 5
L
.12495 .12505 DIA .18 .20 DEEP FOR ITEM 1
⊕ C .005 DIA
1.177 1.197
2.302 2.322
.490 .510 R 4 PLACES
"B"
"B"
35° 2 PLACES
4.125 DIA BSC
G


AXIS AZ
H
4.490 4.510 DIA
C .020 TIR
30° BSC
45° BSC
A
A
D
D
4.490 4.510 DIA
B .020 TIR
2 REF
H
H
45° 2 PLACES
1.490 1.510 2 PLACES
1.740 1.760 2 PLACES
.490 .510 R 2 PLACES

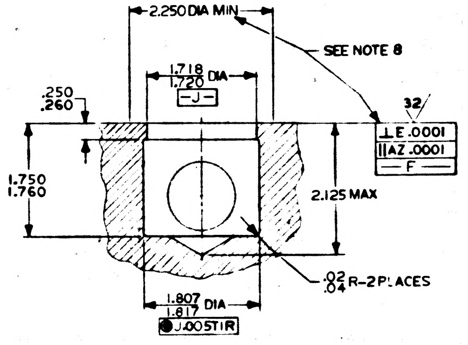



.025 .035 × 45° CHAMFER 3 PLACES
CENTER DRILL SEE DETAIL J
1.654 1.659 RAD
C .010 TIR
3.8125 3.8127 DIA
B .0002 TIR
-C-
.935 .940
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

SECTION G-G

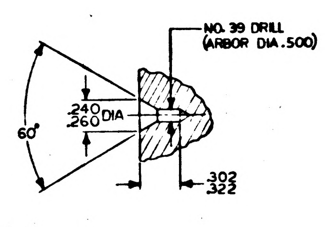

CENTER DRILL SEE DETAIL J
.025 .035 × 45° CHAMFER 3 PLACES
3.307 3.317 DIA
B .010 TIR
3.8125 3.8127 DIA
-B-
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

SECTION F-F

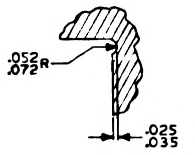

2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
-J-
.250 .260
32
⊥ E .0001
∥ AZ .0001
-F-
1.750 1.760
2.125 MAX
.02 .04 R-2 PLACES
1.807 1.817 DIA
J .005 TIR

SECTION B-B

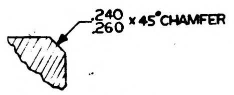
1000025	REV L	SH 1


NO. 39 DRILL
(ARBOR DIA .500)
60°
.240 .260 DIA
.302 .322

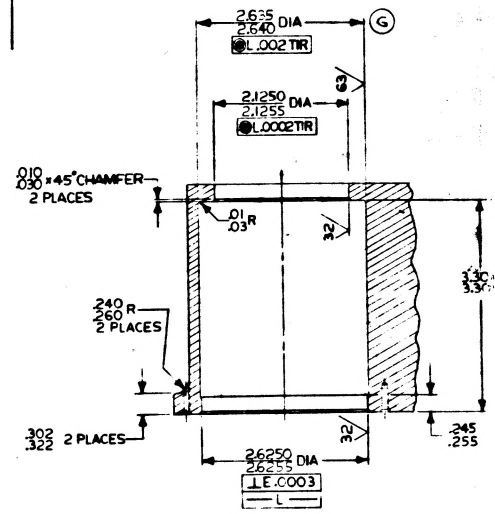
DETAIL J
SCALE 2/1
2 PLACES


.052 .072 R
.025 .035

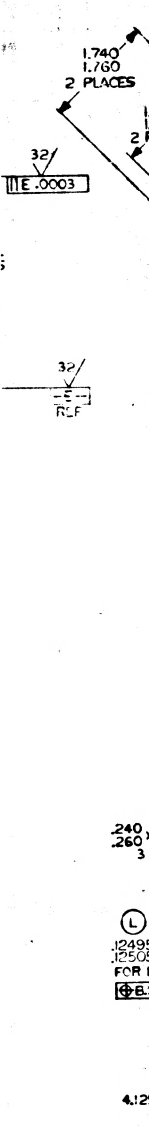
DETAIL H
SCALE 2/1
6 PLACES

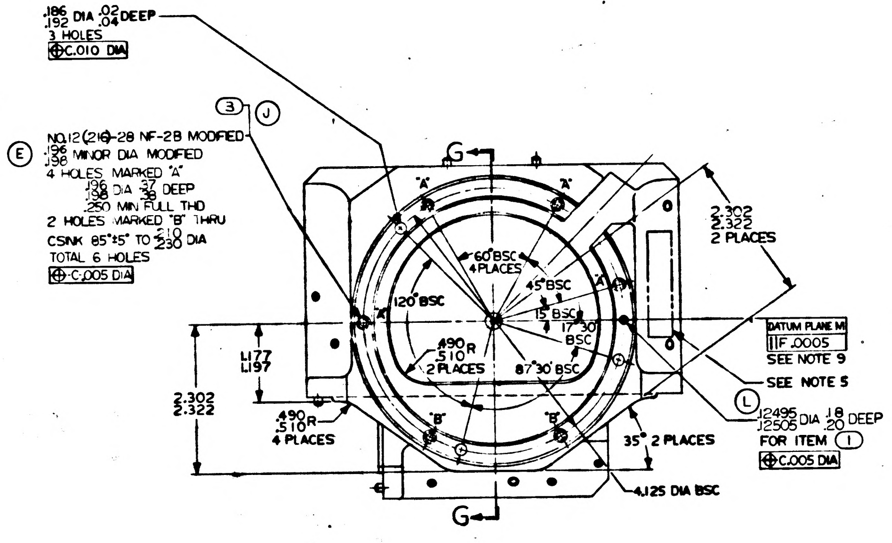

.240 .260 x 45° CHAMFER

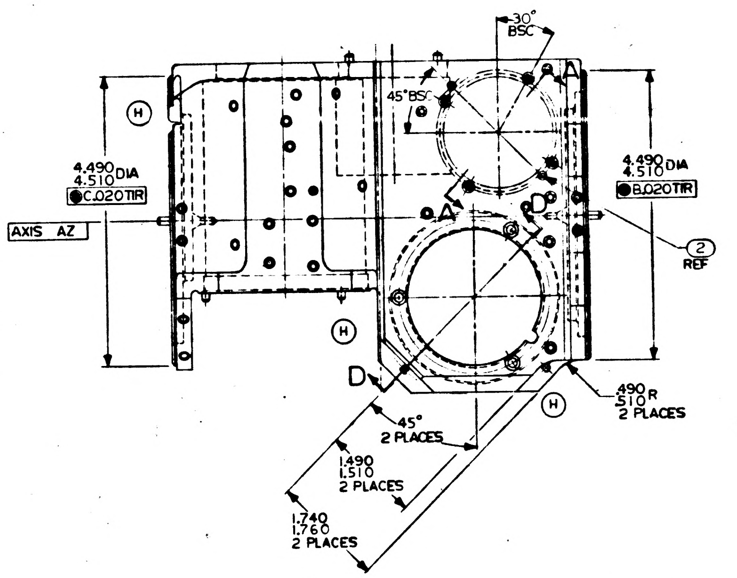
SECTION E-E
2 PLACES


2.635 2.640 DIA
L .002 TIR
G
63
2.1250 2.1255 DIA
L .0002 TIR
.010 .030 x 45° CHAMFER
2 PLACES
.01 .03 R
32
E .0003
3.30 3.305
.240 .260 R
2 PLACES
.302 .322 2 PLACES
32
.245 .255
32
E
REF
2.6250 2.6255 DIA
⊥ E .0003
L

SECTION D-D


1.740 1.760
2 PLACES
.240 .260
3
L
.1249 .1250
FOR
B
4.12


.186 .192 DIA .02 .04 DEEP
3 HOLES
⊕ C .010 DIA
3
J
E
NO.12 (216)-28 NF-2B MODIFIED
.196 .198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.196 .198 DIA .37 .38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSNK 85°±5° TO .210 .230 DIA
TOTAL 6 HOLES
⊕ C .005 DIA
G
"A"
"A"
"A"
"A"
60° BSC
4 PLACES
45° BSC
120° BSC
15° BSC
17° 30' BSC
.490 .510 R
2 PLACES
87° 30' BSC
1.177 1.197
2.302 2.322
.490 .510 R
4 PLACES
"B"
"B"
2.302 2.322
2 PLACES
DATUM PLANE M
∥ F .0005
SEE NOTE 9
SEE NOTE 5
L
.12495 .12505 DIA .18 .20 DEEP
FOR ITEM 1
⊕ C .005 DIA
35° 2 PLACES
4.125 DIA BSC
G


30° BSC
45° BSC
A
H
4.490 4.510 DIA
C .020 TIR
AXIS AZ
A
D
4.490 4.510 DIA
B .020 TIR
2
REF
H
D
H
.490 .510 R
2 PLACES
45°
2 PLACES
1.490 1.510
2 PLACES
1.740 1.760
2 PLACES

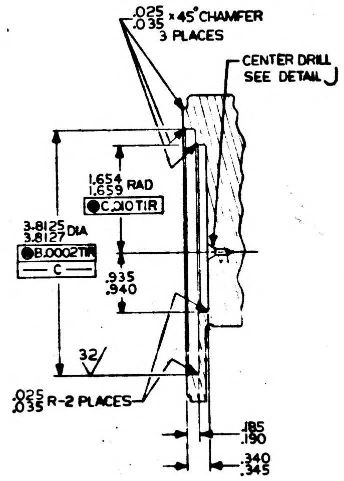
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

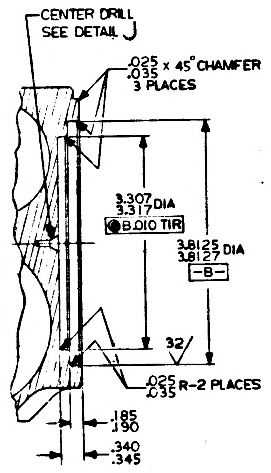
Ⓒ

3. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE $\substack{.052\\.072}$ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES $\substack{.005\\.015}$ R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ & ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

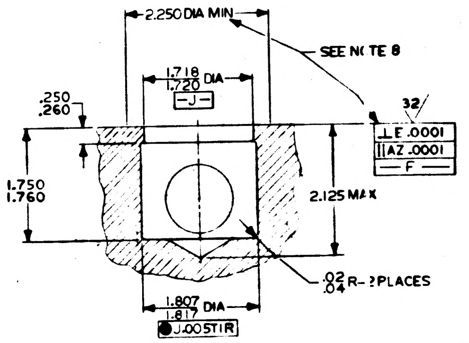
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET


.025 .035 x 45° CHAMFER
3 PLACES
CENTER DRILL
SEE DETAIL J
1.654 1.659 RAD
C .010 TIR
3.8125 3.8127 DIA
B .0002 TIR
C
.935 .940
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

SECTION G-G


CENTER DRILL
SEE DETAIL J
.025 .035 x 45° CHAMFER
3 PLACES
3.307 3.317 DIA
B .010 TIR
3.8125 3.8127 DIA
-B-
32
.025 .035 R-2 PLACES
.185 .190
.340 .345

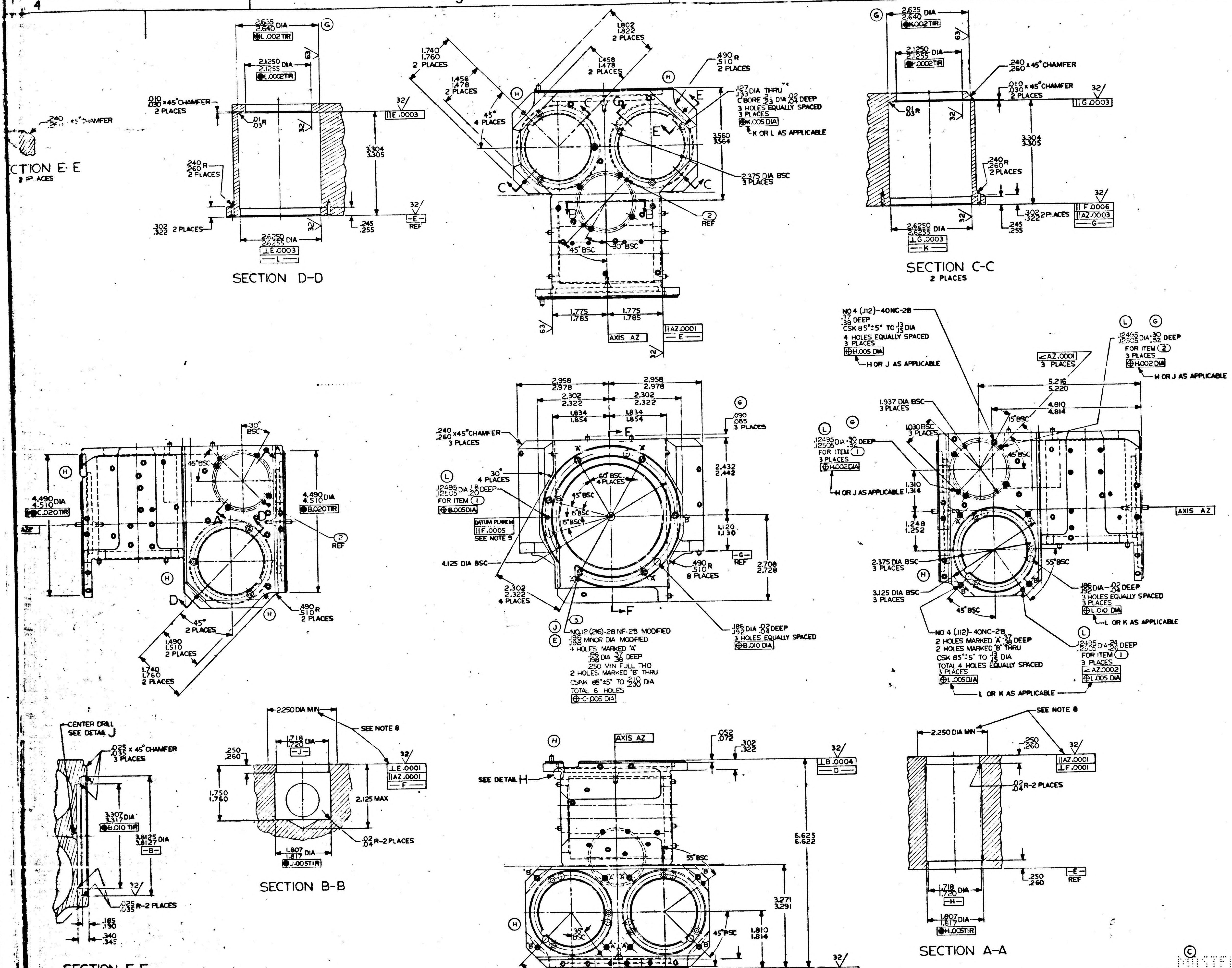
SECTION F-F


2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
-J-
.250 .260
32
⊥ E .0001
∥ AZ .0001
F
1.750 1.760
2.125 MAX
.02 .04 R-2 PLACES
1.807 1.817 DIA
J .005 TIR

SECTION B-B

SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL CHANGES	6/1/62		
B	GENERAL CHANGES	7/25/62	ajb	WHK
C	TDRR 00276	1-22-63	ajb	WK
D	ADDED SHEET 2 OF 2 TDRR 0 611	3-15-63	ajb	WK
E	TDRR 00705	4-3-63	ajb	WK
F	TDRR 00777	4-9-63	ajb	WK
G	TDRR 01053	4-30-63	ajb	WK
H	TDRR 01440	5-22-63	ajb	WK
J	TDRR 01529	6-6-63	ajb	RKB
K	TDRR 01672	6-19-63	ajb	WK
L	TDRR 01807	7-1-63	ajb	WK
M	TDRR 025JB	8-14-63	ajb	LEK

REVISIONS TDRR 00085


4
3
2
1
D
C
B
A
SECTION E-E
2 PLACES
.240 x 45° CHAMFER
2.635 2.640 DIA
L .002 TIR
2.1250 2.1255 DIA
L .0002 TIR
.010 .030 x 45° CHAMFER 2 PLACES
.01 .03 R
32
|| E .0003
3.304 3.305
.240 .260 R 2 PLACES
.302 .322 2 PLACES
.245 .255
2.6250 2.6255 DIA
⊥ E .0003
L
E
REF
SECTION D-D
1.740 1.760 2 PLACES
1.802 1.822 2 PLACES
1.458 1.478 2 PLACES
45° 4 PLACES
.490 .510 R 2 PLACES
.127 .133 DIA THRU C'BORE .21 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
3 PLACES
⊕ K .005 DIA
K OR L AS APPLICABLE
3.560 3.564
2.375 DIA BSC 3 PLACES
2 REF
45° BSC
30° BSC
1.775 1.785
1.775 1.785
AXIS AZ
|| AZ .0001
63
C
D
E
G
H
2.635 2.640 DIA
K .002 TIR
2.1250 2.1255 DIA
K .0002 TIR
.240 .260 x 45° CHAMFER
.010 .030 x 45° CHAMFER 2 PLACES
|| G .0003
.01 .03 R
3.304 3.305
.240 .260 R 2 PLACES
.302 .322 2 PLACES
|| F .0006
|| AZ .0003
.245 .255
2.6250 2.6255 DIA
⊥ G .0003
K
SECTION C-C
2 PLACES
NO 4 (.112)-40NC-2B .37 .38 DEEP
CSK 85° ±5° TO .13 .15 DIA
4 HOLES EQUALLY SPACED
3 PLACES
⊕ H .005 DIA
H OR J AS APPLICABLE
∠ AZ .0001 3 PLACES
.12495 .12505 DIA .30 .32 DEEP
FOR ITEM ②
3 PLACES
⊕ H .002 DIA
H OR J AS APPLICABLE
5.216 5.220
4.810 4.814
1.937 DIA BSC 3 PLACES
1.030 BSC 3 PLACES
15° BSC
45° BSC
.12495 .12505 DIA .30 .32 DEEP
FOR ITEM ①
3 PLACES
⊕ H .002 DIA
H OR J AS APPLICABLE
1.310 1.314
1.248 1.252
AXIS AZ
2.375 DIA BSC 3 PLACES
3.125 DIA BSC 3 PLACES
55° BSC
45° BSC
.186 .192 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
3 PLACES
⊕ L .010 DIA
L OR K AS APPLICABLE
NO 4 (.112)-40NC-2B
2 HOLES MARKED "A" .37 .38 DEEP
2 HOLES MARKED "B" THRU
CSK 85° ±5° TO .13 .15 DIA
TOTAL 4 HOLES EQUALLY SPACED
3 PLACES
⊕ L .005 DIA
L OR K AS APPLICABLE
.12495 .12505 DIA .24 .26 DEEP
FOR ITEM ①
3 PLACES
∠ AZ .0002
⊕ L .005 DIA
2.958 2.978
2.958 2.978
2.302 2.322
2.302 2.322
1.834 1.854
1.834 1.854
.090 .085 3 PLACES
.240 .260 x 45° CHAMFER 3 PLACES
30° 4 PLACES
.12495 .12505 DIA .18 .20 DEEP
FOR ITEM ①
⊕ B .005 DIA
DATUM PLANE M
|| F .0005
SEE NOTE 9
60° BSC 4 PLACES
45° BSC
15° BSC
15° BSC
2.432 2.442
1.120 1.130
G
REF
2.708 2.728
.490 .510 R 8 PLACES
4.125 DIA BSC
2.302 2.322 4 PLACES
F
NO. 12 (.216)-28 NF-2B MODIFIED
.192 .198 MINOR DIA MODIFIED
4 HOLES MARKED "A"
.192 .198 DIA .37 .38 DEEP
.250 MIN FULL THD
2 HOLES MARKED "B" THRU
CSINK 85° ±5° TO .210 .230 DIA
TOTAL 6 HOLES
⊕ C .005 DIA
.186 .192 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ B .010 DIA
30° BSC
45° BSC
4.490 4.510 DIA
C .020 TIR
4.490 4.510 DIA
B .020 TIR
AZ
2 REF
45° 2 PLACES
1.490 1.510 2 PLACES
1.740 1.760 2 PLACES
.490 .510 R 2 PLACES
CENTER DRILL SEE DETAIL J
.025 .035 x 45° CHAMFER 3 PLACES
3.307 3.317 DIA
B .010 TIR
3.8125 3.8127 DIA
B
.025 .035 R-2 PLACES
.185 .190
.340 .345
SECTION F-F
2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
J
.250 .260
⊥ E .0001
|| AZ .0001
F
1.750 1.760
2.125 MAX
1.807 1.817 DIA
J .005 TIR
.02 .04 R-2 PLACES
SECTION B-B
AXIS AZ
.052 .072
.302 .322
|| B .0004
D
SEE DETAIL H
6.625 6.622
55° BSC
3.271 3.291
1.810 1.814
35° BSC
45° BSC
45° BSC
1.498 1.502
1.498 1.502
.052 .072
.302 .322
⊥ C .0004
|| D .0004
SEE NOTE 8
2.250 DIA MIN
.250 .260
|| AZ .0001
⊥ F .0001
.02 .04 R-2 PLACES
1.718 1.720 DIA
H
1.807 1.817 DIA
H .005 TIR
E REF
.250 .260
SECTION A-A

M	M
L	K
K	K
J	H
H	H
G	F
F	F
E	D
D	D
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
12	INSERT, THREADED, SELF LOCKING	1000115-3			3
3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1

LIST OF PARTS AND MATERIALS

© MASTER

	DL1000001
1000065	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

MIT INSTRUMENTATION LAB CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN G. QUINN
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 9/13/62

HOUSING
STABLE MEMBER
IMU

SCALE 1/1
UNIT WT
CODE IDENT

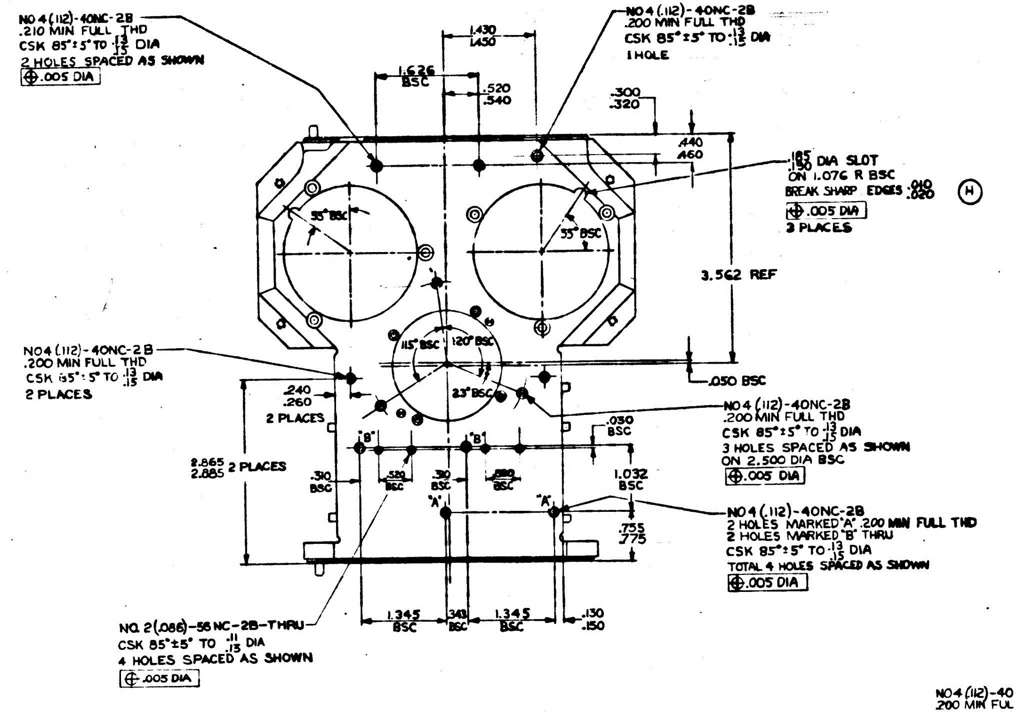
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 1 OF 2

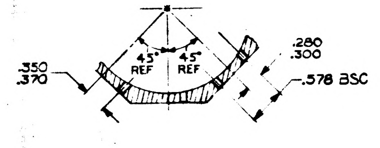
1000025 M

E-2

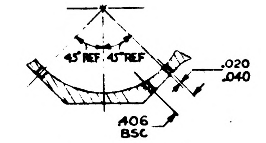
1000025 M

SYM	DESCRIPTION	DATE	APPROVAL	
D	THIS SHEET ADDED TDRR 00611	3-13-63	ajB	WK
F	TDRR 00777	4-9-63	ajB	WK
H	TDRR 01440	5-22-63	ajB	WK
K	TDRR 01672	6-19-63	ajB	WK
M	TDRR 02508	8-14-63	ajB	

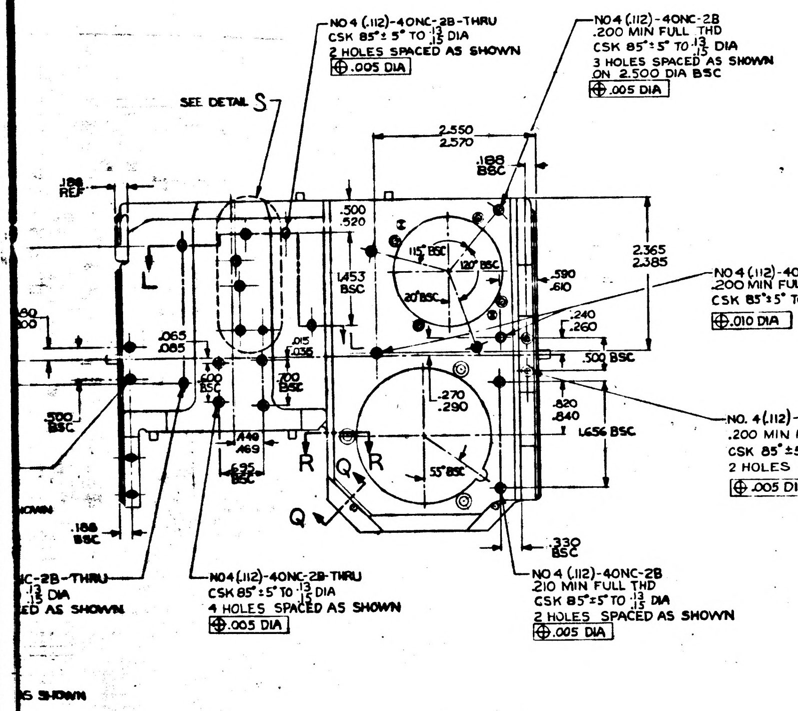

NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
1 HOLE
1.430
1.450
1.626 BSC
.520
.540
.300
.320
.440
.460
.185/.190 DIA SLOT
ON 1.076 R BSC
BREAK SHARP EDGES .010/.020
⊕ .005 DIA
3 PLACES
55° BSC
3.562 REF
115° BSC
120° BSC
23° BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 PLACES
.050 BSC
.240
.260
2 PLACES
2.865
2.885 2 PLACES
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
.030 BSC
1.032 BSC
NO 4 (.112)-40NC-2B
2 HOLES MARKED "A" .200 MIN FULL THD
2 HOLES MARKED "B" THRU
CSK 85° ± 5° TO .13/.15 DIA
TOTAL 4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.755
.775
1.345 BSC
.343 BSC
1.345 BSC
.130
.150
NO. 2 (.086)-56 NC-2B-THRU
CSK 85° ± 5° TO .11/.13 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA

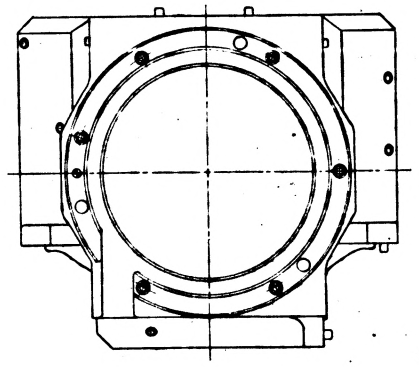

.350
.370
45° REF
45° REF
.280
.300
.578 BSC

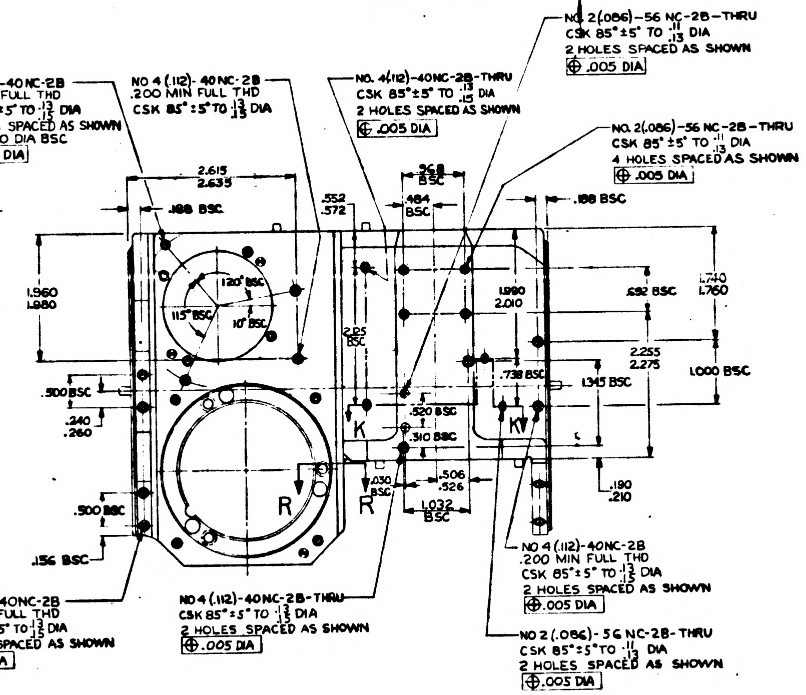
SECTION L-L

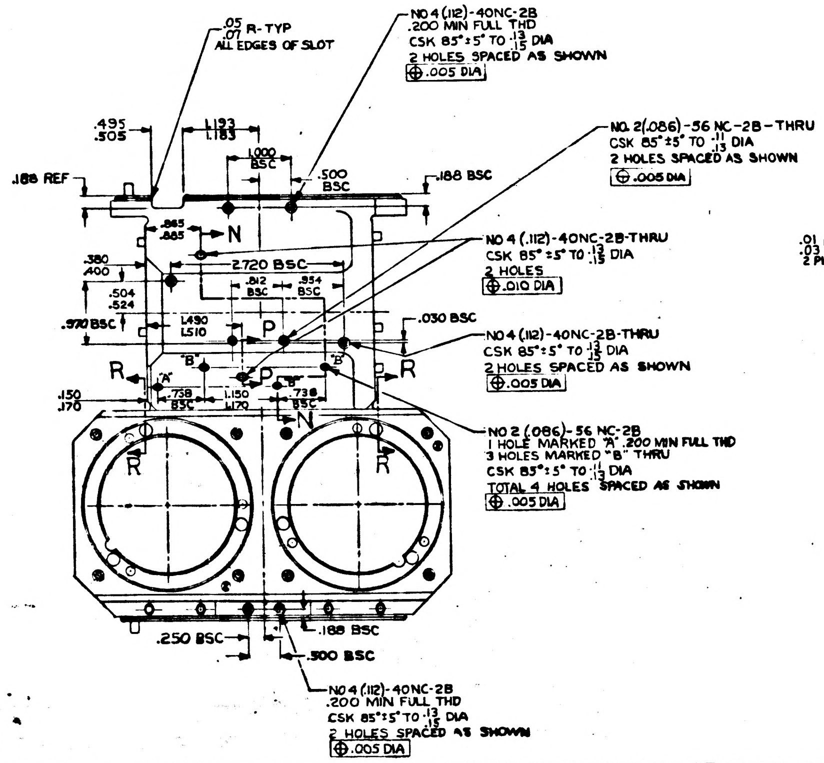

45° REF
45° REF
.020
.040
.406 BSC

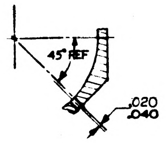
SECTION K-K


NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
SEE DETAIL S
.188 REF
2.550
2.570
.188 BSC
.500
.520
1.453 BSC
115° BSC
120° BSC
20° BSC
2.365
2.385
.590
.610
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
⊕ .010 DIA
.240
.260
.500 BSC
.065
.085
.270
.290
.820
.840
1.656 BSC
NO. 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
55° BSC
R
Q
R
Q
L
.500 BSC
.188 BSC
.330 BSC
NO4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

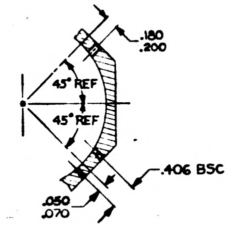



NO 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
NO 4 (.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
NO. 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU
CSK 85° ± 5° TO .11/.13 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO. 2 (.086)-56 NC-2B-THRU
CSK 85° ± 5° TO .11/.13 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
2.615
2.635
.188 BSC
.552
.572
.268 BSC
.484 BSC
.188 BSC
1.960
1.980
120° BSC
115° BSC
10° BSC
1.990
2.010
.692 BSC
1.740
1.760
2.255
2.275
1.000 BSC
.738 BSC
1.345 BSC
.500 BSC
.240
.260
.520 BSC
.310 BSC
K
K
R
.030 BSC
.506
.526
1.032 BSC
.190
.210
.500 BSC
.156 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 2 (.086)-56 NC-2B-THRU
CSK 85° ± 5° TO .11/.13 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

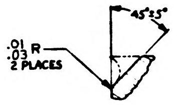

.05/.07 R-TYP
ALL EDGES OF SLOT
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.495
.505
1.173
1.183
1.000 BSC
.500 BSC
.188 REF
.188 BSC
NO. 2 (.086)-56 NC-2B-THRU
CSK 85° ± 5° TO .11/.13 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.865
.885
N
2.720 BSC
.380
.400
.504
.524
.812 BSC
.854 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES
⊕ .010 DIA
.970 BSC
1.490
1.510
P
.030 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
R
R
P
.150
.170
.738 BSC
1.150
1.170
.738 BSC
N
NO 2 (.086)-56 NC-2B
1 HOLE MARKED "A" .200 MIN FULL THD
3 HOLES MARKED "B" THRU
CSK 85° ± 5° TO .11/.13 DIA
TOTAL 4 HOLES SPACED AS SHOWN
⊕ .005 DIA
R
R
.188 BSC
.250 BSC
.500 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA


45° REF
.020
.040

SECTION P-P


.180
.200
45° REF
45° REF
.406 BSC
.050
.070

SECTION N-N


45° ± 5°
.01/.03 R
2 PLACES

SECTION R-R
SCALE 4/1
4 PLACES

Ⓓ THIS SHEET ADDED

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ± 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN G. QUINN
APPROVED FOR MSC
BY DIRECTION MIT

HOUSING,
STABLE MEMBER

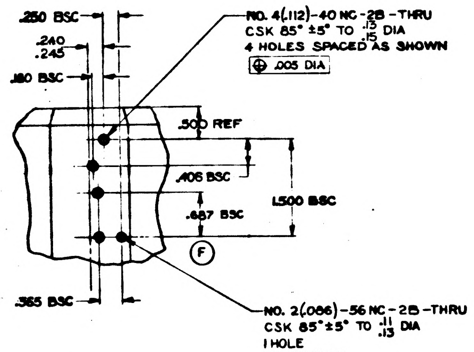
SCALE 1/1
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 2 OF 2

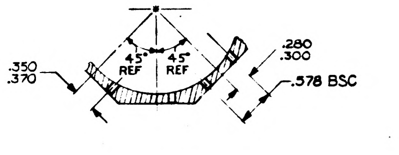
1000025 M 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

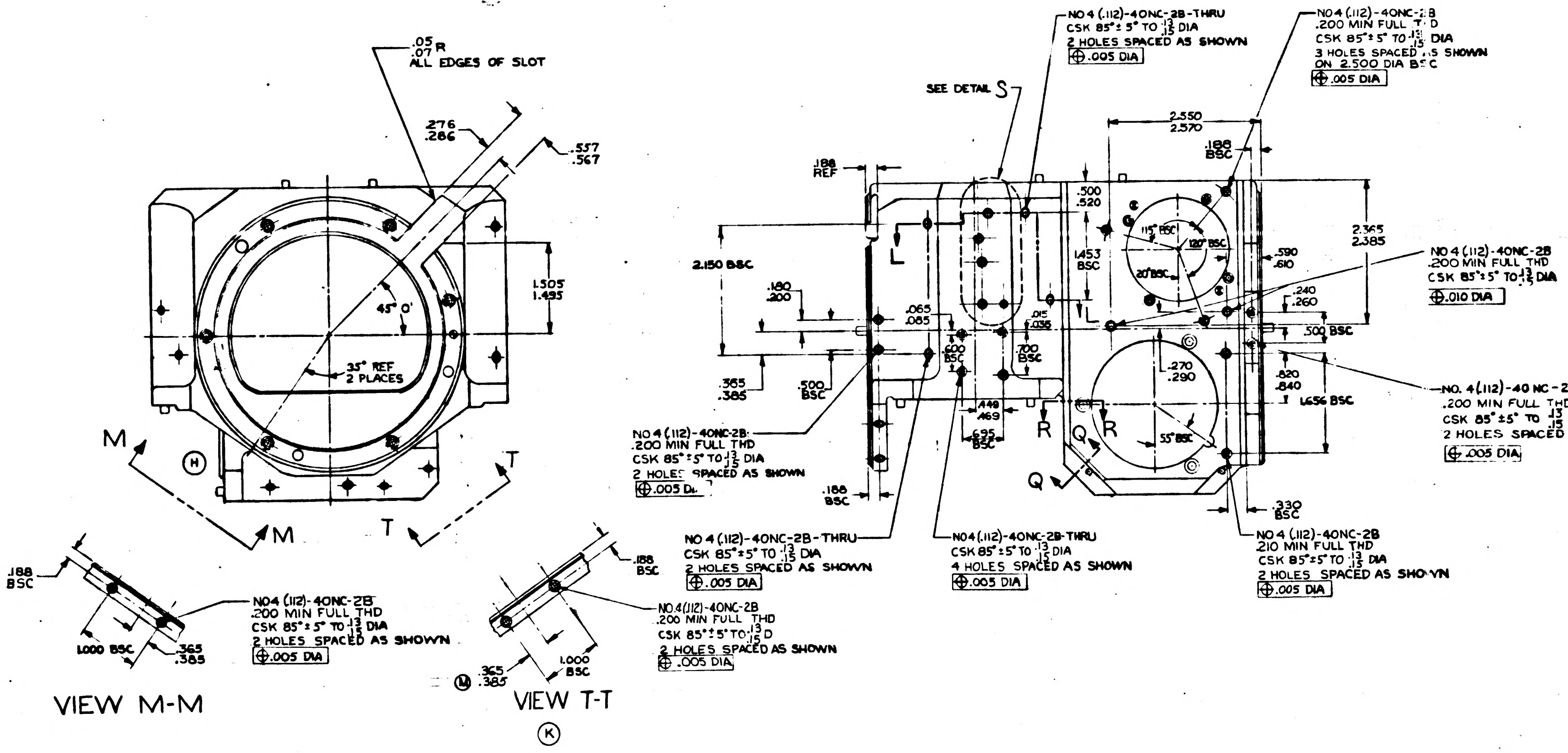
F-2


.250 BSC
.240
.245
.180 BSC
.500 REF
.406 BSC
1.500 BSC
.687 BSC
Ⓕ
.365 BSC
NO. 4(.112)-40 NC-2B-THRU
CSK 85° ±5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO. 2(.086)-56 NC-2B-THRU
CSK 85°±5° TO .11/.13 DIA
1 HOLE
⊕ .005 DIA

DETAIL C

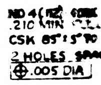

45° REF
45° REF
.350
.370
.280
.300
.578 BSC

SECTION L-L

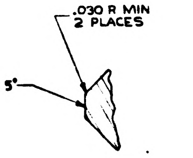

.05/.07 R
ALL EDGES OF SLOT
.276
.286
.557
.567
1.505
1.495
45° 0'
35° REF
2 PLACES
M
M
T
T
Ⓗ
SEE DETAIL S
NO 4 (.112)-40NC-2B-THRU
CSK 85°± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°± 5° TO .13/.15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
2.550
2.570
.188 BSC
.188 REF
.500
.520
2.365
2.385
115° BSC
120° BSC
20° BSC
1.453 BSC
.590
.610
2.150 BSC
.180
.200
.065
.085
.015
.035
.240
.260
.500 BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°± 5° TO .13/.15 DIA
⊕ .010 DIA
.600 BSC
.700 BSC
.270
.290
.820
.840
1.656 BSC
.365
.385
.500 BSC
.448
.469
.695 BSC
R
R
Q
Q
L
L
55° BSC
NO. 4(.112)-40 NC-2
.200 MIN FULL THD
CSK 85° ±5° TO .13/.15
2 HOLES SPACED
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.188 BSC
.330 BSC
NO 4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO4 (.112)-40NC-2B-THRU
CSK 85°±5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85°±5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.188 BSC
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85°± 5° TO .13/.15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
1.000 BSC
.365
.385
.188 BSC
NO.4(.112)-40NC-2B
.200 MIN FULL THD
CSK 85°±5° TO .13/.15 D
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
Ⓜ .365
.385
1.000 BSC
Ⓚ

VIEW M-M

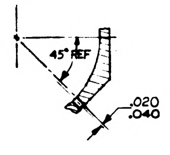
VIEW T-T


NO 4 (.112)
.210 MIN
CSK 85°±5° TO
2 HOLES
⊕ .005 DIA
NO 4 (.112)-40
.200 MIN FULL
CSK 85°±5° T
2 PLACES

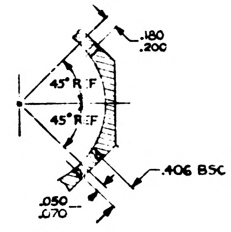
NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
Ⓗ 2 REMOVE BURRS & BREAK ALL SHARP EDGES .005/.015
3 FOR MATERIAL & MACHINING PRIOR TO THIS DRAWING SEE NASA DRAWING NO. 1000025 SHEET 1


.030 R MIN
2 PLACES
.050/.070 × 45°± 5°

SECTION Q-Q
SCALE 4


45° REF
.020
.040

SECTION P-P

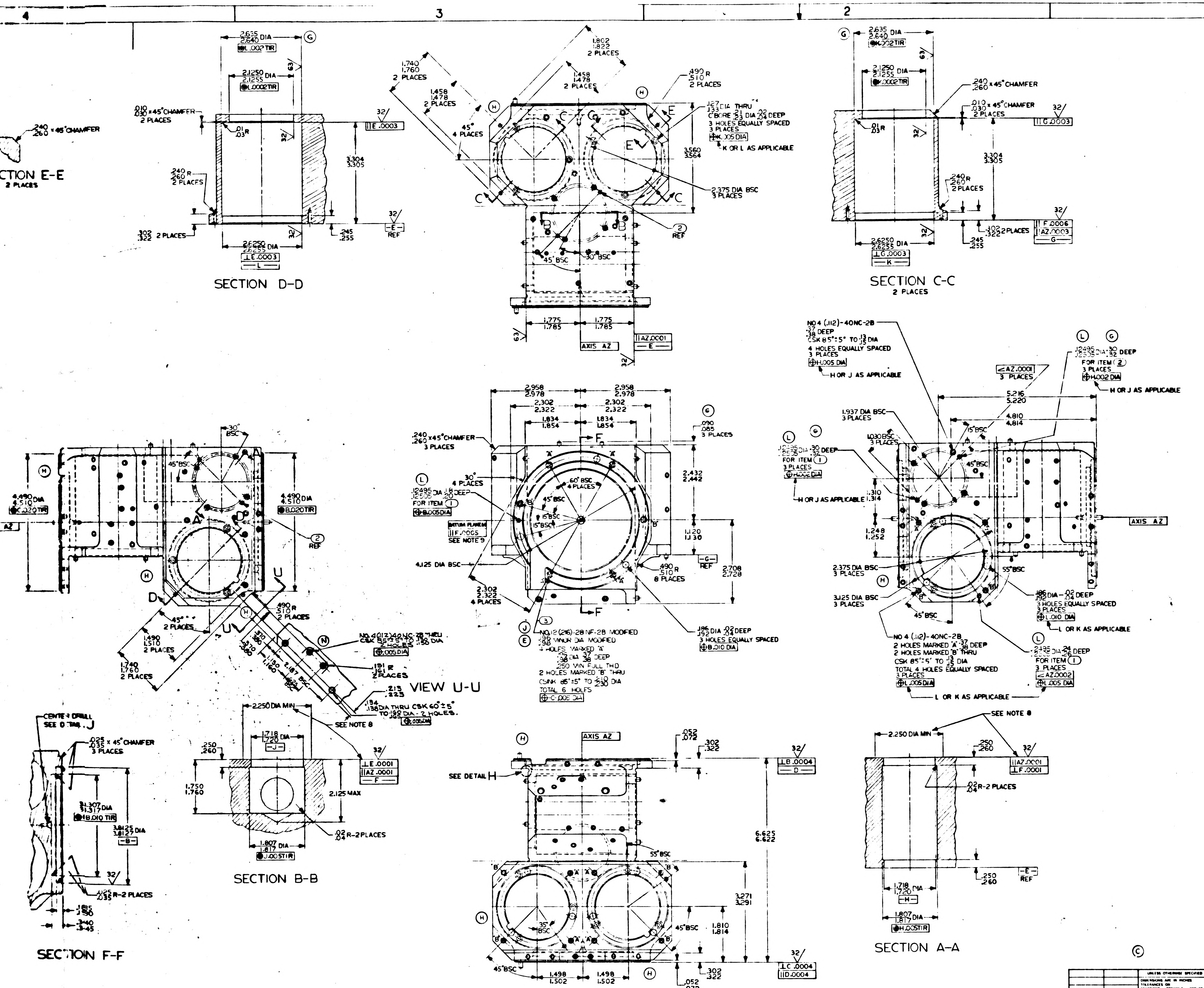

.180
.200
45° REF
45° REF
.406 BSC
.050
.070

SECTION N-N

	REV	SHEET
1000025	M	2

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

F-1



SECTION E-E
2 PLACES
SECTION D-D
SECTION C-C
2 PLACES
SECTION B-B
SECTION A-A
SECTION F-F
VIEW U-U
AXIS AZ
SEE DETAIL H
SEE NOTE 8
SEE NOTE 9
DATUM PLANE M
2.635 2.640 DIA
2.1250 2.1255 DIA
3.304 3.305
2.6250 2.6255 DIA
.240 .260 x 45° CHAMFER
.010 .030 x 45° CHAMFER 2 PLACES
.240 .260 R 2 PLACES
.302 .322 2 PLACES
.245 .255
.167 .133 DIA THRU C'BORE .23 DIA .22 .24 DEEP 3 HOLES EQUALLY SPACED 3 PLACES
K OR L AS APPLICABLE
2.375 DIA BSC 3 PLACES
NO 4 (.112)-40NC-2B .37 .38 DEEP CSK 85° ±5° TO .13 .15 DIA 4 HOLES EQUALLY SPACED 3 PLACES
H OR J AS APPLICABLE
FOR ITEM 2 3 PLACES
L OR K AS APPLICABLE
NO 4 (.112)-40NC-2B 2 HOLES MARKED "A" .37 .38 DEEP 2 HOLES MARKED "B" THRU CSK 85° ±5° TO .13 .15 DIA TOTAL 4 HOLES EQUALLY SPACED 3 PLACES
NO.12 (.216)-28 NF-2B MODIFIED .188 .198 MINOR DIA MODIFIED 4 HOLES MARKED "A" .37 .38 DEEP .250 MIN FULL THD 2 HOLES MARKED "B" THRU CSNK 85° ±5° TO .210 .230 DIA TOTAL 6 HOLES
.186 .192 DIA .22 .24 DEEP 3 HOLES EQUALLY SPACED
NO.4 (112)-40NC-2B THRU CSK 85° ±5° TO .138 .150 DIA 2 HOLES
.134 .138 DIA THRU CSK 60° ±5° TO .192 .198 DIA - 2 HOLES
CENTER DRILL SEE DETAIL J
.025 .035 x 45° CHAMFER 3 PLACES
2.250 DIA MIN
1.718 1.720 DIA
1.807 1.817 DIA
2.125 MAX
.02 .04 R-2 PLACES
4.490 4.510 DIA
4.125 DIA BSC
3.125 DIA BSC 3 PLACES
1.937 DIA BSC 3 PLACES
5.216 5.220
4.810 4.814
6.625 6.622
3.271 3.291
1.498 1.502

SYM	DESCRIPTION	DATE	APPROVED	
A	GENERAL CHANGES	6/1/62		
F	GENERAL CHANGES	7/25/62	ag8	WR
C	TDRR 00276	1-22	ag8	WR
D	ADDED SHEET 2 OF 2 TDRR 00611	3-15-63	2J6	WR
E	TDRR 00705	4-3-63	2J6	WR
F	TDRR 00777	4-9-63	2J6	WR
G	TDRR 01053	4-30-63	2J6	WR
H	TDRR 01440	5-22-63	2J6	WR
J	TDRR 01529	6-6-63	2J6	RKB
K	TDRR 01672	6-19-63	2J6	WR
L	TDRR 01807	7-1-63	2J6	WR
M	TDRR [illegible]	8-14-63	2J6	[illegible]
N	TDRR 06523	6-3-64	[illegible]	[illegible]

REVISIONS TDRR 00086

N	N
M	M
L	K
K	K
J	H
H	H
G	F
F	F
E	D
D	D
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
12	INSERT, THREADED, SELF LOCKING	1000115-3			3
3	PIN, LOCATING	1000089			2
8	PIN, LOCATING	1000088-2			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000001
1000005	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM, BRUSH
SPEC M-100-T

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN G. QUINN
APPROVED FOR NASA
BY DIRECTION

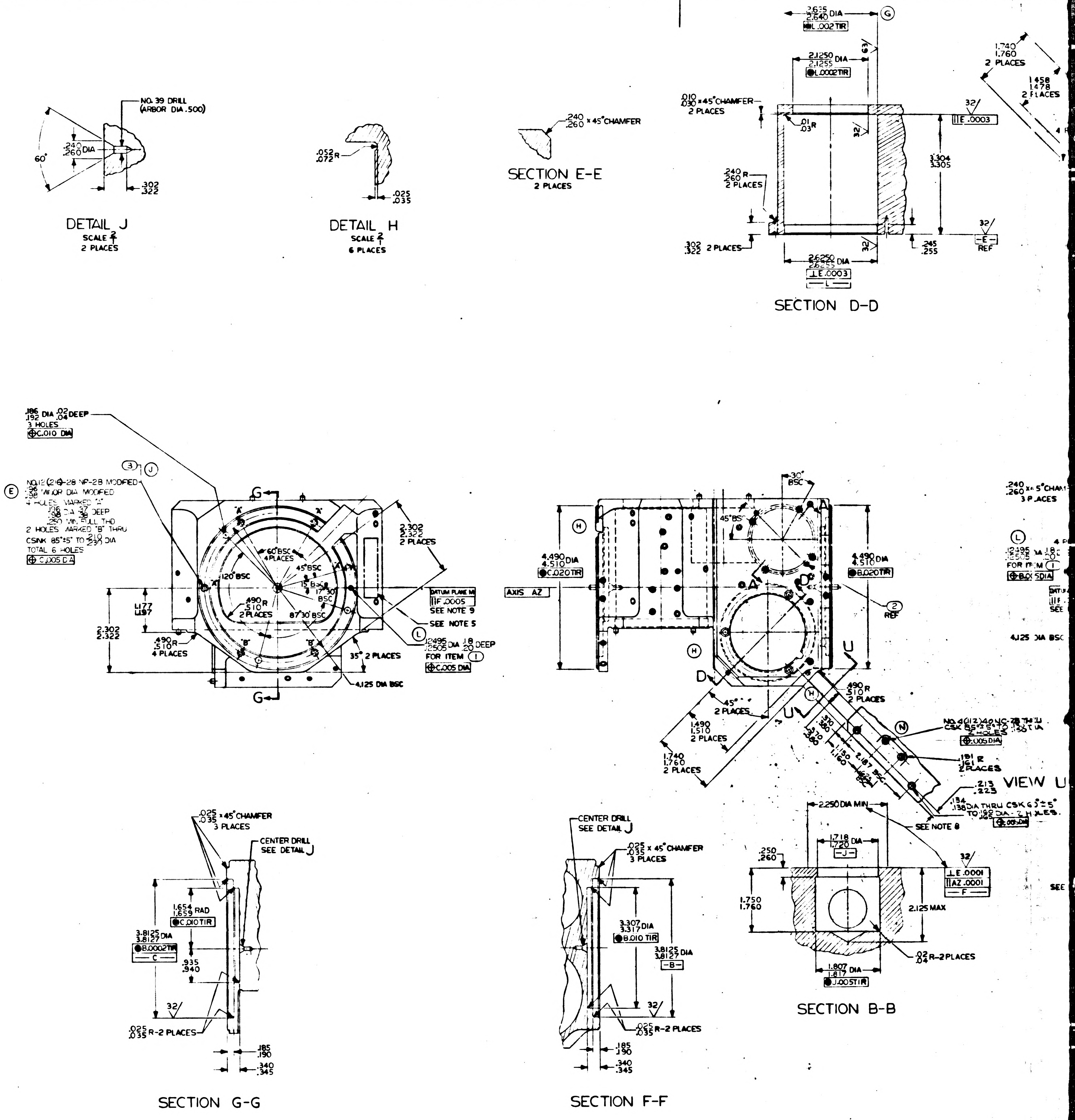
HOUSING
STABLE MEMBER
IMU

SCALE 1/1
UNIT WT.
CODE IDENT

MIT INSTRUMENTATION LABORATORY Cambridge Mass
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000025
SHEET 1 OF 2

1000025 N
1000025 N 1

271000025


DETAIL J
SCALE 2
2 PLACES
NO. 39 DRILL (ARBOR DIA .500)
.240 .260 DIA
60°
.302 .322
DETAIL H
SCALE 2
6 PLACES
.052 .072 R
.025 .035
SECTION E-E
2 PLACES
.240 .260 x 45° CHAMFER
SECTION D-D
2.635 2.640 DIA
2.1250 2.1255 DIA
.010 .030 x 45° CHAMFER 2 PLACES
.240 .260 R 2 PLACES
.302 .322 2 PLACES
3.304 3.305
.245 .255
2.6250 2.6255 DIA
1.740 1.760 2 PLACES
1.458 1.478 2 PLACES
.186 .192 DIA .02 .04 DEEP 3 HOLES
NO. 12 (216)-28 NF-2B MODIFIED
4 HOLES MARKED "A"
2 HOLES MARKED "B" THRU
TOTAL 6 HOLES
2.302 2.322 2 PLACES
60° BSC 4 PLACES
120° BSC
45° BSC
15° BSC
17°30' BSC
87°30' BSC
.490 .510 R 2 PLACES
.490 .510 R 4 PLACES
1.177 1.197
2.302 2.322
35° 2 PLACES
4.125 DIA BSC
.12495 .12505 DIA .18 .20 DEEP FOR ITEM ①
DATUM PLANE M
SEE NOTE 9
SEE NOTE 5
G
G
AXIS AZ
4.490 4.510 DIA
30° BSC
45° BSC
2 REF
1.490 1.510 2 PLACES
1.740 1.760 2 PLACES
45° 2 PLACES
VIEW U
NO. 4 (112)-40 UNC-2B THRU
.191 .161 R 2 PLACES
.213 .223
.240 .260 x 45° CHAM 3 PLACES
4.125 DIA BSC
SECTION G-G
.025 .035 x 45° CHAMFER 3 PLACES
CENTER DRILL SEE DETAIL J
1.654 1.659 RAD
3.8125 3.8127 DIA
.935 .940
.025 .035 R-2 PLACES
.185 .190
.340 .345
SECTION F-F
CENTER DRILL SEE DETAIL J
.025 .035 x 45° CHAMFER 3 PLACES
3.307 3.317 DIA
3.8125 3.8127 DIA
.025 .035 R-2 PLACES
.185 .190
.340 .345
SECTION B-B
2.250 DIA MIN
SEE NOTE 8
1.718 1.720 DIA
.250 .260
1.750 1.760
2.125 MAX
.02 .04 R-2 PLACES
1.807 1.817 DIA

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓒ

3. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED
4. FILLETS AND RADII TO BE $\frac{.052}{.072}$ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. REMOVE BURRS AND BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R
7. LINE THRU CENTERS OF -B- AND -C- ESTABLISHES AXIS AZ
8. ∥ & ⊥ TOLERANCES APPLY IN THIS AREA ONLY
9. LINE THRU AXIS AZ AND CENTER OF ITEM ① ESTABLISHES DATUM PLANE M
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

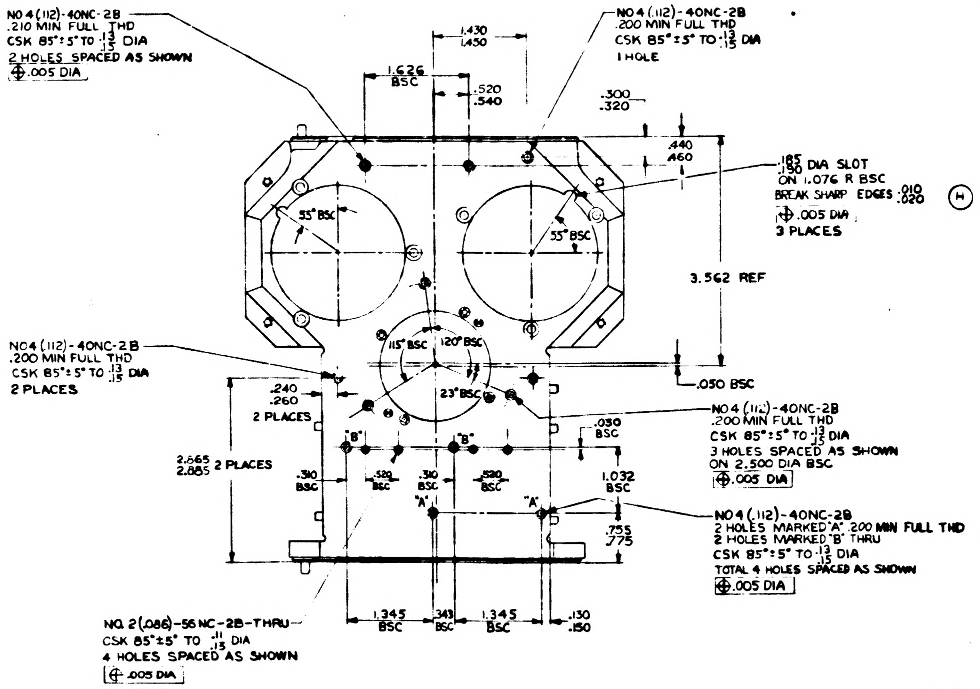
Ⓓ 11. SEE SHEET 2 FOR DIMENSIONS OF ALL HOLES SHOWN AND NOT DIMENSIONED ON THIS SHEET

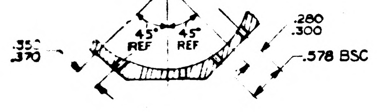
1000025	REV N	SH 1

1/1000025

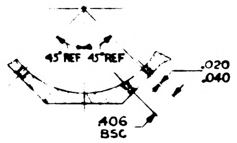
N 1000025

SYM	DESCRIPTION	DATE	APPROVAL	
D	THIS SHEET ADDED TDRR 00611	3-13-63		
F	TDRR 00777	4-9-63		
H	TDRR 01440	5-22-63		
K	TDRR 01672	6-19-63		
M	TDRR 02508	8-14-63		
N	TDRR 08523	6-3-64		

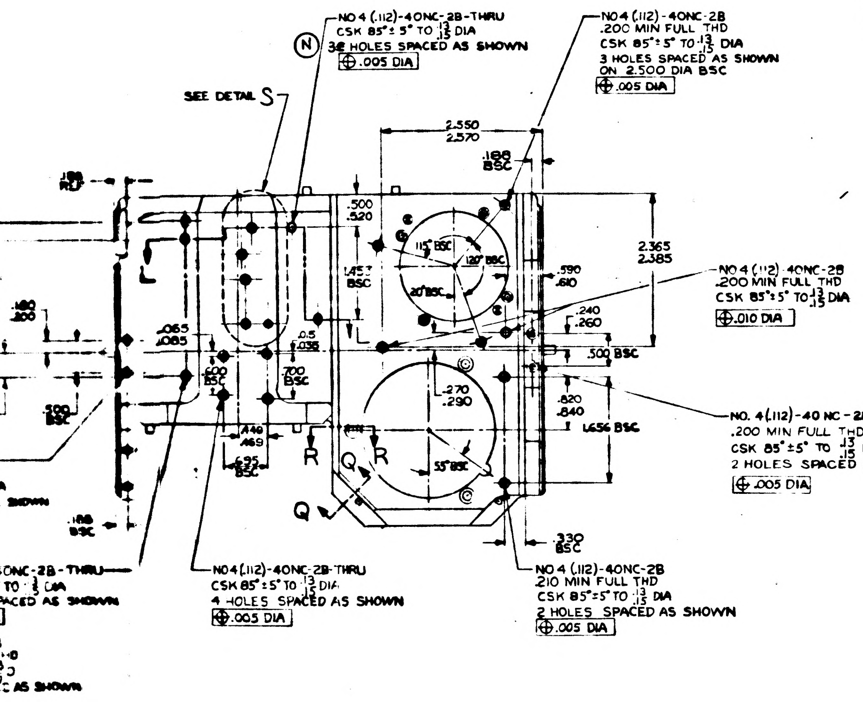

NO4 (.112)-40NC-2B .210 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 1 HOLE
1.430/1.450
1.626 BSC
.520/.540
.300/.320
.440/.460
.185/.190 DIA SLOT ON 1.076 R BSC BREAK SHARP EDGES .010/.020 ⊕.005 DIA 3 PLACES
55° BSC
3.562 REF
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 PLACES
115° BSC 120° BSC 23° BSC
.050 BSC
.240/.260 2 PLACES
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕.005 DIA
.030 BSC
2.665/2.685 2 PLACES
.310 BSC .520 BSC .310 BSC .520 BSC
1.032 BSC
NO4 (.112)-40NC-2B 2 HOLES MARKED "A" .200 MIN FULL THD 2 HOLES MARKED "B" THRU CSK 85°±5° TO .13/.15 DIA TOTAL 4 HOLES SPACED AS SHOWN ⊕.005 DIA
.755/.775
NO. 2(.086)-56NC-2B-THRU CSK 85°±5° TO .11/.15 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
1.345 BSC .343 BSC 1.345 BSC .130/.150

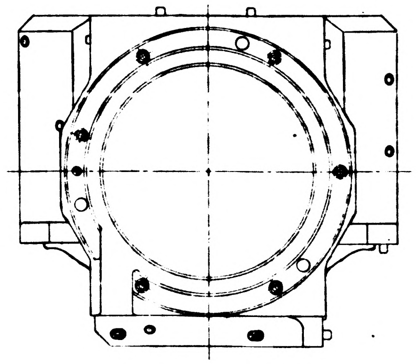

45° REF 45° REF
.350/.370
.280/.300
.578 BSC

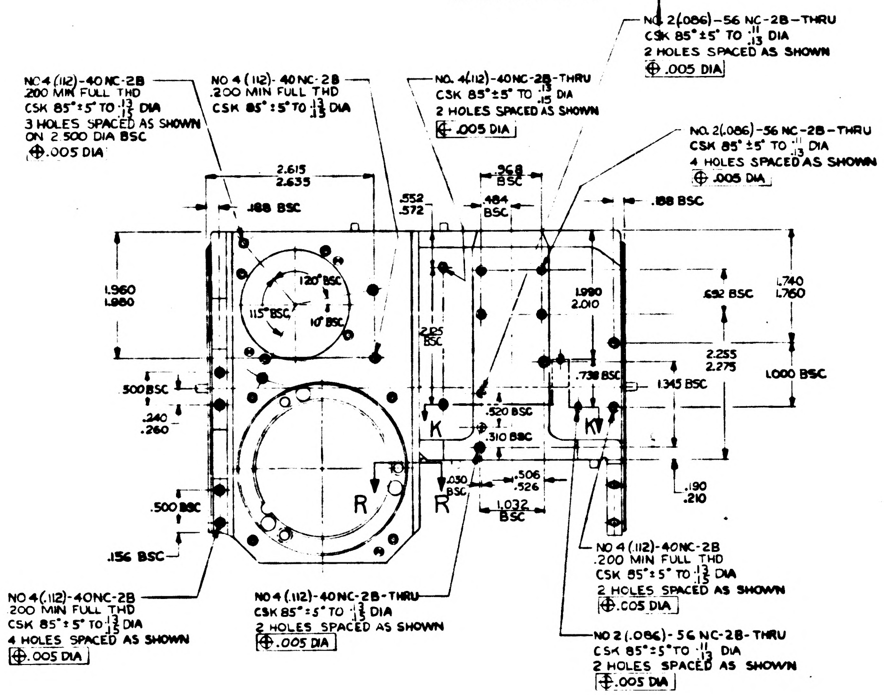
SECTION L-L

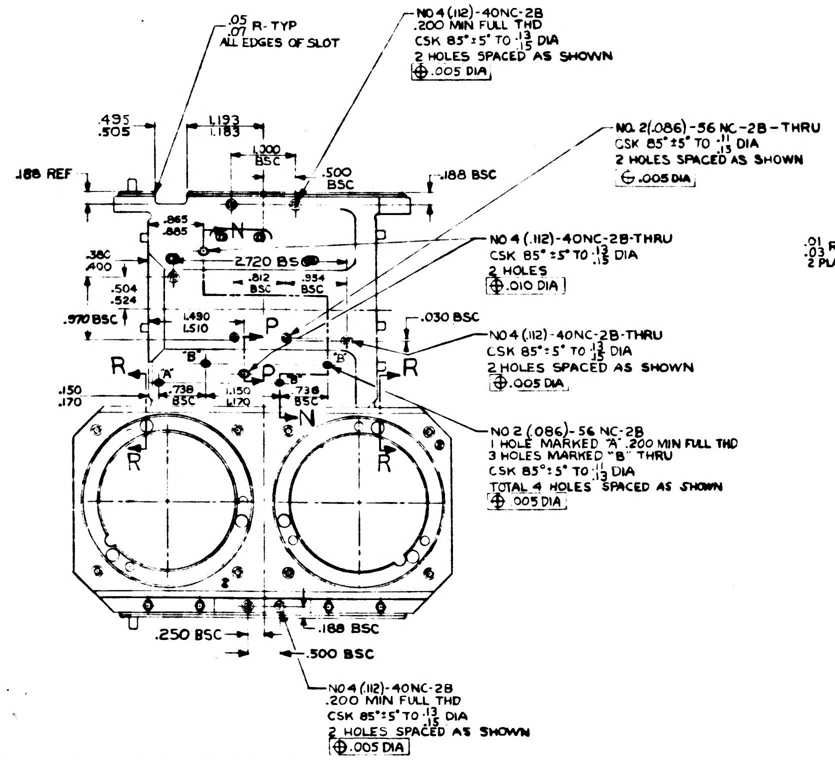

45° REF 45° REF
.020/.040
.406 BSC

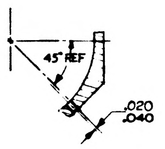
SECTION K-K


NO4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 3 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕.005 DIA
SEE DETAIL S
2.550/2.570
.185 BSC
.500/.520
2.365/2.385
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA ⊕.010 DIA
.590/.610
.240/.260
.500 BSC
.820/.840
1.656 BSC
NO. 4(.112)-40 NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
115° BSC 120° BSC 10° BSC
.270/.290
55° BSC
.065/.085
.180/.200
.500 BSC
.440/.460
.635 BSC
.600 BSC
.700 BSC
Q R Q R
.330 BSC
NO4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B .210 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA

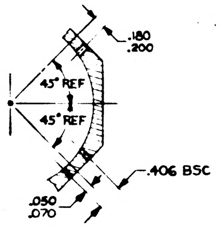



NO. 2(.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 3 HOLES SPACED AS SHOWN ON 2.500 DIA BSC ⊕.005 DIA
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA
NO. 4(.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO. 2(.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
2.615/2.635
.188 BSC
.552/.572
.368 BSC
.484 BSC
.188 BSC
1.960/1.980
1.980/2.010
.592 BSC
.740/.760
120° BSC 115° BSC 10° BSC
2.255/2.275
.738 BSC
1.345 BSC
1.000 BSC
.500 BSC
.240/.260
.520 BSC
.310 BSC
K K R R
.506/.526
1.032 BSC
.030 BSC
.190/.210
.500 BSC
.156 BSC
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 4 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
NO2 (.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA

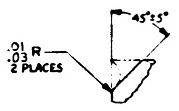

.05/.07 R-TYP ALL EDGES OF SLOT
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
.495/.505
1.193/1.183
.300 BSC
.500 BSC
.188 REF
.188 BSC
NO. 2(.086)-56 NC-2B-THRU CSK 85°±5° TO .11/.13 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
.865/.885
NO4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES ⊕.010 DIA
.380/.400
2.720 BSC
.812 BSC .934 BSC
.504/.524
.970 BSC
1.490/1.510
.030 BSC
NO4 (.112)-40NC-2B-THRU CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA
N N P P R R R R
.150/.170
.738 BSC
1.150/1.170
.738 BSC
NO 2 (.086)-56 NC-2B 1 HOLE MARKED "A" .200 MIN FULL THD 3 HOLES MARKED "B" THRU CSK 85°±5° TO .11/.13 DIA TOTAL 4 HOLES SPACED AS SHOWN ⊕.005 DIA
.250 BSC
.188 BSC
.500 BSC
NO4 (.112)-40NC-2B .200 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 2 HOLES SPACED AS SHOWN ⊕.005 DIA


45° REF
.020/.040

SECTION P-P


45° REF
45° REF
.180/.200
.406 BSC
.050/.070

SECTION N-N


45°±5°
.01/.03 R 2 PLACES

SECTION R-R
SCALE 4/1
4 PLACES

Ⓓ THIS SHEET ADDED

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN G. GUINN
APPROVED FOR MSC
MIT

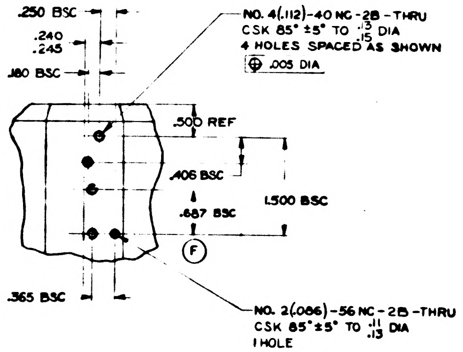
HOUSING,
STABLE MEMBER

SCALE 1/1
UNIT WT
CODE IDENT

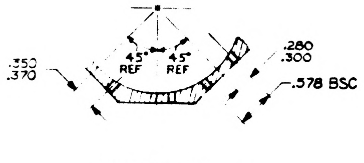
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000025
SHEET 2 OF 2

1000025 REV N SHEET 2

2/1000025


.250 BSC
.240
.245
.180 BSC
NO. 4(.112)-40 NC-2B-THRU
CSK 85° ±5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
.500 REF
.406 BSC
.687 BSC
1.500 BSC
Ⓕ
.365 BSC
NO. 2(.086)-56 NC-2B-THRU
CSK 85° ±5° TO .11 .13 DIA
1 HOLE
⊕ .005 DIA

DETAIL S

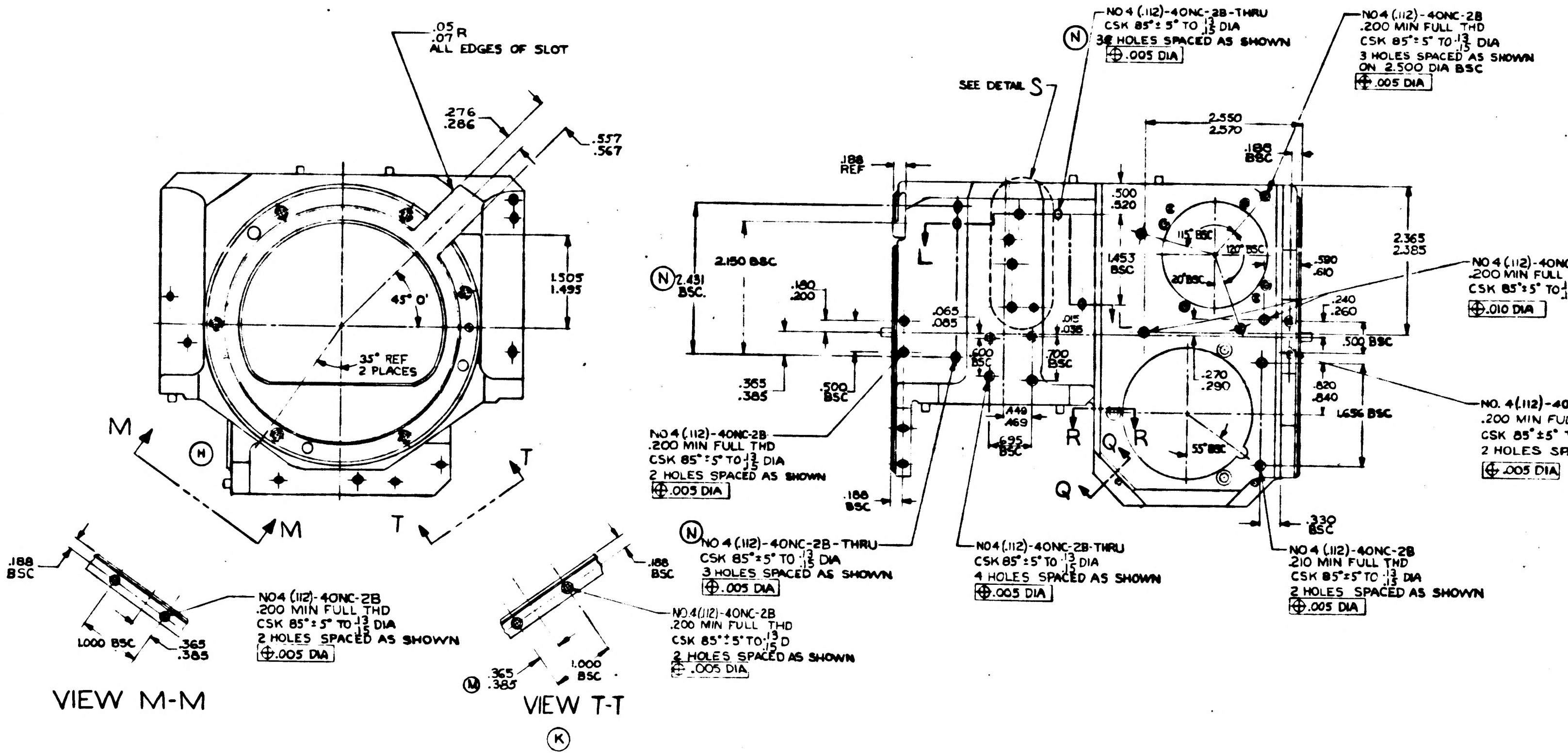

.350
.370
45° REF
45° REF
.280
.300
.578 BSC

SECTION L-L

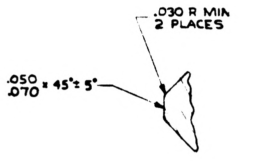
NO 4 (.112)-40NC-2B
.210 MIN F LL THD
CSK 85° ±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
2 PLACES

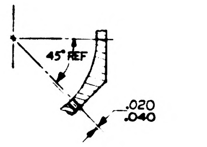
NO. 2(.086)-56
CSK 85° ±5° TO
4 HOLES SPA
⊕ .005 DIA


.05
.07 R
ALL EDGES OF SLOT
.276
.286
.557
.567
1.505
1.495
45° 0'
35° REF
2 PLACES
M
M
T
T
Ⓗ
.188
BSC
NO4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
1.000 BSC
.365
.385
VIEW M-M
.188
BSC
NO.4(.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 D
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
Ⓜ .365
.385
1.000
BSC
VIEW T-T
Ⓚ
SEE DETAIL S
Ⓝ NO 4 (.112)-40NC-2B-THRU
CSK 85° ±5° TO .13 .15 DIA
38 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
3 HOLES SPACED AS SHOWN
ON 2.500 DIA BSC
⊕ .005 DIA
2.550
2.570
.188
BSC
.188
REF
Ⓝ 2.431
BSC.
2.150 BSC
.180
.200
.065
.085
.015
.035
.500
.520
1.453
BSC
115° BSC
120° BSC
20° BSC
.590
.610
2.365
2.385
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
⊕ .010 DIA
.240
.260
.500 BSC
.270
.290
.820
.840
1.656 BSC
NO. 4(.112)-40 NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
L
L
.600
BSC
.700
BSC
.365
.385
.500
BSC
.449
.469
.695
BSC
R
R
Q
Q
55° BSC
.330
BSC
NO 4 (.112)-40NC-2B
.200 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA
.188
BSC
Ⓝ NO 4 (.112)-40NC-2B-THRU
CSK 85° ±5° TO .13 .15 DIA
3 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO4 (.112)-40NC-2B-THRU
CSK 85° ±5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
⊕ .005 DIA
NO 4 (.112)-40NC-2B
.210 MIN FULL THD
CSK 85° ±5° TO .13 .15 DIA
2 HOLES SPACED AS SHOWN
⊕ .005 DIA

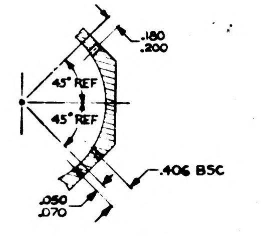
NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
Ⓗ 2 REMOVE BURRS & BREAK ALL ~~SHARP EDGES~~ $\genfrac{}{}{0pt}{}{.005}{.015}$
3 FOR MATERIAL & MACHINING PRIOR TO THIS DRAWING SEE NASA DRAWING NO. 1000025 SHEET 1


.030 R MIN
2 PLACES
.050
.070 × 45° ± 5°

SECTION Q-Q
SCALE 4


45° REF
.020
.040

SECTION P-P


.180
.200
45° REF
45° REF
.406 BSC
.050
.070

SECTION N-N

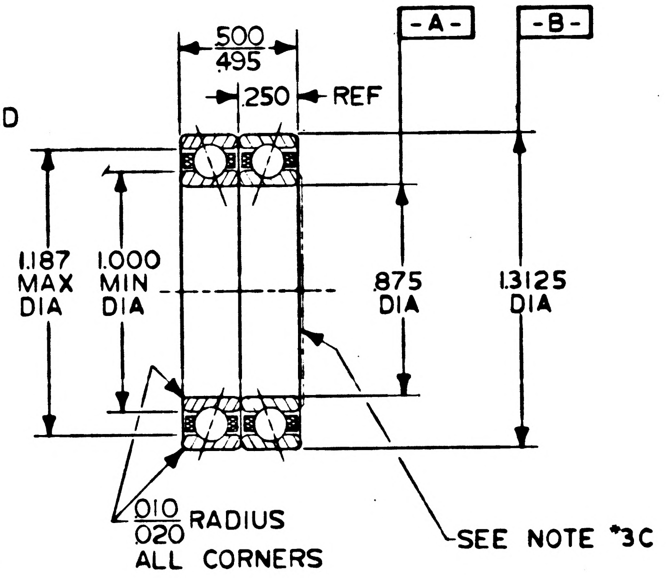
REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	DWG TITLE READ, "BEARING, BALL PRELOADED PAIR IMU AXIS".	7-17-62	L.K.M.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. MATL: CRES-AISI, CL 440C ANNEALED
   ALT: SPEC QQ-S-763 COND A, FORM ROUND, FINISH HOT.
3. REQUIREMENTS:
   A. MAX AXIAL LOAD CAP. 450 LBS
   B. MAX RADIAL LOAD CAP. 100 LBS
   C. MAX FACE MISALIGNMENT .001
   D. DF MOUNTING.
   E. BEARING PRELOAD 30 LBS. ± 10 LBS.
   F. BEARINGS TO BE FREE, NO RUNNING END PLAY OR RADIAL PLAY
   G. PERMANENTLY MARK HIGH POINT OF ECCENTRICITY ON THE FACE OF DIA -A- AND DIA -B- BOTH BEARINGS
   H. MAX TORQUE 10 INCH OZ AT 400 LBS AXIAL PLUS 20 LBS RADIAL LOAD
   J. UNLESS SPECIFIED OTHERWISE TOLERANCES SHALL BE IN ACCORDANCE WITH ABEC-5
   K. MIN LIFE EXPECTANCY: 2000 HRS OPERATING
   L. LUBRICATION: USE MIL-L-6085
4. RETAINER MATERIAL TO BE NON-FUNGUS NUTRIENT
5. IDENTIFY USING DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130
6. UNLESS OTHERWISE SPECIFIED THE REQUIREMENTS OF FEDERAL SPEC FF-B-171 FOR TYPE III, CLASS I BEARINGS SHALL APPLY

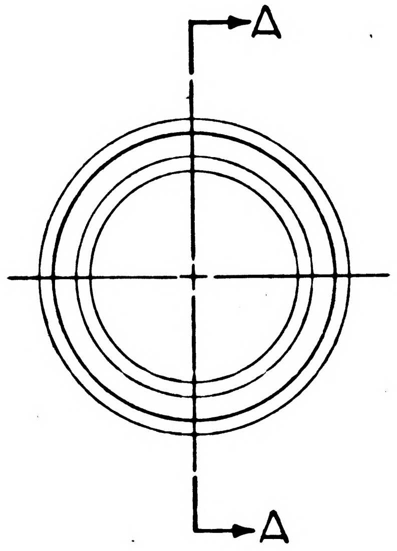
ORIGINAL SOURCES OF SUPPLY

BARDEN CORPORATION
DANBURY, CONNECTICUT
A540ZAX80DF30 ±10

FAFNIR BEARING CO.
NEW BRITAIN, CONNECTICUT
MMA-540-WI-2CRV-DF



SECTION A-A



1000029 A

1000011		UNLESS OTHERWISE SPECIFIED
1000010		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES SEE NOTE *3J
1000009		
1000008		
1000007		DO NOT SCALE THIS DRAWING
1000006	DL 1000001	MATERIAL: SEE NOTE *2
NEXT ASSY	USED ON	
APPLICATION		

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	7-31-62
CHECKED		
DRAWN	L.MORSE	3/62

APPROVED FOR MSC
Jack Bernard 7/31/62
BY DIRECTION
MIT APPROVAL: W. Pepper 7/31/62

BEARING, BALL, DUPLEX
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000029
SHEET 1 OF 1

REVISIONS TDRR 00003					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	DWG TITLE READ, "BEARING, BALL PRELOADED PAIR IMU AXIS".	7-17-62		
Ⓜ	B	TDR 00016	8-9-62		
	C	TDRR 01146	5-8-63	agB	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. MATL: CRES-AISI, CL 440C ANNEALED
   ALT: SPEC QQ-S-763 COND A, FORM ROUND, FINISH HOT.
3. REQUIREMENTS:
   - A. MAX AXIAL LOAD CAP. 450 LBS
   - B. MAX RADIAL LOAD CAP. 100 LBS
   - C. MAX FACE MISALIGNMENT .001
   - D. DF MOUNTING.
   - E. BEARING PRELOAD 30 LBS. ± 10 LBS.
   - Ⓒ F. MAX STARTING TORQUE IN UNMOUNTED CONDITION : 1.0 OZ-IN.
   - G. PERMANENTLY MARK HIGH POINT OF ECCENTRICITY ON THE FACE OF DIA -A- AND DIA -B- BOTH BEARINGS
   - H. MAX TORQUE 10 INCH OZ AT 400 LBS AXIAL PLUS 20 LBS RADIAL LOAD
   - J. UNLESS SPECIFIED OTHERWISE TOLERANCES SHALL BE IN ACCORDANCE WITH ABEC-5
   - K. MIN LIFE EXPECTANCY: 2000 HRS OPERATING
   - L. LUBRICATION: USE MIL-L-6085
4. RETAINER MATERIAL TO BE NON-FUNGUS NUTRIENT
5. IDENTIFY USING DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

Ⓒ 6. UNLESS OTHERWISE SPECIFIED THE REQUIREMENTS OF FEDERAL SPEC FF-B-171 FOR GRADE 50 BEARINGS AND PARAGRAPHS 3, 4, & 5 SHALL APPLY.

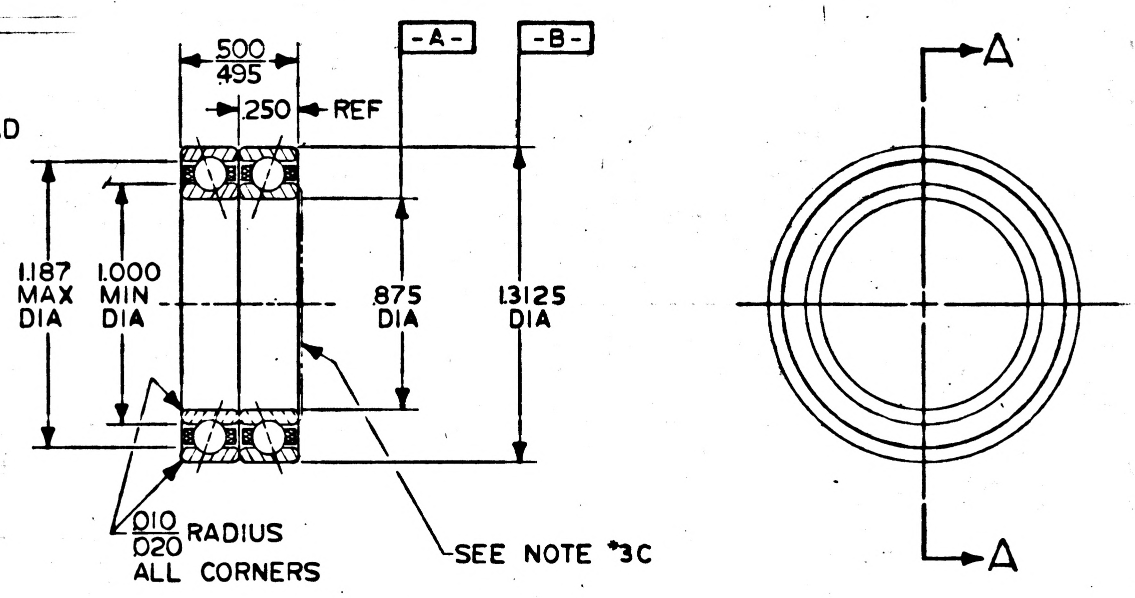
ORIGINAL SOURCES OF SUPPLY

BARDEN CORPORATION
DANBURY, CONNECTICUT
A540ZAX80DF30 ±10

FAFNIR BEARING CO.
NEW BRITAIN, CONNECTICUT
MMA-540-WI-2CRV-DF

Ⓒ 7. NOTES 3A, 3B, 3H, & 3K ARE DESIGN REQUIREMENTS.

Ⓒ 8. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN G & ND 1015404 CLASS 2



SECTION A-A

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000010	
1000015	
Ⓑ 1000008	
1000014	DL 1000201
Ⓒ 1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
SEE NOTE #3J

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE #2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	7-31-62
CHECKED		
DRAWN	L. MORSE	3/62

APPROVED FOR MSC
Jack Bernard 7/31/62
BY DIRECTION
MIT APPROVAL: W. Trageser 7/31/62

BEARING, BALL, DUPLEX
SPECIFICATION CONTROL DRAWING

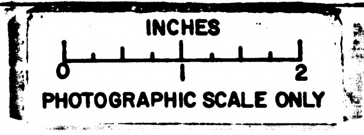
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000029

SHEET 1 OF 1



Ⓜ	REVISIONS TDRR 00003				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	DWG TITLE READ, "BEARING, BALL PRELOADED PAIR IMU AXIS".	7-17-62		
	B	TDR 00016	8-9-62		BKB
	C	TDRR 01146	5-8-63	ajB	
	D	REPLACED BY REV E WITH CHANGES TDRR 01928	7-1-63	ajB	

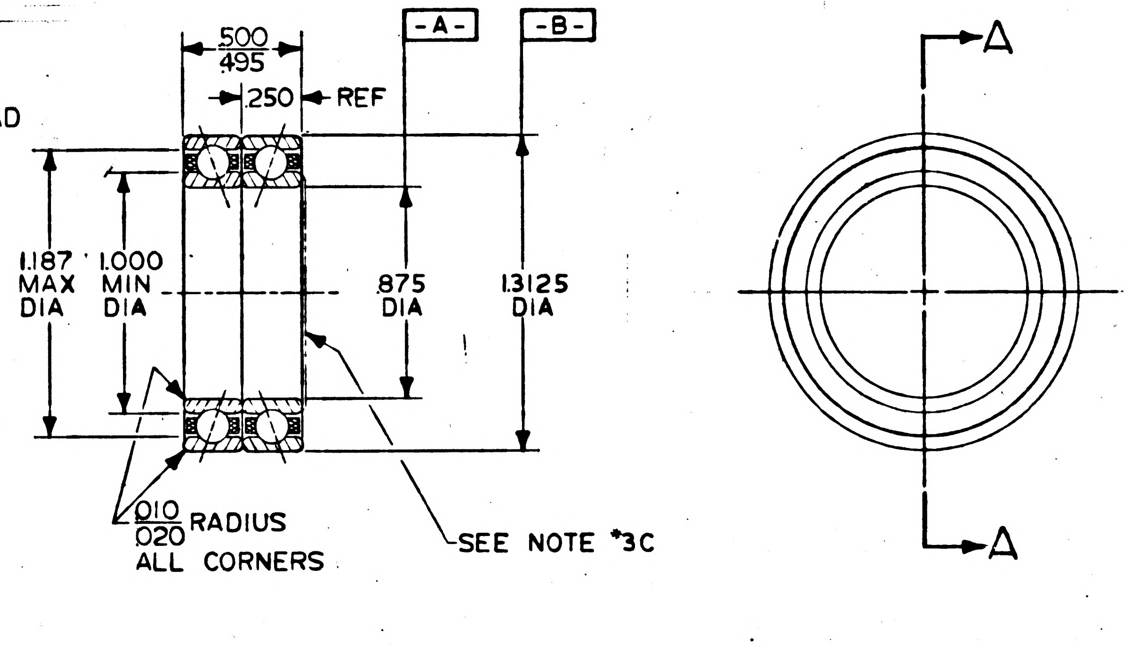
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. MAT'L: CRES-AISI, CL 440C ANNEALED
   ALT: SPEC QQ-S-763 COND A, FORM ROUND, FINISH HOT.
3. REQUIREMENTS:
   - A. MAX AXIAL LOAD CAP. 450 LBS
   - B. MAX RADIAL LOAD CAP. 100 LBS
   - C. MAX FACE MISALIGNMENT .001
   - D. DF MOUNTING.
   - E. BEARING PRELOAD 30 LBS. ± 10 LBS.
   - Ⓒ F. MAX STARTING TORQUE IN UNMOUNTED CONDITION : 1.0 OZ-IN.
   - G. PERMANENTLY MARK HIGH POINT OF ECCENTRICITY ON THE FACE OF DIA -A- AND DIA -B- BOTH BEARINGS
   - H. MAX TORQUE 10 INCH OZ AT 400 LBS AXIAL PLUS 20 LBS RADIAL LOAD
   - J. UNLESS SPECIFIED OTHERWISE TOLERANCES SHALL BE IN ACCORDANCE WITH ABEC-5
   - K. MIN LIFE EXPECTANCY: 2000 HRS OPERATING
   - L. LUBRICATION: USE MIL-L-6085
4. RETAINER MATERIAL TO BE NON-FUNGUS NUTRIENT
5. IDENTIFY USING DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130
6. Ⓒ UNLESS OTHERWISE SPECIFIED THE REQUIREMENTS OF FEDERAL SPEC FF-B-171 FOR GRADE 50 BEARINGS AND PARAGRAPHS 3, 4, & 5 SHALL APPLY.

ORIGINAL SOURCES OF SUPPLY

BARDEN CORPORATION
DANBURY, CONNECTICUT
A540ZAX80DF30 ±10

FAFNIR BEARING CO.
NEW BRITAIN, CONNECTICUT
MMA-540-WI-2CRV-DF

7. Ⓒ NOTES 3A, 3B, 3H, & 3K ARE DESIGN REQUIREMENTS.
8. Ⓒ SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN G & ND 1015404 CLASS 2



SECTION A-A

REPLACED BY REV E WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000010	
1000015	
Ⓑ 1000008	
1000014	DL 1000201
Ⓒ 1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
SEE NOTE *3J
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE *2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153		DATE
APPROVED	A J Boyce	7-31-62
CHECKED		
DRAWN	L.MORSE	3/62
APPROVED FOR MSC	Jack Barnard	7/31/62
BY DIRECTION		
MIT APPROVAL:	W. Kupfer	7/31/62

BEARING, BALL, DUPLEX
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000029
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NASA Apollo G & N Specification
PS-1000030
April [illegible], 1963
Class A
TDRR 00210
28 Dec. 1962

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WAK		
B	02414	All pages	WAK		12 Aug 63

This specification consists of pages i through iii and 1 to 5 inclusive

---

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

WA Kupfer 28 Dec '62
MIT Instrumentation Laboratory Date

JB Michael 12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Transmitter Resolver, Type 45RU10n8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G & N

ND-1002013	Description and Requirments Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G & N

1000030	Resolver, One Speed Transmitter, Specification Control Drawing

(Copies of specifications and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

NASA Apollo G & N Specification
PS-1000030
April [illegible], 1963
Class A
TDRR 00210
28 Dec. 1962

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WSK	WSS.	
B	02414	All pages	WSK	WSS.	12 Aug 63
C	02931	3	WSK	WSS.	6 Sep 63

This specification consists of pages i through iii and 1 to 5 inclusive

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Apollo G & N Specification
PS-1000030
28 December 1962
Class A Release
TDRR -00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

W S Kupfer 28 Dec '62
MIT Instrumentation Laboratory Date

12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Transmitter Resolver, Type 45RU10n8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G & N

ND-1002013	Description and Requirments Publication for Procurement of Resolvers, Electrical, AC, General Specification.

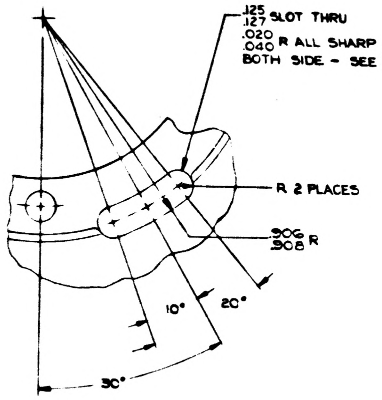
DRAWINGS

Apollo G & N

1000030	Resolver, One Speed Transmitter, Specification Control Drawing

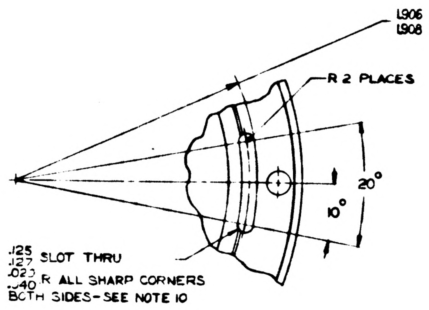
(Copies of specifications and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDR 00028			
A	GENERAL REVISIONS			
B	GENERAL REVISIONS			
C	GENERAL REVISIONS		4/10	W/K



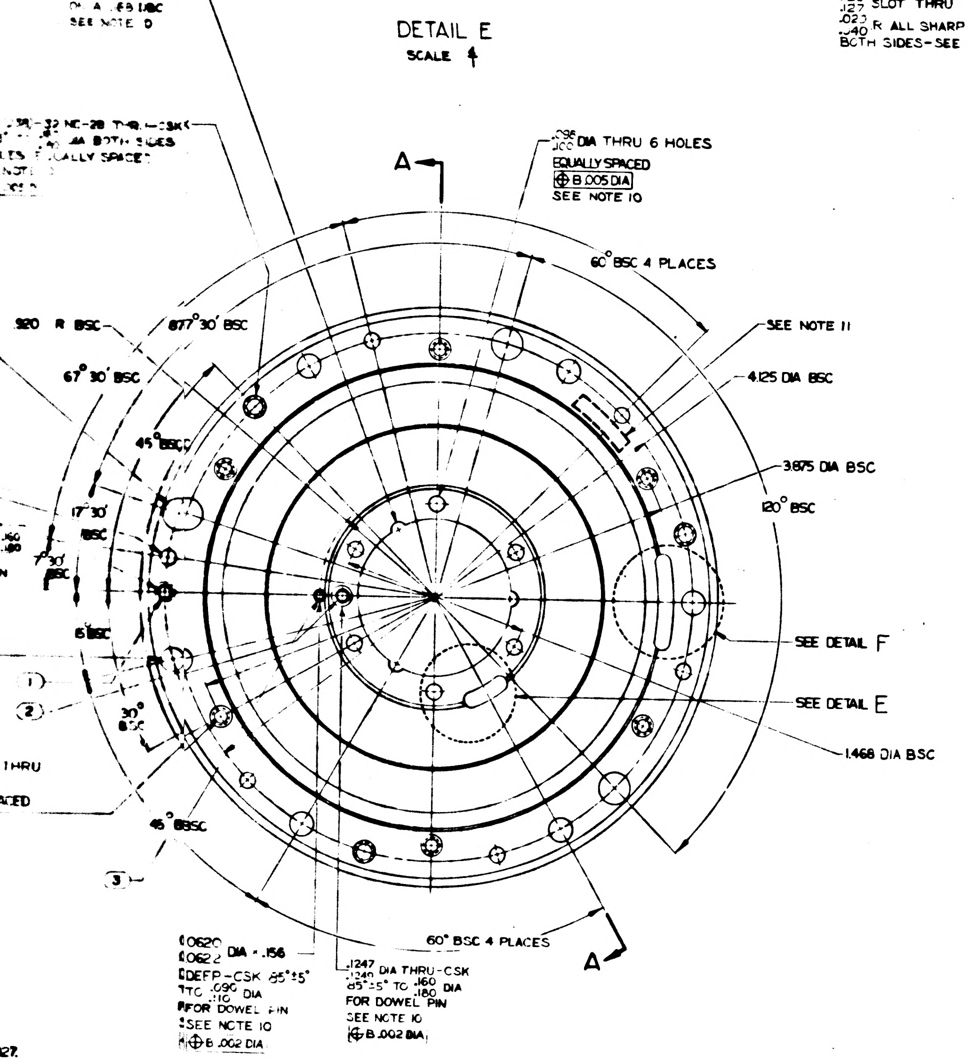
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°

DETAIL E
SCALE 4/1

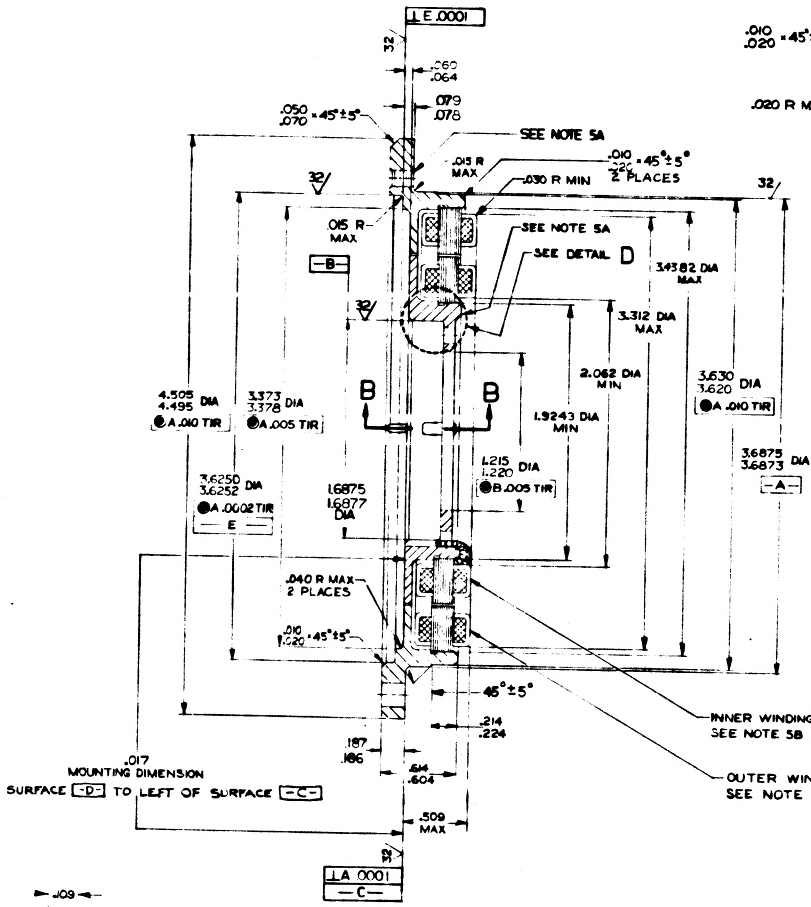


1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDES-SEE NOTE 10

DETAIL F
SCALE 2/1

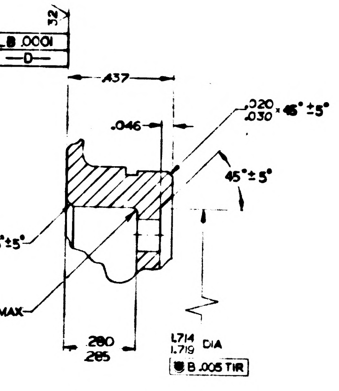


3 PLACES
SPACED)
SEE NOTE D
-32 NC-2B THRU-CSK
DIA BOTH SIDES
EQUALLY SPACED
A
.098 .100 DIA THRU 6 HOLES
EQUALLY SPACED
⊕ B .005 DIA
SEE NOTE 10
60° BSC 4 PLACES
.920 R BSC
877°30' BSC
67°30' BSC
SEE NOTE 11
4.125 DIA BSC
45° BSC
3.875 DIA BSC
120° BSC
17°30' BSC
7°30' BSC
15° BSC
SEE DETAIL F
SEE DETAIL E
①
②
30° BSC
1.468 DIA BSC
THRU
SPACED
45° BSC
③
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156
DEEP-CSK 85°±5°
TO .090 .110 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕ B .002 DIA
.1247 .1249 DIA THRU-CSK
85°±5° TO .160 .180 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕ B .002 DIA



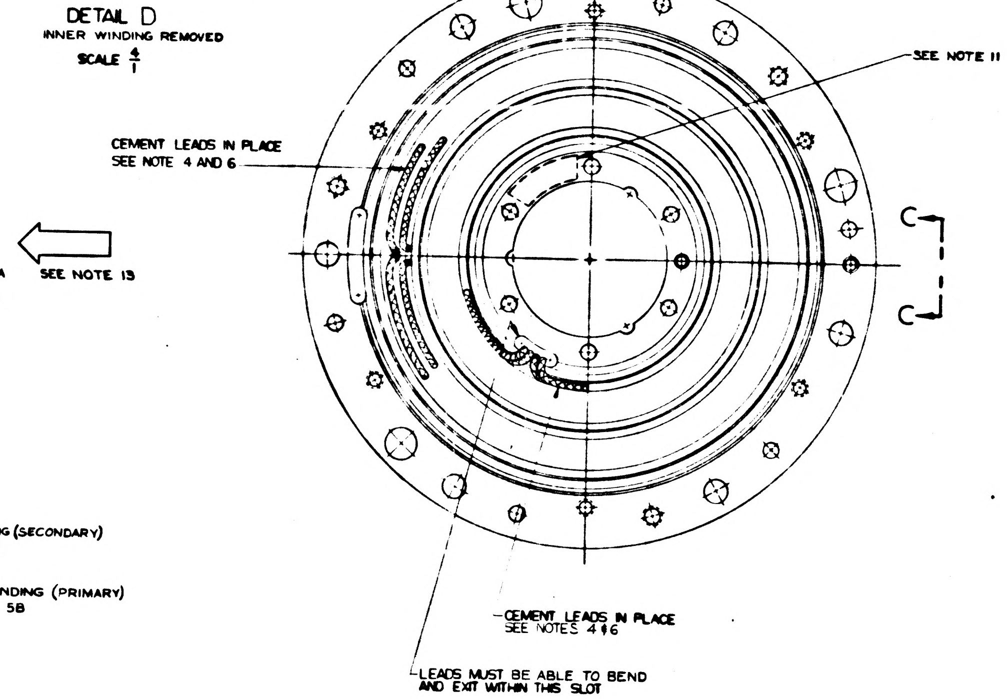
⊥ E .0001
32
.060 .064
.079 .078
.050 .070 × 45°±5°
SEE NOTE 5A
.015 R MAX
.010 .020 × 45°±5° 2 PLACES
.030 R MIN
32
32
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
3.312 DIA MAX
32
2.062 DIA MIN
B
B
1.9243 DIA MIN
4.505 4.495 DIA
A .010 TIR
3.373 3.378 DIA
A .005 TIR
3.630 3.620 DIA
A .010 TIR
1.215 1.220 DIA
B .005 TIR
3.6875 3.6873 DIA
-A-
3.6250 3.6252 DIA
A .0002 TIR
-E-
1.6875 1.6877 DIA
.040 R MAX 2 PLACES
.010 .020 × 45°±5°
45°±5°
.214 .224
.187 .186
.614 .604
.509 MAX
.017
MOUNTING DIMENSION
SURFACE -D- TO LEFT OF SURFACE -C-
32
⊥ A .0001
-C-

SECT A-A



32
⊥ B .0001
-D-
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.719 DIA
B .005 TIR

DETAIL D
INNER WINDING REMOVED
SCALE 4/1



SEE NOTE 13
SEE NOTE 11
CEMENT LEADS IN PLACE
SEE NOTE 4 AND 6
C
C
INNER WINDING (SECONDARY)
SEE NOTE 5B
OUTER WINDING (PRIMARY)
SEE NOTE 5B
CEMENT LEADS IN PLACE
SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND
AND EXIT WITHIN THIS SLOT

.027.

SHALL BE

SPEC ... 00 ALT SPEC MIL-B-21531

-1bc78

AND

AND -D-

OPERATING

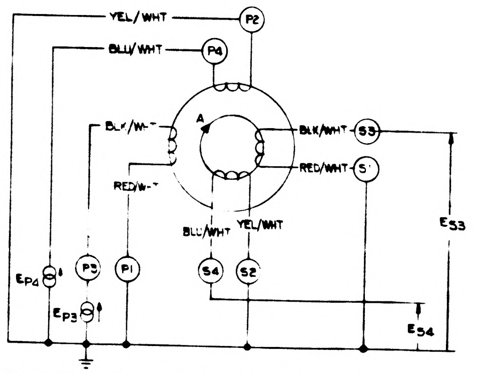
PER PS 1000032 OR PS 1000033

CATED PER NOTE 11

SERIAL NO. & MANUFACTURERS

130

UNITS AT A UNIFORM PART



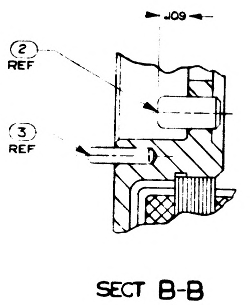
YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E_{S3}
E_{P4}
P3
P1
S4
S2
E_{P3}
E_{S4}

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A = 0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$



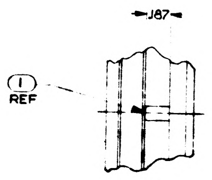
.109
② REF
③ REF

SECT B-B
SCALE 4/1

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



VIEW C-C
SCALE 4/1

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	PIN, STR, HDLS (DWL)	MS 3555-2			3
1	PIN, LOCATING	1000032			2
1	PIN, LOCATING	1000033			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000008	
1000033	
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5

INCHES
PHOTOGRAPHIC SCALE ONLY

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED A J Bogan 9-20-62
CHECKED
DRAWN L. MILLS
APPROVED FOR MSC
D. Rhine 9-20-62
BY DIRECTION MIT APPROVED
W K 9/20/62

RESOLVER, ONE SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT
CODE IDENT

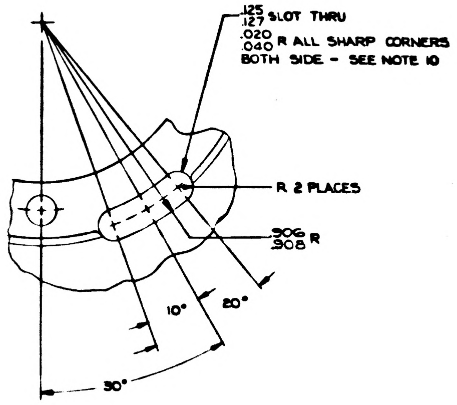
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000030
SHEET 1 OF 1

1000030 C 1

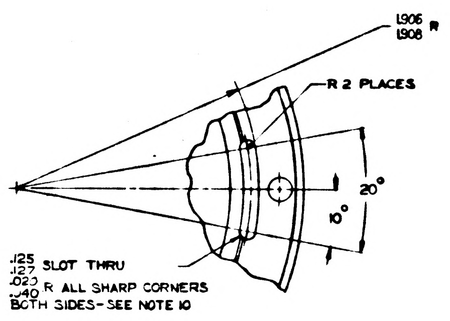
1000030

1000030

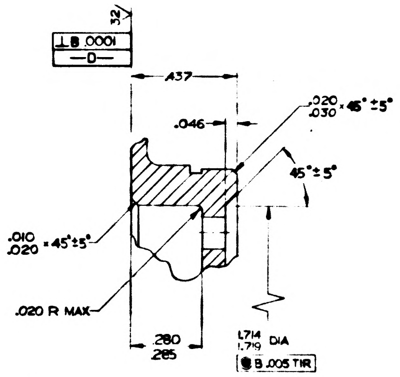
12/2


.125
.127 SLOT THRU
.020
.040 R ALL SHARP CORNERS
BOTH SIDE - SEE NOTE 10
R 2 PLACES
.306
.308 R
10°
20°
30°

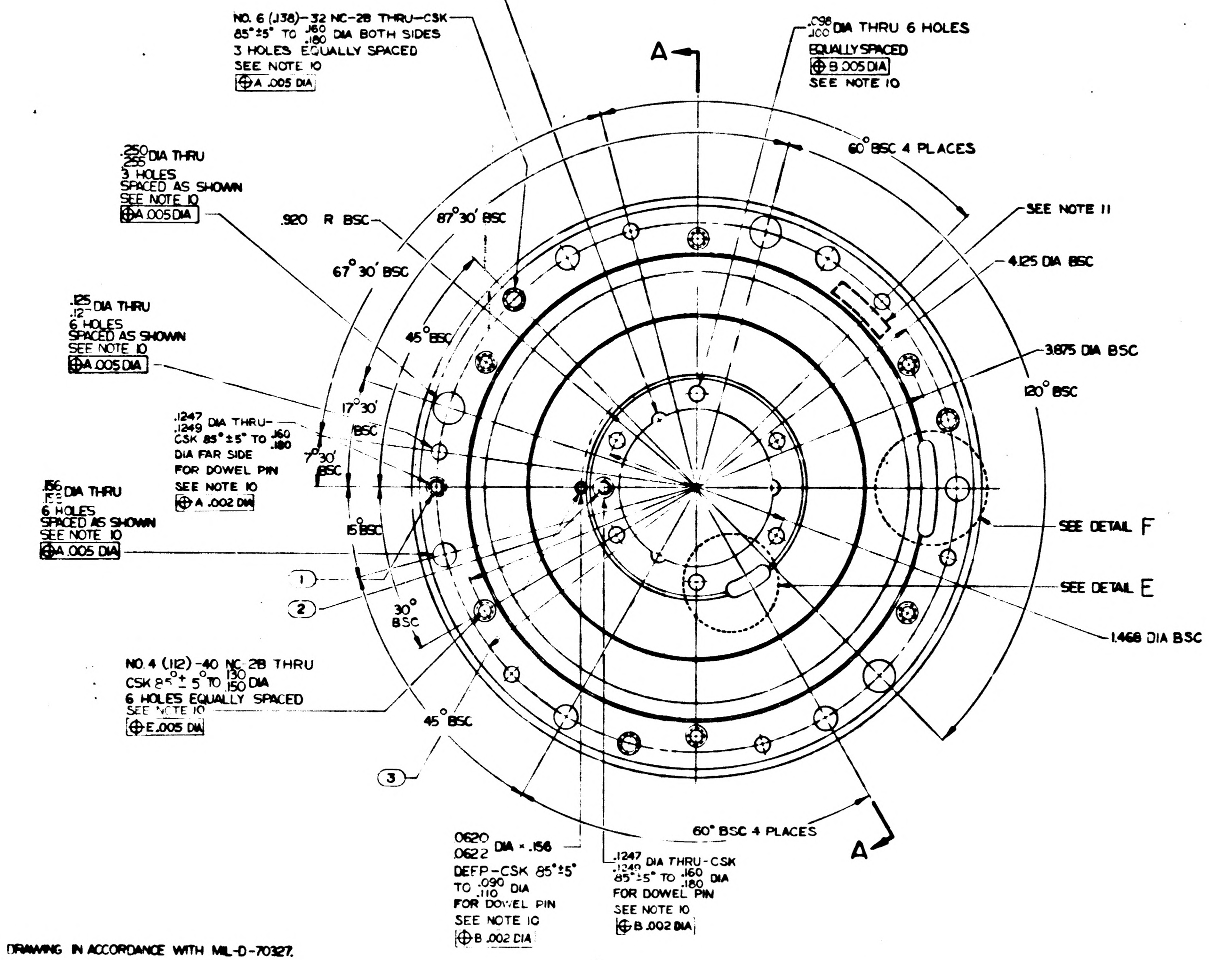
DETAIL E
SCALE 4

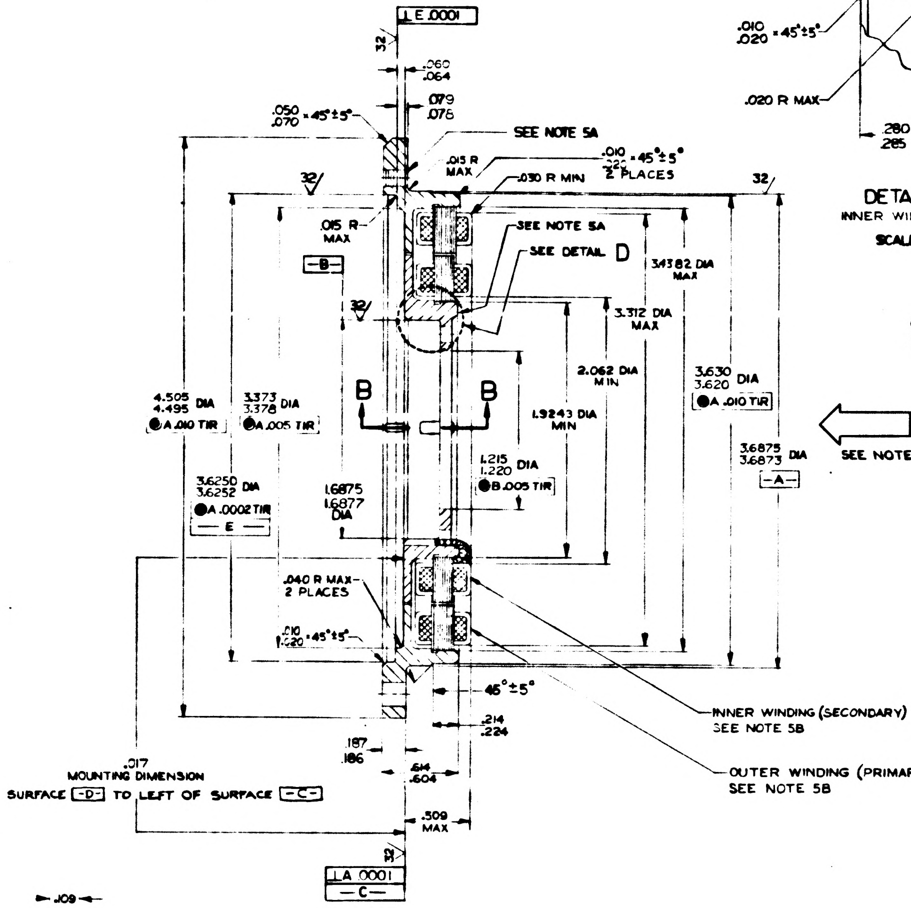

1.906
1.908 R
R 2 PLACES
20°
10°
.125
.127 SLOT THRU
.020
.040 R ALL SHARP CORNERS
BOTH SIDES - SEE NOTE 10

DETAIL F
SCALE 2

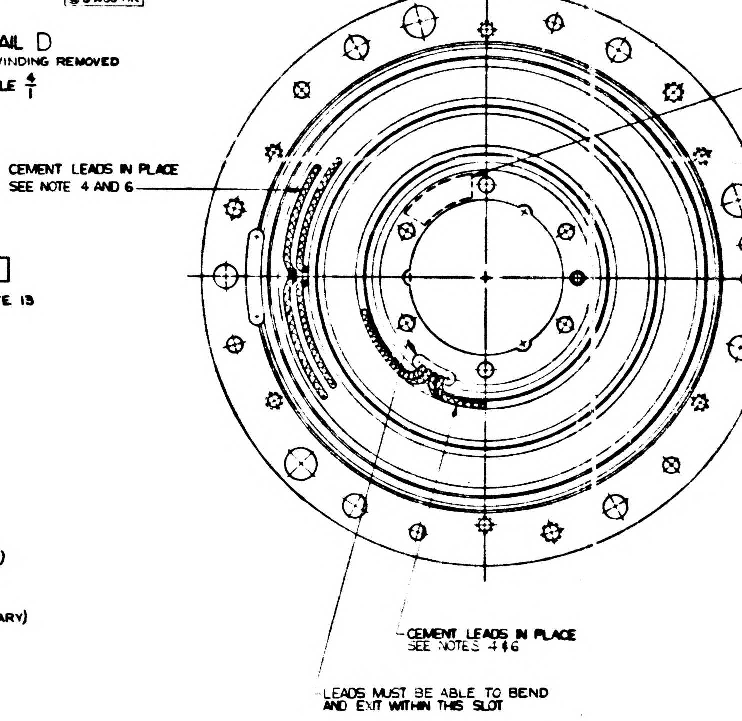

32
⊥ B .0001
-D-
.437
.046
.020
.030 × 45°±5°
45°±5°
.010
.020 × 45°±5°
.020 R MAX
.280
.285
1.714
1.712 DIA
⊚ B .005 TIR

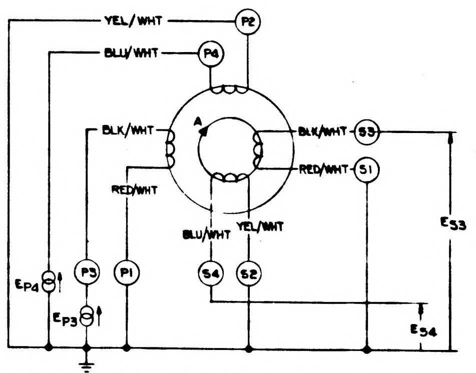
DETAIL D
INNER WINDING REMOVED
SCALE 4

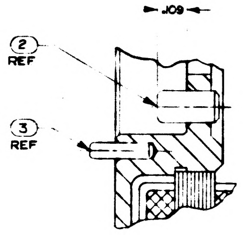

.062 R 3 PLACES
EQUALLY SPACED
ON A 1.188 DBC
SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK
85°±5° TO .160 .180 DIA BOTH SIDES
3 HOLES EQUALLY SPACED
SEE NOTE 10
⊕ A .005 DIA
A
.098
.100 DIA THRU 6 HOLES
EQUALLY SPACED
⊕ B .005 DIA
SEE NOTE 10
60° BSC 4 PLACES
.250
.255 DIA THRU
3 HOLES
SPACED AS SHOWN
SEE NOTE 10
⊕ A .005 DIA
.920 R BSC
87° 30' BSC
67° 30' BSC
SEE NOTE 11
4.125 DIA BSC
.125
.127 DIA THRU
6 HOLES
SPACED AS SHOWN
SEE NOTE 10
⊕ A .005 DIA
45° BSC
3.875 DIA BSC
120° BSC
17° 30' BSC
7° 30' BSC
.1247
.1249 DIA THRU-
CSK 85°±5° TO .160 .180
DIA FAR SIDE
FOR DOWEL PIN
SEE NOTE 10
⊕ A .002 DIA
.156
.158 DIA THRU
6 HOLES
SPACED AS SHOWN
SEE NOTE 10
⊕ A .005 DIA
15° BSC
SEE DETAIL F
1
2
30° BSC
SEE DETAIL E
1.468 DIA BSC
NO. 4 (.112)-40 NC-2B THRU
CSK 85°±5° TO .130 .150 DIA
6 HOLES EQUALLY SPACED
SEE NOTE 10
⊕ E .005 DIA
45° BSC
3
60° BSC 4 PLACES
A
.0620
.0622 DIA × .156
DEEP-CSK 85°±5°
TO .090 .110 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕ B .002 DIA
.1247
.1249 DIA THRU-CSK
85°±5° TO .160 .180 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕ B .002 DIA


⊥ E .0001
32
.060
.064
.079
.076
.050
.070 × 45°±5°
SEE NOTE 5A
.013 R MAX
.010
.020 × 45°±5°
2 PLACES
.030 R MIN
32
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
32
3.312 DIA MAX
2.062 DIA MIN
1.9243 DIA MIN
3.630
3.620 DIA
⊚ A .010 TIR
B
B
4.505
4.495 DIA
⊚ A .010 TIR
3.373
3.378 DIA
⊚ A .005 TIR
1.215
1.220 DIA
⊚ B .005 TIR
3.6875
3.6873 DIA
-A-
SEE NOTE 13
3.6250
3.6252 DIA
⊚ A .0002 TIR
-E-
1.6875
1.6877 DIA
.040 R MAX
2 PLACES
.010
.020 × 45°±5°
45°±5°
INNER WINDING (SECONDARY)
SEE NOTE 5B
.187
.186
.214
.224
.614
.604
OUTER WINDING (PRIMARY)
SEE NOTE 5B
.017
MOUNTING DIMENSION
SURFACE -D- TO LEFT OF SURFACE -C-
.509 MAX
⊥ A .0001
-C-

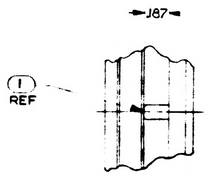
SECT A-A


CEMENT LEADS IN PLACE
SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE
SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND
AND EXIT WITHIN THIS SLOT


YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E_{S3}
E_{P4}
P3
P1
S4
S2
E_{P3}
E_{S4}


.109
2
REF
3
REF

SECT B-B
SCALE 4



VIEW C-C
SCALE 2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63√ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$ R
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN, RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000030
5. MATERIAL:
   - A. MOUNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   - B WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER AXIAL PLAY ±.010 FROM POSITION SHOWN.
8. PART MUST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. RESOLVERS SHALL BE ELECTRICALLY ZEROED AS DEFINED BY PS1000030 WHEN DOWEL PINS ① AND ② ARE ALIGNED WITHIN ±0°1'.
10. HOLE FOR DOWEL PINS ① & ② MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. ALL DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A=0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

INCHES
PHOTOGRAPHIC SCALE ONLY

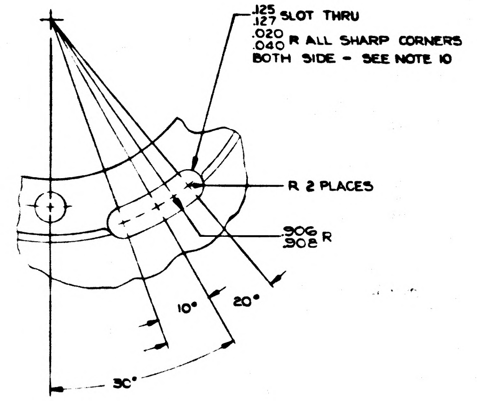
1000008		UNLESS OTHERWISE SPECIFIED
1000033		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES — ±.005 ±0°3'
1000032	CL 1000001	DO NOT SCALE THIS DRAWING
NEXT ASSY	USED ON	MATERIAL SEE NOTE 5
APPLICATION		

QTY REQD

APPROVED
CHECKED
DRAWN

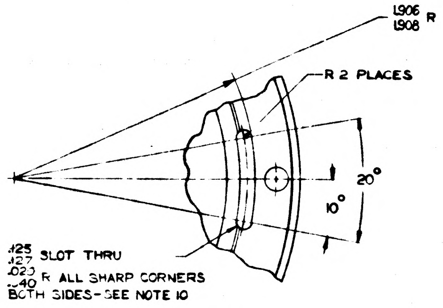
1000030	REV C	SHEET 1

SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS		
B	GENERAL REVISIONS		
C	GENERAL REVISIONS		
D	TDRR 00151	12-11-62	



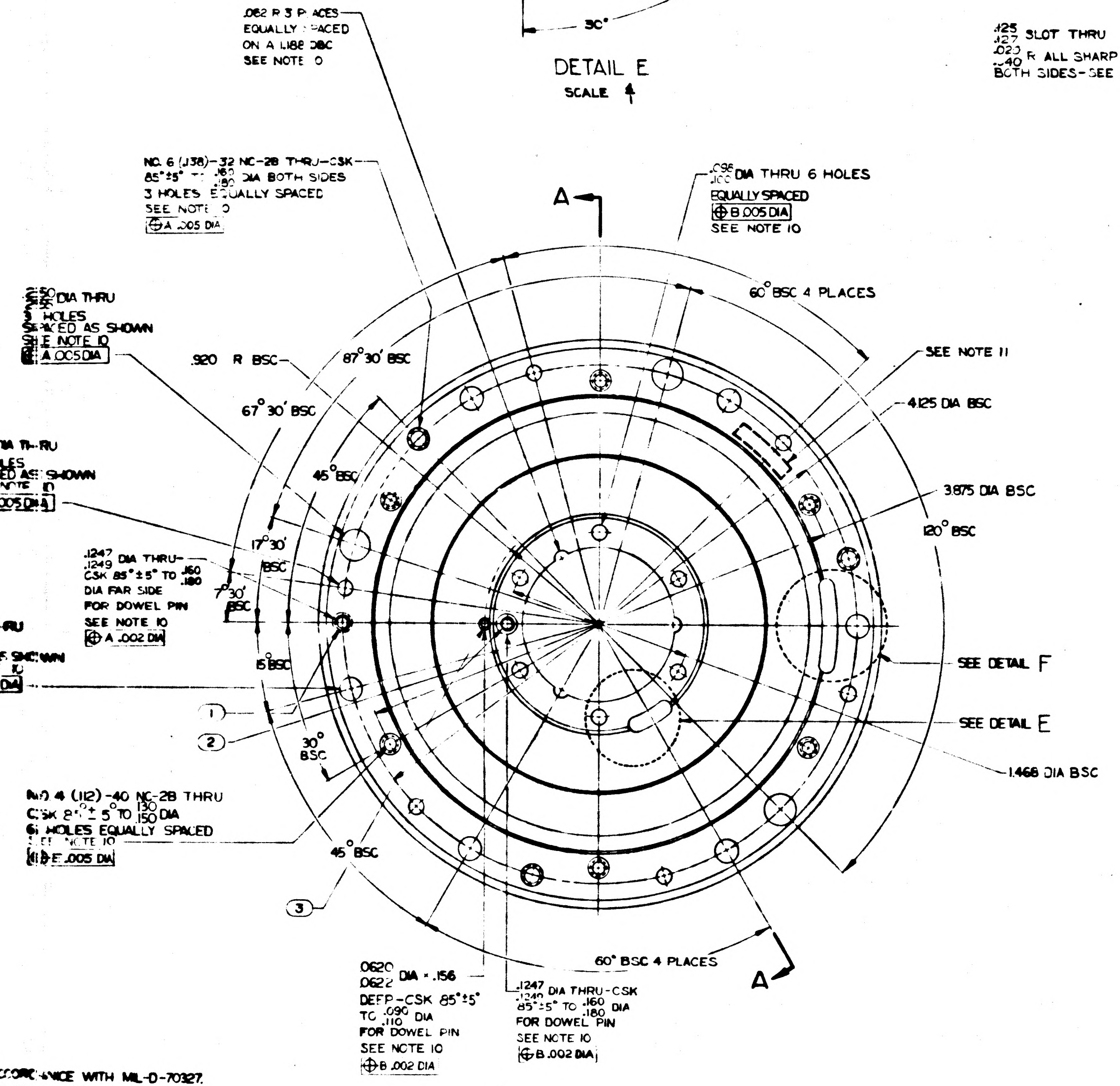
.125 .127 SLOT THRU
.020 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°

DETAIL E
SCALE 4/1

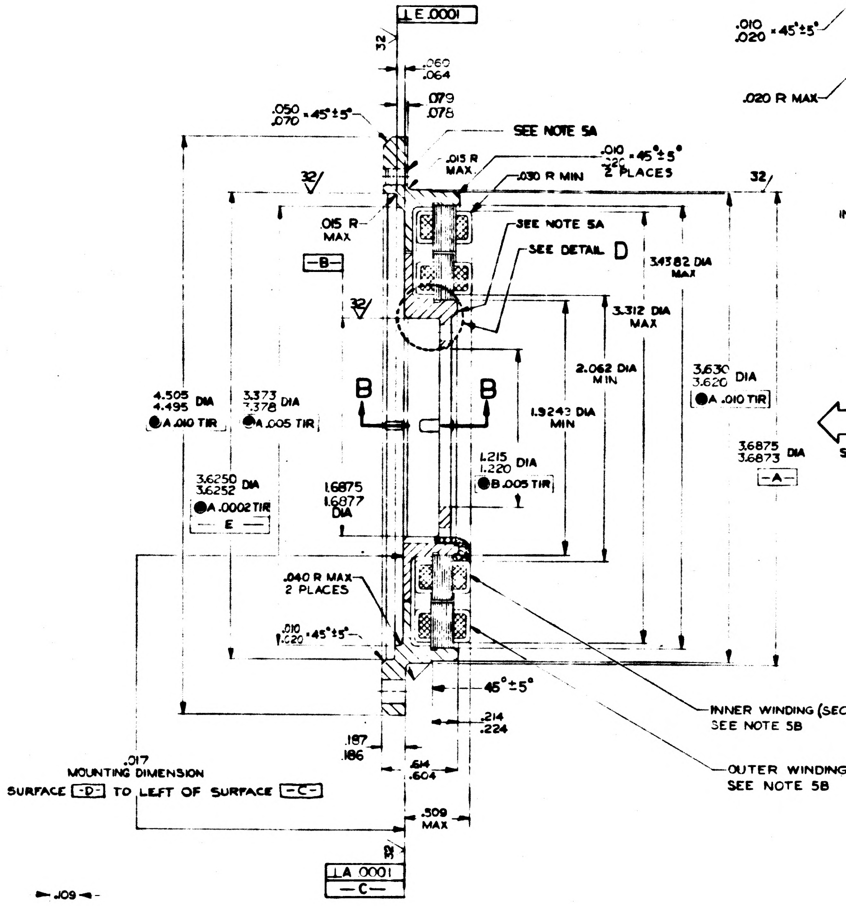


1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.023 .40 R ALL SHARP CORNERS BOTH SIDES-SEE NOTE 10

DETAIL F
SCALE 2/1

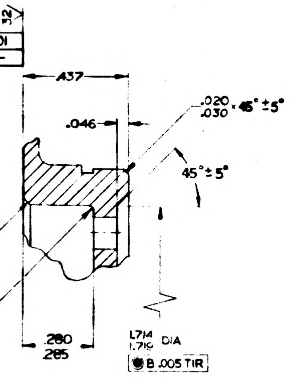


.062 R 3 PLACES EQUALLY SPACED ON A 1.188 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 A .005 DIA
DIA THRU 6 HOLES EQUALLY SPACED B .005 DIA SEE NOTE 10
A
60° BSC 4 PLACES
DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 A .005 DIA
.920 R BSC
67°30' BSC
87°30' BSC
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
45° BSC
17°30'
DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 A .005 DIA
.1247 .1249 DIA THRU- CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 A .002 DIA
15 BSC
30° BSC
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
1
2
3
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 E .005 DIA
45° BSC
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 B .002 DIA



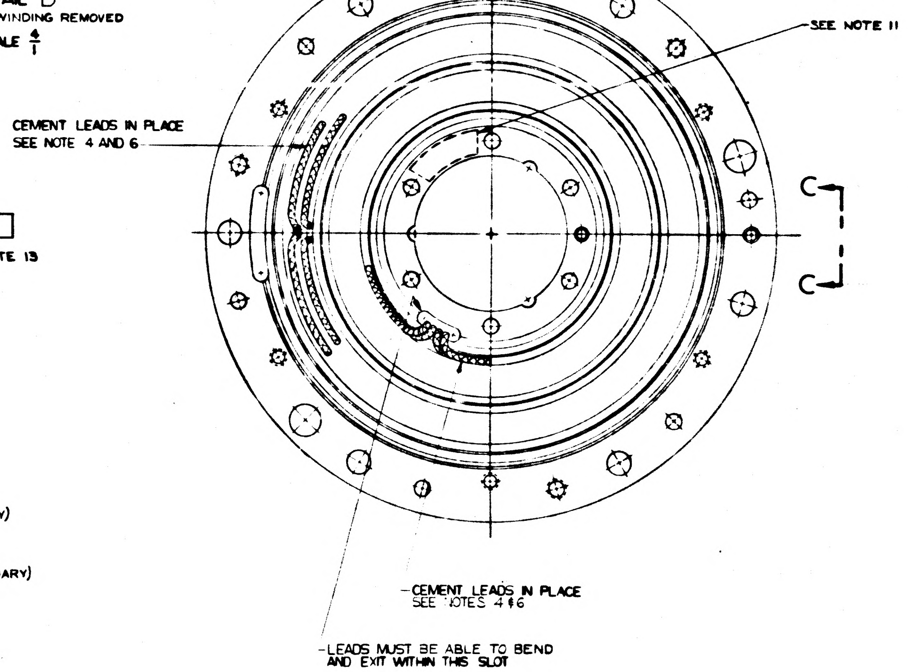
E .0001
.060 .064
.079 .078
.050 .070 x 45°±5°
SEE NOTE 5A
.015 R MAX
.030 R MIN
.010 .020 x45°±5° 2 PLACES
32
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4582 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
1.9243 DIA MIN
3.630 3.620 DIA A .010 TIR
3.6875 3.6873 DIA -A-
4.505 4.495 DIA A .010 TIR
3.373 3.378 DIA A .005 TIR
B
B
1.215 1.220 DIA B .005 TIR
3.6250 3.6252 DIA A .0002 TIR -E-
1.6875 1.6877 DIA
.040 R MAX 2 PLACES
.010 .020 x45°±5°
45°±5°
.214 .224
.187 .186
.614 .604
.509 MAX
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
A .0001 -C-
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
SEE NOTE 13

SECT A-A

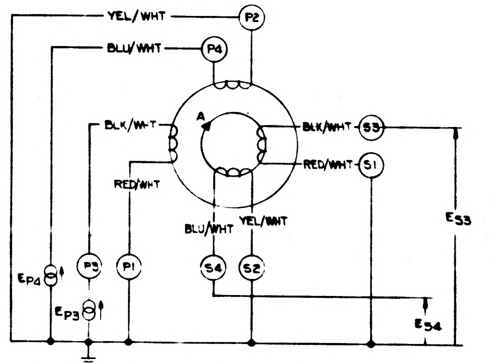


B .0001 -D-
32
.437
.046
.020 .030 x 45°±5°
45°±5°
.010 .020 x45°±5°
.020 R MAX
.280 .285
1.714 1.716 DIA B .005 TIR

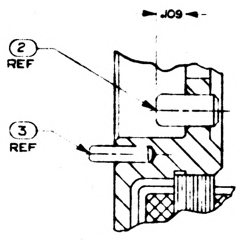
DETAIL D
INNER WINDING REMOVED
SCALE 4/1



SEE NOTE 11
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
C
C
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT

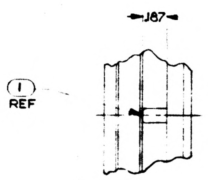


YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E53
EP4
P3
P1
S4
S2
EP3
E54



.109
2 REF
3 REF

SECT B-B
SCALE 4/1



VIEW C-C
SCALE 2/1

RAWING IN ACCORDANCE WITH MIL-D-70327.
R UNLESS OTHERWISE SPECIFIED.

ARP EDGES .006 .015 R

POSITIONED AS SHOWN RESOLVERS SHALL BE ZER ±2° AS DEFINED BY PS1000030

UNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531 NONE ... AL, EXCEPT WHERE NOTED
12 INCH MINIMUM LENGTH PER MIL-W-16878

DIA TO BE INSPECTED WITH DIA -A- AND ... TIR, AND SURFACES -C- AND -D- ... RESPECT TO EACH OTHER ... FROM POSITION SHOWN.

... 0030 WHEN OPERATING ... 0.003 ... WITH 1000031-2 PER PS1000032 OR PS1000033 ... BE ELECTRICALLY ... WHEN DOWEL PINS ARE ALIGNED WITHIN 0°1'

... 2 MUST BE LOCATED PER NOTE 9

... HOLES, OR WIRE SLOTS

... NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS ... LOCATIONS PER MIL-STD-130

... THE SPECIFIED LIMITS AT A UNIFORM PART

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3} \cos A - E_{P4} \sin A\right]$$

$$E_{S4} = K\left[E_{P3} \sin A + E_{P4} \cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A = 0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	PIN, STR, HDLS (DWL)	MS16555-2			3
1	PIN, LOCATING, STRT, HDLS.	1000088-1			2
1	PIN, LOCATING, STRT, HDLS.	1000088-2			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5

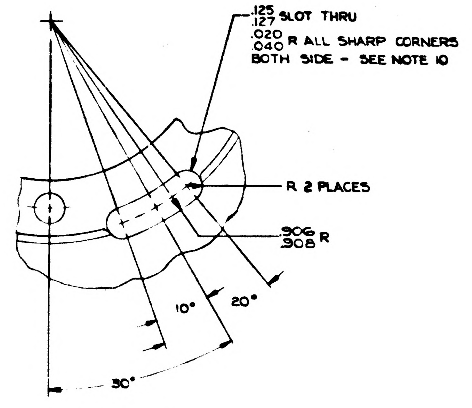
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED AJ Bryne 9-20-62
CHECKED
DRAWN L. MILLS
APPROVAL FOR MSC
MIT APPROVED
9/20/62

RESOLVER, ONE SPEED TRANSMITTER SPECIFICATION CONTROL DRAWING

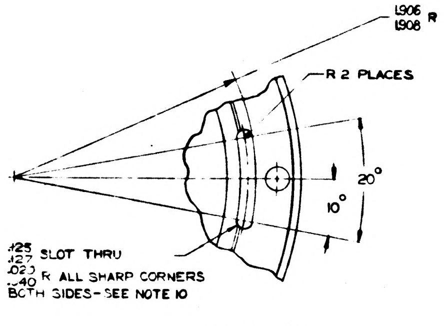
SCALE 2-1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000030
SHEET 1 OF 1

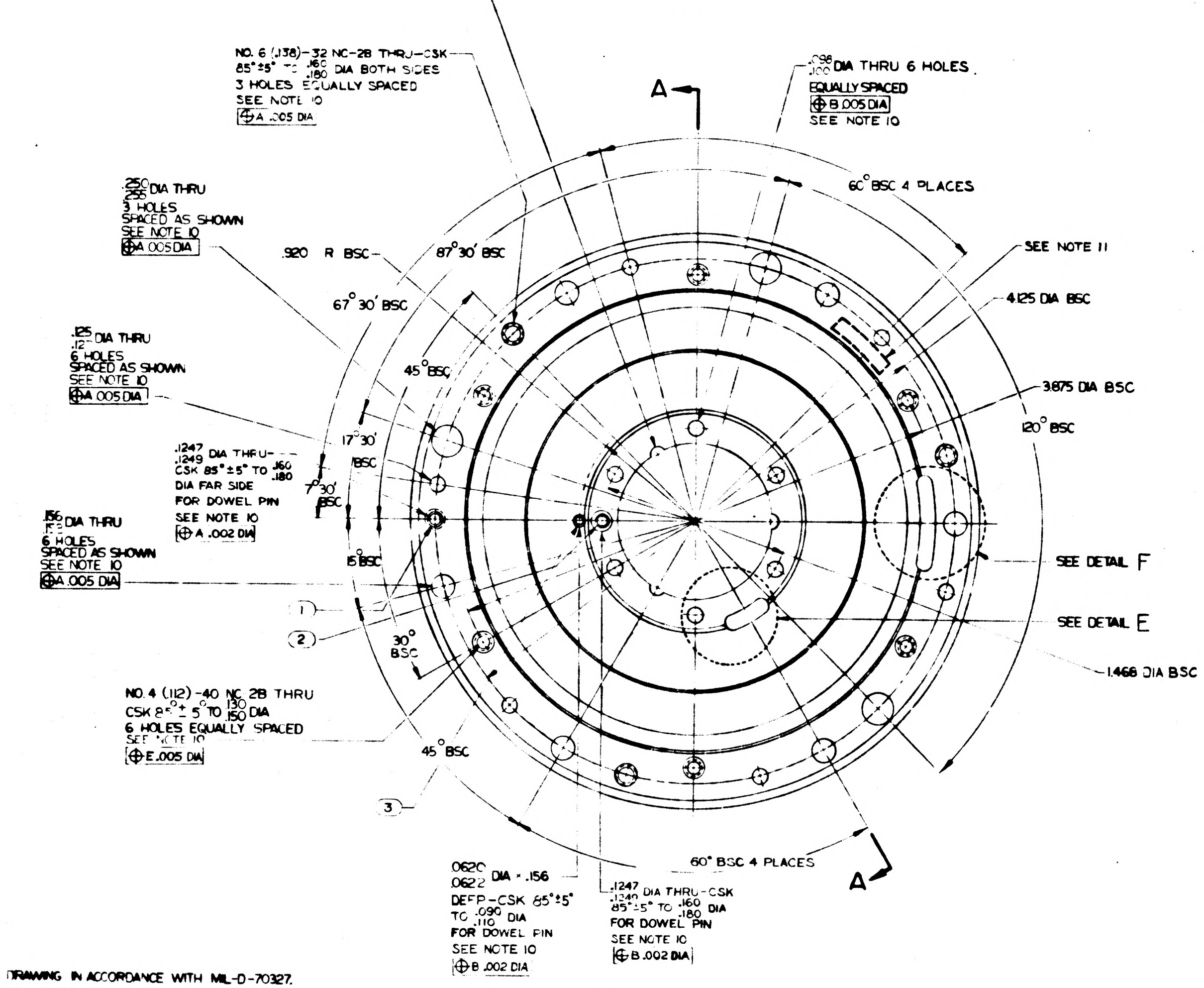
1000030 REV D SHEET 1


.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°

DETAIL E
SCALE 4/1

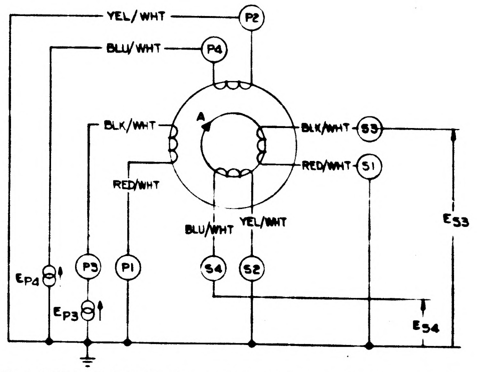

1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDES - SEE NOTE 10

DETAIL F
SCALE 2/1


.062 R 3 PLACES EQUALLY SPACED ON A 1.186 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 ⊕A .005 DIA
.098 DIA THRU 6 HOLES EQUALLY SPACED ⊕B .005 DIA SEE NOTE 10
A
.250 DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
.920 R BSC
87°30' BSC
67°30' BSC
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
.125 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
45° BSC
3.875 DIA BSC
120° BSC
17°30' BSC
7°30' BSC
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 ⊕A .002 DIA
.156 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
15° BSC
SEE DETAIL F
SEE DETAIL E
30° BSC
1
2
1.468 DIA BSC
NO. 4 (.112)-40 NC 2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 ⊕E .005 DIA
45° BSC
3
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$ R
4. W[illegible] ELECTRICAL LEADS ARE POSITIONED AS SHOWN, RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2' AS DEFINED BY PS1000030
5. MATERIAL:
   A. MOUNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE 28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -E- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER [illegible] AXIAL PLAY ±.010 FROM POSITION SHOWN.
8. PART MUST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. RESOLVERS SHALL BE ELECTRICALLY ZEROED AS DEFINED BY PS1000030 WHEN DOWEL PINS [illegible] AND (2) ARE ALIGNED WITHIN ±0°1'
10. HOLE FOR DOWEL PINS ( ) & (2) MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. ALL DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

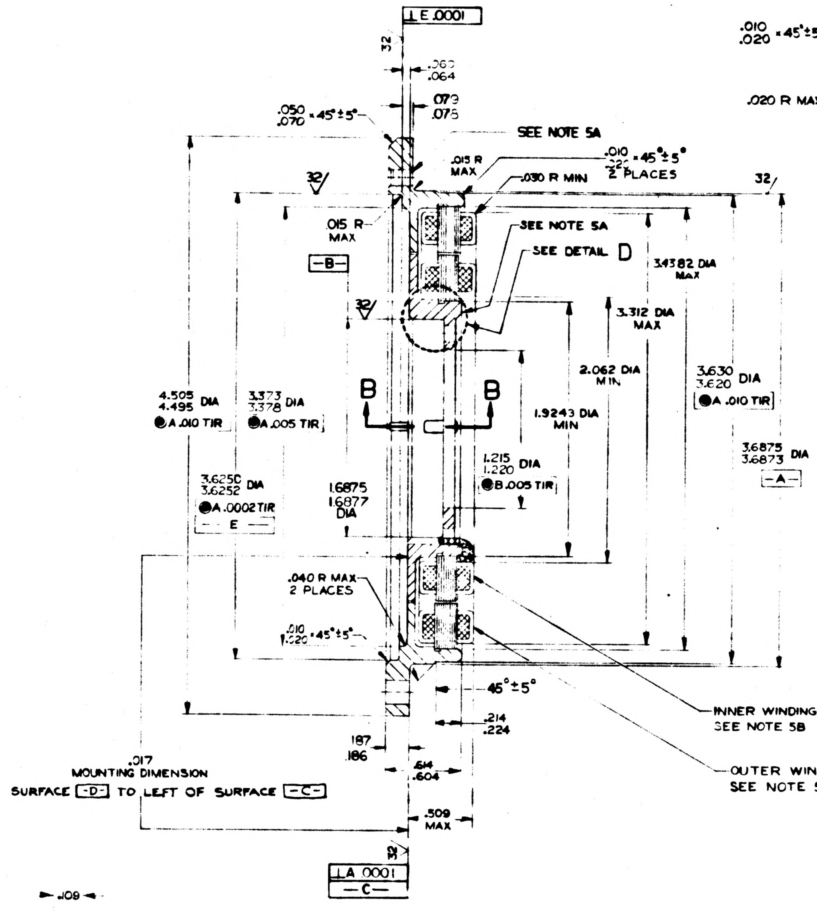

YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
RED/WHT
S1
YEL/WHT
BLU/WHT
E S3
E P4
P3
P1
S4
S2
E P3
E S4

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

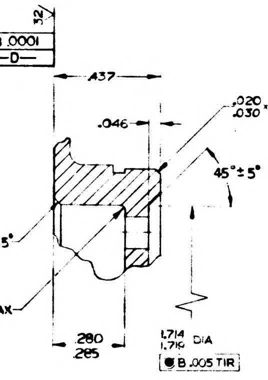
$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$


⊥ E .0001
32
.060 .064
.073 .075
.050 .070 × 45° ±5°
SEE NOTE 5A
.015 R MAX
.010 .020 × 45° ±5° 2 PLACES
.030 R MIN
32/
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
B
B
4.505 4.495 DIA ⊕A .010 TIR
3.373 3.378 DIA ⊕A .005 TIR
1.9243 DIA MIN
3.630 3.620 DIA ⊕A .010 TIR
3.6875 3.6873 DIA -A-
1.215 1.220 DIA ⊕B .005 TIR
3.6250 3.6252 DIA ⊕A .0002 TIR -E-
1.6875 1.6877 DIA
.040 R MAX 2 PLACES
.010 .020 × 45° ±5°
45° ±5°
.214 .224
.187 .186
.614 .604
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
.509 MAX
⊥ A .0001 -C-
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B

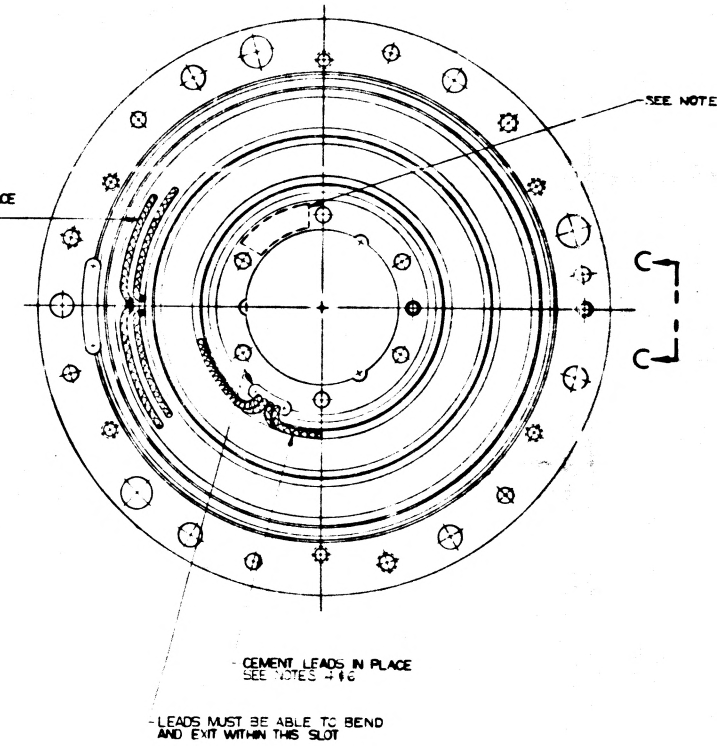
SEE NOTE 13

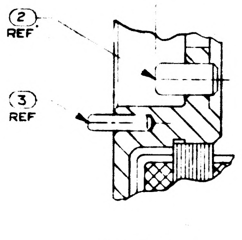
SECT A-A


32
⊥ B .0001 -D-
.437
.046
.020 .030 × 45° ±5°
45° ±5°
.010 .020 × 45° ±5°
.020 R MAX
.280 .285
1.714 1.716 DIA ⊕B .005 TIR

DETAIL D
INNER WINDING REMOVED
SCALE 4/1

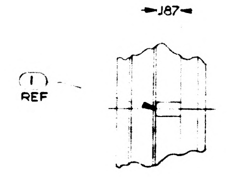
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6


SEE NOTE
C
C
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT


.108
(2) REF
(3) REF

SECT B-B
SCALE 4/1

ORIGINAL SOURCES OF SUPPLY
THE BENDIX CORPORATION
TETERBORO, NEW JERSEY
CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



VIEW C-C
SCALE 2/1

INCHES
PHOTOGRAPHIC SCALE ONLY

1	R[illegible], HOLDS[illegible]		MS[illegible]
1	[illegible]		
1	[illegible]		
QTY REQD	NOMENCLATURE OR DESCRIPTION		

LIST OF PARTS AND

1000008		
1000033	DL 1000201	
1000032	DL 1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153 DATE
APPROVED [illegible] 2-20-62
CHECKED
DRAWN L. MILLS
APPROVAL FOR MSC
BY DIRECTION MIT APPROVED
W. [illegible] 2/20/62

RESOLVER
TRANSMITTER

SCALE 2

1000030 REV D SHEET 1

Apollo G & N Specification
PS-1000030
[illegible]
Class A
TDRR 00210
28 Dec. 1962

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WSK	WSS.	
B	02414	All pages	WSK	WSS.	12Aug63
C	02931	3	WSK	WSS.	6Aug63
D	05721	2	WSK		2?Jan64

This specification consists of pages i through iii and 1 to 5 inclusive

REV.

Apollo G & N Specification
PS-1000030
28 December 1962
Class A Release
TDRR -00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

W S Kupfer 28 Dec '62
MIT Instrumentation Laboratory Date

Michael 12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Transmitter Resolver, Type 45RU10n8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G & N

ND-1002013	Description and Requirments Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G & N

1000030	Resolver, One Speed Transmitter, Specification Control Drawing

(Copies of specifications and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

Apollo G & N Specification
PS-1000030

Class A
TDRR 00210
28 Dec. 1962

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WSK		
B	02414	All pages	WSK		12 Aug 63
C	02931	3	WSK		6 Sep 63
D	05721	2	WSK		22 Jan 64

This specification consists of pages i through iii and 1 to 5 inclusive

REV. B

Apollo G & N Specification

00[illegible]30

28 December 1962

Class A Release

TDRR -00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

28 Dec 62

MIT Instrumentation Laboratory Date

12/28/62

NASA/MSC Approval Date

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

EXAMINED AND APPROVED

F S Mihalo   Asst. Contl & Guidance Eng Mgr.   12/28/62
APPROVED BY   TITLE   DATE

APPROVED BY   TITLE   DATE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Robert J. Therrien   Staff Member   28 December 1962
EXAMINED BY   TITLE   DATE

John E. Miller   Director [illegible]   28 December 1962
APPROVED BY   TITLE   DATE

David G. Hoag   Tech Dir   28 Dec 62
APPROVED BY   TITLE   DATE

AC SPARK PLUG DIVISION, GENERAL MOTORS CORPORATION

Henry J. Harding   Sr. Specification Writer   19 December 1962
PREPARED BY   TITLE   DATE

A J Stalian   28 DEC 1962
ACCEPTED BY   TITLE   DATE

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Transmitter Resolver, Type 45RU10n8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G & N

ND-1002013	Description and Requirments Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G & N

1000030	Resolver, One Speed Transmitter, Specification Control Drawing

(Copies of specifications and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 GENERAL. The resolver shall conform to the requirements of specification ND-1002013 with the following exceptions or additions:

a. Accuracy determination shall be made with loads of 1000 ohms ± 10 percent on both secondary windings. The relative accuracy between the two loads shall be ± 0.25 percent.

b. The resolver shall be tested as an RX only, with black excited high, red grounded, and the yellow and blue primary windings commoned and ungrounded.

c. The following paragraphs of Specification ND-1002013 are not applicable.

(1) Phase Shift Variations Due to Voltage.
(2) Angular Error Versus Voltage.
(3) Angular Error Versus Frequency.
(4) Primary Impedance Unbalance.
(5) Temperature Rise.
(6) Friction Torque.
(7) Brush Slip Ring Continuity.

d. Measurement of air gap per side shall be made and shall conform to the value listed in 3.5p.

e. Alignment of electrical zero: With the locating dowel pins aligned as specified on drawing 1000030, rated voltage applied as specified in 3.1b, and secondary loads applied as specifed in 3.1a; the electrical output shall be within ± 2 arc minutes of electrical zero.

3.2 DESIGN AND CONSTRUCTION The resolver shall be of the design, construction and physical dimensions shown on drawing 1000030. The manufacture, material, and mechanical and electrical construction of the resolver shall be in accordance with the requirements of Specification ND-1002013.

3.3 FINISHES AND PROTECTIVE TREATMENT The resolver finishes, protective treatment, and moisture, fungus, and corrosion treatments shall be in accordance with the requirements of drawing 1000030 and Specification ND-1002013.

3.4 QUALIFICATION PERFORMANCE CHARACTERISTICS AND CONDITIONS

3.4.1 General. The qualification testing shall conform to the requirements of Specification ND-1002013 with the following exceptions or additions.

3.4.1.1 Environmental.

3.4.1.1.1 Vibration, Operating. With the resolver tested as specified, the angular deviation shall not exceed 10 arc seconds, peak.

3.4.1.1.2 Shock, Operating With the resolver tested as specified, the angular deviation shall not exceed 10 arc seconds, peak.

3.4.1.1.3 Low Temperature, Operating With the resolver subjected to a temperature of 0°C±2.8°C (32°F±5°F) and tested as specified, the angular deviation shall not exceed 10 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 20 mv, rms.

3.4.1.1.4 High Temperature, Operating With the resolver subjected to a temperature of 93.3°±2.8°C (200F±5°F) and tested as specified, the angular deviation shall not exceed 10 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 20 mv,rms.

3.4.1.1.5 52°C Temperature, Operating With resolver subjected to a temperature of 52°±1°C (125.6°F±1.8°F) and tested as specified, the angular deviation shall not exceed 5 arc seconds, peak and the bridge fundamental null voltage variations shall not exceed 5 mv, rms.

3.4.1.1.6 Thermal Shock The resolver shall be tested as specified with the low temperature as indicated in 3.4.1.1.3.

3.4.1.1.7 Humidity, Operating With the resolver tested as specified, the angular deviation shall not exceed 10 arc seconds, peak.

3.4.1.1.8 Thermal Vacuum The resolver shall be tested as specified while exposed to a vacuum level of 3.0 psia, and the low and high temperatures specified in 3.4.1.1.3 and 3.4.1.1.4 respectively

3.4.1.2 Endurance During the applicable portions of endurance testing, the following conditions shall be maintained:

a) Low Temperature - 48.9°±2.8°C (120°F±5°F)
b) High Temperature - 82.2°±2.8°C (180°F+5°F)
c) Operating Speed - 0 rpm

3.5 DETAIL CHARACTERISTICS. The resolver shall have the following specific characteristics when tested at the applicable ambient conditions as specified in Specification ND-1002013.

a. Primary	Outer Member
b. Test Voltage	28V ± 2%
c. Test Frequency	800 cps ± 0.5%
d. Impedance	
(1) Zpo	195 ohms + 15% + j946 ohms ± 15%
(2) Zpo	127 + j 53 ohms, nominal
(3) Zso	225 ohms ± 15% + j1028 ohms ± 15%
(4) Zss	136 + j 63 ohms, nominal
e. Null Voltage	
(1) Total	28 millivolts, maximum
(2) Fundamental	28 millivolts, maximum
f. Phase Shift	3.3° ± 0.5°
g. Phase Shift Versus Rotation	± 0.50°

h. Transformation Ratio	1.00 ± 1%
i. Angular Error	5 arc minutes, peak, maximum
(1) Angular Interval for Accuracy Measurement	15%
j. Impedance Unbalance, Secondary	100 Z-sec,maximum
k. Input Current, Unloaded	28.9 milliamperes, norminal
m. Input Power, Unloaded	174 milliwatts, nominal
n. DC Resistance	
(1) Primary	58 ohms ± 15%
(2) Secondary	78 ohms ± 15%
p. Air Gap Per Side	0.004 inch, minimum

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. Sampling, inspection and testing shall be in accordance with the requirements of Specification ND-1002013, and as specified herein.

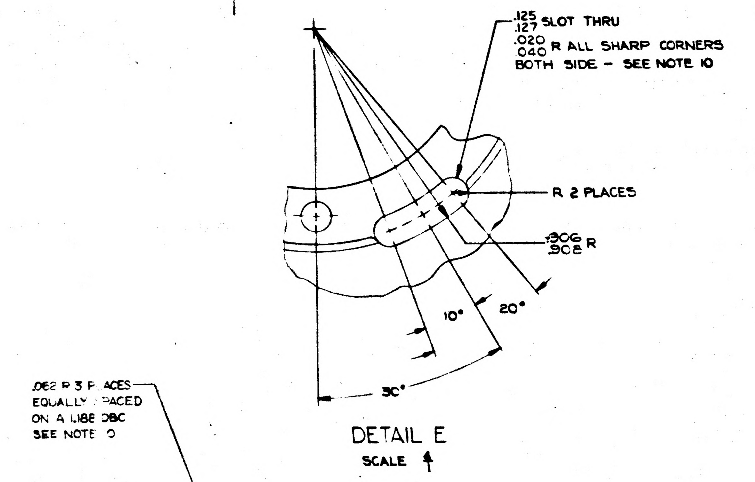
5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery shall be in accordance with the requirements of Specification ND-1002013.

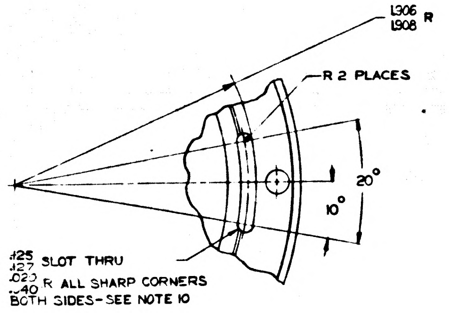
6. NOTES

6.1 The notes specified in Specification ND-1002013 are applicable to this resolver.

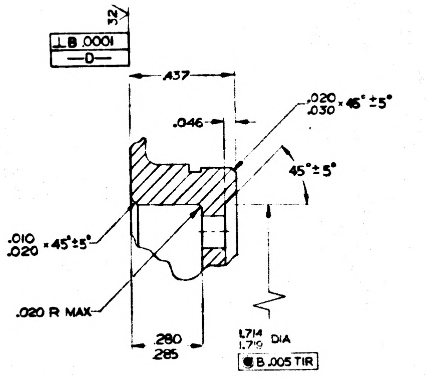
REVISIONS TDR CC028				
SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL REVISIONS			
B	GENERAL REVISIONS			
C	GENERAL REVISIONS		ajb	WJR
D	TDRR CC151	12-12-62	ajb	WJR
E	TDRR CC255	1-9-63	ajb	


.125
.127 SLOT THRU
.020
.040 R ALL SHARP CORNERS
BOTH SIDE - SEE NOTE 10
R 2 PLACES
.306
.308 R
10°
20°
30°
.062 R 3 PLACES
EQUALLY SPACED
ON A 1.186 DBC
SEE NOTE 10

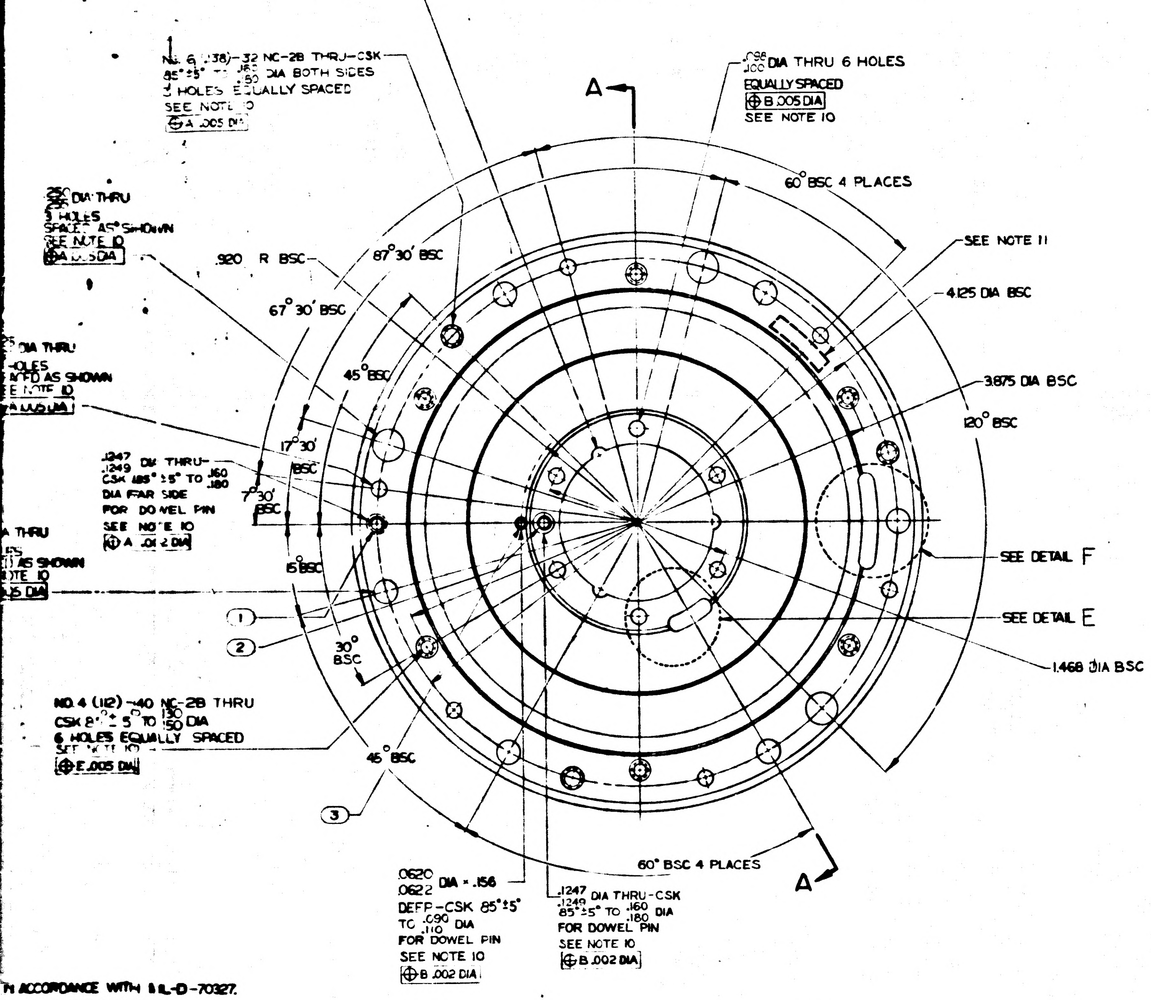
DETAIL E
SCALE 4/1

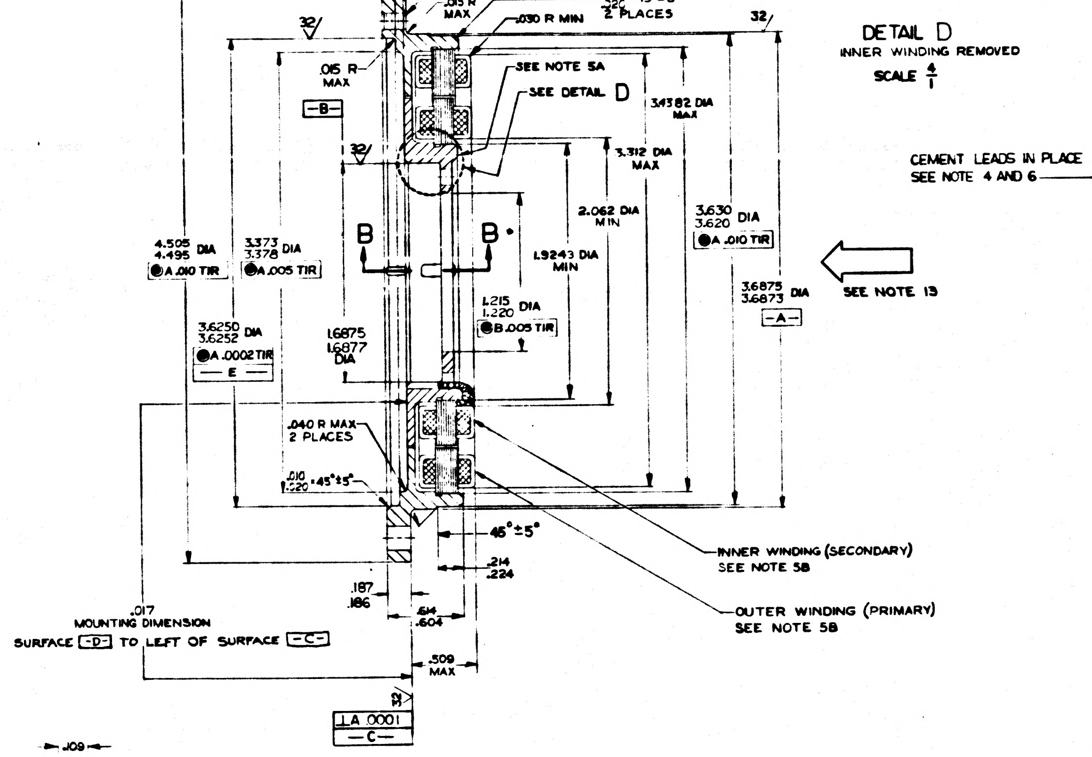

1.306
1.308 R
R 2 PLACES
20°
10°
.125
.127 SLOT THRU
.020
.040 R ALL SHARP CORNERS
BOTH SIDES-SEE NOTE 10

DETAIL F
SCALE 4/1

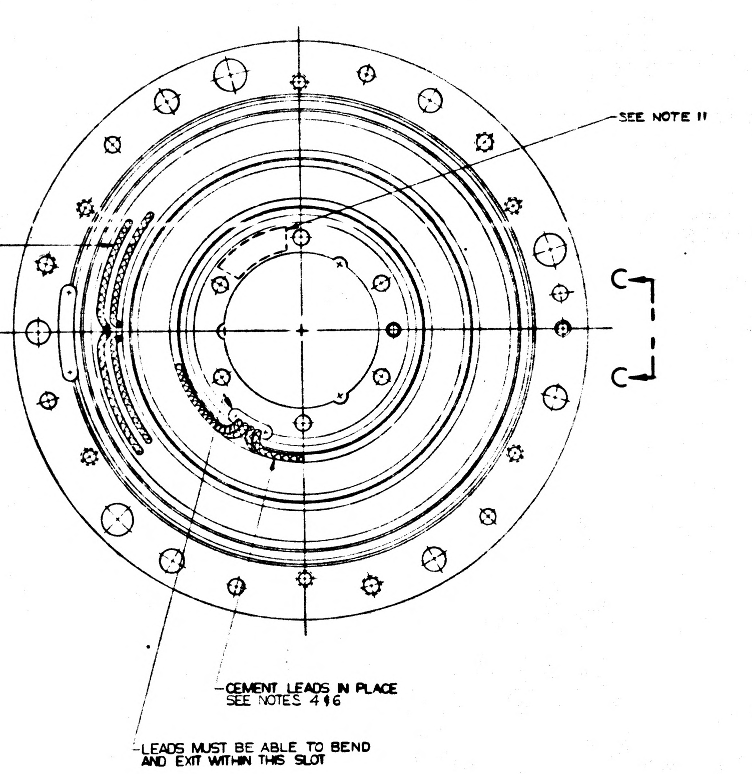

32
⊥ B .0001
-D-
.437
.046
.020
.030 × 45° ±5°
45° ±5°
.010
.020 × 45° ±5°
.020 R MAX
.280
.285
1.714
1.719 DIA
⊚ B .005 TIR

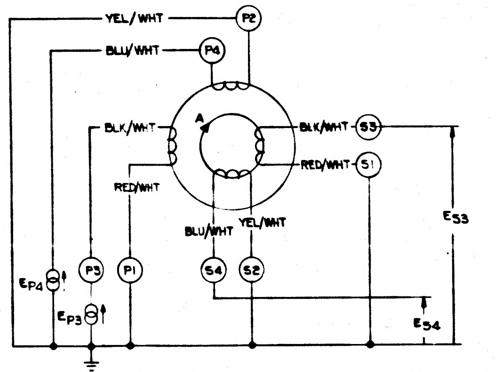
DETAIL D
INNER WINDING REMOVED
SCALE 4/1

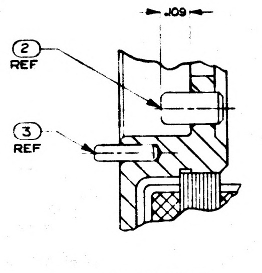

A
NO. 6 (.138)-32 NC-2B THRU-CSK
85° ±5° TO .180 DIA BOTH SIDES
3 HOLES EQUALLY SPACED
SEE NOTE 10
⊕ A .005 DIA
.096
.100 DIA THRU 6 HOLES
EQUALLY SPACED
⊕ B .005 DIA
SEE NOTE 10
DIA THRU
3 HOLES
SPACED AS SHOWN
SEE NOTE 10
A .005 DIA
.920 R BSC
87° 30' BSC
67° 30' BSC
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
45° BSC
17° 30' BSC
7° 30' BSC
15° BSC
30° BSC
45° BSC
.1247
.1249 DIA THRU-
CSK 85° ±5° TO .160
.180
DIA FAR SIDE
FOR DOWEL PIN
SEE NOTE 10
⊕ A .002 DIA
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
NO. 4 (.112)-40 NC-2B THRU
CSK 85° ±5° TO .130
.150 DIA
6 HOLES EQUALLY SPACED
SEE NOTE 10
⊕ E .005 DIA
1
2
3
60° BSC 4 PLACES
A
.0620
.0622 DIA × .156
DEEP-CSK 85° ±5°
TO .090
.110 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕ B .002 DIA
.1247
.1249 DIA THRU-CSK
85° ±5° TO .160
.180 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕ B .002 DIA


⊥ E .0001
32
.060
.064
.050
.070 × 45° ±5°
.079
.075
SEE NOTE 5A
.010
.020 × 45° ±5°
2 PLACES
32
.015 R MAX
.030 R MIN
.015 R MAX
SEE NOTE 5A
SEE DETAIL D
-B-
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
1.9243 DIA MIN
3.630
3.620 DIA
⊚ A .010 TIR
B
B
4.505
4.495 DIA
⊚ A .010 TIR
3.373
3.378 DIA
⊚ A .005 TIR
1.215
1.220 DIA
⊚ B .005 TIR
3.6873
3.6875 DIA
-A-
SEE NOTE 13
3.6250
3.6252 DIA
⊚ A .0002 TIR
-E-
1.6875
1.6877 DIA
.040 R MAX
2 PLACES
.010
.020 × 45° ±5°
45° ±5°
.214
.224
.187
.186
.614
.604
.509 MAX
.017
MOUNTING DIMENSION
SURFACE -D- TO LEFT OF SURFACE -C-
INNER WINDING (SECONDARY)
SEE NOTE 5B
OUTER WINDING (PRIMARY)
SEE NOTE 5B
⊥ A .0001
-C-

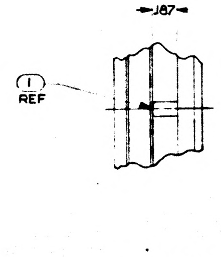
SECT A-A


SEE NOTE 11
CEMENT LEADS IN PLACE
SEE NOTE 4 AND 6
C
C
CEMENT LEADS IN PLACE
SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND
AND EXIT WITHIN THIS SLOT


YEL/WHT
P2
BLU/WHT
P4
A
BLK/WHT
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E_S3
E_P4
E_P3
P3
P1
S4
S2
E_S4


.109
2
REF
3
REF

SECT B-B
SCALE 4/1



VIEW C-C
SCALE 2/1

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

IN ACCORDANCE WITH MIL-D-70327.
S OTHERWISE SPECIFIED.
DGES .005
.015 R
EADS ARE POSITIONED AS SHOWN RESOLVERS SHALL BE
WITHIN ±2° AS DEFINED BY PS1000030

RING, BERYLLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
S OPTIONAL, EXCEPT WHERE NOTED
NCH MINIMUM LENGTH PER MIL-W-16878

BE INSPECTED WITH DIA -A- AND
TIR, AND SURFACE: -C- AND -D-
ECT TO EACH OTHER
[illegible] FROM POSITION SHOWN.
[illegible] WHEN OPERATING
000O8-1 OR WITH [illegible] 2081-2 PER PS1000032 OR PS1000033
ELECTRICALLY [illegible]
[illegible] MATE DOWEL PINS
ALIGNED WITHIN 0°
[illegible] ( ) & (E) MUST BE LOCATED PER NOTE 9
KEEP HOLES OR WIRE SLOTS
DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS
SPEC LOCATIONS PER MIL-STD-130
BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART
[illegible]

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\ \mathrm{COS}\ A - E_{P4}\ \mathrm{SIN}\ A\right]$$

$$E_{S4} = K\left[E_{P3}\ \mathrm{SIN}\ A + E_{P4}\ \mathrm{COS}\ A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1	PIN, STR, HDLS (DWL)	MS16555-602			3
1	PIN, LOCATING, STRT, HDLS	1000088-1			2
1	PIN, LOCATING, STRT, HDLS	1000088-2			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001

APPLICATION

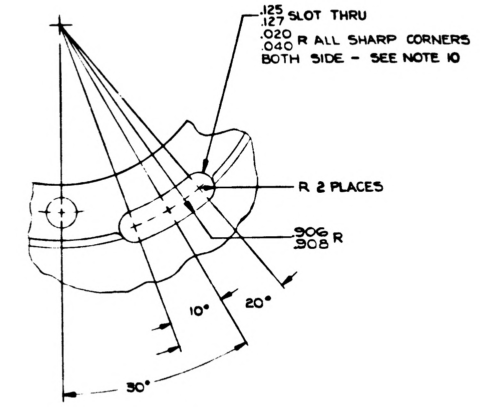
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED AJ Boyce 9-20-62
CHECKED
DRAWN L. MILLS
APPROVED FOR MSC
9-20-62
MIT APPROVED
WA Hoffer 9/20/62

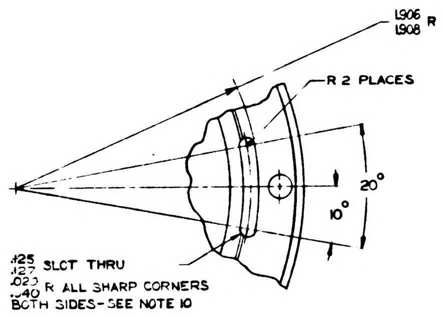
RESOLVER,
ONE SPEED
TRANSMITTER
SPECIFICATION CONTROL
DRAWING

SCALE 2-1
UNIT WT
CODE IDENT

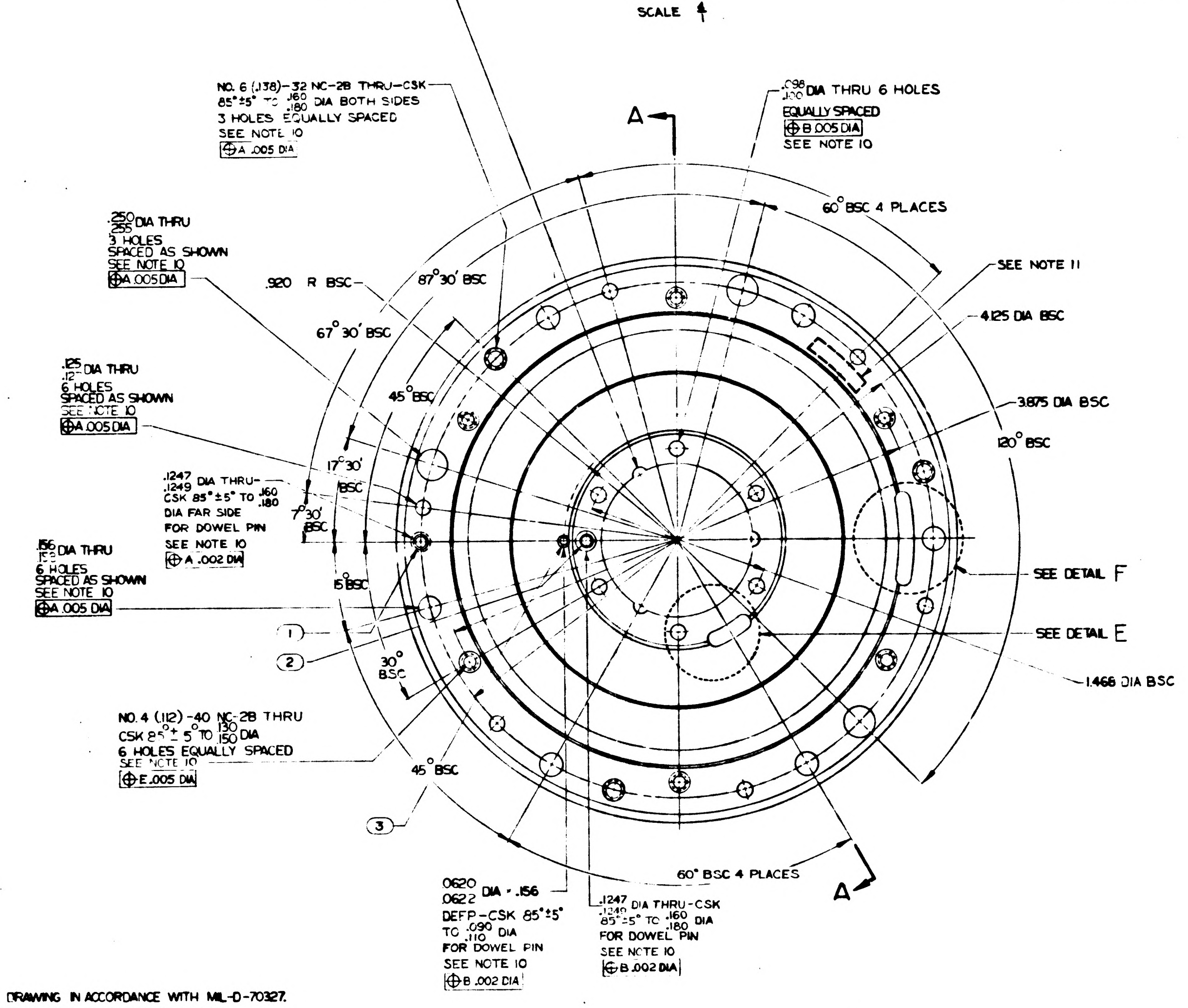
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000030
SHEET 1 OF 1

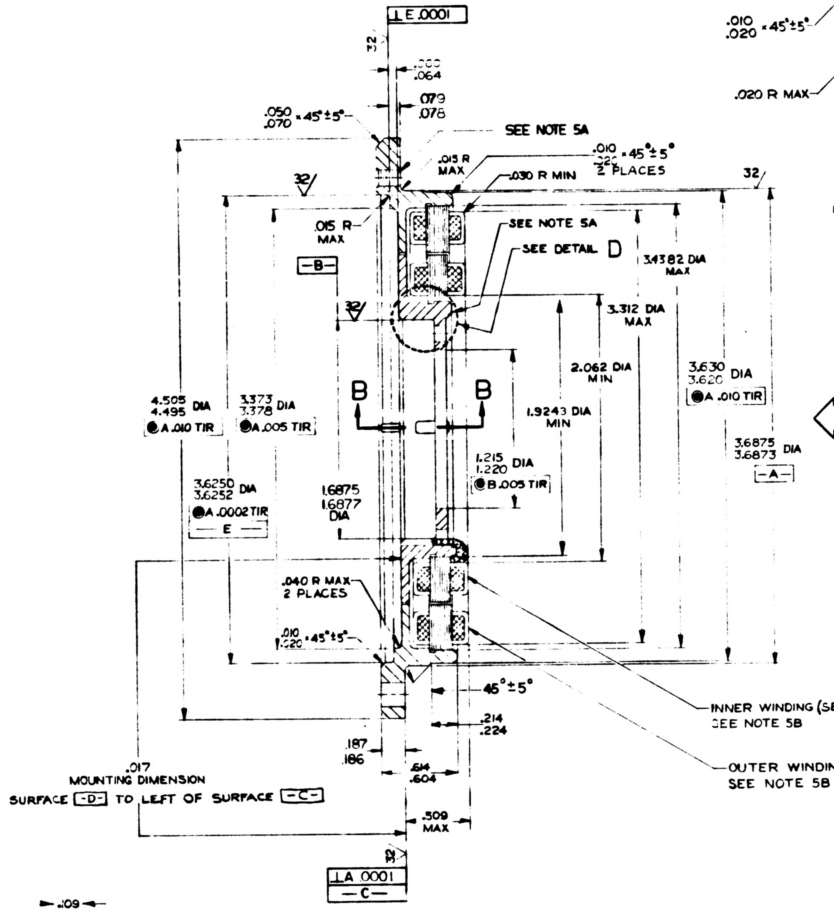

.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°

DETAIL E
SCALE 4/1

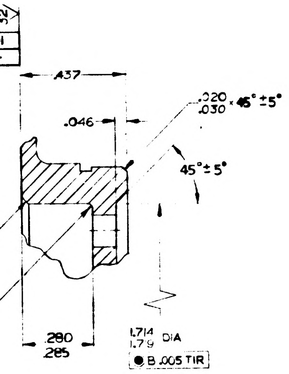

1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDES-SEE NOTE 10

DETAIL F
SCALE 2/1

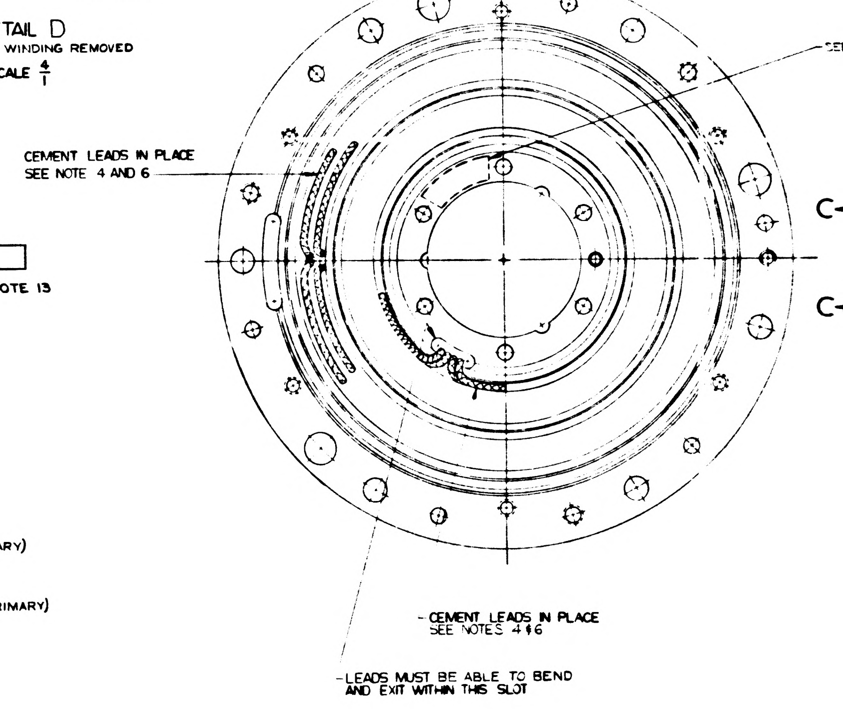

.062 R 3 PLACES EQUALLY SPACED ON A 1.188 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 ⊕A .005 DIA
.128 .130 DIA THRU 6 HOLES EQUALLY SPACED ⊕B .005 DIA SEE NOTE 10
A
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
.250 .255 DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
.920 R BSC
87°30' BSC
67°30' BSC
.125 .127 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
45° BSC
17°30' BSC
7°30' BSC
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 ⊕A .002 DIA
.156 .159 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
15° BSC
1
2
30° BSC
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 ⊕E .005 DIA
45° BSC
3
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA

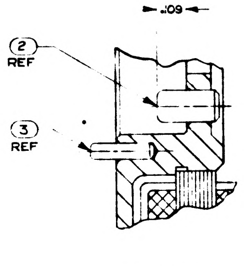

⊥E .0001
32
.062 .064
.079 .078
.050 .070 × 45°±5°
SEE NOTE 5A
.015 R MAX
.030 R MIN
.010 .020 × 45°±5° 2 PLACES
32
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
1.9243 DIA MIN
3.630 3.620 DIA ◉A .010 TIR
3.6875 3.6873 DIA -A-
SEE NOTE 13
B B
4.505 4.495 DIA ◉A .010 TIR
3.373 3.378 DIA ◉A .005 TIR
3.6250 3.6252 DIA ◉A .0002 TIR -E-
1.6875 1.6877 DIA
1.215 1.220 DIA ◉B .005 TIR
.040 R MAX 2 PLACES
.010 .020 × 45°±5°
45°±5°
.214 .224
.187 .186
.614 .604
.509 MAX
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
⊥A .0001 -C-
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B

SECT A-A

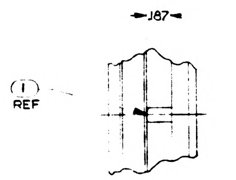

⊥B .0001 -D-
32
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.719 DIA ◉B .005 TIR

DETAIL D
INNER WINDING REMOVED
SCALE 4/1


CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
C
C
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT


.09
2 REF
3 REF

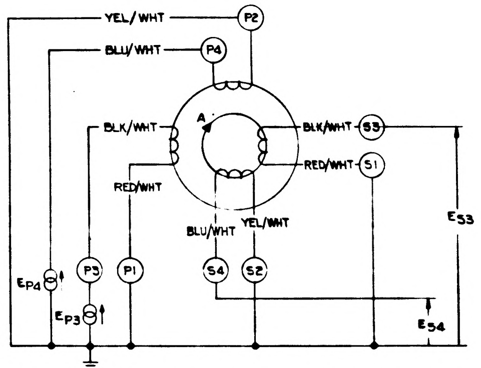
SECT B-B
SCALE 4/1



VIEW C-C
SCALE 4/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES .005 .015 R
4. VA[illegible] ELECTRICAL LEADS ARE POSITIONED AS SHOWN RESOLVERS SHALL BE AT [illegible]ECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000030
5. MATERIAL:
   A. MOUNTING RING, BERYLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYP[illegible] -28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER [illegible] AXIAL PLAY ±.010 FROM POSITION SHOWN.
8. PART [illegible]ST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. RESOLVERS SHALL BE ELECTRICALLY Z[illegible]ED AS [illegible]IED BY PS1000030 WHEN DOWEL PINS ① AND ② ARE ALIGNED WITHIN ±0°1'.
10. HOLE FOR DOWEL PINS ① & ② MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIF[illegible] USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. AL[illegible] DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TE[illegible]PERATURE OF 68°F ±1°F


YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E53
EP4
P3
P1
S4
S2
EP3
E54

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A = 0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION

NEXT ASSY	USED ON
1000008	
1000033	DL 000201
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
—	±.005	±0°30'

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

APPROVED
CHECKED
DRAWN
APPROVAL FOR USE

1000030 REV E SHEET 1

Apollo G & N Specification
PS-1000030E

Class A
TDRR 00210
28 Dec. 1962

PROCUREMENT SPECIFICATION

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WSK	WSS	
B	02414	All pages	WSK	WSS	12 Aug 63
C	02931	3	WSK	WSS	6 Aug 63
D	05721	2	WSK		22 Jan 64
E	25175	2, 3	WK	---	1/11/66

This specification consists of pages i throughiii and 1 to 5 inclusive

REV. E

3. REQUIREMENTS

3.1 GENERAL. The resolver shall conform to the requirements of specification ND-1002013 with the following exceptions or additions:

a. Accuracy determination shall be made with loads of 1000 ohms ± 10 percent on both secondary windings. The relative accuracy between the two loads shall be ± 0.25 percent.

b. The resolver shall be tested as an RX only, with black excited high, red grounded, and the yellow and blue primary windings commoned and ungrounded.

c. The following paragraphs of Specification ND-1002013 are not applicable.

(1) Phase Shift Variations Due to Voltage.
(2) Angular Error Versus Voltage.
(3) Angular Error Versus Frequency.
(4) Primary Impedance Unbalance.
(5) Temperature Rise.
(6) Friction Torque.
(7) Brush Slip Ring Continuity.

d. Measurement of air gap per side shall be made and shall conform to the value listed in 3.5p.

e. **Alignment of electrical zero:** With the locating dowel pins aligned as specified on drawing 1000030, rated voltage applied as specified in 3.1b, and secondary loads applied as specifed in 3.1a; the electrical output shall be within ± 2 arc minutes of electrical zero.

3.2 DESIGN AND CONSTRUCTION The resolver shall be of the design,construction and physical dimensions shown on drawing 1000030. The manufacture, material, and mechanical and electrical construction of the resolver shall be in accordance with the requirements of Specification ND-1002013.

3.3 FINISHES AND PROTECTIVE TREATMENT The resolver finishes, protective treatment, and moisture, fungus, and corrosion treatments shall be in accordance with the requirements of drawing 1000030 and Specification ND-1002013.

3.4 QUALIFICATION PERFORMANCE CHARACTERISTICS AND CONDITIONS

3.4.1 General. The qualification testing shall conform to the requirements of Specification ND-1002013 with the following exceptions or additions.

3.4.1.1 Environmental.

3.4.1.1.1 Vibration, Operating. With the resolver tested as specified, the angular deviation shall not exceed 40 arc seconds, peak.

3.4.1.1.2 Shock, Operating With the resolver tested as specified, the angular deviation shall not exceed 20 arc seconds, peak.

3.4.1.1.3 Low Temperature, Operating With the resolver subjected to a temperature of 0°C±2.8°C (32°F±5°F) and tested as specified, the angular deviation shall not exceed 30 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 20 mv, rms.

3.4.1.1.4 High Temperature, Operating With the resolver subjected to a temperature of 93.3°±2.8°C (200F±5°F) and tested as specified, the angular deviation shall not exceed 30 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 20 mv,rms.

3.4.1.1.5 52°C Temperature, Operating With resolver subjected to a temperature of 52°±1°C (125.6°F±1.8°F) and tested as specified, the angular deviation shall not exceed 30 arc seconds, peak and the bridge fundamental null voltage variations shall not exceed 20 mv, rms.

3.4.1.1.6 Thermal Shock The resolver shall be tested as specified with the low temperature as indicated in 3.4.1.1.3.

3.4.1.1.7 Humidity, Operating With the resolver tested as specified, the angular deviation shall not exceed 120 arc seconds, max.

3.4.1.1.8 Thermal Vacuum The resolver shall be tested as specified while exposed to a vacuum level of 3.0 psia, and the low and high temperatures specified in 3.4.1.1.3 and 3.4.1.1.4 respectively

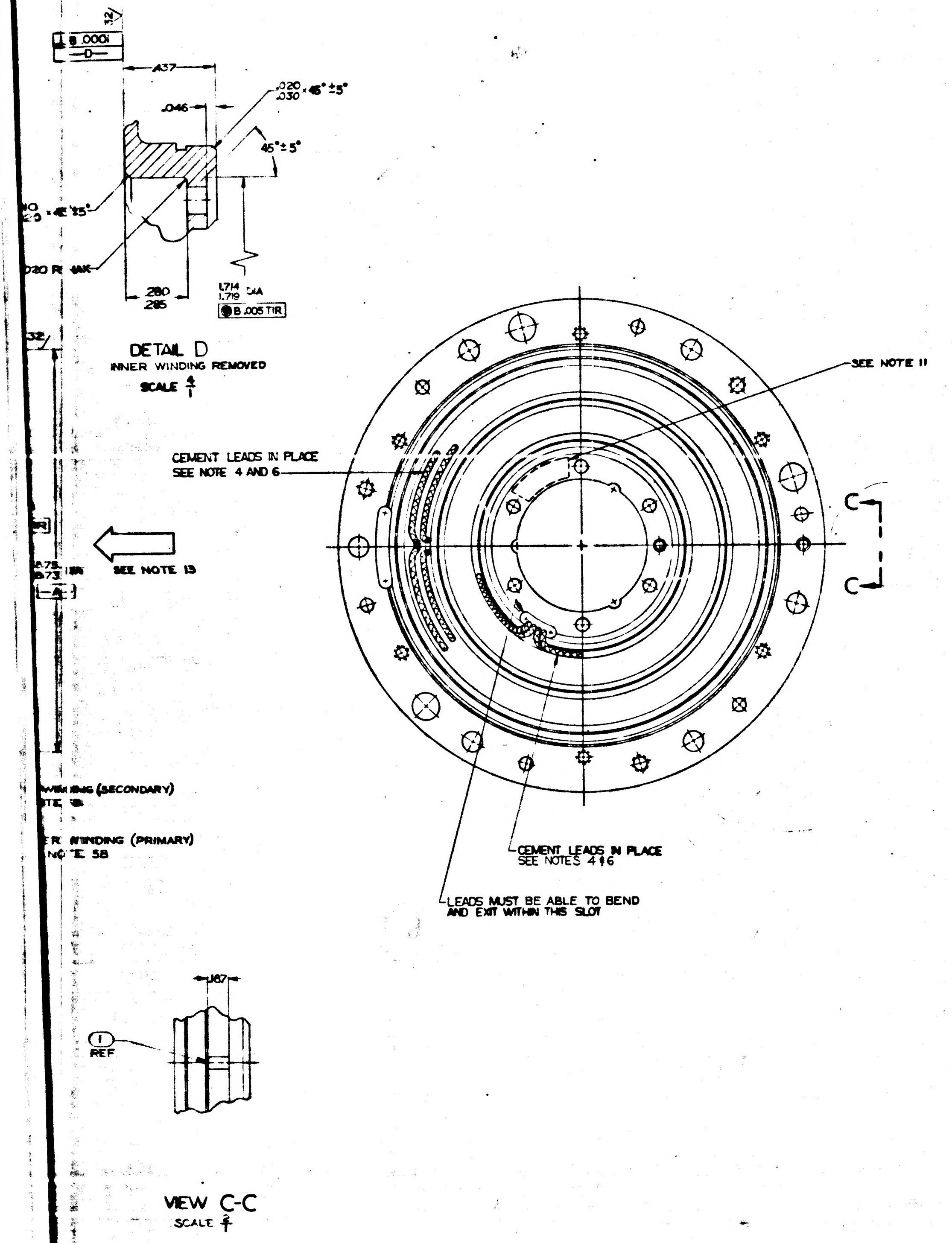
3.4.1.2 Endurance During the applicable portions of endurance testing, the following conditions shall be maintained:

a) Low Temperature - 48.9°±2.8°C (120°F±5°F)
b) High Temperature - 82.2°±2.8°C (180°F+5°F)
c) Operating Speed - 0 rpm

3.5 DETAIL CHARACTERISTICS. The resolver shall have the following specific characteristics when tested at the applicable ambient conditions as specified in Specification ND-1002013.

a. Primary	Outer Member
b. Test Voltage	28V ± 2%
c. Test Frequency	800 cps ± 0.5%
d. Impedance	
(1) Zpo	195 ohms + 15% + j946 ohms ± 15%
(2) Zpo	127 + j 53 ohms, nominal
(3) Zso	225 ohms ± 15% + j1028 ohms ± 15%
(4) Zss	136 + j 63 ohms, nominal
e. Null Voltage	
(1) Total	28 millivolts, maximum
(2) Fundamental	28 millivolts, maximum
f. Phase Shift	3.3° ± 0.5°
g. Phase Shift Versus Rotation	± 0.50°

REVISIONS TDR 00028				
SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL REVISIONS			
B	GENERAL REVISIONS			
C	GENERAL REVISIONS		ajb	WK
D	TDRR 00151	12-12-62	ajb	WK
E	TDRR 00235	1-9-63	ajb	WK
F	TDRR 01149	5-8-63	ajb	WK


32
B .0001
D
.437
.046
.020
.030 × 45° ± 5°
45° ± 5°
.280
.285
1.714
1.719 DIA
B .005 TIR
.020 R MAX
32
SEE NOTE 11
CEMENT LEADS IN PLACE
SEE NOTE 4 AND 6
SEE NOTE 13
C
C
WINDING (SECONDARY)
NOTE 5
R WINDING (PRIMARY)
NOTE 5B
CEMENT LEADS IN PLACE
SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND
AND EXIT WITHIN THIS SLOT
.187
1
REF

DETAIL D
INNER WINDING REMOVED
SCALE 4/1

VIEW C-C
SCALE 4/1

MASTER

Ⓔ	1	PIN, STR, HDLS (DWL)	MS16555-602			3
	1	PIN, LOCATING, STRT., HDLS	1000088-1			2
Ⓓ	1	PIN, LOCATING, STRT., HDLS	1000088-2			1
	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓓ

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT INSTRUMENTATION LAB CONTRACT
NAS 9 153
APPROVED A J Bryant DATE
CHECKED
DRAWN L. Adams
APPROVED FOR MSC
MIT APPROVED
9/20/62

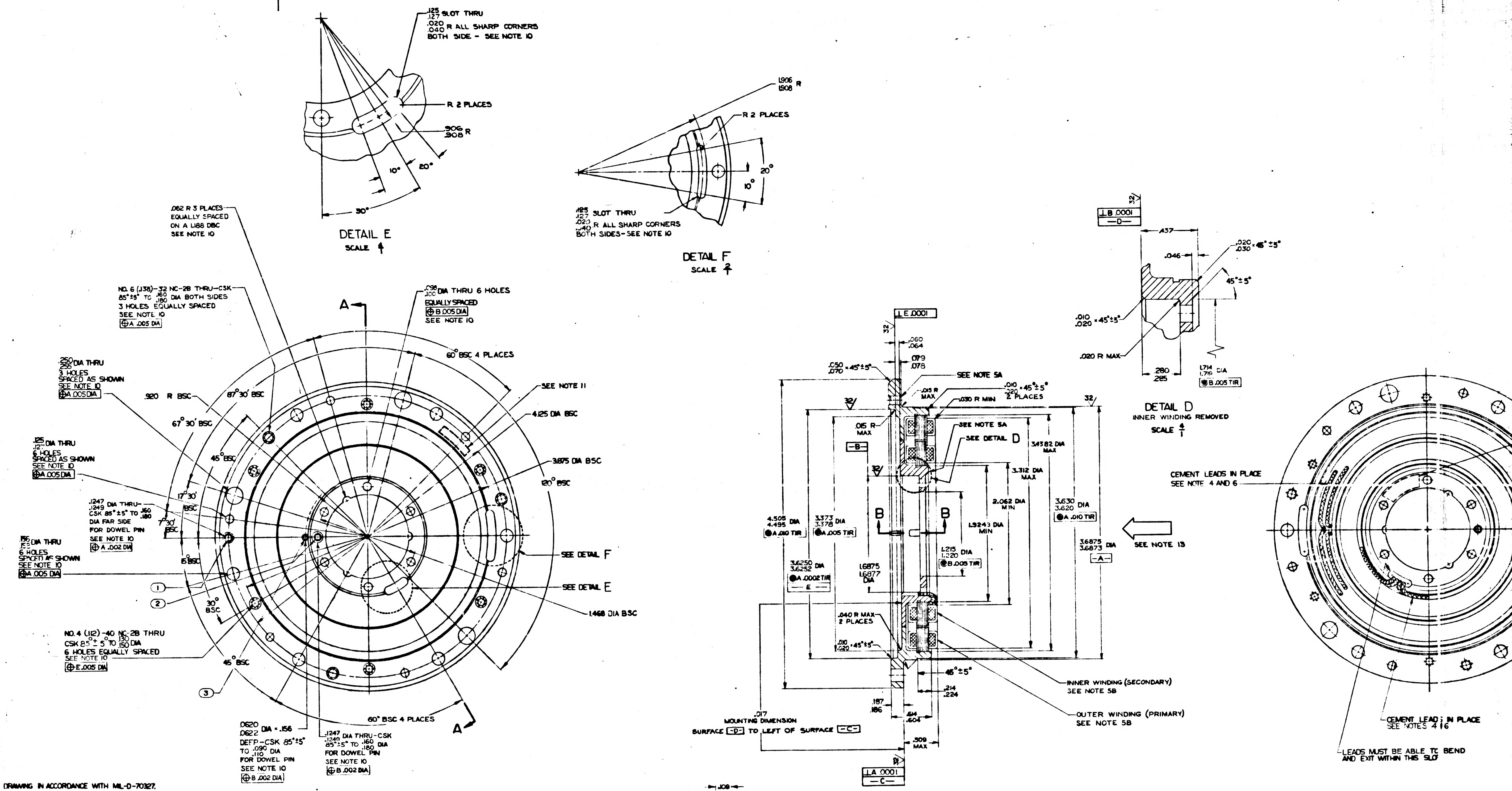
RESOLVER, ONE SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000030
SHEET OF

1000030 F

INCHES
PHOTOGRAPHIC SCALE ONLY

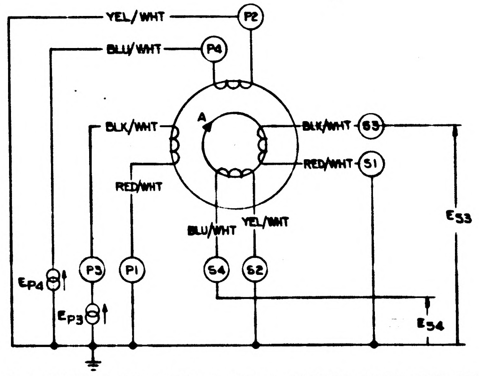


.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°
DETAIL E
SCALE 4/1
1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDES-SEE NOTE 10
DETAIL F
SCALE 2/1
.062 R 3 PLACES EQUALLY SPACED ON A 1.188 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 ⊕A .005 DIA
.098 .100 DIA THRU 6 HOLES EQUALLY SPACED ⊕B .005 DIA SEE NOTE 10
60° BSC 4 PLACES
.250 .255 DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
.920 R BSC
87° 30' BSC
67° 30' BSC
SEE NOTE 11
4.125 DIA BSC
.125 .127 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
45° BSC
3.875 DIA BSC
120° BSC
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 ⊕A .002 DIA
17° 30' BSC
7° 30' BSC
.156 .157 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
15° BSC
SEE DETAIL F
SEE DETAIL E
1
2
30° BSC
1.468 DIA BSC
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 ⊕E .005 DIA
45° BSC
3
A
60° BSC 4 PLACES
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
⊥B .0001
-D-
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.716 DIA
⊕B .005 TIR
DETAIL D
INNER WINDING REMOVED
SCALE 4/1
⊥E .0001
.060 .064
.079 .078
.050 .070 × 45°±5°
SEE NOTE 5A
.015 R MAX
.010 .020 × 45°±5° 2 PLACES
.030 R MIN
SEE NOTE 5A
SEE DETAIL D
.015 R MAX
-B-
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
3.630 3.620 DIA ⊕A .010 TIR
4.505 4.495 DIA ⊕A .010 TIR
3.373 3.378 DIA ⊕A .005 TIR
B
B
1.9243 DIA MIN
1.215 1.220 DIA ⊕B .005 TIR
3.6875 3.6873 DIA -A-
SEE NOTE 13
3.6250 3.6252 DIA ⊕A .0002 TIR -E-
1.6875 1.6877 DIA
.040 R MAX 2 PLACES
.010 .020 × 45°±5°
45°±5°
.214 .224
.187 .186
.614 .604
.509 MAX
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
⊥A .0001
-C-
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT

SECT A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. $\sqrt{63}$ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000030
5. MATERIAL:
   A. MOUNTING RING, BERYLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER .001 AXIAL PLAY ±.010 FROM POSITION SHOWN FOR QUALIFICATION & REQUALIFICATION TESTING ONLY (F)
8. PART MUST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. RESOLVERS SHALL BE ELECTRICALLY ZEROED AS DEFINED BY PS1000030 WHEN DOWEL PINS (1) AND (2) ARE ALIGNED WITHIN ±0°1'.
10. HOLE FOR DOWEL PINS (1) & (2) MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. ALL DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F



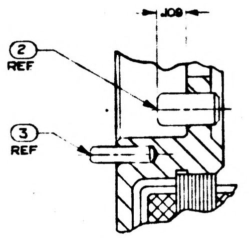
YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E S3
E P4
E P3
P3
P1
S4
S2
E S4

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A, POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A=0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$



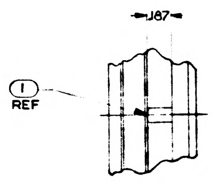
.109
2 REF
3 REF

SECT B-B
SCALE 4/1

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



VIEW C-C
SCALE 2/1

MASTER

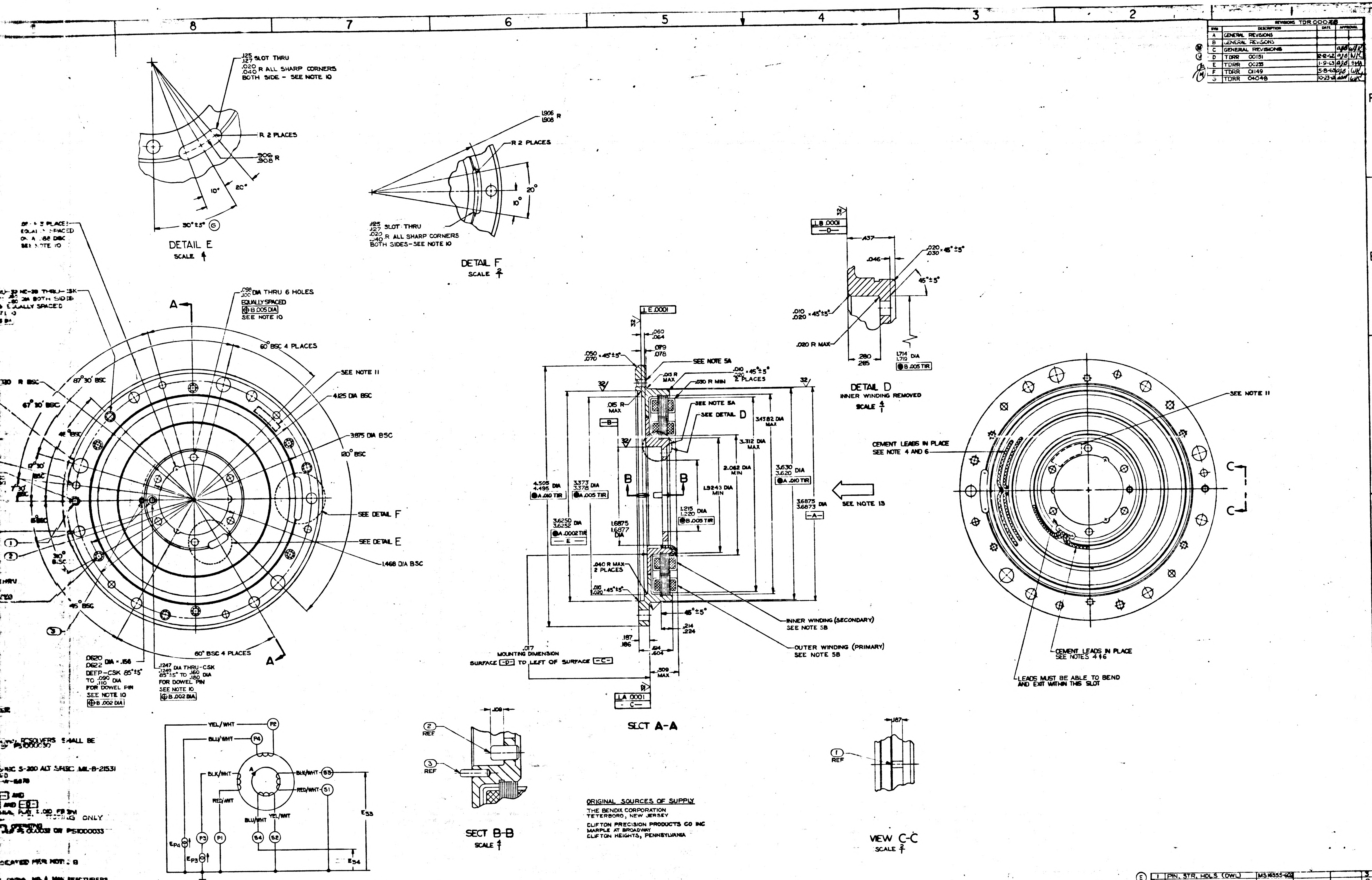
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000008	
1000033	DL 1000201
1000032	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
— ±.005 ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDR 00028			
A	GENERAL REVISIONS			
B	GENERAL REVISIONS			
C	GENERAL REVISIONS		ajb	WK
D	TDRR 00151	12-12-62	ajb	WK
E	TDRR 00235	1-9-63	ajb	HMA
F	TDRR 01149	5-8-63	ajb	WK
G	TDRR 04048	10-23-63		WK


DETAIL E
SCALE 4/1
DETAIL F
SCALE 2/1
DETAIL D
INNER WINDING REMOVED
SCALE 4/1
SECT A-A
SECT B-B
SCALE 4/1
VIEW C-C
SCALE 4/1
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
1.906 1.908 R
30° ±5°
.098 .100 DIA THRU 6 HOLES EQUALLY SPACED
SEE NOTE 10
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
.0620 .0622 DIA × .156 DEEP-CSK 85° ±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10
.1247 .1249 DIA THRU-CSK 85° ±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10
SEE NOTE 5A
SEE DETAIL D
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
SEE NOTE 13
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT
YEL/WHT
BLU/WHT
BLK/WHT
RED/WHT
BLK/WHT
RED/WHT
BLU/WHT
YEL/WHT
P2
P4
S3
S1
P3
P1
S4
S2
E_{P4}
E_{P3}
E_{S3}
E_{S4}
REF

RESOLVERS SHALL BE PS1000030

S-200 ALT SPEC MIL-B-21531

TESTING ONLY

OR PS1000033

LOCATED PER NOTE 8

MANUFACTURERS

OF A UNIFORM PART

ORIGINAL SOURCES OF SUPPLY
THE BENDIX CORPORATION
TETERBORO, NEW JERSEY
CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A = 0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	PIN, STR, HDLS (DWL)	MS16555-602			3
1	PIN, LOCATING, STRT., HDLS.	1000088-1			2
1	PIN, LOCATING, STRT., HDLS.	1000088-2			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN L. MILLS
APPROVED FOR MSC
BY DIRECTION MIT APPROVED 9/20/62

RESOLVER, ONE SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

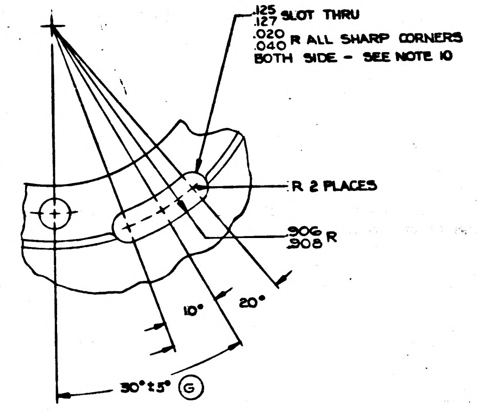
SCALE 2-1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000030
SHEET 1 OF 1

1000030

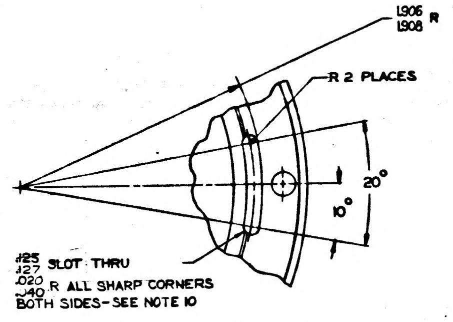
PHOTOGRAPHIC SCALE ONLY

E-2



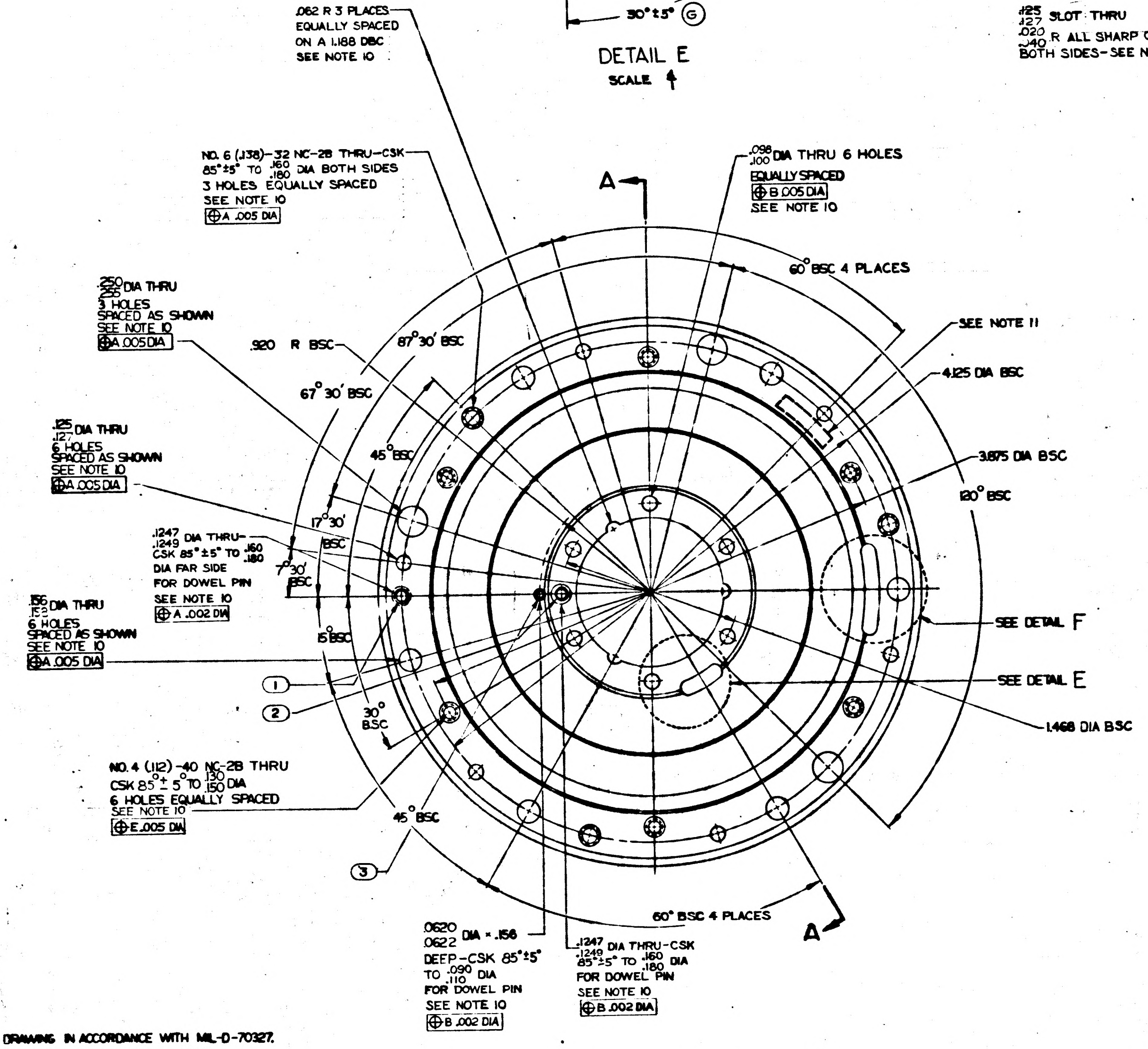
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDE - SEE NOTE 10
R 2 PLACES
.306 .308 R
10°
20°
30° ± 5° (G)

DETAIL E
SCALE 4/1

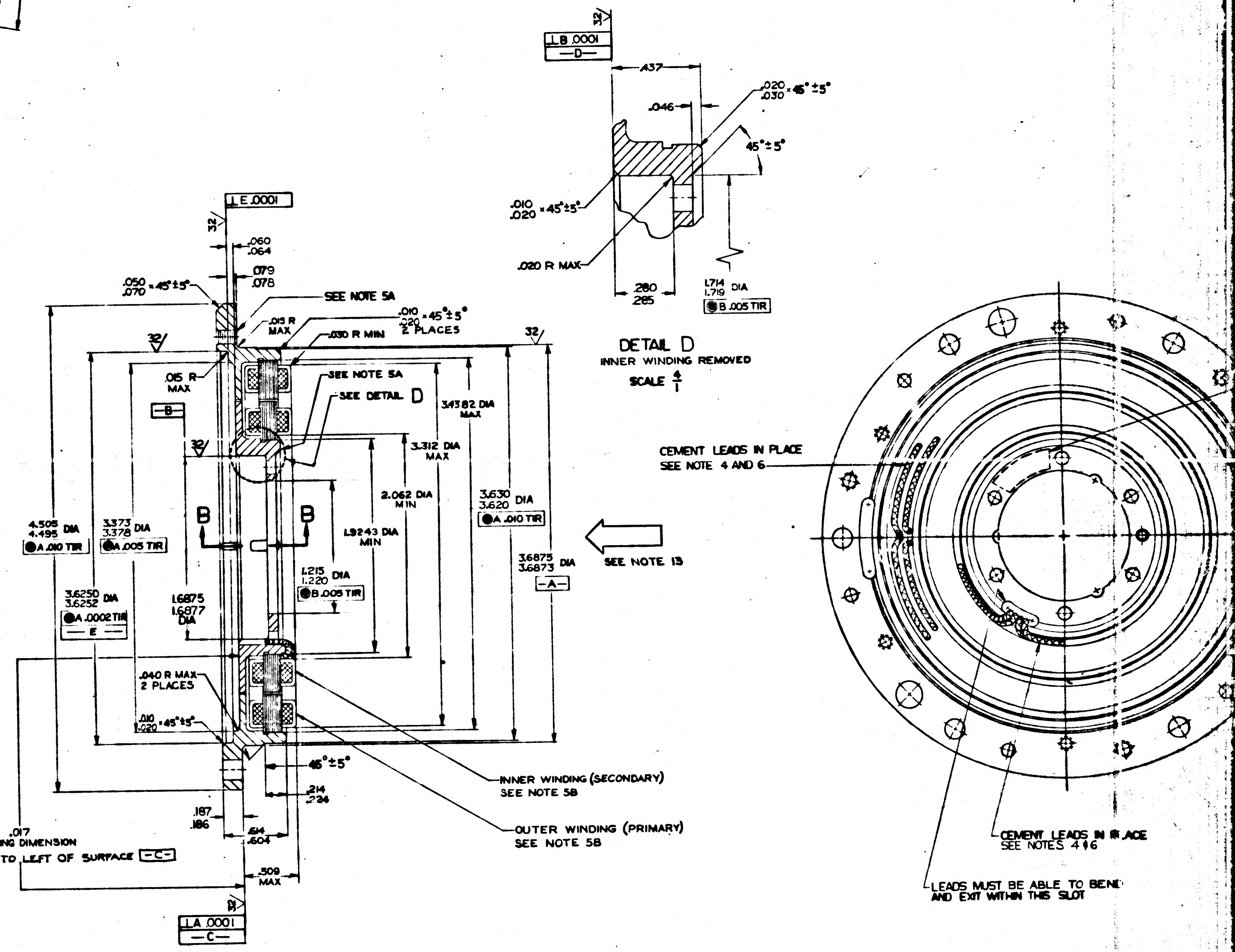


1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDES - SEE NOTE 10

DETAIL F
SCALE 2/1



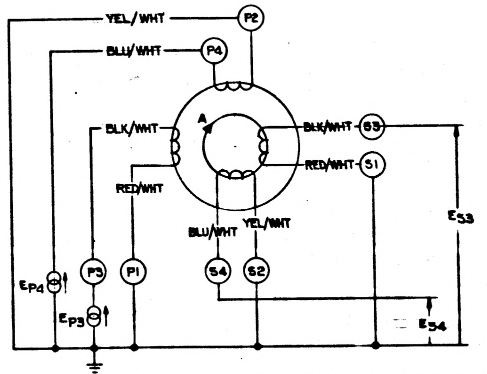
.062 R 3 PLACES EQUALLY SPACED ON A 1.188 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 ⊕A .005 DIA
.098 .100 DIA THRU 6 HOLES EQUALLY SPACED ⊕B .005 DIA SEE NOTE 10
A
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
.250 .252 DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
.920 R BSC
87° 30' BSC
67° 30' BSC
45° BSC
.125 .127 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
17° 30' BSC
7° 30' BSC
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 ⊕A .002 DIA
.156 .158 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
15° BSC
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
1
2
30° BSC
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 ⊕E .005 DIA
45° BSC
3
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA



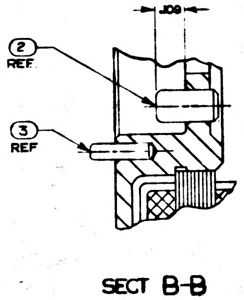
.1 B .0001 -D-
32
.437
.046
.020 .030 × 45° ± 5°
45° ± 5°
.010 .020 × 45° ± 5°
.020 R MAX
.280 .285
1.714 1.719 DIA ⊕B .005 TIR
.1 E .0001
.060 .064
.079 .078
.050 .070 × 45° ± 5°
SEE NOTE 5A
.015 R MAX
.010 .020 × 45° ± 5° 2 PLACES
.030 R MIN
SEE NOTE 5A
SEE DETAIL D
.015 R MAX
-B-
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
1.9243 DIA MIN
3.630 3.620 DIA ⊕A .010 TIR
3.6875 3.6873 DIA -A-
B
B
4.505 4.495 DIA ⊕A .010 TIR
3.373 3.378 DIA ⊕A .005 TIR
1.6875 1.6877 DIA
1.215 1.220 DIA ⊕B .005 TIR
3.6250 3.6252 DIA ⊕A .0002 TIR -E-
.040 R MAX 2 PLACES
.010 .020 × 45° ± 5°
45° ± 5°
.214 .224
.187 .186
.614 .604
.509 MAX
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
.1 A .0001 -C-
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
SEE NOTE 13
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT

DETAIL D
INNER WINDING REMOVED
SCALE 4/1

SECT A-A



YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E S3
E_{P4}
P3
P1
S4
S2
E_{P3}
E_{S4}



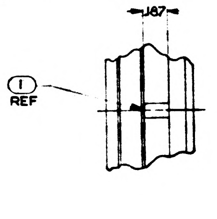
.109
2 REF
3 REF

SECT B-B
SCALE 4/1

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



VIEW C-C
SCALE 2/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$ R
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN, RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000030
5. MATERIAL:
   A. MOUNTING RING, BERYLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. (F) ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER .001 AXIAL PLAY ±.010 FROM POSITION SHOWN FOR QUALIFICATION & REQUALIFICATION TESTING ONLY
8. PART MUST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. RESOLVERS SHALL BE ELECTRICALLY ZEROED AS DEFINED BY PS1000030 WHEN DOWEL PINS ① AND ② ARE ALIGNED WITHIN ±0°1'.
10. HOLE FOR DOWEL PINS ① & ② MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. ALL DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K \left[E_{P3} \cos A - E_{P4} \sin A\right]$$

$$E_{S4} = K \left[E_{P3} \sin A + E_{P4} \cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A = 0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

MASTER

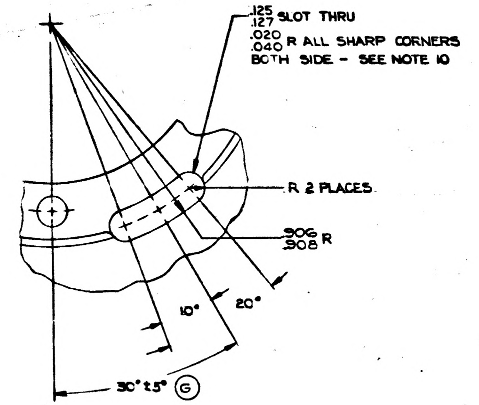
1000008	
1000033	DL 1000201
1000032	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.015 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

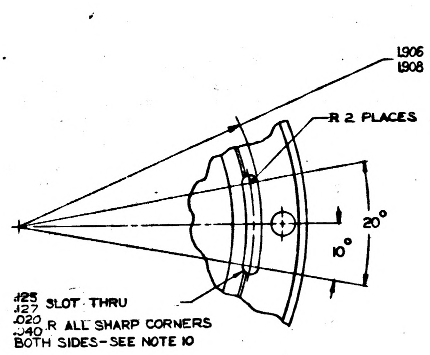
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000030 REV G SHEET 1

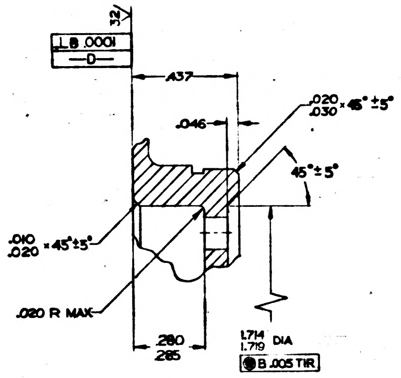
SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDR000			
A	GENERAL REVISIONS			
B	GENERAL REVISIONS			
C	GENERAL REVISIONS		ajb	WK
D	TDRR 00151	12-12-62	ajb	WK
E	TDRR 00255	1-9-63	ajb	
F	TDRR 01149	5-8-63	ajb	WK
G	TDRR 04048	10-23-63		WK
H	TDRR 05613	1-7-64		


.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30° ± 5° (G)

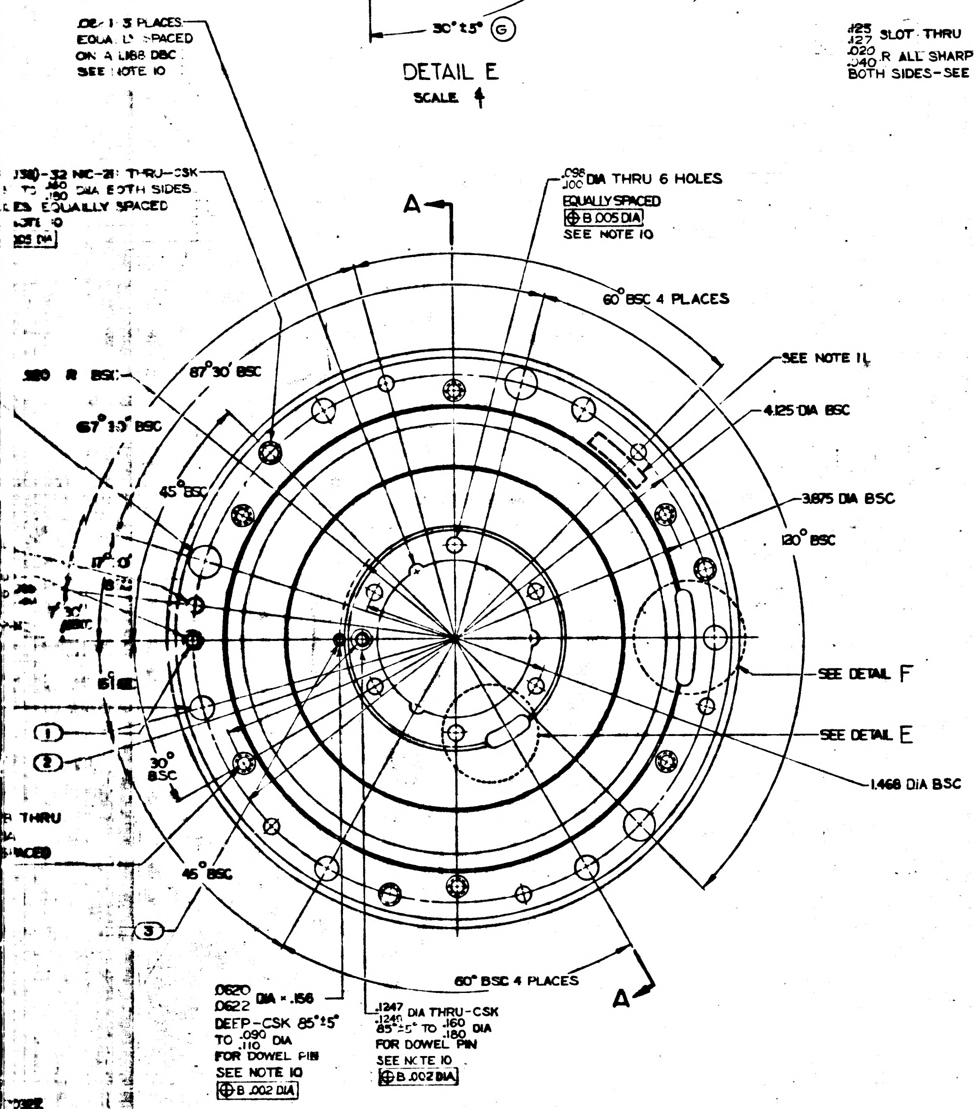
DETAIL E
SCALE 4

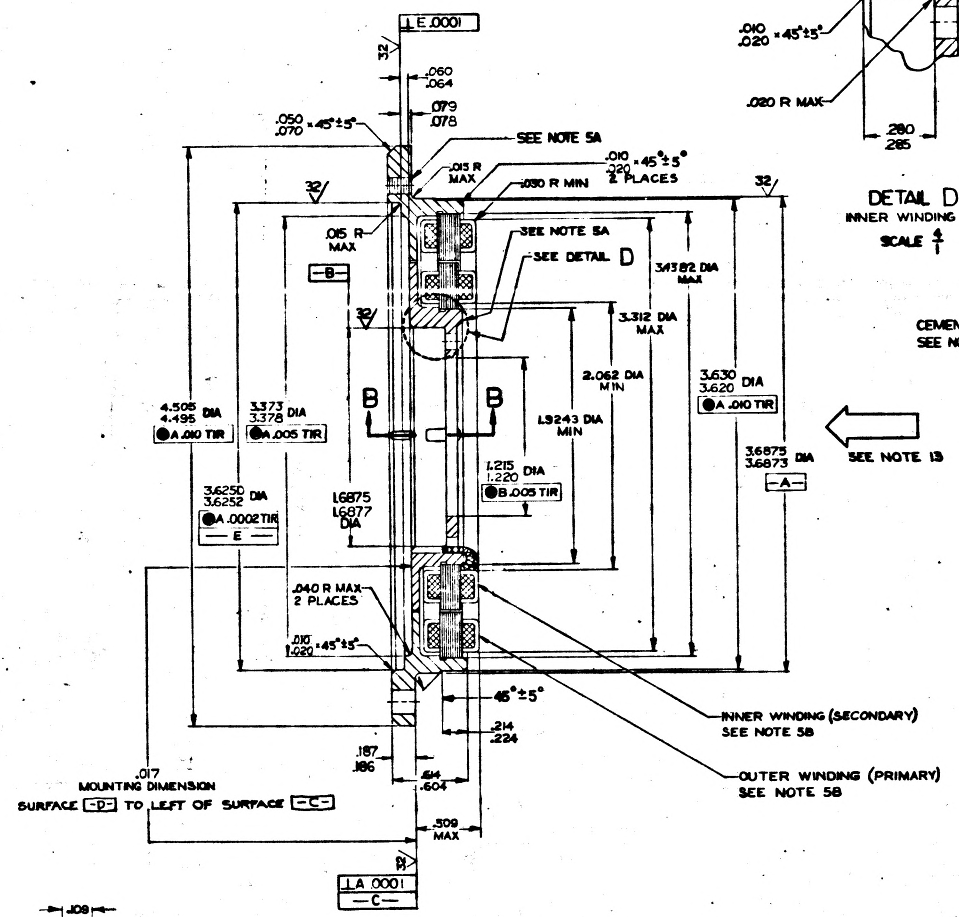

1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDES-SEE NOTE 10

DETAIL F
SCALE 2/1

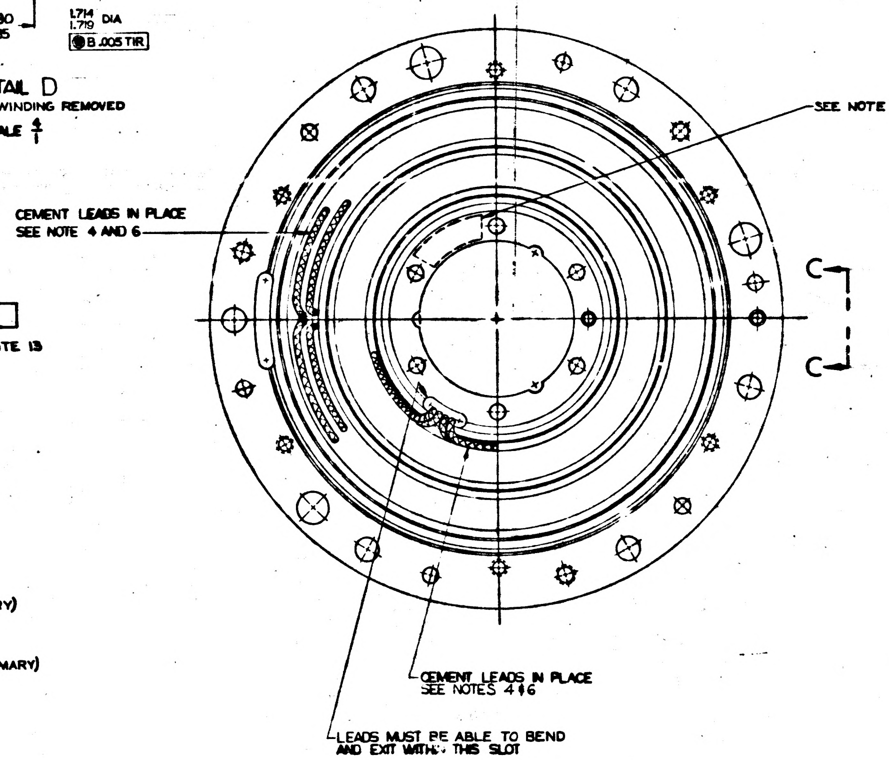

32
⊥B .0001
-D-
.437
.046
.020 .030 × 45° ± 5°
45° ± 5°
.010 .020 × 45° ± 5°
.020 R MAX
.280 .285
1.714 1.719 DIA
◉B .005 TIR

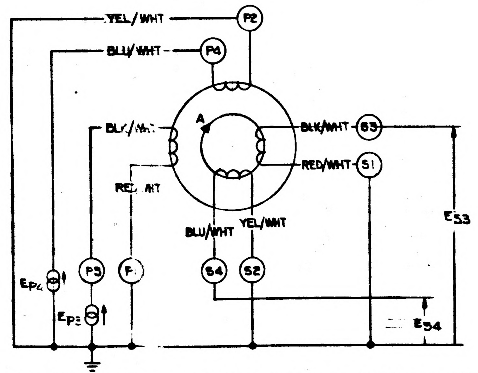
DETAIL D
INNER WINDING REMOVED
SCALE 4/1

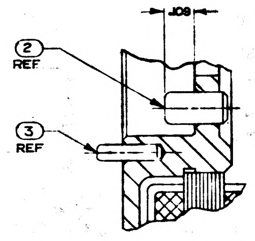

.082 1 3 PLACES
EQUALLY SPACED
ON A 1.188 DBC
SEE NOTE 10
.1380-32 NC-2B THRU-CSK
TO .140 .150 DIA BOTH SIDES
ES EQUALLY SPACED
NOTE 10
.005 DIA
A
.098 .100 DIA THRU 6 HOLES
EQUALLY SPACED
⊕B .005 DIA
SEE NOTE 10
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
.180 R BSC
87° 30' BSC
67° 30' BSC
45° BSC
17° 0'
30° BSC
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
1
2
3
30° BSC
45° BSC
R THRU
DIA
SPACED
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156
DEEP-CSK 85° ± 5°
TO .090 .110 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕B .002 DIA
.1247 .1249 DIA THRU-CSK
85° ± 5° TO .160 .180 DIA
FOR DOWEL PIN
SEE NOTE 10
⊕B .002 DIA


⊥E .0001
32
.060 .064
.079 .078
.050 .070 × 45° ± 5°
SEE NOTE 5A
.015 R MAX
.030 R MIN
.010 .020 × 45° ± 5° 2 PLACES
32
32
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
3.312 DIA MAX
32
B
B
2.062 DIA MIN
1.9243 DIA MIN
3.630 3.620 DIA
◉A .010 TIR
4.505 4.495 DIA
◉A .010 TIR
3.373 3.378 DIA
◉A .005 TIR
3.6250 3.6252 DIA
◉A .0002 TIR
-E-
1.6875 1.6877 DIA
1.215 1.220 DIA
◉B .005 TIR
3.6875 3.6873 DIA
-A-
SEE NOTE 13
.040 R MAX
2 PLACES
.010 .020 × 45° ± 5°
45° ± 5°
.214 .224
INNER WINDING (SECONDARY)
SEE NOTE 5B
OUTER WINDING (PRIMARY)
SEE NOTE 5B
.187 .186
.614 .604
.017
MOUNTING DIMENSION
SURFACE -D- TO LEFT OF SURFACE -C-
.509 MAX
32
⊥A .0001
-C-

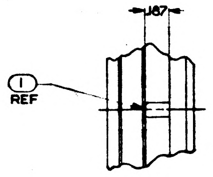
SECT A-A


SEE NOTE 11
CEMENT LEADS IN PLACE
SEE NOTE 4 AND 6
C
C
CEMENT LEADS IN PLACE
SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND
AND EXIT WITHIN THIS SLOT


YEL/WHT
P2
BLU/WHT
P4
A
BLK/WHT
S3
RED/WHT
S1
BLK/WHT
RED/WHT
BLU/WHT
YEL/WHT
E53
Ep4
P3
F1
S4
S2
Ep3
E54


.109
2 REF
3 REF

SECT B-B
SCALE 4/1



VIEW C-C
SCALE 2/1

OWN RESOLVERS SHALL BE
BY PS1000130

SPEC S-200 MIT SPEC MIL-B-21531
TED
-W-16878

AND

AYS -0-
ARS PLAY 1 OND FROM
ATION TESTING ONLY

AL OPERATING
PS 1000032 OR PS1000033

CATED PER NOTE 9

SERIAL NO & MANUFACTURERS
NO-130

PARTS AT A UNIFORM PART

18. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO ($A=0$) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

ORIGINAL SOURCES OF SUPPLY
THE BENDIX CORPORATION
TETERBORO, NEW JERSEY
CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
(E)	1	PIN, STR, HDLS (DWL)	MS16555-602			3
	1	PIN, LOCATING, STRT., HDLS.	1000088-1			2
(D)	1	PIN, LOCATING, STRT., HDLS.	1000088-2			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001

APPLICATION (D)

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ± .005 ANGLES ± 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED R J Bryant DATE 9-20-62
CHECKED
DRAWN L. MILLS
APPROVAL FOR MSC
W J Klein
BY DIRECTION MIT APPROVED
W K Dyer 9/20/62

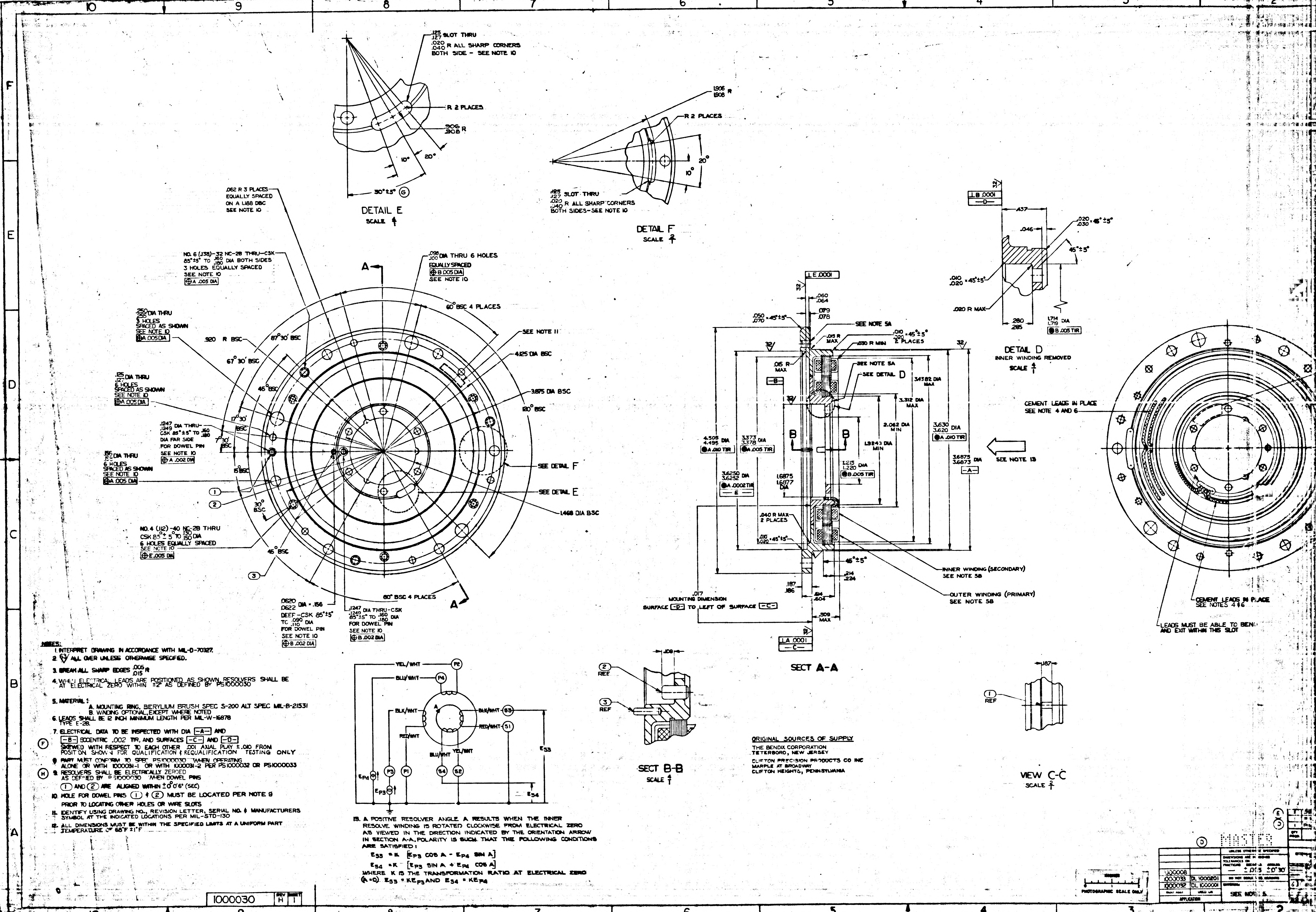
RESOLVER, ONE SPEED TRANSMITTER SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000030
SHEET 1 OF 1

30 REV H SHEET 1

1000030


DETAIL E
SCALE 4/1
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°±5° (G)
DETAIL F
SCALE 2/1
1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDES-SEE NOTE 10
.062 R 3 PLACES EQUALLY SPACED ON A 1.188 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 ⊕ A .005 DIA
.098 .100 DIA THRU 6 HOLES EQUALLY SPACED ⊕ B .005 DIA SEE NOTE 10
A
60° BSC 4 PLACES
.250 .255 DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕ A .005 DIA
.920 R BSC
87°30' BSC
67°30' BSC
SEE NOTE 11
4.125 DIA BSC
.125 .127 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕ A .005 DIA
45° BSC
3.875 DIA BSC
120° BSC
17°30'
7°30' BSC
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 ⊕ A .002 DIA
.156 .158 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕ A .005 DIA
15° BSC
SEE DETAIL F
SEE DETAIL E
1
2
30° BSC
1.468 DIA BSC
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 ⊕ E .005 DIA
45° BSC
3
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 ⊕ B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 ⊕ B .002 DIA
DETAIL D
INNER WINDING REMOVED
SCALE 4/1
⊥ B .0001 -D-
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.719 DIA ◎ B .005 TIR
⊥ E .0001
.060 .064
.079 .078
.050 .070 × 45°±5°
SEE NOTE 5A
.010 .020 × 45°±5° 2 PLACES
.015 R MAX
.030 R MIN
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
1.3243 DIA MIN
3.630 3.620 DIA ◎ A .010 TIR
3.6873 3.6875 DIA -A-
SEE NOTE 13
4.505 4.495 DIA ◎ A .010 TIR
3.373 3.378 DIA ◎ A .005 TIR
B
B
1.215 1.220 DIA ◎ B .005 TIR
3.6250 3.6252 DIA ◎ A .0002 TIR -E-
1.6875 1.6877 DIA
.040 R MAX 2 PLACES
.010 .020 × 45°±5°
45°±5°
.214 .224
.187 .186
.594 .604
.509 MAX
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
⊥ A .0001 -C-
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
SECT A-A
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT
YEL/WHT
BLU/WHT
P2
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E_{S3}
E_{P4}
P3
P1
S4
S2
E_{P3}
E_{S4}
2 REF
3 REF
.109
SECT B-B
SCALE 4/1
.187
1 REF
VIEW C-C
SCALE 2/1
PHOTOGRAPHIC SCALE ONLY
MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63 ∨ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES .005 .015 R
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN, RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000030
5. MATERIAL:
   A. MOUNTING RING, BERYLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. (F) ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER .001 AXIAL PLAY ±.010 FROM POSITION SHOWN FOR QUALIFICATION & REQUALIFICATION TESTING ONLY
8. PART MUST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. (H) RESOLVERS SHALL BE ELECTRICALLY ZEROED AS DEFINED BY PS1000030 WHEN DOWEL PINS ① AND ② ARE ALIGNED WITHIN ±0°0'6" (SEC)
10. HOLE FOR DOWEL PINS ① & ② MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. ALL DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A=0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO INC
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

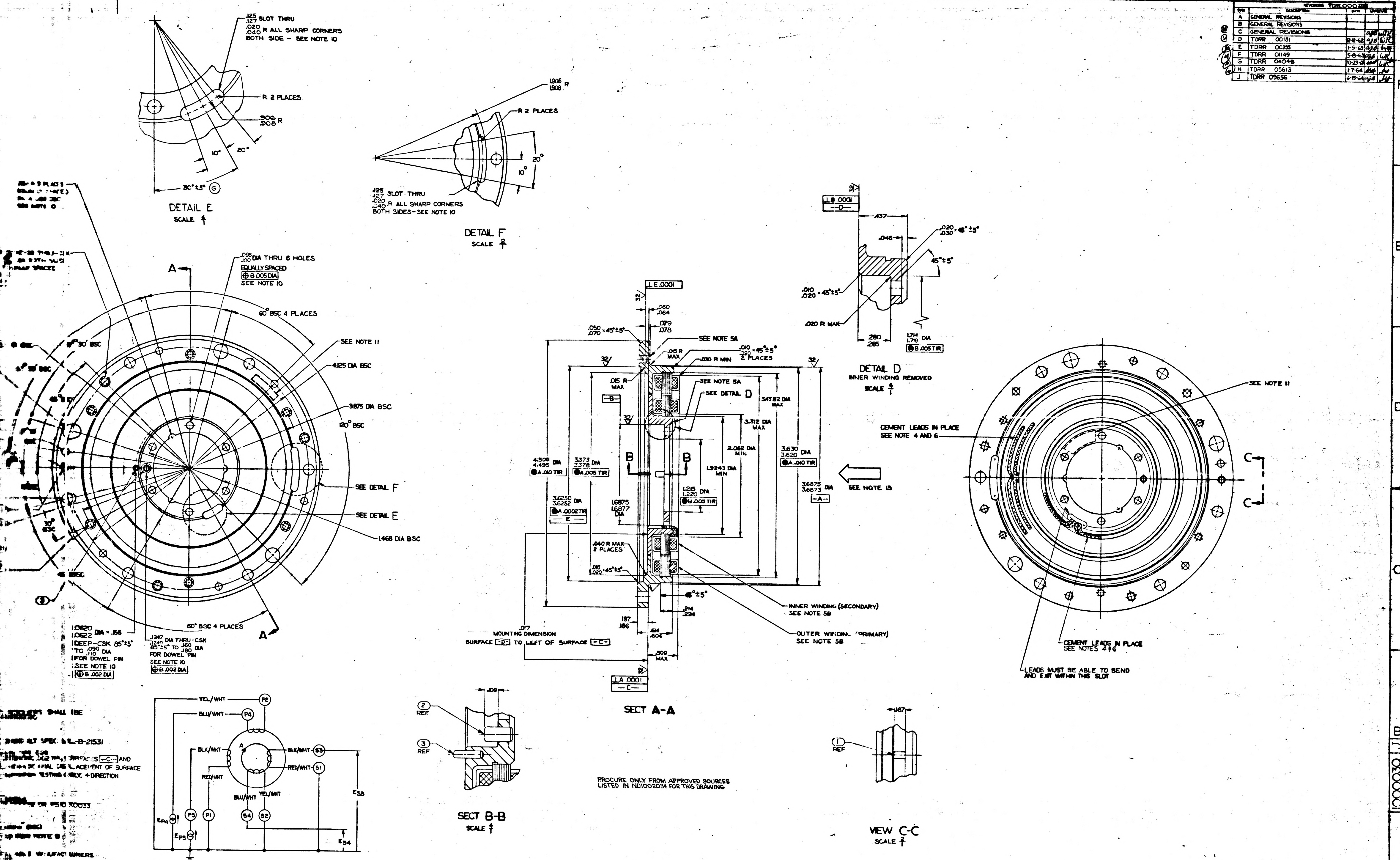
(D)

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

1000030 REV H SHEET 1

REVISIONS TDR 000[illegible]			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS		
B	GENERAL REVISIONS		
C	GENERAL REVISIONS		WK
D	TDRR 00151	12-12-62	WK
E	TDRR 00235	1-9-63	
F	TDRR 01149	5-8-63	WK
G	TDRR 04048	10-23-63	WK
H	TDRR 05613	1-7-64	
J	TDRR 09656	6-15-64	



.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°±5° Ⓖ
DETAIL E
SCALE 4/1
1.906 1.908 R
R 2 PLACES
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDES - SEE NOTE 10
DETAIL F
SCALE 4/1
.096 .100 DIA THRU 6 HOLES
EQUALLY SPACED
B .005 DIA
SEE NOTE 10
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
60° BSC 4 PLACES
1.0620 1.0622 DIA × .156
DEEP-CSK 85°±5°
TO .090 .110 DIA
FOR DOWEL PIN
SEE NOTE 10
B .002 DIA
.1247 .1249 DIA THRU-CSK
85°±5° TO .160 .180 DIA
FOR DOWEL PIN
SEE NOTE 10
B .002 DIA
A
LE .0001
.060 .064
.079 .078
.050 .070 × 45°±5°
SEE NOTE 5A
.015 R MAX
.010 .020 × 45°±5° 2 PLACES
.030 R MIN
.015 R MAX
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
1.9243 DIA MIN
1.215 1.220 DIA
B .005 TIR
4.505 4.495 DIA
A .010 TIR
3.373 3.378 DIA
A .005 TIR
3.6250 3.6252 DIA
A .0002 TIR
1.6875 1.6877 DIA
3.630 3.620 DIA
A .010 TIR
3.6875 3.6873 DIA
SEE NOTE 13
.040 R MAX 2 PLACES
.010 .020 × 45°±5°
45°±5°
.214 .224
.187 .186
.614 .604
.509 MAX
.017 MOUNTING DIMENSION
SURFACE -D- TO LEFT OF SURFACE -C-
LA .0001
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
SECT A-A
LB .0001
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.719 DIA
B .005 TIR
DETAIL D
INNER WINDING REMOVED
SCALE 4/1
SEE NOTE 11
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
C C
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT
YEL/WHT P2
BLU/WHT P4
BLK/WHT
BLK/WHT S3
RED/WHT S1
RED/WHT
YEL/WHT
BLU/WHT
A
E_S3
E_P4
E_P3
P3 P1 S4 S2
E_S4
.109
2 REF
3 REF
SECT B-B
SCALE 4/1
.187
1 REF
VIEW C-C
SCALE 4/1

[illegible] SHALL BE

[illegible] SPEC [illegible]L-B-21531

[illegible] SURFACES —C— AND

[illegible] OF AXIAL DISPLACEMENT OF SURFACE

[illegible] TESTING ONLY. + DIRECTION

[illegible] OR 510 X0033

[illegible] NOTE 9

[illegible] MANUFACTURERS

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\,[E_{P3}\cos A - E_{P4}\sin A]$$

$$E_{S4} = K\,[E_{P3}\sin A + E_{P4}\cos A]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	PIN, STR, HDLS (DWL)	MS16555-602			3
1	PIN, LOCATING, STRT., HDLS.	1000088-1			2
1	PIN, LOCATING, STRT., HDLS.	1000088-2			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

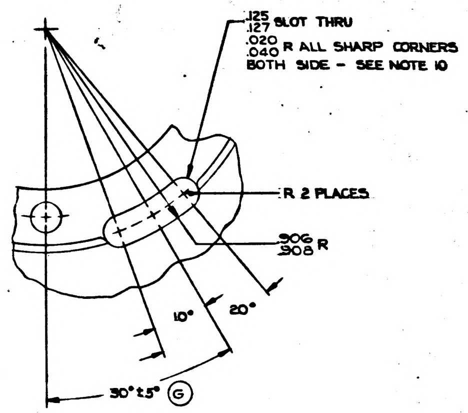
MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
BY DIRECTION MIT APPROVED
9/20/62

RESOLVER, ONE SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT.
CODE IDENT

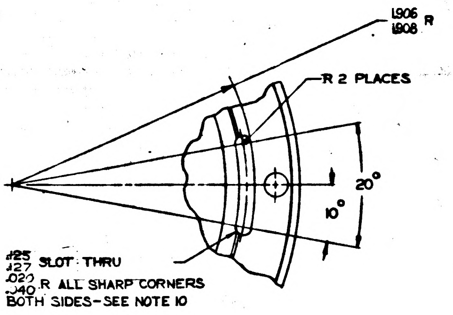
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000030
SHEET 1 OF 1

PHOTOGRAPHIC SCALE ONLY



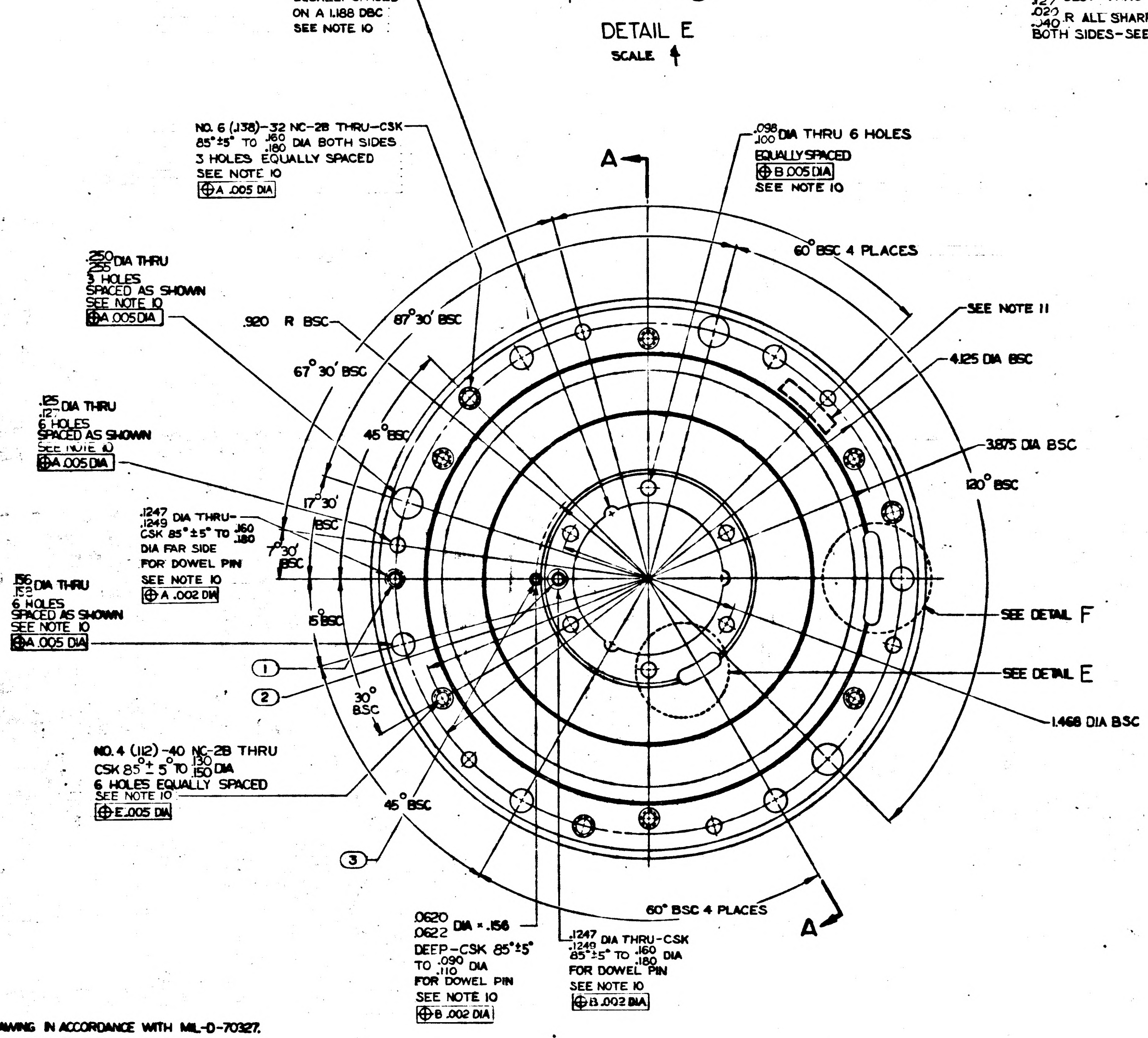
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDE - SEE NOTE 10
R 2 PLACES
.902 .908 R
10°
20°
30°±5° Ⓖ

DETAIL E
SCALE 4

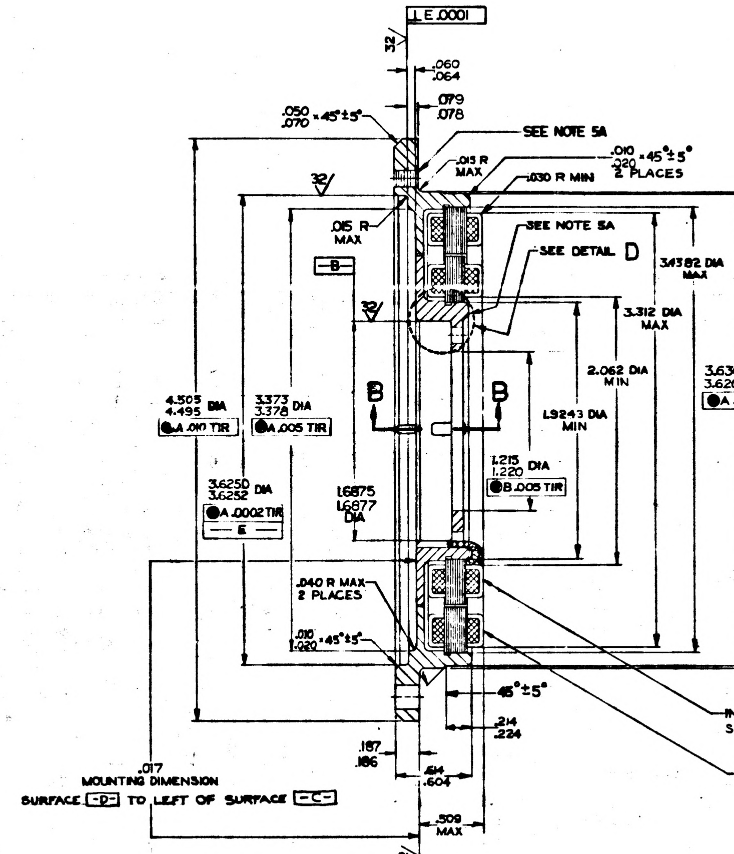


1.906 1.908 R
R 2 PLACES
20°
10°
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS
BOTH SIDES-SEE NOTE 10

DETAIL F
SCALE 2

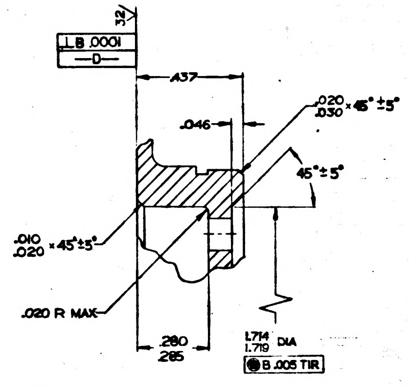


.062 R 3 PLACES EQUALLY SPACED ON A 1.188 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 ⊕A .005 DIA
.098 .100 DIA THRU 6 HOLES EQUALLY SPACED ⊕B .005 DIA SEE NOTE 10
A
.250 .252 DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
.920 R BSC
67°30' BSC
67°30' BSC
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
.125 .127 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
45° BSC
3.875 DIA BSC
120° BSC
17°30' BSC
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 ⊕A .002 DIA
7°30' BSC
.156 .158 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
15° BSC
SEE DETAIL F
SEE DETAIL E
①
②
30° BSC
1.468 DIA BSC
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 ⊕E .005 DIA
45° BSC
③
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA



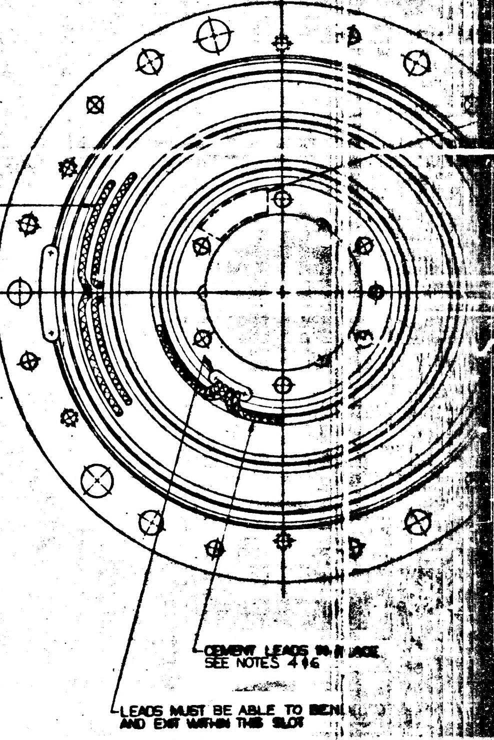
LE .0001
32
.060 .064
.079 .078
.050 .070 × 45°±5°
SEE NOTE 5A
.015 R MAX
.010 .020 × 45°±5° 2 PLACES
.030 R MIN
.015 R MAX
SEE NOTE 5A
SEE DETAIL D
-B-
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
B
B
1.9243 DIA MIN
4.505 4.495 DIA ⊕A .010 TIR
3.373 3.378 DIA ⊕A .005 TIR
1.215 1.220 DIA ⊕B .005 TIR
3.6250 3.6252 DIA ⊕A .0002 TIR
-E-
1.6875 1.6877 DIA
.040 R MAX 2 PLACES
.010 .020 × 45°±5°
45°±5°
.214 .224
.187 .186
.614 .604
.509 MAX
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
LA .0001
-C-
3.630 3.620 DIA ⊕A .010 TIR
3.6875 3.6873 DIA
-A-
SEE NOTE 13
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B

SECT A-A



32
LB .0001
-D-
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.719 DIA
⊕B .005 TIR

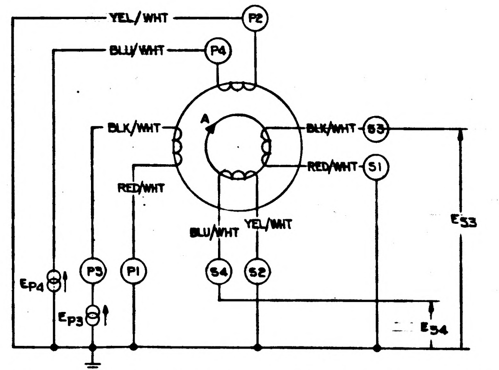
DETAIL D
INNER WINDING REMOVED
SCALE 4



CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. $\sqrt{63}$ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$ R
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN, RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000030
5. MATERIAL:
   A. MOUNTING RING, BERYLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER 1 MILLIRADIAN, AND A +.010 AXIAL DISPLACEMENT OF SURFACE -C- FROM POSITION SHOWN FOR QUALIFICATION AND REQUALIFICATION TESTING ONLY. + DIRECTION IS DEFINED IN DIRECTION OF ORIENTATION ARROW. Ⓕ
8. PART MUST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. RESOLVERS SHALL BE ELECTRICALLY ZEROED AS DEFINED BY PS1000030 WHEN DOWEL PINS ① AND ② ARE ALIGNED OR COMPENSATED TO WITHIN ±0°0'6" (SEC) Ⓗ
10. HOLE FOR DOWEL PINS ① & ② MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. ALL DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F



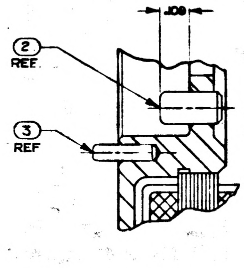
YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
YEL/WHT
BLU/WHT
E53
EP4
P3
P1
S4
S2
EP3
E54

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

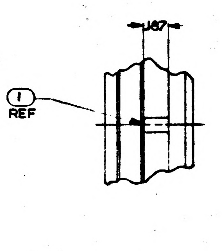
WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A=0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$



.108
② REF.
③ REF

SECT B-B
SCALE 4

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING



VIEW C-C
SCALE 2

Ⓔ
Ⓓ
MASTER

Ⓓ

1000008	
1000033	DL 1000201
1000032	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
— ±.005 ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

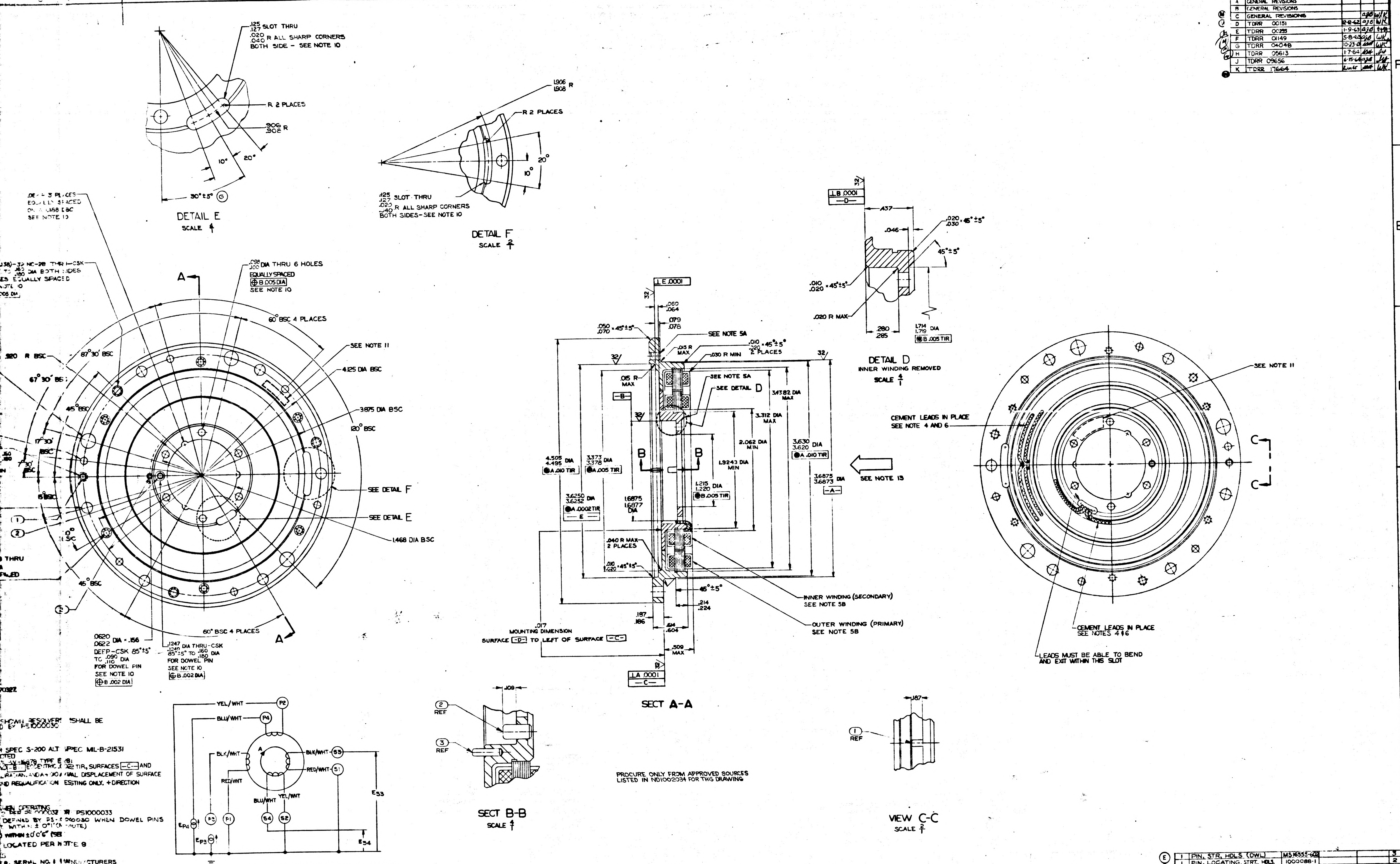
QTY. REQ.

INCHES
PHOTOGRAPHIC SCALE ONLY

1000030	REV J	SHEET 1

SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL REVISIONS			
B	GENERAL REVISIONS			
C	GENERAL REVISIONS		ajB	WK
D	TDRR 00151	12-12-62	ajB	WK
E	TDRR 00255	1-9-63	ajB	
F	TDRR 01149	5-8-63	ajB	WK
G	TDRR 04048	10-23-63		WK
H	TDRR 05613	1-7-64		
J	TDRR 09656	6-15-64	ajB	
K	TDRR 17664	2 Jan 65		WK

REVISIONS TDR00028


DETAIL E
SCALE 4/1
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°±5°
DETAIL F
SCALE 2/1
1.906 1.908 R
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDES - SEE NOTE 10
DETAIL D
INNER WINDING REMOVED
SCALE 4/1
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.719 DIA
B .005 TIR
.098 .100 DIA THRU 6 HOLES EQUALLY SPACED
B .005 DIA
SEE NOTE 10
60° BSC 4 PLACES
SEE NOTE 11
4.125 DIA BSC
3.875 DIA BSC
120° BSC
SEE DETAIL F
SEE DETAIL E
1.468 DIA BSC
67°30' BSC
45° BSC
17°30' BSC
30' BSC
45° BSC
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10
B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10
B .002 DIA
SECT A-A
SEE NOTE 5A
SEE DETAIL D
4.505 4.495 DIA
3.373 3.378 DIA
3.6250 3.6252 DIA
A .0002 TIR
1.6875 1.6877 DIA
2.062 DIA MIN
1.9243 DIA MIN
1.215 1.220 DIA
B .005 TIR
3.312 DIA MAX
3.4382 DIA MAX
3.630 3.620 DIA
A .010 TIR
3.6875 3.6873 DIA
SEE NOTE 13
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
.509 MAX
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT
SECT B-B
SCALE 4/1
VIEW C-C
SCALE 2/1
YEL/WHT
BLU/WHT
BLK/WHT
RED/WHT
P2
P4
P3
P1
S1
S2
S3
S4
E_{P4}
E_{P3}
E_{S3}
E_{S4}

SHOWN RESOLVERS SHALL BE
D BY PS1000030

SPEC S-200 ALT SPEC MIL-B-21531

ECCENTRIC .002 TIR, SURFACES -C- AND

DISPLACEMENT OF SURFACE

AND REQUALIFICATION TESTING ONLY. + DIRECTION

WHEN OPERATING

PS1000033

DEFINED BY PS-1000030 WHEN DOWEL PINS

WITHIN ± 0°1' (MINUTE)

WITHIN ±0°0'6"

LOCATED PER NOTE 9

SERIAL NO. MANUFACTURERS

-STD-130

LIMITS AT A UNIFORM PART

13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO $(A=0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	PIN, STR, HDLS (DWL)	MS16555-602			3
1	PIN, LOCATING, STRT., HDLS.	1000088-1			2
1	PIN, LOCATING, STRT., HDLS.	1000088-2			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000008	
1000033	DL 1000201
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED AJ Boyce DATE 9-20-62
CHECKED
DRAWN L. MILLS
APPROVED FOR MSC
9-20-62
BY DIRECTION MIT APPROVED
W. Hoffer 9/20/62

RESOLVER, ONE SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT
CODE IDENT

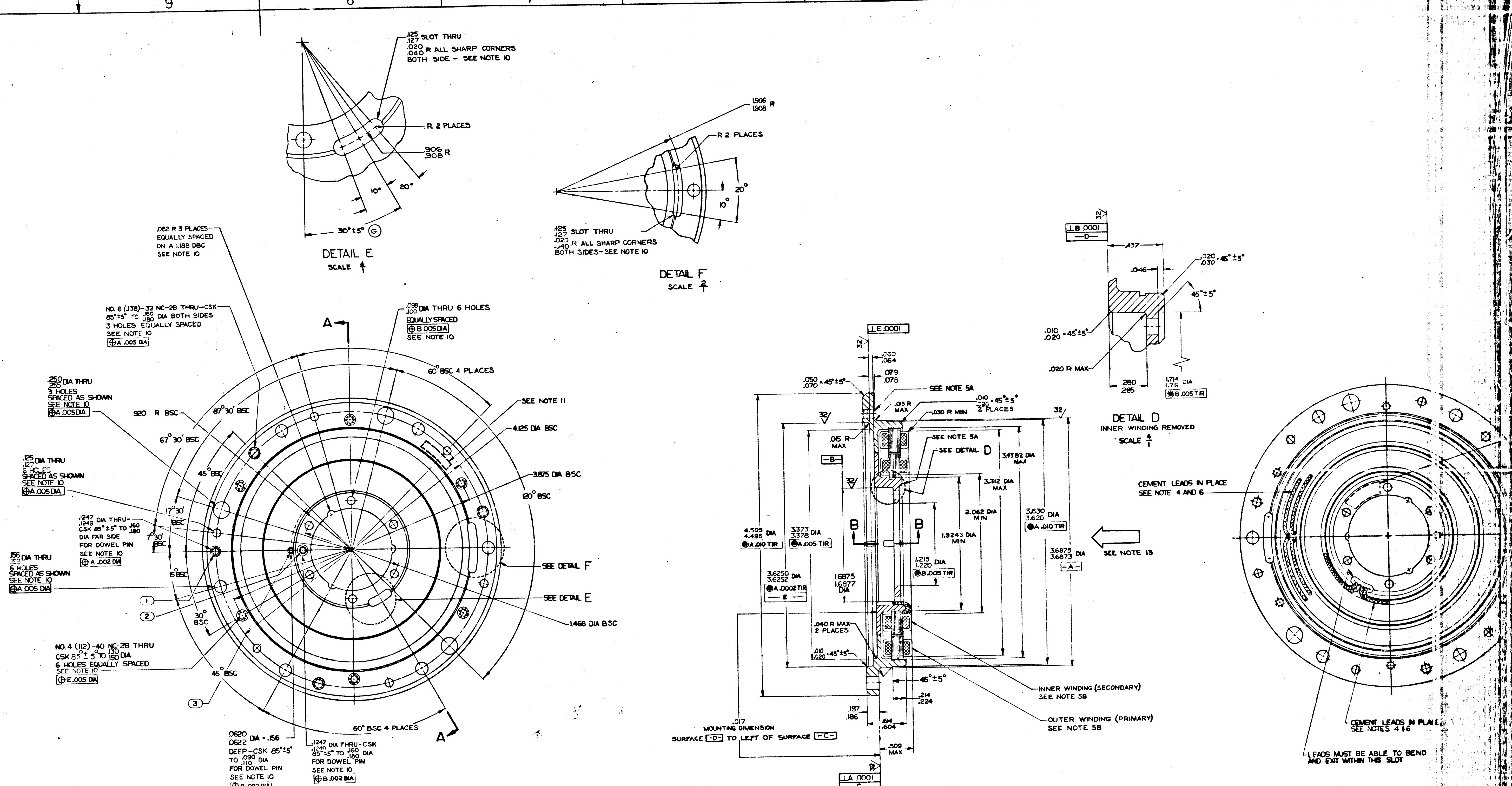
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000030
SHEET 1 OF 1

PHOTOGRAPHIC SCALE ONLY

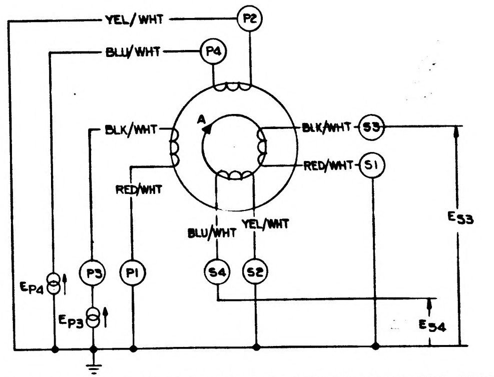
1000030 REV K SHEET 1

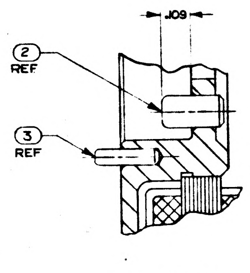
1000030 K

E-2

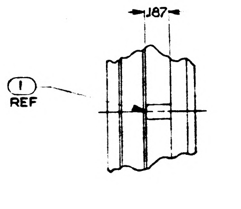

.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDE - SEE NOTE 10
R 2 PLACES
.906 .908 R
10°
20°
30°±5° (G)
DETAIL E
SCALE 4/1
1.906 1.908 R
R 2 PLACES
.125 .127 SLOT THRU
.020 .040 R ALL SHARP CORNERS BOTH SIDES-SEE NOTE 10
DETAIL F
SCALE 2/1
.062 R 3 PLACES EQUALLY SPACED ON A 1.188 DBC SEE NOTE 10
NO. 6 (.138)-32 NC-2B THRU-CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED SEE NOTE 10 ⊕A .005 DIA
.098 .100 DIA THRU 6 HOLES EQUALLY SPACED ⊕B .005 DIA SEE NOTE 10
A
60° BSC 4 PLACES
.250 .255 DIA THRU 3 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
.920 R BSC
87° 30' BSC
67° 30' BSC
SEE NOTE 11
4.125 DIA BSC
.125 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
45° BSC
3.875 DIA BSC
120° BSC
17° 30' BSC
7° 30' BSC
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FAR SIDE FOR DOWEL PIN SEE NOTE 10 ⊕A .002 DIA
.156 .159 DIA THRU 6 HOLES SPACED AS SHOWN SEE NOTE 10 ⊕A .005 DIA
15° BSC
SEE DETAIL F
SEE DETAIL E
1
2
30° BSC
1.468 DIA BSC
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED SEE NOTE 10 ⊕E .005 DIA
45° BSC
3
60° BSC 4 PLACES
A
.0620 .0622 DIA × .156 DEEP-CSK 85°±5° TO .090 .110 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
.1247 .1249 DIA THRU-CSK 85°±5° TO .160 .180 DIA FOR DOWEL PIN SEE NOTE 10 ⊕B .002 DIA
⊥B .0001 -D-
32
.437
.046
.020 .030 × 45°±5°
45°±5°
.010 .020 × 45°±5°
.020 R MAX
.280 .285
1.714 1.719 DIA ⊕B .005 TIR
DETAIL D
INNER WINDING REMOVED
SCALE 4/1
⊥E .0001
32
.060 .064
.079 .078
.050 .070 × 45°±5°
SEE NOTE 5A
.015 R MAX
.010 .020 × 45°±5° 2 PLACES
.030 R MIN
32
.015 R MAX
-B-
SEE NOTE 5A
SEE DETAIL D
3.4382 DIA MAX
3.312 DIA MAX
3.630 3.620 DIA ⊕A .010 TIR
2.062 DIA MIN
1.9243 DIA MIN
B
B
4.505 4.495 DIA ⊕A .010 TIR
3.373 3.378 DIA ⊕A .005 TIR
1.215 1.220 DIA ⊕B .005 TIR
3.6250 3.6252 DIA ⊕A .0002 TIR -E-
1.6875 1.6877 DIA
3.6875 3.6873 DIA -A-
SEE NOTE 13
.040 R MAX 2 PLACES
.010 .020 × 45°±5°
45°±5°
.214 .224
.187 .186
.614 .604
.017 MOUNTING DIMENSION SURFACE -D- TO LEFT OF SURFACE -C-
.509 MAX
⊥A .0001 -C-
INNER WINDING (SECONDARY) SEE NOTE 5B
OUTER WINDING (PRIMARY) SEE NOTE 5B
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
CEMENT LEADS IN PLACE SEE NOTES 4 & 6
LEADS MUST BE ABLE TO BEND AND EXIT WITHIN THIS SLOT

SECT A-A


YEL/WHT
P2
BLU/WHT
P4
BLK/WHT
A
BLK/WHT
S3
RED/WHT
S1
RED/WHT
BLU/WHT
YEL/WHT
E53
EP4
P3
P1
S4
S2
EP3
E54


.109
2 REF
3 REF

SECT B-B
SCALE 4/1



VIEW C-C
SCALE 2/1

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$ R
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN, RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000030
5. MATERIAL:
   A. MOUNTING RING, BERYLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER 1 MILLIRADIAN, AND A +.010 AXIAL DISPLACEMENT OF SURFACE -C- FROM POSITION SHOWN FOR QUALIFICATION AND REQUALIFICATION TESTING ONLY. + DIRECTION IS DEFINED IN DIRECTION OF ORIENTATION ARROW. (F)
8. PART MUST CONFORM TO SPEC PS1000030 WHEN OPERATING ALONE OR WITH 1000031-1 OR WITH 1000031-2 PER PS1000032 OR PS1000033
9. RESOLVERS SHALL BE ELECTRICALLY ZEROED AS DEFINED BY PS-1000030 WHEN DOWEL PINS ~~① & ② ARE ALIGNED OR COMPENSATED TO WITHIN ± 0°1'(MINUTE)~~ ① AND ② ARE ALIGNED OR COMPENSATED TO WITHIN ±0°0'6" (SEC) (H)
10. HOLE FOR DOWEL PINS ① & ② MUST BE LOCATED PER NOTE 9 PRIOR TO LOCATING OTHER HOLES OR WIRE SLOTS
11. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL AT THE INDICATED LOCATIONS PER MIL-STD-130
12. ALL DIMENSIONS MUST BE WITHIN THE SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
13. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION. RATIO AT ELECTRICAL ZERO $(A=0)$ $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000008	
1000033	DL 1000201
1000032	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

QTY REQD	
1	PIN
1	PIN
1	PIN

1000030 REV K SHEET 1

RESOLVER, ONE SPEED TRANSMITTER

TYPE 45RU10N8

Record of Revisions

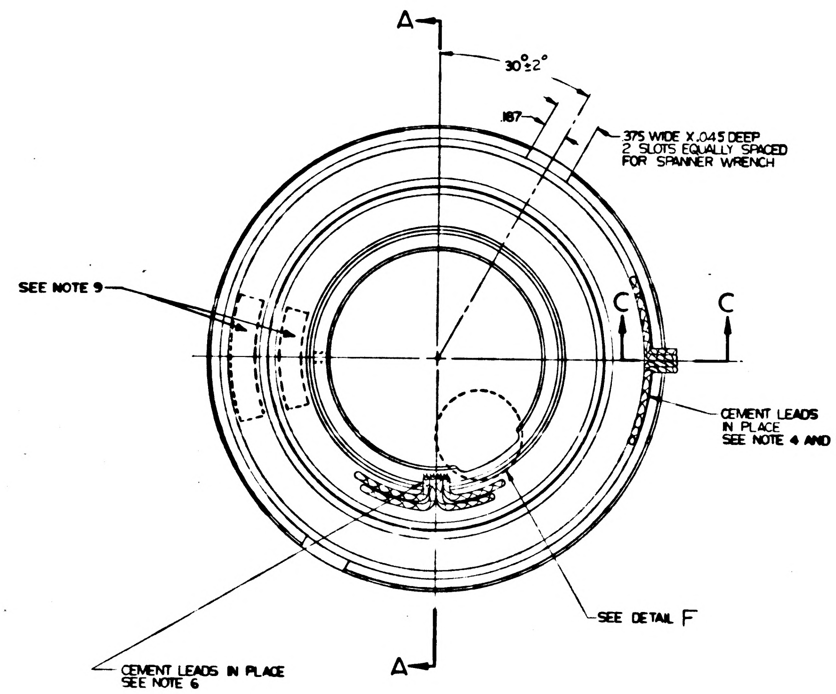
Revision Letter	TDRR #	Pages Revised	Approvals	
			MIT	NASA
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WSK	

This specification consists of pages i through iii and 1 to 5 inclusive

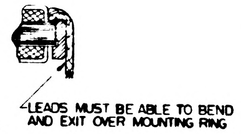
REV. A

REVISIONS TDR 00028

SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS		

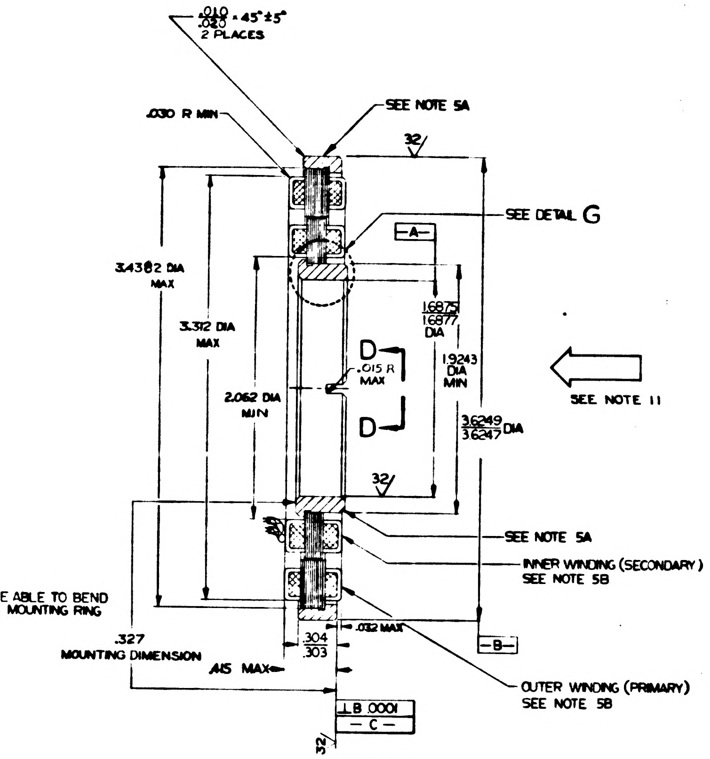


A
30°±2°
.187
.375 WIDE X .045 DEEP
2 SLOTS EQUALLY SPACED
FOR SPANNER WRENCH
SEE NOTE 9
C
C
CEMENT LEADS
IN PLACE
SEE NOTE 4 AND 6
SEE DETAIL F
CEMENT LEADS IN PLACE
SEE NOTE 6
A



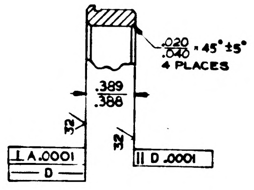
LEADS MUST BE ABLE TO BEND
AND EXIT OVER MOUNTING RING

SECT C-C



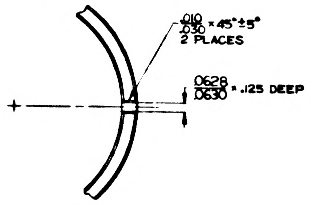
.010 / .020 × 45° ±5°
2 PLACES
.030 R MIN
SEE NOTE 5A
32
SEE DETAIL G
-A-
3.4382 DIA MAX
3.312 DIA MAX
2.062 DIA MIN
1.6875 / 1.6877 DIA
1.9243 DIA MIN
D
.015 R MAX
D
3.6249 / 3.6247 DIA
SEE NOTE 11
32
SEE NOTE 5A
INNER WINDING (SECONDARY)
SEE NOTE 5B
.304 / .303
.032 MAX
-B-
.327
MOUNTING DIMENSION
.415 MAX
OUTER WINDING (PRIMARY)
SEE NOTE 5B
⊥ B .0001
-C-
32

SECT A-A



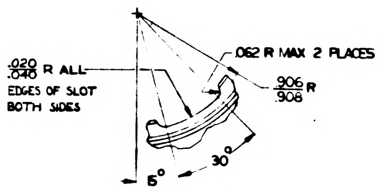
.020 / .040 × 45° ±5°
4 PLACES
.389 / .388
32
⊥ A .0001
-D-
32
∥ D .0001

DETAIL G
SCALE $\frac{2}{1}$



.010 / .030 × 45° ±5°
2 PLACES
.0628 / .0630 × .125 DEEP

VIEW D-D
RESOLVER REMOVED



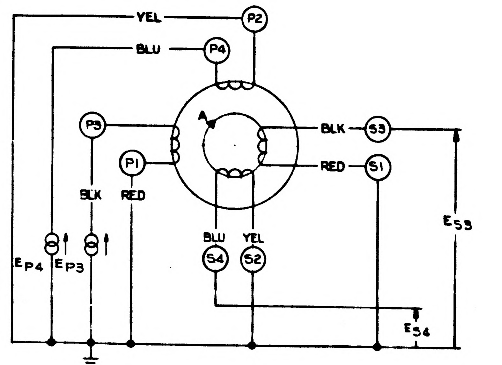
.062 R MAX 2 PLACES
.020 / .040 R ALL
EDGES OF SLOT
BOTH SIDES
.906 / .908 R
15°
30°

DETAIL F
SCALE $\frac{2}{1}$

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. $\sqrt{63}$ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R.
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN THE RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000031
5. MATERIAL:
   - A. MOUNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT; BERYLLIUM PER MIL-B-21531
   - B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER .001, AXIAL PLAY ±.010 FROM POSITION SHOWN
8. PART 1000031-1, GYRO ERROR RESOLVER MUST CONFORM TO SPEC PS1000031-1 WHEN OPERATING WITH 1000030 PER PS1000032

   PART 1000031-2, PITCH-YAW RESOLVER MUST CONFORM TO SPEC PS1000031-2 WHEN OPERATING WITH 1000030 PER PS1000033
9. IDENTIFY BOTH PARTS USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., SERIAL NO., AND MANUFACTURES SYMBOL PER MIL-STD-130 AT INDICATED LOCATIONS
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F



YEL
P2
BLU
P4
P3
P1
A
BLK
S3
RED
S1
BLK
RED
BLU
YEL
S4
S2
E_{P4}
E_{P3}
E_{S3}
E_{S4}

11. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0)
$E_{S2} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

PART NO.	DESCRIPTION	NEXT ASSY	USED ON
1000031-1	GYRO ERROR	1000032	DL1000001
1000031-2	PITCH YAW	1000033	DL1000001

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

HIGHER
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000033	
1000032	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN L. MILLS
APPROVED FOR MSC
W. J. Rhine 6-20-62
MIT APPROVED
8/29/62

RESOLVERS,
GYRO ERROR &
PITCH-YAW
SPECIFICATION CONTROL
DRAWING

SCALE 2-1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000031
SHEET 1 OF 1

1000031 | 1

1000031 | REV A

1000021

28 December 1962

PROCUREMENT SPECIFICATION

ONE SPEED GYRO ERROR RESOLVER

TYPE 37RU34N32

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals	
			MIT	NASA
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WR	

This specification consists of pages i through iiii and 1 to 5 inclusive.

REV. A

PROCUREMENT SPECIFICATION

ONE SPEED PITCH-YAW RESOLVER

TYPE 37RU9IN8

Record of Revisions

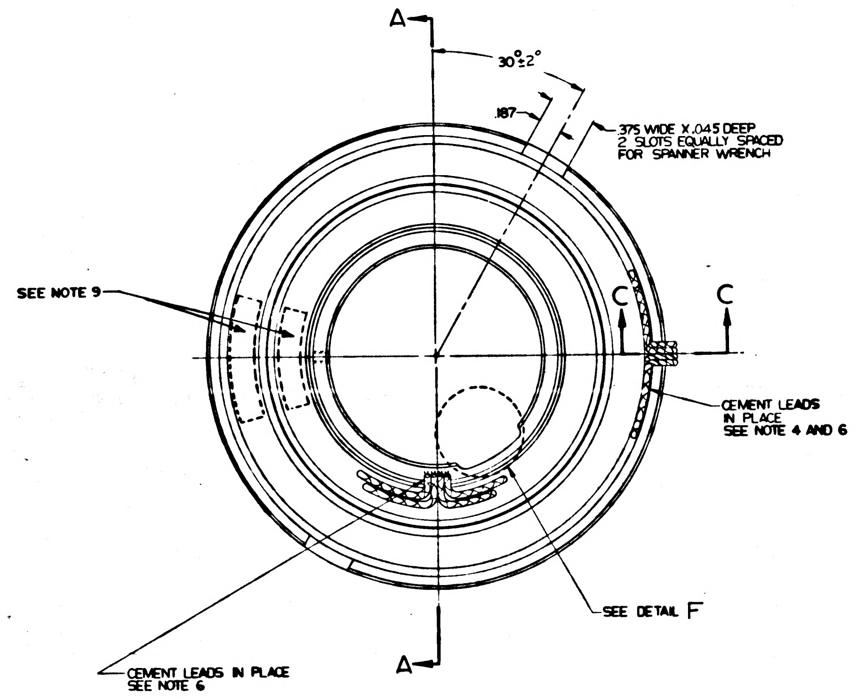
Revision Letter	TDRR #	Pages Revised	Approvals	
			MIT	NASA
A	00739	Title page, 1 through 5 inclusive, iiii eliminated.	WK	

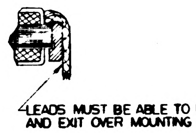
This specification consists of pages i through iii and 1 to 5 inclusive.

REV. A

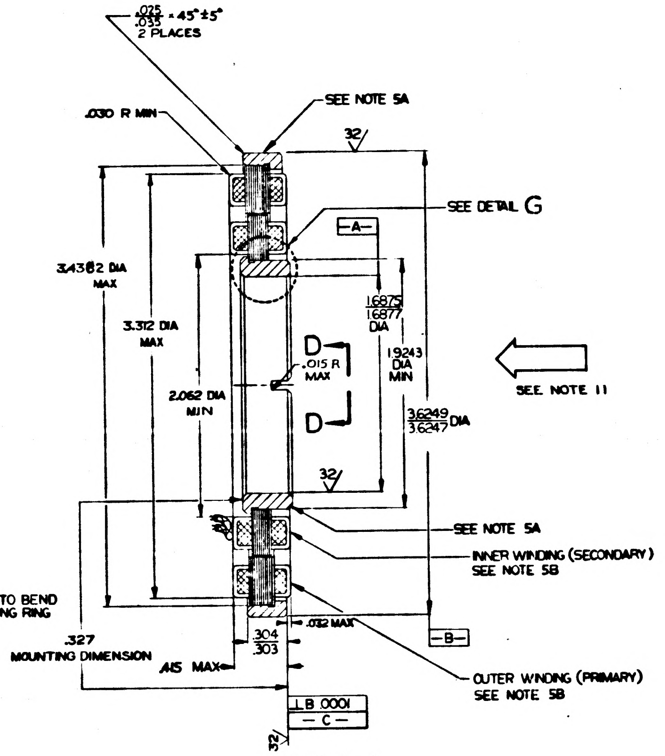
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS		
B	TDRR 00357	2-12-63	

REVISIONS TDR 00028

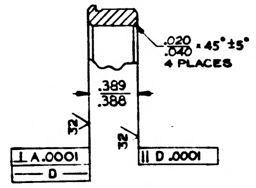

A
30°±2°
.187
.375 WIDE X .045 DEEP 2 SLOTS EQUALLY SPACED FOR SPANNER WRENCH
SEE NOTE 9
C
C
CEMENT LEADS IN PLACE SEE NOTE 4 AND 6
SEE DETAIL F
CEMENT LEADS IN PLACE SEE NOTE 6
A


LEADS MUST BE ABLE TO BEND AND EXIT OVER MOUNTING RING

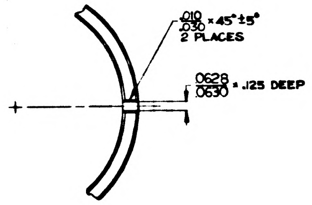
SECT C-C


.025/.035 × 45°±5° 2 PLACES
.030 R MIN
SEE NOTE 5A
32
SEE DETAIL G
-A-
3.4382 DIA MAX
3.312 DIA MAX
1.6875/1.6877 DIA
1.9243 DIA MIN
D
.015 R MAX
D
2.062 DIA MIN
3.6249/3.6247 DIA
SEE NOTE 11
32
SEE NOTE 5A
INNER WINDING (SECONDARY) SEE NOTE 5B
.032 MAX
.304/.303
-B-
.327 MOUNTING DIMENSION
.415 MAX
OUTER WINDING (PRIMARY) SEE NOTE 5B
⊥ B .0001
-C-
32

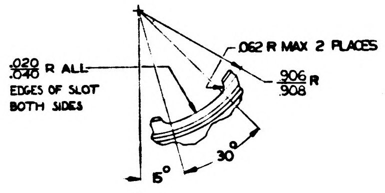
SECT A-A


.020/.040 × 45°±5° 4 PLACES
.389/.388
32
⊥ A .0001
-D-
32
∥ D .0001

DETAIL G
SCALE $\frac{2}{1}$


.010/.030 × 45°±5° 2 PLACES
.0628/.0630 × .125 DEEP

VIEW D-D
RESOLVER REMOVED

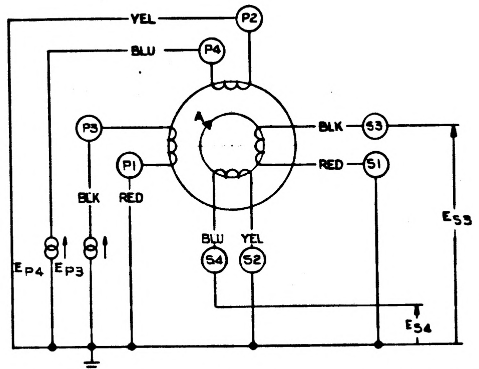

.062 R MAX 2 PLACES
.020/.040 R ALL EDGES OF SLOT BOTH SIDES
.906/.908 R
30°
15°

DETAIL F
SCALE $\frac{2}{1}$

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R.
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN THE RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000031
5. MATERIAL:
   A. MOUNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT; BERYLLIUM PER MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER .001, AXIAL PLAY ±.010 FROM POSITION SHOWN
8. PART 1000031-1, GYRO ERROR RESOLVER MUST CONFORM TO SPEC PS1000031-1 WHEN OPERATING WITH 1000030 PER PS1000032

   PART 1000031-2, PITCH-YAW RESOLVER MUST CONFORM TO SPEC PS1000031-2 WHEN OPERATING WITH 1000030 PER PS1000033
9. IDENTIFY BOTH PARTS USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., SERIAL NO., AND MANUFACTURES SYMBOL PER MIL-STD-130 AT INDICATED LOCATIONS
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F


YEL
P2
BLU
P4
P3
P1
A
BLK
S3
RED
S1
BLK
RED
BLU
YEL
S4
S2
E_{P4}
E_{P3}
E_{S3}
E_{S4}

11. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0)
$E_{S2} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

PART NO.	DESCRIPTION	NEXT ASSY	USED ON
1000031-1	GYRO ERROR	1000032	DL1000201
1000031-2	PITCH YAW	1000033	DL1000201

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000033	
1000032	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN L. MILLS
APPROVED FOR MSC
MIT APPROVED

RESOLVERS, GYRO ERROR & PITCH-YAW SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO 1000031
SHEET 1 OF 1

1000031 B

Apollo G&N Specification
PS-1000031-1
Class A
TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION

ONE SPEED GYRO ERROR RESOLVER

TYPE 37RU34N32

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WK		
B	02416	All pages	WK		12 aug 63

This specification consists of pages i through iiii and 1 to 5 inclusive.

REV.BA

Apollo G&N Specification
PS-1000031-1
28 December 1962
Class A Release
TDRR #00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

MIT Instrumentation Laboratory 28 Dec '62
Date

NASA/MSC Approval 12/28/62
Date

PROCUREMENT SPECIFICATION

ONE SPEED GYRO ERROR RESOLVER

TYPE 37RU34N32

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Gyro Error Resolver, Type 37RU34N32, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G&N		
	ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G&N		
	1000031	Resolver, Gyro Error and Pitch-Yaw, Specification Control Drawing

[redacted] Apollo G&N Specification
PS-1000031-2
5 April 1963

Class A
TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION

ONE SPEED PITCH-YAW RESOLVER

TYPE 37RU918

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated.	WK		
B	02409	All Pages	WK	WSS	12 Aug 63

This specification consists of pages i through iii and 1 to 5 inclusive.

PROCUREMENT SPECIFICATION

ONE SPEED PITCH-YAW RESOLVER

TYPE 37RU918

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Pitch-Yaw Resolver, Type 37RU918, hereinafte called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the dat of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G&N

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G&N

1000031	Resolver, Gyro Error and Pitch-Specification Control Drawing.

REVISIONS TDR 00028

SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ A	GENERAL REVISIONS		a96	WK
B	TDRR 00357	2-12-63	a96	WK
C	TDRR 01150	5-8-63	a96	WK

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5

1000001

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
MIT APPROVED

RESOLVERS, GYRO ERROR & PITCH-YAW
SPECIFICATION CONTROL DRAWING

SCALE 2—1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO 1000031
SHEET OF

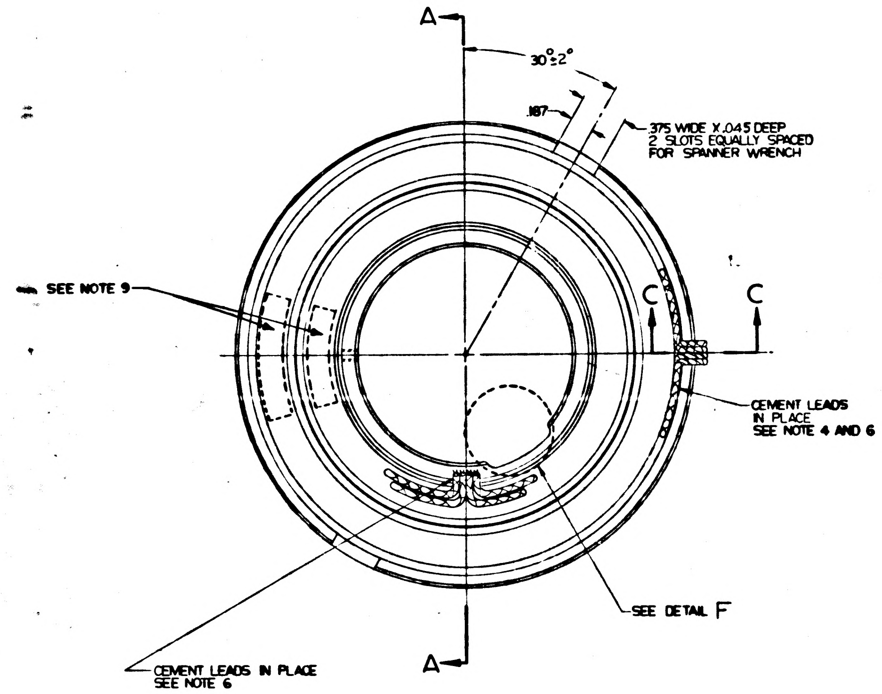
C 1000031

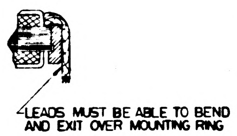
1000031

INCHES
PHOTOGRAPHIC SCALE ONLY

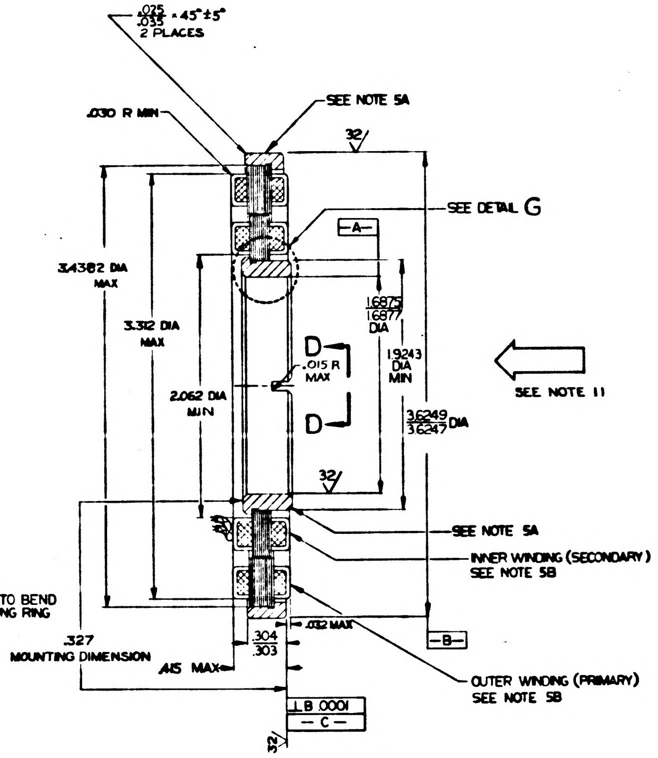
REVISIONS TDR 0028

SYM	DESCRIPTION	DATE	APPR.
A	GENERAL REVISIONS		
B	TDRR C0357	2-12-63	
C	TDRR C1150	3-8-63	

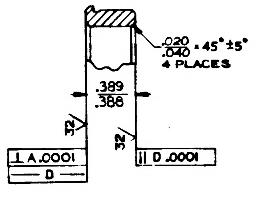

A
30°±2°
.187
.375 WIDE X .045 DEEP
2 SLOTS EQUALLY SPACED
FOR SPANNER WRENCH
SEE NOTE 9
C
C
CEMENT LEADS
IN PLACE
SEE NOTE 4 AND 6
SEE DETAIL F
CEMENT LEADS IN PLACE
SEE NOTE 6
A


LEADS MUST BE ABLE TO BEND
AND EXIT OVER MOUNTING RING

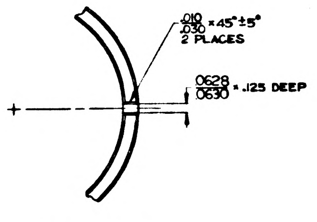
SECT C-C


.025/.035 × 45°±5°
2 PLACES
.030 R MIN
SEE NOTE 5A
32
SEE DETAIL G
-A-
3.4382 DIA
MAX
3.312 DIA
MAX
1.6875/1.6877
DIA
D
.015 R
MAX
1.9243
DIA
MIN
SEE NOTE 11
2.062 DIA
MIN
D
3.6249/3.6247 DIA
32
SEE NOTE 5A
INNER WINDING (SECONDARY)
SEE NOTE 5B
.032 MAX
-B-
.327
MOUNTING DIMENSION
.304/.303
.415 MAX
⊥ B .0001
-C-
32
OUTER WINDING (PRIMARY)
SEE NOTE 5B

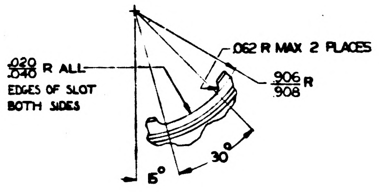
SECT A-A


.020/.040 × 45°±5°
4 PLACES
.389/.388
32
32
⊥ A .0001
-D-
∥ D .0001

DETAIL G
SCALE 2/1


.010/.030 × 45°±5°
2 PLACES
.0628/.0630 × .125 DEEP

VIEW D-D
RESOLVER REMOVED

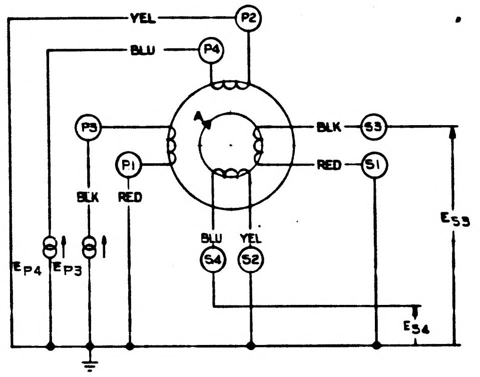

.020/.040 R ALL
EDGES OF SLOT
BOTH SIDES
.062 R MAX 2 PLACES
.906/.908 R
30°
15°

DETAIL F
SCALE 2/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R.
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN THE RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ± 2° AS DEFINED BY PS1000031
5. MATERIAL:
   A. MOUNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT; BERYLLIUM PER MIL-B-2531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, AND SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER .001, AXIAL PLAY ±.010 FROM POSITION SHOWN DURING QUALIFICATION & REQUALIFICATION TESTING ONLY. Ⓒ
8. PART 1000031-1, GYRO ERROR RESOLVER MUST CONFORM TO SPEC PS1000031-1 WHEN OPERATING WITH 1000030 PER PS1000032

   PART 1000031-2, PITCH-YAW RESOLVER MUST CONFORM TO SPEC PS1000031-2 WHEN OPERATING WITH 1000030 PER PS1000033
9. IDENTIFY BOTH PARTS USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., SERIAL NO., AND MANUFACTURES SYMBOL PER MIL-STD-130 AT INDICATED LOCATIONS
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F


YEL
P2
BLU
P4
P3
P1
A
BLK
S3
RED
S1
BLK
RED
BLU
YEL
S4
S2
E_{P4}
E_{P3}
E_{S3}
E_{S4}

11. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0) $E_{S2} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

PART NO.	DESCRIPTION	NEXT ASSY	USED ON
1000031-1	GYRO ERROR	1000032	DL1000201
1000031-2	PITCH YAW	1000033	DL1000201

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000033	
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN L. MILLS
APPROVED FOR MIT
MIT APPROVED

RESOLVERS,
GYRO ERROR &
PITCH-YAW
SPECIFICATION CONTROL
DRAWING

SCALE 2—1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1C000031
SHEET 1 OF 1

1000031 REVISH C

INCHES
PHOTOGRAPHIC SCALE ONLY

19 35

Apollo G&N Specification
PS-1000031-1

Class A
TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION

ONE SPEED GYRO ERROR RESOLVER

TYPE 37RU34N32

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WK		
B	02416	All pages	WK	WS	12 Aug 63
C	03980	3 and 4	WK	hL	23 Oct 63

This specification consists of pages i through iiii and 1 to 5 inclusive.

REV.BA

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

W A Kupfer 28 Dec '62
MIT Instrumentation Laboratory Date

12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

ONE SPEED GYRO ERROR RESOLVER

TYPE 37RU34N32

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Gyro Error Resolver, Type 37RU34N32, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G&N

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G&N

1000031	Resolver, Gyro Error and Pitch-Yaw, Specification Control Drawing

35

[redacted] Apollo G&N Specification
PS-1000031-2
3 April 1963

Class A
TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION

ONE SPEED PITCH-YAW RESOLVER

TYPE 37RU91N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 through 5 inclusive, iiii eliminated.	WK		
B	02409	All Pages	WK	WSS.	12 Aug 63
C	03979	2 and 4	WK	WSS.	23 Oct 63

This specification consists of pages i through iii and 1 to 5 inclusive.

---

28 December 1962
Class A Release
TDRR 00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

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This document does not supersede any existing publication or instructions.

28 Dec '62
MIT Instrumentation Laboratory Date

12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

ONE SPEED PITCH-YAW RESOLVER

TYPE 37RU91N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Pitch-Yaw Resolver, Type 37RU91N8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G&N

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G&N

1000031	Resolver, Gyro Error and Pitch-Yaw, Specification Control Drawing.

[redacted] Apollo G&N Specification
PS-1000031-1

Class A
TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION

ONE SPEED GYRO ERROR RESOLVER

TYPE 37RU54N32

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals MIT	Approvals NASA	DATE
A	00739	Title page, 1 through 5 inclusive, iiii eliminated	WK		
B	02416	All pages	WK		12 Aug 63
C	03980	3 and 4	WK		23 Oct 63

This specification consists of pages i through iii and 1 to 5 inclusive.

Rev. BA

Apollo G&N Specification
ND-1000031-1
28 December 1962
Class A Release
TDRR #00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

28 Dec '62
MIT Instrumentation Laboratory Date

12/28/62
NASA/MSC Approval Date

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

EXAMINED AND APPROVED

	MT-Control & Guidance Proj Mgr.	12/28/62
APPROVED BY	TITLE	DATE
APPROVED BY	TITLE	DATE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Robert J. Thurrien	Staff Member	28 December 1962
EXAMINED BY	TITLE	DATE
[illegible] E Miller	[illegible]	28 December 1962
APPROVED BY	TITLE	DATE
David G. Hoag	Tech Dir	28 Dec 62
APPROVED BY	TITLE	DATE

AC SPARK PLUG DIVISION, GENERAL MOTORS CORPORATION

Henry [illegible]	Sr. Specification Writer	19 December 1962
PREPARED BY	TITLE	DATE
		28 DEC. 1962
ACCEPTED BY	TITLE	DATE

PROCUREMENT SPECIFICATION
ONE SPEED GYRO ERROR RESOLVER

TYPE 37RU34N32

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Gyro Error Resolver, Type 37RU34N32, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Apollo G&N

MD-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G&N

1000031	Resolver, Gyro Error and Pitch-Yaw, Specification Control Drawing

3. REQUIREMENTS

3.1 **GENERAL** The resolver shall conform to the requirements of Specification ND-1002013, with the following exceptions or additions:

a. Accuracy determination shall be made with loads of 10,000 ohms ±10 percent on both secondary windings. The relative accuracy between the two resistors shall be ±1 percent.

b. The following paragraphs of Specification ND-1002013 are not applicable:

(1) Angular Error Versus Voltage
(2) Angular Error Versus Frequency
(3) Impedance Unbalance
(4) Temperature Rise
(5) Friction Torque
(6) Brush Slip Ring Continuity

c. Measurement of air gap per side shall be made and shall conform to the value listed in 3.5 p.

d. While testing the resolver in accordance with the test titled Phase Shift Variation Versus Voltage of Specification ND-1002013, the excitation shall be varied from 0.5 to 2V and the phase shift changes shall be as specified in 3 5 q.

3.2 **DESIGN AND CONSTRUCTION** The resolver shall be of the design, construction, and physical dimensions shown on drawing 1000031. The manufacture, materials, and mechanical and electrical construction of the resolver shall be in accordance with the requirements of Specification ND-1002013.

3.3 **FINISHES AND PROTECTIVE TREATMENT** The resolver finishes, protective treatment, and moisture, fungus, and corrosion treatments shall be in accordance with the requirements of Specification ND-1002013 and drawing 1000031.

3.4 QUALIFICATION PERFORMANCE CHARACTERISTICS AND CONDITIONS

3.4.1 GENERAL The qualification testing shall conform to the requirements of Specification ND-1002013 with the following exceptions or additions.

3.4.1.1 Environmental

3.4.1.1.1 Vibration, Operating. With the resolver tested as specified, the angular deviation shall not exceed 20 arc seconds, peak.

3.4.1.1.2 Shock, Operating. With the resolver tested as specified, the angular deviation shall not exceed 20 arc seconds, peak.

3.4.1.1.3 Low Temperature, Operating. With the resolver subjected to a temperature of 0°C ±2.8°C (32°F ±5°F) and tested as specified, the angular deviation shall not exceed 20 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 2.0 mv, rms.

3.4.1.1.4 High Temperature, Operating With the resolver subjected to a temperature of 93.3° ±2.8°C (200°F ±5°F) and tested as specified, the angular deviation shall not exceed 20 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 2.0 mv, rms.

3.4.1.1.5 52°C Temperature, Operating. With resolver subjected to a temperature of 52° ±1°C (125.6°F ±1.8°F) and tested as specified, the angular deviation shall not exceed 10 arc seconds peak and the bridge fundamental null voltage variations shall not exceed 1.0 mv, rms.

3.4.1.1.6 Thermal Shock The resolver shall be tested as specified with the low temperature as indicated in 3.4.1.1 3.

3.4.1.1.7 Humidity, Operating. With the resolver tested as specified, the angular deviation shall not exceed 20 arc seconds, peak.

3.4.1.1.8 Thermal Vacuum The resolver shall be tested as specified while exposed to a vacuum level of 3.0 psia and the low and high temperature specified in 3.4.1.1.3 and 3.4.1.1.4 respectively.

3.4.1.2 Endurance. During the applicable portions of endurance testing, the following conditions shall be maintained:

a. Low Temperature	48.9° ±2.8°C (120°F ±5°F)
b. High Temperature	82.2° ±2.8°C (180°F ±5°F)
c. Operating Speed	0 rpm

3.5 **DETAIL PERFORMANCE CHARACTERISTICS** The resolver shall have the following specific characteristics when tested at the applicable ambient conditions as specified in Specification ND-1002013.

a. Primary	Outer member
b. Rated Voltage	28V ±1%
c. Test Voltage	1V ±2%
d. Test Frequency	3200 cps ±0.5%
e. Impedance	
(1) Zpo	993 ohms +15% + j 3245 ohms ±15%
(2) Zps	176 + j 258 ohms, nominal
(3) Zso	1063 ohms +15% + j 3470 ohms ±15%
(4) Zss	195 + j 282 ohms, nominal
f. Null Voltages	
(1) Total	1 millivolt rms/1 volt rms input
(2) Fundamental	1 millivolt rms/1 volt rms input
g. Phase Shift	1.5° maximum
h. Phase Shift Versus Rotation	±1.0°
i. Transformation Ratio	1.00 ±3%
j. Angular Error	10 arc minutes peak (maximum)
Angular Intervals for Accuracy Measurement	15°
k. Input Current, Unloaded	0.3 milliampere, nominal
m. Input Power, Unloaded	0.09 milliwatt, nominal
n. DC Resistance	
(1) Primary	80 ohms ±15%
(2) Secondary	103 ohms ±15%
p. Air Gap Per Side	0.005 inch, minimum
q. Phase Shift vs Voltage	±1.0°

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL Sampling, inspection and testing shall be in accordance with the requirements of Specification ND-1002013, and as specified herein.

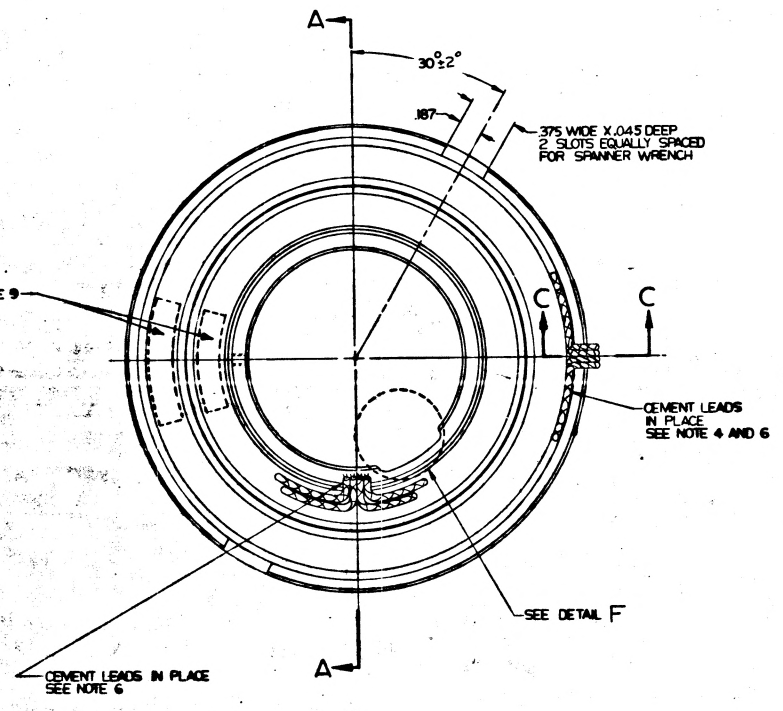
5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery shall be in accordance with the requirements of Specification ND-1002013.

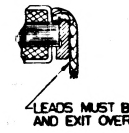
6. NOTES

6.1 The notes specified in Specification ND-1002013 are applicable to this resolver.

REVISIONS TDR 00028			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS		
B	TDRR 00357	2-12-63	
C	TDRR 01150	5-8-6	
D	TDRR 09655	6-15-64	

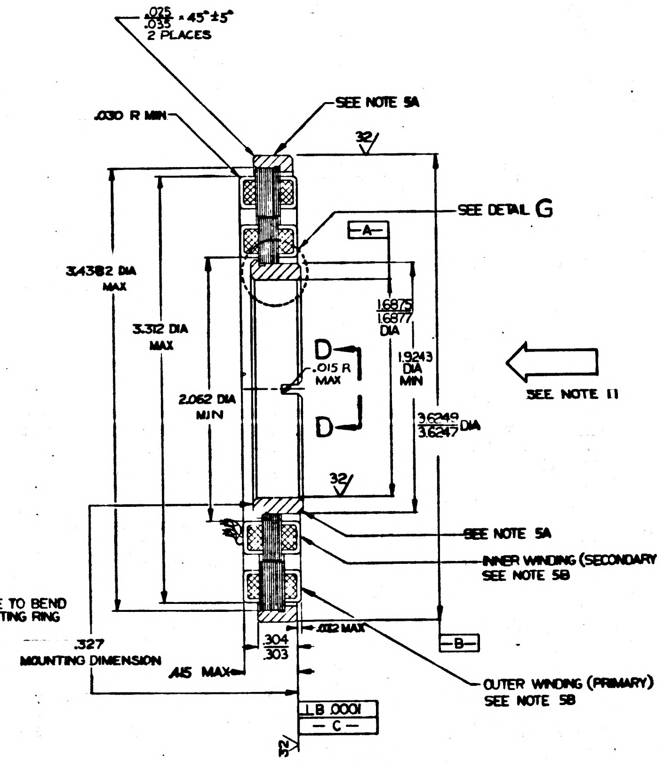


A
30°±2°
.187
.375 WIDE X .045 DEEP
2 SLOTS EQUALLY SPACED
FOR SPANNER WRENCH
SEE NOTE 9
C
C
CEMENT LEADS
IN PLACE
SEE NOTE 4 AND 6
SEE DETAIL F
CEMENT LEADS IN PLACE
SEE NOTE 6
A



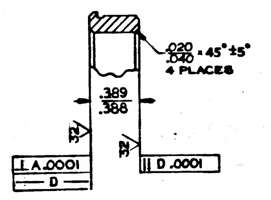
LEADS MUST BE ABLE TO BEND
AND EXIT OVER MOUNTING RING

SECT C-C



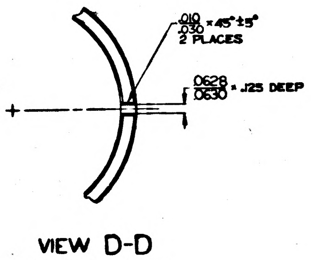
.025/.035 × 45° ±5°
2 PLACES
.030 R MIN
SEE NOTE 5A
32/
SEE DETAIL G
-A-
3.4382 DIA MAX
3.312 DIA MAX
1.6875/1.6877 DIA
1.9243 DIA MIN
D
.015 R MAX
D
SEE NOTE 11
2.062 DIA MIN
3.6249/3.6247 DIA
32/
SEE NOTE 5A
INNER WINDING (SECONDARY)
SEE NOTE 5B
.327
MOUNTING DIMENSION
.304/.303
.032 MAX
-B-
.415 MAX
OUTER WINDING (PRIMARY)
SEE NOTE 5B
⊥ B .0001
-C-
32/

SECT A-A



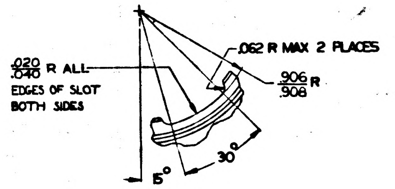
.020/.040 × 45° ±5°
4 PLACES
.389/.388
32/
⊥ A .0001
-D-
32/
∥ D .0001

DETAIL G
SCALE 2/1



.010/.030 × 45° ±5°
2 PLACES
.0628/.0630 × .125 DEEP

VIEW D-D
RESOLVER REMOVED



.020/.040 R ALL
EDGES OF SLOT
BOTH SIDES
.062 R MAX 2 PLACES
.906/.908 R
30°
15°

DETAIL F
SCALE 2/1

PROCURE ONLY FROM APPROVED SOURCES
LISTED IN ND1002034 FOR THIS DRAWING

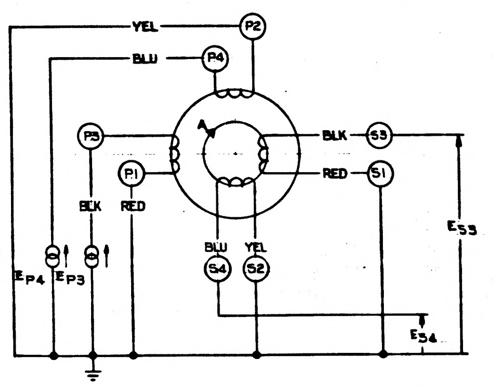
PART NO.	DESCRIPTION	NEXT ASSY	USED ON
1000031-1	GYRO ERROR	1000032	DL1000201
1000031-2	PITCH YAW	1000033	DL1000201

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. √ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R.
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN THE RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000031
5. MATERIAL:
   - A. MOUNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT; BERYLLIUM PER MIL-B-21531
   - B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, SURFACES -C- AND -D- SKEWED WITH RESPECT TO EACH OTHER 1 MILLIRADIAN, AND A +.010 AXIAL DISPLACEMENT OF SURFACE -C- FROM POSITION SHOWN FOR QUALIFICATION AND REQUALIFICATION TESTING ONLY. + DIRECTION IS DEFINED IN DIRECTION OF ORIENTATION ARROW.
8. PART 1000031-1, GYRO ERROR RESOLVER MUST CONFORM TO SPEC PS1000031-1 WHEN OPERATING WITH 1000030 PER PS1000032

   PART 1000031-2, PITCH-YAW RESOLVER MUST CONFORM TO SPEC PS1000031-2 WHEN OPERATING WITH 1000030 PER PS1000033
9. IDENTIFY BOTH PARTS USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., SERIAL NO., AND MANUFACTURES SYMBOL PER MIL-STD-130 AT INDICATED LOCATIONS
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

(6)



YEL
P2
BLU
P4
P3
P1
BLK
RED
A
BLK
S3
RED
S1
BLU
YEL
S4
S2
E_{P4}
E_{P3}
E_{S3}
E_{S4}

11. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$
$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0)
$E_{S2} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000033	
1000032	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
BY DIRECTION MIT APPROVED

RESOLVERS, GYRO ERROR & PITCH-YAW
SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000031
SHEET 1 OF 1

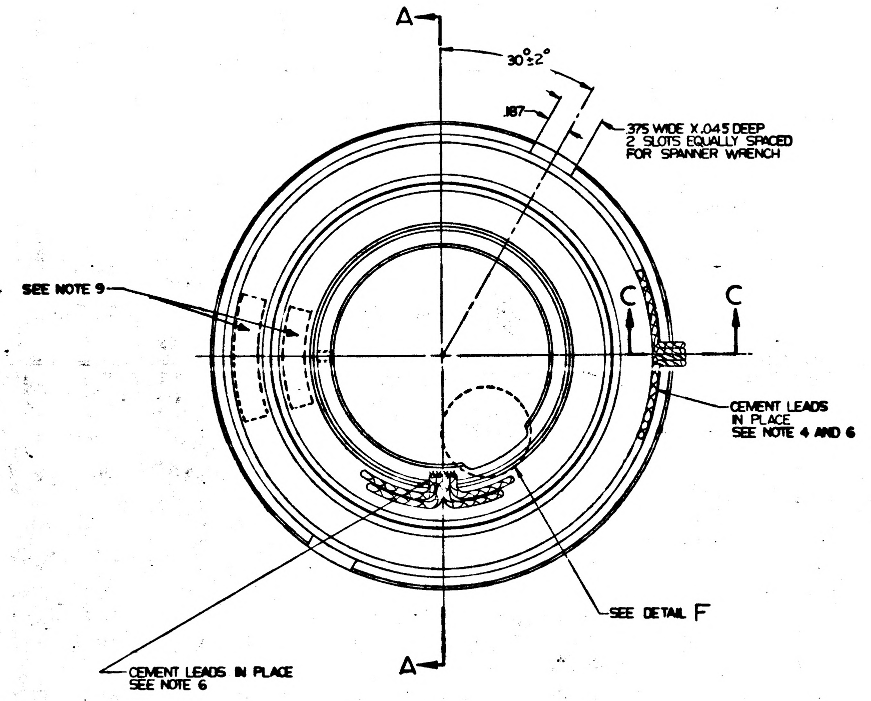
1000031

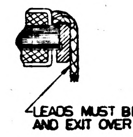
1000031

1000031

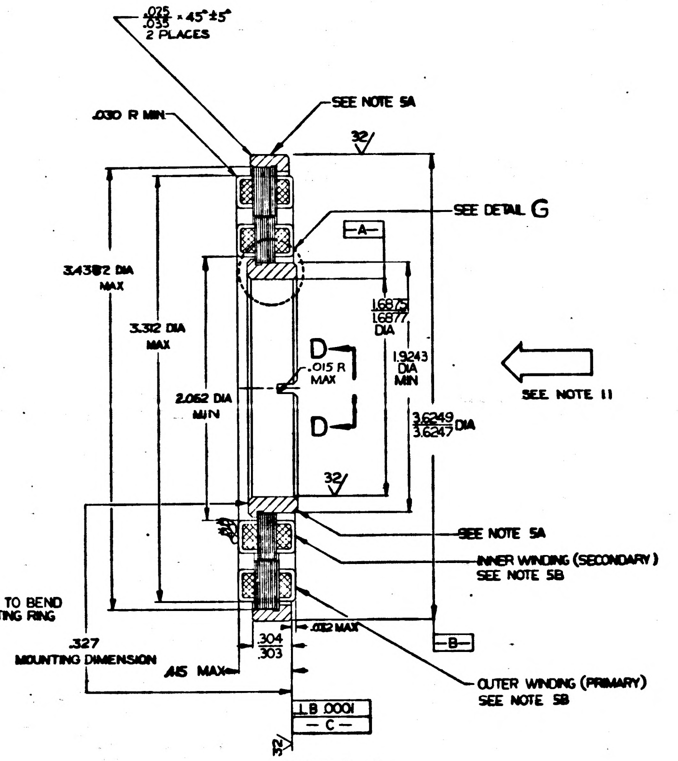
SYM	DESCRIPTION		APPROVAL
A	GENERAL REVISIONS		
B	TDRR 00357	2-[illegible]	
C	TDRR 01150	3-[illegible]	
D	TDRR 09655	6-[illegible]	

REVISIONS TDRR 009

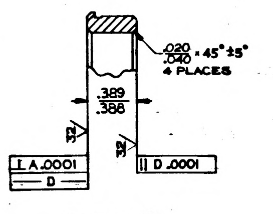

A
30° ±2°
.187
.375 WIDE X .045 DEEP
2 SLOTS EQUALLY SPACED
FOR SPANNER WRENCH
SEE NOTE 9
C
C
CEMENT LEADS
IN PLACE
SEE NOTE 4 AND 6
SEE DETAIL F
CEMENT LEADS IN PLACE
SEE NOTE 6
A


LEADS MUST BE ABLE TO BEND
AND EXIT OVER MOUNTING RING

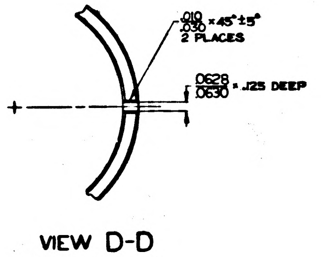
SECT C-C


.025/.035 × 45° ±5°
2 PLACES
.030 R MIN
SEE NOTE 5A
32
SEE DETAIL G
-A-
3.4382 DIA
MAX
3.312 DIA
MAX
1.6875/1.6877 DIA
D
.015 R
MAX
D
1.9243
DIA
MIN
2.062 DIA
MIN
3.6249/3.6247 DIA
SEE NOTE 11
32
SEE NOTE 5A
INNER WINDING (SECONDARY)
SEE NOTE 5B
.327
MOUNTING DIMENSION
.304/.303
.012 MAX
.415 MAX
-B-
OUTER WINDING (PRIMARY)
SEE NOTE 5B
⊥ B .0001
-C-
32

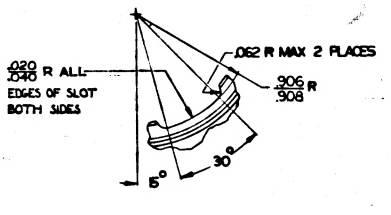
SECT A-A


.020/.040 × 45° ±5°
4 PLACES
.389/.388
32
32
⊥ A .0001
-D-
∥ D .0001

DETAIL G
SCALE 2/1


.010/.030 × 45° ±5°
2 PLACES
.0628/.0630 × .125 DEEP

VIEW D-D
RESOLVER REMOVED

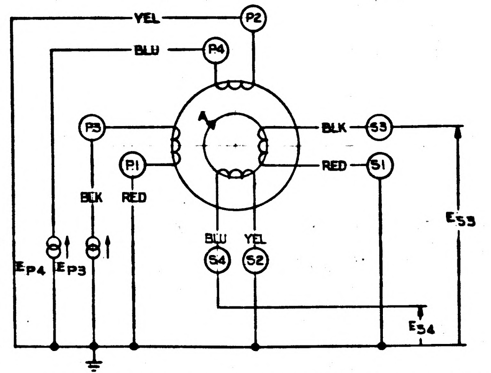

.020/.040 R ALL
EDGES OF SLOT
BOTH SIDES
.062 R MAX 2 PLACES
.906/.908 R
15°
30°

DETAIL F
SCALE 2/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R.
4. WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN THE RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° AS DEFINED BY PS1000031
5. MATERIAL:
   A. MOUNTING RING, BERYLLIUM BRUSH SPEC S-200 ALT; BERYLLIUM PER MIL-B-21531
   B. WINDING OPTIONAL, EXCEPT WHERE NOTED
6. LEADS SHALL BE 12 INCH MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
7. ELECTRICAL DATA TO BE INSPECTED WITH DIA -A- AND -B- ECCENTRIC .002 TIR, SURFACES -C- AND -D-. SKEWED WITH RESPECT TO EACH OTHER 1 MILLIRADIAN, AND A +.010 AXIAL DISPLACEMENT OF SURFACE -C- FROM POSITION SHOWN FOR QUALIFICATION AND REQUALIFICATION TESTING ONLY. + DIRECTION IS DEFINED IN DIRECTION OF ORIENTATION ARROW. ⓒ
8. PART 1000031-1, GYRO ERROR RESOLVER MUST CONFORM TO SPEC PS1000031-1 WHEN OPERATING WITH 1000030 PER PS1000032

   PART 1000031-2, PITCH-YAW RESOLVER MUST CONFORM TO SPEC PS1000031-2 WHEN OPERATING WITH 1000030 PER PS1000033
9. IDENTIFY BOTH PARTS USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., SERIAL NO., AND MANUFACTURES SYMBOL PER MIL-STD-130 AT INDICATED LOCATIONS
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F


YEL
P2
BLU
P4
P3
P1
A
BLK
RED
BLK
S3
RED
S1
BLU
YEL
S4
S2
E_{P4}
E_{P3}
E_{S3}
E_{S4}

11. A POSITIVE RESOLVER ANGLE A RESULTS WHEN THE INNER RESOLVE WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTION A-A. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\cos A - E_{P4}\sin A\right]$$

$$E_{S4} = K\left[E_{P3}\sin A + E_{P4}\cos A\right]$$

WHERE K IS THE TRANSFORMATION RATIO AT ELECTRICAL ZERO (A=0) $E_{S2} = KE_{P3}$ AND $E_{S4} = KE_{P4}$

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

PART NO.	DESCRIPTION	NEXT ASSY	USED ON
1000031-1	GYRO ERROR	1000032	DL1000201
1000031-2	PITCH YAW	1000033	DL1000201

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL & NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000033	
1000032	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
MIT APPROVED

RESOLVERS, GYRO ERROR & PITCH-YAW
SPECIFICATION CONTROL DRAWING

SCALE 2-1
UNIT WT.
CODE IDENT.

INSTRUMENTATION LABORATORY
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
1000031
SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000031 REV D1

NASA DOCUMENT
~~ND~~ PS-1000031-1
28 December 1962
Class A Release
TDRR # 00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components, the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

W.A. Kupfer 28 Dec '62
MIT Instrumentation Laboratory Date

12/28/62
NASA/MSC Approval Date

NASA PROCUREMENT
SPEC NO. PS-1000031-1
28 December 1962
Class A
TDRR

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
ONE SPEED GYRO ERROR RESOLVER
TYPE 37RU34N32
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment

This specification consists of page i to iii and 1 to 5 inclusive.

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
ONE SPEED GYRO ERROR RESOLVER
TYPE 37RU34N32

TABLE OF CONTENTS

Section	Title	Page
1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	1
4	QUALITY ASSURANCE PROVISIONS	5
5	PREPARATION FOR DELIVERY	5
6	NOTES	5

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
ONE SPEED GYRO ERROR RESOLVER
TYPE 37RU34N32

1. SCOPE

1.1 SCOPE - This specification establishes the requirements for the procurement of the One Speed Gyro Error Resolver, Type 37RU34N32, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

NASA

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification for, National Aeronautics and Space Administration

DRAWINGS

NASA

1000031-1	One Speed Gyro Error Resolver, Specification Control Drawing

(Specifications and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency as directed by the contracting officer.)

3. REQUIREMENTS

3.1 GENERAL - The resolver shall conform to the requirements of Specification ND-1002013, with the following exceptions or additions:

a. Accuracy determination shall be made with loads of 10,000 ohms ±5% on both secondary windings. The relative accuracy between the two resistors shall be ±1%.

NASA DOCUMENT
~~ND~~ PS-1000031-2
28 December 1962
Class A Release
TDRR 00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

28 Dec '62
MIT Instrumentation Laboratory — Date

12/28/62
NASA/MSC Approval — Date

NASA PROCUREMENT
SPEC. NO. PS-1000031-2
28 December 1962
Class A
TDRR

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
ONE SPEED PITCH-YAW RESOLVER
TYPE 37RU91N8
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment

This specification consists of page i to iii and 1 to 5 inclusive.

NASA PROCUREMENT
SPEC. NO. PS-1000031-2

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
ONE-SPEED PITCH-YAW RESOLVER
TYPE 37RU91N8

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4.	QUALITY ASSURANCE PROVISIONS	5
5.	PREPARATION FOR DELIVERY	5
6.	NOTES	5

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
ONE SPEED PITCH-YAW RESOLVER
TYPE 37RU91N8

1. SCOPE

1.1 SCOPE. This specification establishes the requirements for the procurement of the One Speed Pitch-Yaw Resolver, Type 37RU91N8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

NASA

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification for, National Aeronautics and Space Administration

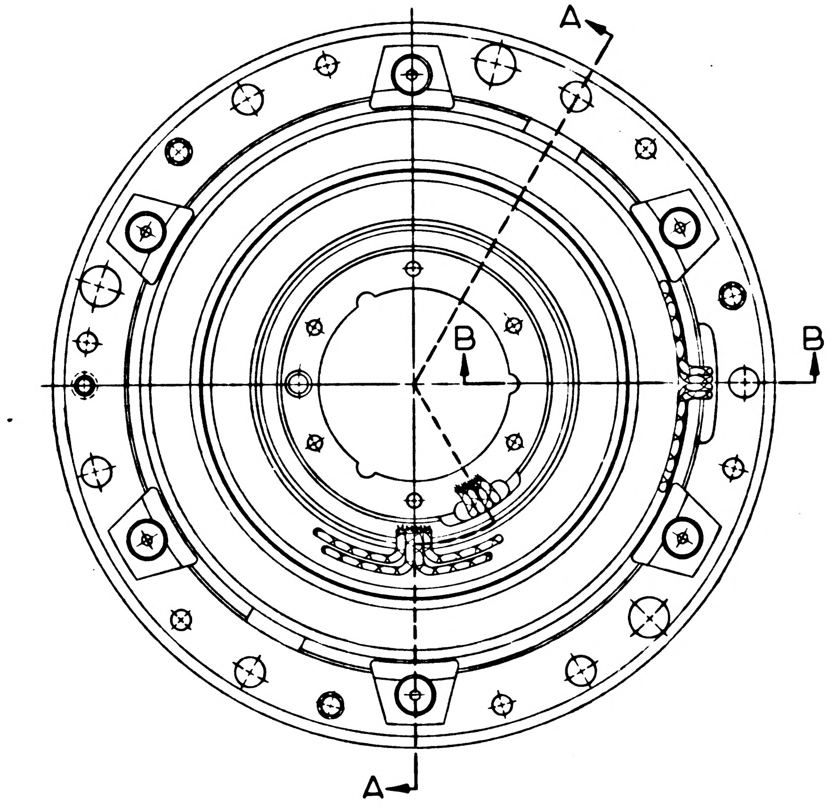
DRAWINGS

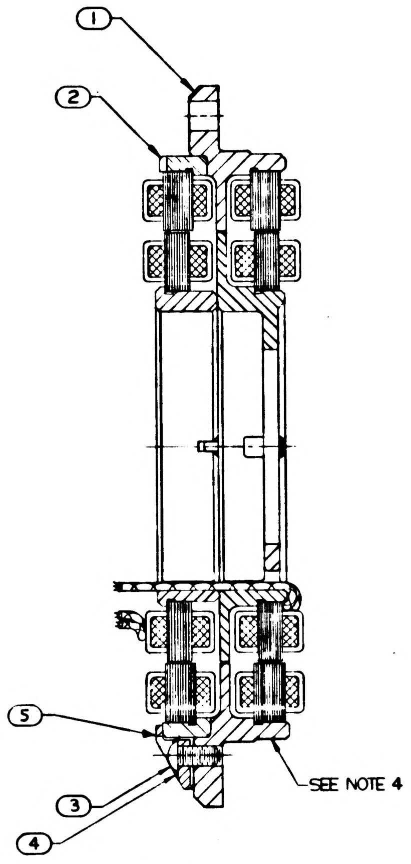
NASA

1000031-2	One Speed Pitch-Yaw Resolver, Specification Control Drawing

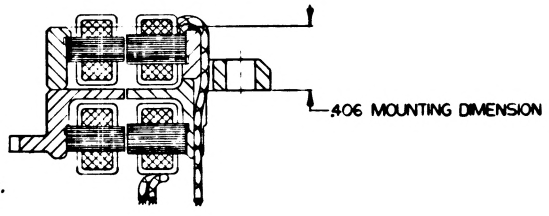
(Specification and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRC0028		
	A	GENERAL REVISIONS		9/26 WJK





SECTION A-A



SECTION B-B

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④.
3. ASSEMBLY MUST CONFORM TO PS1000032
4. IDENTIFY PER MIL-STD-130 AT INDICATED LOCATION AS FOLLOWS:

1000032	REV LETTER	SERIAL NO.	MFG SYMBOL
MATCHED	1000031-1	REV LETTER	SERIAL NO.
WITH	1000030	REV LETTER	SERIAL NO.

5. ITEM ② SHALL BE AT ELECTRICAL ZERO AS DEFINED BY PS1000031-1 WHEN CLAMPED TO ITEM ① WHEN ITEM ① IS AT ELECTRICAL ZERO AS DEFINED BY PS1000030 CLAMP WITH ITEMS ③ & ⑤ PER NOTE 2 CAUTION: DO NOT DISTURB ITEMS ③ & ⑤ AFTER ALIGNMENT

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
6	CLAMP, RESOLVER	1000094			5
AS REQD	ADH, RUB. RESIN, SYN	FSN-12Z-30000-5			4
6	SCR, CAP, SOC. BUT. HD	1000093			3
1	RSVR, GYRO ERROR	1000031-1			2
1	RSVR, ONE SPEED XMTR	1000030			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000010	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
DATE
APPROVED C J Bayer 2-20-62
CHECKED
DRAWN L. MILLS 2-20-62
APPROVED FOR MSC W J Rhine 8-20-62
BY DIRECTION MIT APPROVED W J Kaplan Jr. 9/20/62

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR
SPECIFICATION CONTROL DWG

SCALE 2-1
UNIT WT. —
CODE IDENT. —

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000032
SHEET 1 OF

1000032 A

PROCUREMENT SPECIFICATION

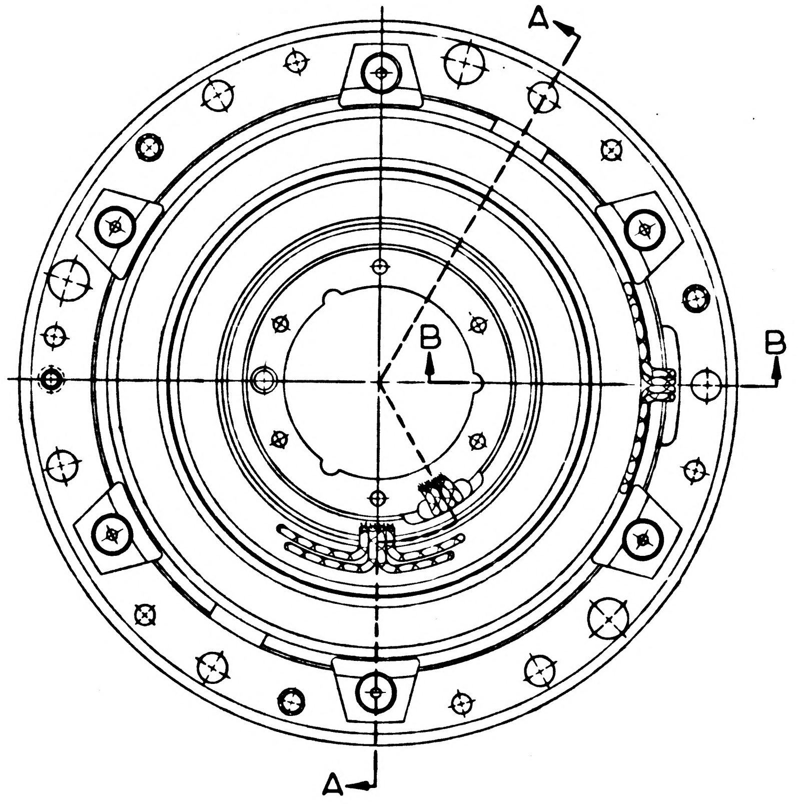
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR

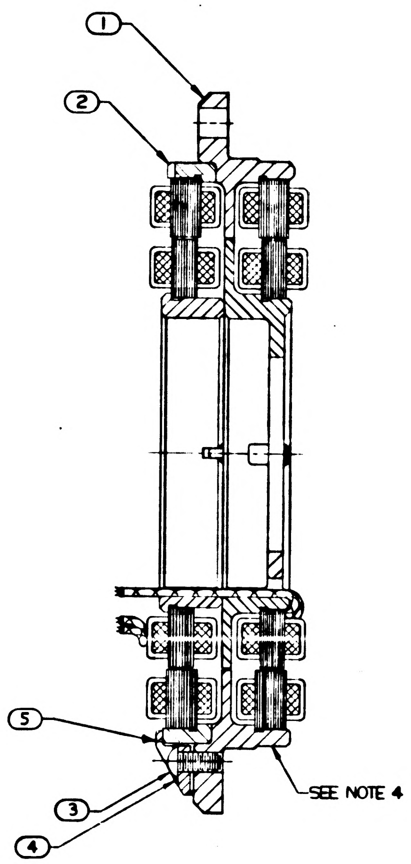
Record of Revisions

Revision Letter	TDRR	Pages Revised	Approvals	
			MIT	NASA
A	00840	Title page, 1 to 9 iiii eliminated, now 10 pages. 9, or iii eliminated.	WLK 17 Apr 63	4/17/63

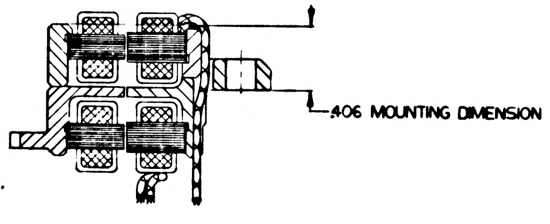
This specification consists of pages ii through iii and 1 to 10 inclusive.

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDR 00028				
	A	GENERAL REVISIONS		ajb WJK
	B1	TDRR 00037	10-1-62	ajb WJK





SECTION A-A



SECTION B-B

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④.
3. ASSEMBLY MUST CONFORM TO PS1000032
4. IDENTIFY PER MIL-STD-130 AT INDICATED LOCATION AS FOLLOWS:

1000032	REV LETTER	SERIAL NO.	MFG SYMBOL
MATCHED	1000031-1	REV LETTER	SERIAL NO.
WITH	1000030	REV LETTER	SERIAL NO.

5. ITEM ② SHALL BE AT ELECTRICAL ZERO AS DEFINED BY PS1000031-1 WHEN CLAMPED TO ITEM ① WHEN ITEM ① IS AT ELECTRICAL ZERO AS DEFINED BY PS1000030 CLAMP WITH ITEMS ③ & ⑤ PER NOTE 2
CAUTION: DO NOT DISTURB ITEMS ③ & ⑤ AFTER ALIGNMENT

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	6	CLAMP, RESOLVER	1000094			5
	AS REQD	ADH, RUB. RESIN, SYN	FSN-12Z-30000-5			4
Ⓑ	6	SCR, BUT HD, SELF LOCK, SOC, HEX	1000093-13			3
	1	RSVR, GYRO ERROR	1000031-1			2
	1	RSVR, ONE SPEED XMTR	1000030			1

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000010	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	3-20-62
CHECKED		
DRAWN	L. MILLS	3-20-62
APPROVED FOR MSC	W J Rhine	8-20-62
BY DIRECTION MIT APPROVED	W J Kapla	9/20/62

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000032
SHEET 1 OF 1

1000032 B

[redacted] Apollo G&N Specification
PS-1000032
Class A Release
TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR

Record of Revisions

Revision Letter	TDRR	Pages Revised	Approvals MIT	Approvals NASA	DATE
A	00840	Title page, 1 to 9 iiii ~~eliminated~~, now ~~10 pages~~. 9, or iii eliminated.	WAK 17Apr63	4/17/63	
B	02410	All Pages	WK	W.S.	12Aug63

This specification consists of pages i through iii and 1 to 10 inclusive.

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This document does not supersede any existing publication or instructions.

WA Kupfer 28 Dec '62
MIT Instrumentation Laboratory Date

Michael 12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Transmitter and Gyro Error Resolver Assembly hereinafter called resolver assembly.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Method of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery

Apollo G&N

ND-1015404	General Specification, Configur Process and Quality Control Requirements for Suppliers of H Reliability Articles for use in Spacecraft and Supporting Equip

STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts

REVISIONS TDR00028				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
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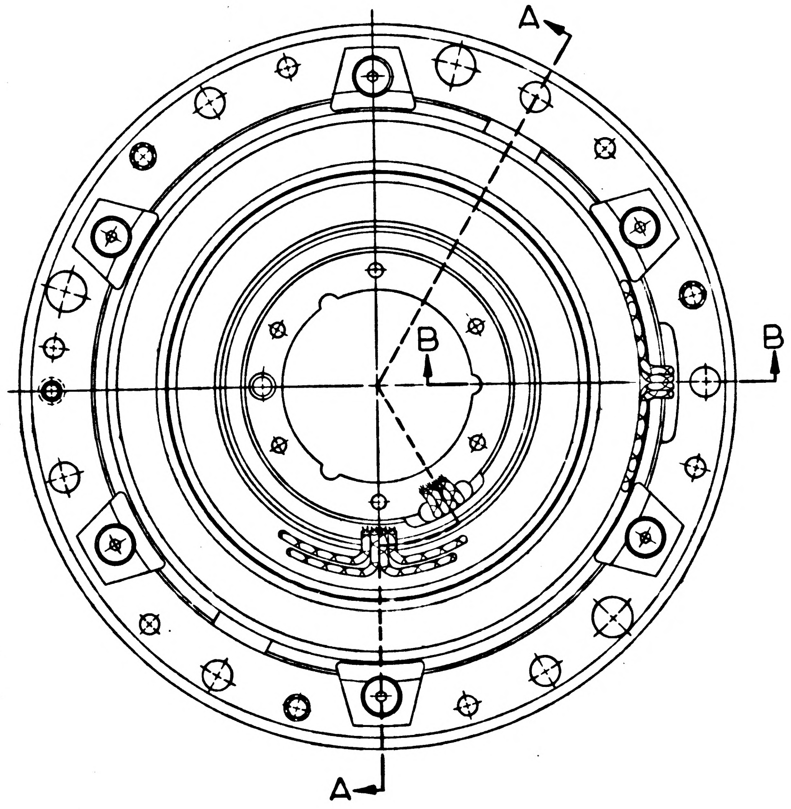
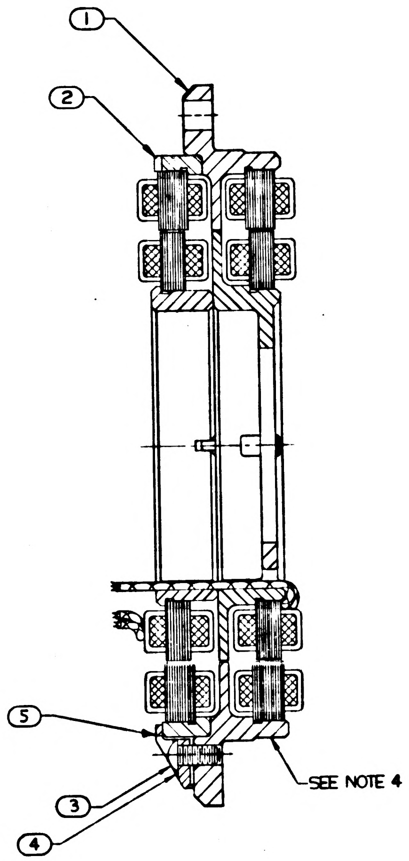
	B1	TDRR 00037	10-1-62	ajb WJK
	C	TDRR 00358	2-2-63	ajb WJK





SECTION A-A

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④.
3. ASSEMBLY MUST CONFORM TO PS1000032
4. IDENTIFY PER MIL-STD-130 AT INDICATED LOCATION AS FOLLOWS:

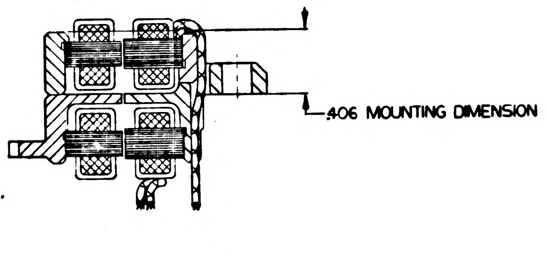
1000032	REV LETTER	SERIAL NO.	MFG SYMBOL
MATCHED	1000031-1	REV LETTER	SERIAL NO.
WITH	1000030	REV LETTER	SERIAL NO.

5. ITEM ② SHALL BE AT ELECTRICAL ZERO AS DEFINED BY PS1000031-1 WHEN CLAMPED TO ITEM ① WHEN ITEM ① IS AT ELECTRICAL ZERO AS DEFINED BY PS1000030 CLAMP WITH ITEMS ③ & ⑤ PER NOTE 2
CAUTION: DO NOT DISTURB ITEMS ③ & ⑤ AFTER ALIGNMENT

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



SECTION B-B

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
6	CLAMP, RESOLVER	1000094			5
AS REQ'D	ADH. GOODYEAR CPA 923 A		MIL-A-13883		4
6	SCR, BUT HD, SELF LOCK, SOC, HEX	1000093-13			3
1	RSVR, GYRO ERROR	1000031-1			2
1	RSVR, ONE SPEED XMTR	1000030			1

LIST OF PARTS AND MATERIALS

C

NEXT ASSY	USED ON
	DL1000201
1000010	DL1000001

APPLICATION

INCHES
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PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	9-20-62
CHECKED		
DRAWN	L. MILLS	9-20-62

APPROVED FOR MSC
W J Rhine 9-20-62
BY DIRECTION MIT APPROVED
9/20/62

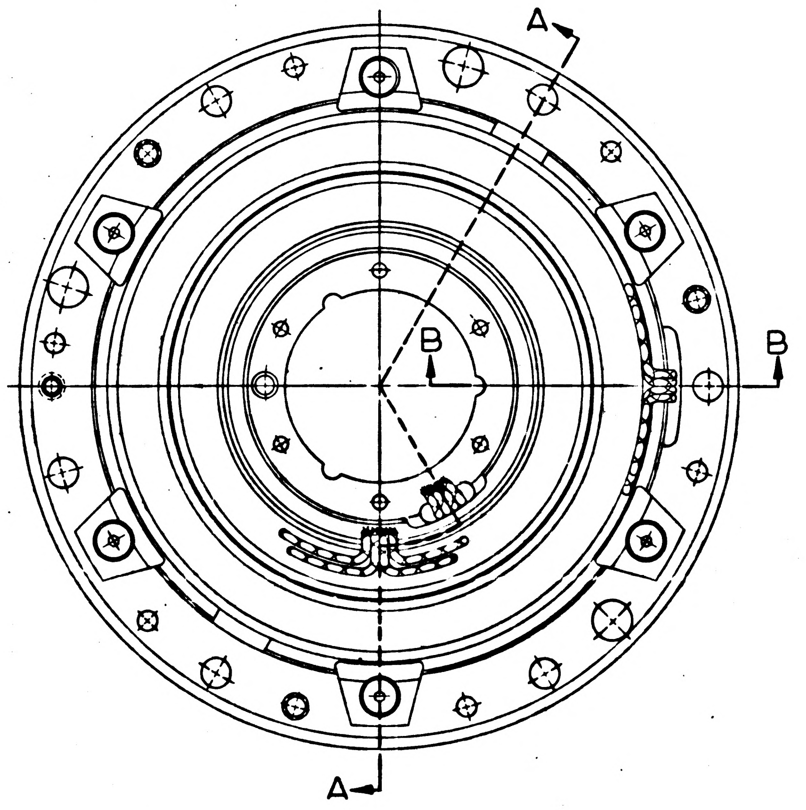
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR
SPECIFICATION CONTROL DWG

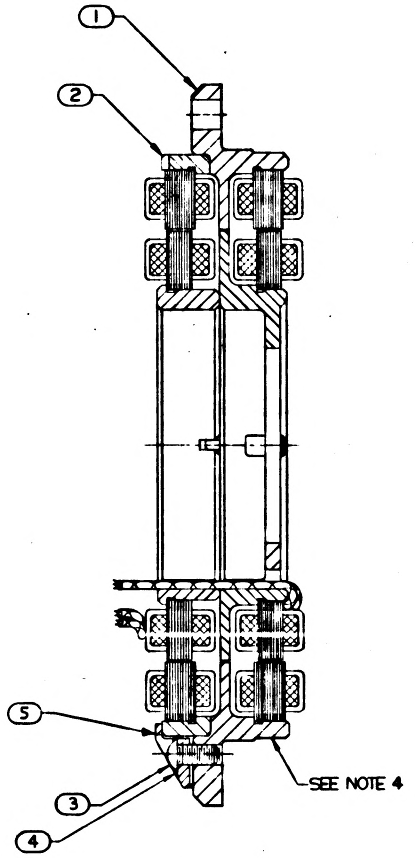
SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000032
SHEET 1 OF 1

1000032 B

REVISIONS TDR00028				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS		ajb wk
	B1	TDRR 00037	10-1-62	ajb wk
	C	TDRR 00358	2-12-63	ajb wk
	D	TDRR 01673	6-19-63	ajb wk





SECTION A-A

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④.
3. ASSEMBLY MUST CONFORM TO PS1000032
4. IDENTIFY PER MIL-STD-130 AT INDICATED LOCATION AS FOLLOWS:

1000032	REV LETTER	SERIAL NO.	MFG SYMBOL
MATCHED	1000031-1	REV LETTER	SERIAL NO.
WITH	1000030	REV LETTER	SERIAL NO.

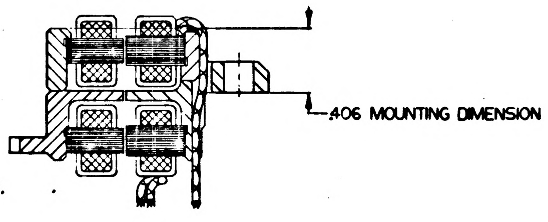
5. ITEM ② SHALL BE AT ELECTRICAL ZERO AS DEFINED BY PS1000031-1 WHEN CLAMPED TO ITEM ① WHEN ITEM ① IS AT ELECTRICAL ZERO AS DEFINED BY PS1000030 CLAMP WITH ITEMS ③ & ⑤ PER NOTE 2

CAUTION: DO NOT DISTURB ITEMS ③ & ⑤ AFTER ALIGNMENT

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



SECTION B-B

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
6	CLAMP, RESOLVER	1000094			5
AS REQD	ADH, GOODYEAR CPA 923 A		MIL-A-13883		4
6	SCR, BUT HD, SELF LOCK, SOC, SPL	1000250-13			3
1	RSVR, GYRO ERROR	1000031-1			2
1	RSVR, ONE SPEED XMTR	1000030			1

LIST OF PARTS AND MATERIALS

Ⓒ Ⓓ Ⓑ

NEXT ASSY	USED ON
	DL1000201
1000010	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	2-20-62
CHECKED		
DRAWN	L. MILLS	4-20-62

APPROVED FOR MSC W J Rhine 8-20-62
BY DIRECTION MIT APPROVED W J Hayden 9/20/62

RESOLVER ASSEMBLY,
ONE SPEED
TRANSMITTER AND
GYRO ERROR
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT
2-1	—	—

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000032

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000032 D

NASA DOCUMENT
~~ND~~ PS-1000032
28 December 1962
Class A Release
TDRR 00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

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This document does not supersede any existing publication or instructions.

W. Kaffer 28 Dec '62
MIT Instrumentation Laboratory Date

F.B. Michael 12/28/62
NASA/MSC Approval Date

NASA PROCUREM
SPEC NO. PS-100
28 December 196
Class A
TDRR

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

By [illegible]
APOLLO [illegible]

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment

This specification consists of page i [illegible] and 1 to 9 inclusive

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NASA PROCUREMENT
SPEC NO. PS-1000032

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR

[illegible] SPECIFICATION FOR

TABLE OF CONTENTS

Section	Title	Page
1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	2
4	QUALITY ASSURANCE PROVISIONS	3
5	PREPARATION FOR DELIVERY	5
6	NOTES	6

NASA PROCUREMENT
SPEC. NO. PS- 1000032
~~17 September 1962~~

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND GYRO ERROR

1. SCOPE

1.1 SCOPE This specification establishes the requirements for the procurement of the One Speed Transmitter and Gyro Error Resolver Assembly, hereinafter called resolver assembly.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Method of
MIL-S-901	Shockproof Equipment, Class HI (High-Impact) Shipboard Application, Tests for
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of

NASA

ND-1015404	Quality Control, Configuration Control, Process Control Requirements, Suppliers of High Reliability Articles for use in Spacecraft and Supporting Equipment.

STANDARDS

Military

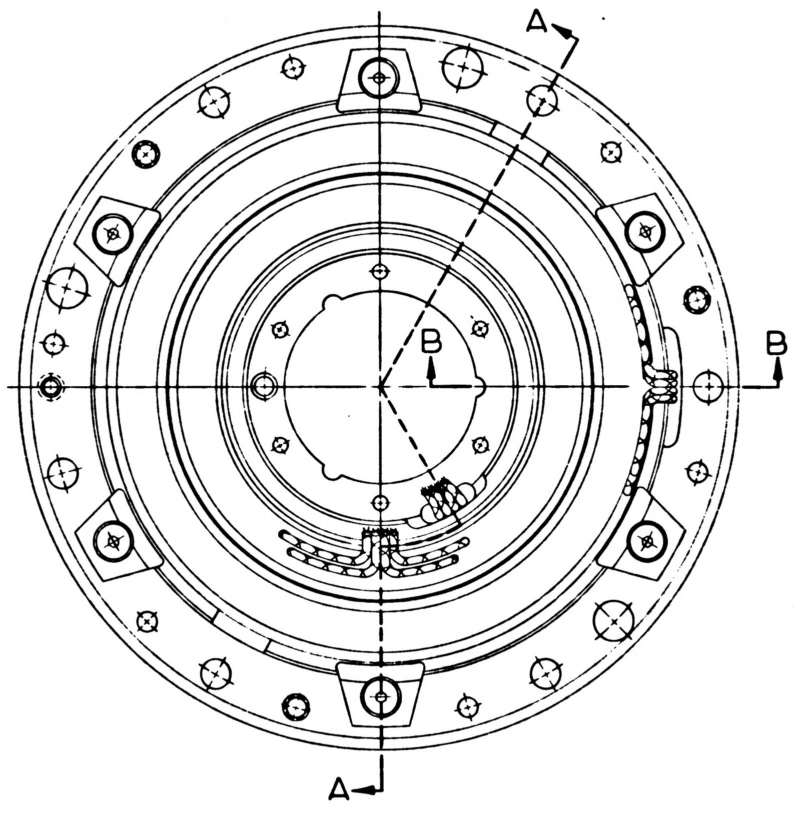
MIL-STD-167	Mechanical Vibrations of Shipboard Equipment
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts

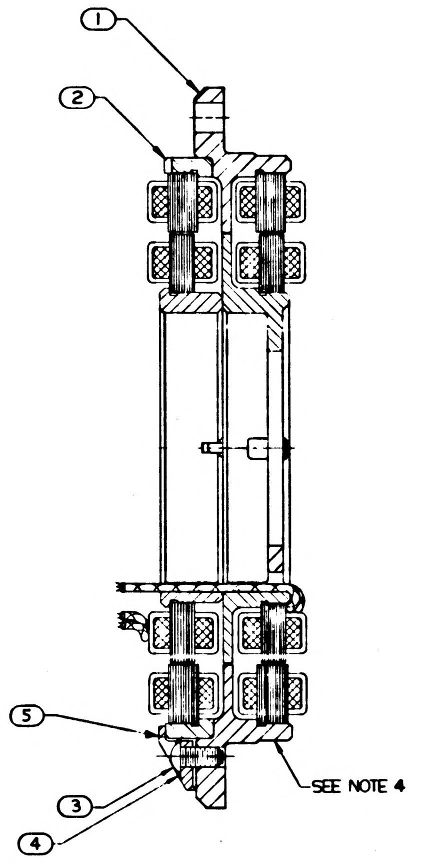
DRAWINGS

NASA

1000030	Resolver, One Speed Transmitter, Specification Control Drawing
1000031	Resolvers, Gyro Error & Pitch Yaw, Specification Control Drawing

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDR00028		
	A	GENERAL REVISIONS		ajb





SECTION A-A

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④
3. ASSEMBLY MUST CONFORM TO PS 1000033
4. IDENTIFY PER MIL-STD-130 AT INDICATED LOCATION AS FOLLOWS:

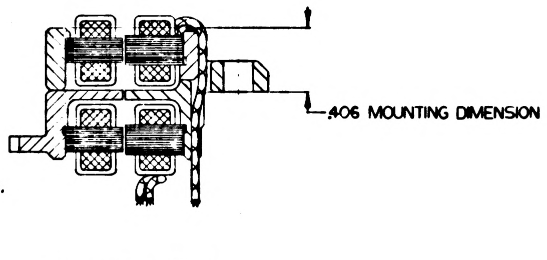
1000033	REV LETTER	SERIAL NO.	MFG SYMBOL
MATCHED	1000031-2	REV LETTER	SERIAL NO.
WITH	1000030	REV LETTER	SERIAL NO.

5. ITEM ② SHALL BE AT ELECTRICAL ZERO AS DEFINED BY PS 1000031-2 WHEN CLAMPED TO ITEM ① WHEN ITEM ① IS AT ELECTRICAL ZERO AS DEFINED BY PS 1000030 CLAMP WITH ITEMS ③ & ⑤ PER NOTE 2
CAUTION: DO NOT DISTURB ITEMS ③ & ⑤ AFTER ALIGNMENT

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



SECTION B-B

INCHES
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PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
6	CLAMP, RESOLVER	1000094			5
AS REQD	ADH, RUB. RESIN, SYN	FSN-12Z-30000-5			4
6	SCR, CAP, SOC, BUT. HD	1000093			3
1	RSVR, PITCH YAW	1000031-2			2
1	RSVR, ONE SPEED XMTR	1000030			1

LIST OF PARTS AND MATERIALS

10000	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	J Boyce	2-20-62
CHECKED		
DRAWN	L. MILLS	4-20-62
APPROVED FOR MSC	9-20-62	
BY DIRECTION MIT APPROVED	Walter Koupf	7/20/62

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH YAW SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000033
SHEET 1 OF 1

1000033 A

20 December 1962

PROCUREMENT SPECIFICATION

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW

Record of Revisions

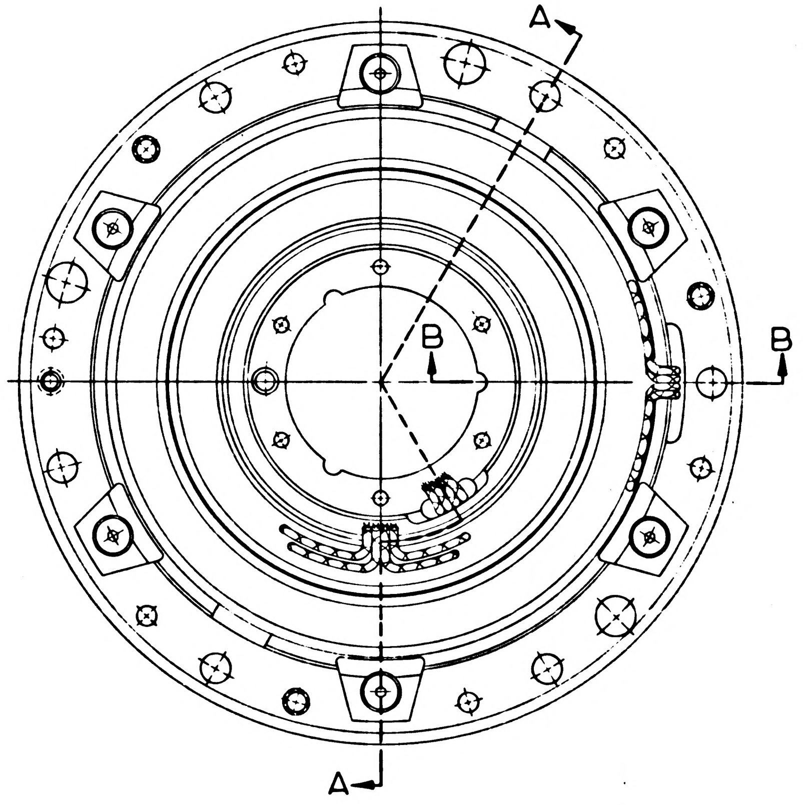
Revision Letter	TDRR	Pages Revised	Approvals	
			MIT	NASA
A	00840	Title page, 1 to 9, iiii eliminated, now 10 pages.	WAK 17 Apr 63	4/17/63

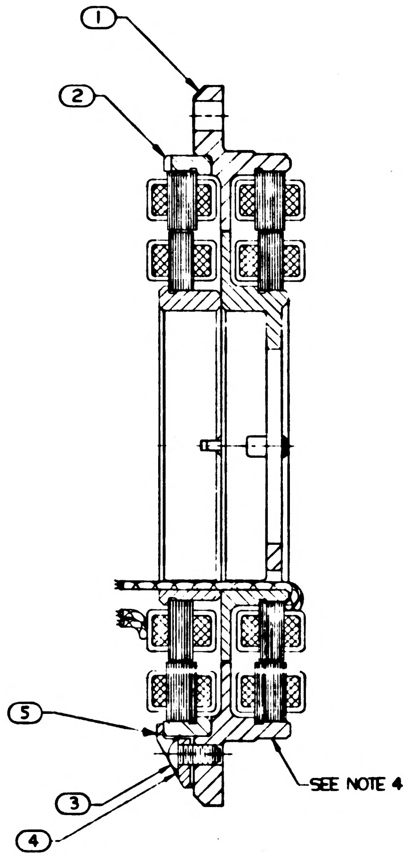
This specification consists of pages ii through iii and 1 to 10 inclusive.

Rev. A

REVISIONS TDRR00028

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS		
	B1	TDRR 00038	10-1-62	





SECTION A-A

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④
3. ASSEMBLY MUST CONFORM TO PS 1000033
4. IDENTIFY PER MIL-STD-130 AT INDICATED LOCATION AS FOLLOWS:

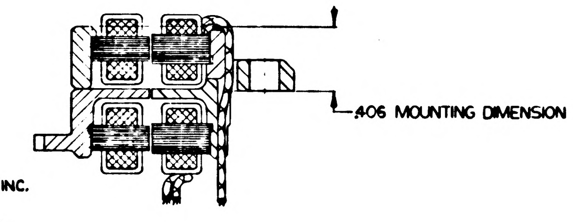
1000033	REV LETTER	SERIAL NO.	MFG SYMBOL
MATCHED	1000031-2	REV LETTER	SERIAL NO.
WITH	1000030	REV LETTER	SERIAL NO.

5. ITEM ② SHALL BE AT ELECTRICAL ZERO AS DEFINED BY PS 1000031-2 WHEN CLAMPED TO ITEM ① WHEN ITEM ① IS AT ELECTRICAL ZERO AS DEFINED BY PS 1000030 CLAMP WITH ITEMS ③ & ⑤ PER NOTE 2
CAUTION: DO NOT DISTURB ITEMS ③ & ⑤ AFTER ALIGNMENT

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



SECTION B-B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
6	CLAMP, RESOLVER	1000094			5
AS REQD	ADH, RUB. RESIN, SYN	FSN-12Z-30000-5			4
6	SCR, BUT, HD, SELF LOCK, SOC, HEX	1000093-13			3
1	RSVR, PITCH YAW	1000031-2			2
1	RSVR, ONE SPEED XMTR	1000030			1

Ⓑ

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
10000	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	J Boyce	2-21-62
CHECKED		
DRAWN	L. MILLS	2-20-62

APPROVED FOR MSC 9-20-62
BY DIRECTION MIT APPROVED
Walter Kupfer 1/20/62

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH YAW SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

MIT
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LABORATORY
CAMBRIDGE, MASS

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000033

SHEET 1 OF 1

1000033 B

[redacted] Apollo G&N Specification
PS-1000033
Class A Release
TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW

Record of Revisions

Revision Letter	TDRR	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00840	Title page, 1 to 9, iiii eliminated, now 10 pages.	WAK 17 Apr 63	4/17/63	
B	02417	All Pages	WK		12 AUG 63

This specification consists of pages i through iii and 1 to 10 inclusive.

NASA DOCUMENT
~~ND~~ PS-1000033
28 December 1962
Class A Release
TDRR 00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

MIT Instrumentation Laboratory ____ 28 Dec 62
Date

NASA/MSC Approval ____ 12/28/62
Date

PROCUREMENT SPECIFICATION
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Transmitter and Pitch-Yaw Resolver Assembly hereinafter called resolver assembly.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Method of
MIL-E-17555	Electronic and Electrical Equipme and Associated Repair Parts, Preparation for Delivery of

Apollo G&N

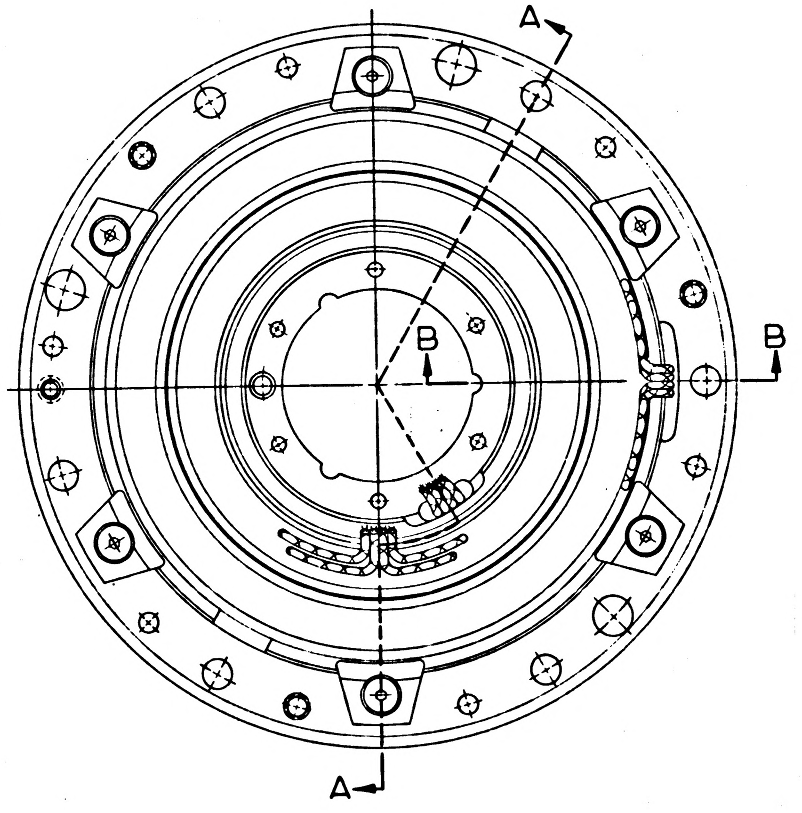
ND-1015404	General Specification, Configurat Process and Quality Control Requirements for Suppliers of Hig Reliability Articles for use in Spacecraft and Supporting Equipme

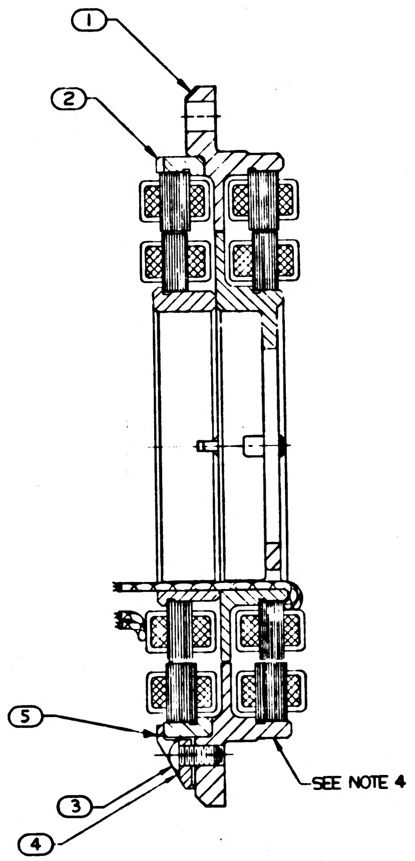
STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment.

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRO0028			
	A	GENERAL REVISIONS		ajb	wlk
	B1	TDRR 00038	10-1-62	ajb	
	C	TDRR 00358	2-12-63	ajb	wlk





SECTION A-A

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④
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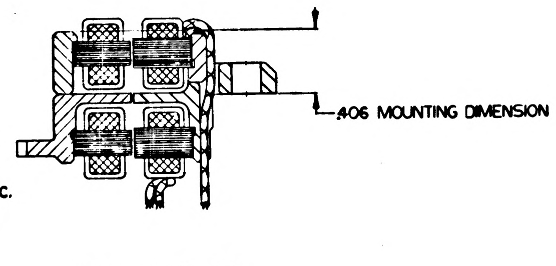
ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA



SECTION B-B

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
6	CLAMP, RESOLVER	1000094			5
AS REQD	ADH. GOODYEAR CPA 923 A		MIL-A-13883		4
6	SCR, BUT, HD, SELF LOCK, SOC, HEX	1000093-13			3
1	RSVR, PITCH YAW	1000031 2			2
1	RSVR, ONE SPEED XMTR	1000030			1

LIST OF PARTS AND MATERIALS

Ⓒ Ⓑ

Ⓒ MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
	DL1000201
10000	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	J Boyce	2-20-62
CHECKED		
DRAWN	L. MILLS	4-20-62

APPROVED FOR MSC 9-20-62
BY DIRECTION MIT APPROVED
Walter Hoyle 2/20/62

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH YAW SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000033
SHEET 1 OF 1

1000033 B

TDRR 00210
28 December 1962

PROCUREMENT SPECIFICATION

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW

Record of Revisions

Revision Letter	TDRR	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00840	Title page, 1 to 9, iiii eliminated, now 10 pages.	WAK 17 Apr. 63	4/17/63	
B	02417	All Pages	WK		12 AUG 63
C	03977	3	WK	WSS	23 Oct 63

This specification consists of pages i through iii and 1 to 10 inclusive.

Rev. B

NASA DOCUMENT
~~ND~~ FS-[illegible]
28 December 1962
Class A Release

TD[illegible]

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components, the construction specifications, and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

28 Dec 62
MIT Instrumentation Laboratory — Date

12/28/62
NASA/MSC Approval — Date

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

EXAMINED AND APPROVED

[illegible]   12/28/62
APPROVED BY   TITLE   DATE

APPROVED BY   TITLE   DATE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Robert J Therrien   Staff Member   28 December 1962
EXAMINED BY   TITLE   DATE

[illegible] Miller   Director [illegible]   28 December 1962
APPROVED BY   TITLE   DATE

David G Hoag   Tech Dir   28 Dec 62
APPROVED BY   TITLE   DATE

AC SPARK PLUG DIVISION, GENERAL MOTORS CORPORATION

Henry [illegible]   Sr. Specification Writer   12/28/62
PREPARED BY   TITLE   DATE

A J [illegible]   28 DEC 1962
ACCEPTED BY   TITLE   DATE

PROCUREMENT SPECIFICATION

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the One Speed Transmitter and Pitch-Yaw Resolver Assembly hereinafter called resolver assembly.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Method of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of

Apollo G&N

ND-1015404	General Specification, Configuration, Process and Quality Control Requirements for Suppliers of High Reliability Articles for use in Spacecraft and Supporting Equipment

STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment.

DRAWINGS

Apollo G&N

1000030	Resolver, One Speed Transmitter Specification Control Drawing.
1000031	Resolver, Gyro Error and Pitch-Yaw, Specification Control Drawing
1000033	Resolver Assembly, One Speed Transmitter and Pitch-Yaw, Specification Control Drawing.

3. REQUIREMENTS

3.1 GENERAL

3.1.1 Prior compliance. The subassemblies comprising the resolver assembly under test shall have met the requirements of their applicable test specifications prior to testing of the resolver assembly.

3.1.2 Qualification Sample. When specified by the procuring activity, representative samples of the resolver assembly shall be manufactured using the methods and procedures proposed for the production lot. These shall be submitted to the NASA inspector for qualification tests at an activity designated in the contract or by the procuring activity.

These qualification tests are conducted to determine whether or not the resolver assemblies are being produced in compliance with the requirements of the contract, specifications, and drawings. Further production of the item by the contractor prior to approval of the procuring activity or the completion of the qualification tests shall be at the contractor's risk. The qualification tests shall be conducted in accordance with the procedures specified in Section 4.

3.1.3 Requalification Samples. When specified by the procuring activity, the contractor shall submit one or more resolver assemblies to a designated testing activity to determine compliance of the sample (s) with the requirements of the contract, specifications, and drawings. The resolver assemblies constituting the sample shall be selected from production lots by the procuring activity.

3.1.4 Electrical. The resolver assembly shall meet the following electrical requirements. All requirements specified herein shall apply to the resolver assemblies covered by this specification.

3.1.4.1 Coincidence of Electrical Zero. When tested in accordance with 4.2.2.3, the ~~pitch yaw~~ resolver shall be within ±3 minutes of electrical zero.

3.1.4.2 Cross Coupling. With the unit tested in accordance with 4.2.2.4, the measured voltage shall not exceed 10 millivolts total.

3.1.5 Qualification The resolver assembly shall meet the following qualification requirements.

3.1.5.1 Vibration, Operating, Condition. The resolver assemblies shall withstand the vibration requirements specified in 4.2.3.3.

3.1.5.1.1 Angular Deviation With the resolver assembly tested as specified, the angular deviation shall not exceed ±0.5 minute.

3.1.5.2 Shock, Operating Condition The resolver assemblies shall withstand the shock requirements specified in 4.2.3.4.

3.1.5.2.1 Angular Deviation With the resolver assembly tested as specified, the angular deviation shall not exceed ±0.5 minutes.

3.1.5.3 Humidity, Operating Condition The resolver assemblies shall exhibit the capabilities of performing as specified herein, with no damage or evidence of rust, blistering, varnish, condensates or corrosion when tested in accordance with the requirements of 4.2.3.5.

3.1.5.3.1 Cross Coupling With the resolver assembly tested as specified, the cross coupling shall be as indicated in 3.1.4.2.

3.1.5.4 Temperature.

3.1.5.4.1 Low. The resolver assembly shall be subjected to the temperature condition specified in 4.2.3.6.1 and upon completion, shall successfully meet the requirements of 3.1.4.

3.1.5.4.2 High. The resolver assembly shall be subjected to the temperature condition speeified in 4.2.3.6.2 and upon completion, shall successfully meet the requirements of 3.1.4.

3.2 DETAIL Additional detail requirements or exceptions applicable to the resolver assemblies are specified on the NASA drawing.. All resolver assemblies procured under this specification shall meet the requirements of the applicable NASA drawing.

3.3 PERFORMANCE AND PRODUCT CHARACTERISTICS. The following requirements are stated to inform the supplier of the goals that were considered in the design. Inclusion of this information shall not be construed by the supplier as authorization to modify the design.

If the design of any part is not completely specified by the contractual documents, the supplier may submit a suggested design document for approval which will support these requirements.

If, in the opinion of the contractor, any design or testing shall impose undue time delay or expense, he shall so state, in detail, in a counterproposal, substantiating all contributing factors when submitting a bid, proposal, or change request in connection with this specification.

Requests for changes or deviations to this specification or to applicable drawings, specifications, publications, materials, or processes specified herein shall be accompanied by written justification.

3.3.1 Design.

3.3.1.1 Reliability Design objectives require maximum reliability of these resolver assemblies during their periods of useful life. Every effort shall be made to design and produce units capable of meeting a maximum failure rate of 5 per 1,000,000 hours.

3.3.1.2 Workmanship The fabrication and finish of the resolver assemblies and parts shall be such as to produce units free from any defect that would affect proper functioning in service. Particular care and attention shall be paid to neatness and thoroughness of soldering, wiring, marking of parts and assemblies, and freedom of parts from burrs and sharp edges.

3.3.2 Parts and Materials. The parts and materials used in fabricating the resolver assemblies shall be in strict accordance with the applicable drawings and specifications referenced herein. Substitute materials shall be selected with such quality as to ensure that the equipment will meet the requirements of this specification and shall be subject to prior approval of the procuring activity.

3.3.2.1 Flammable Materials. Materials which may be ignited or cause an explosion shall not be used for construction applications where sparking or arcing could cause ignition. Materials which may inadvertently support combustion shall not be used. Flammable impregnating, potting, or embedding compounds, when enclosed in fire-resistant containers, shall be acceptable.

3.3.2.2 Toxic Materials. Materials which produce harmful toxic effects during service usage shall not be used. Where a suitable nontoxic material is not available, preventive measures shall be provided, subject to the approval of NASA. Materials which, when ignited, produce toxic substances or vapors shall be avoided whenever practicable.

3.3.2.3 Unstable Materials. Materials which are unstable or become unstable to the extent that they emit or deposit corrosive substances capable of causing corrosion or producing electrical leakage paths within an assembly under possible operating and storage conditions shall not be used during manufacture or recommended for use during maintenance.

3.3.2.4 Corrosion, Moisture, and Fungus-Resistant Materials. Materials shall be selected for noncorrosive and nonhygroscopic characteristics and ability to resist the effects of corrosion, moisture and fungus. Preference shall be given to materials with inherent fungus resistance rather than reliance upon the application of surface fungistatic or fungicidal treatments.

3.3.2.5 Dissimilar Metals. The use of dissimilar metals shall be avoided whenever practicable. Magnesium shall not be used except with the prior approval of the procuring agency or when so called for on the applicable drawings.

3.3.3 Radio Interference Suppression. The suppression of radio noise and interference shall be considered in the design of the resolver assemblies.

3.3.4 Shelf Life. The resolver assembly shall have a shelf life of at least 5 years, without operation, at ambient room temperature, after final acceptance at the vender's plant.

4. QUALITY ASSURANCE PROVISIONS

4.1 **GENERAL** Unless otherwise specified herein, the supplier is responsible for the performance of all inspection requirements prior to submission for NASA inspection and acceptance. Unless otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to NASA. Inspection records of the examinations and tests shall be kept complete and available to NASA as specified in the contract or order. The supplier shall conform to the quality assurance provisions in Specification MD-1015404, Class 1.

4.2 TESTS

4.2.1 **TEST CONDITIONS** Unless otherwise specified herein, the resolver assemblies shall be subjected to the tests under the following conditions:

a. Temperature	25° ±10°C
b. Relative humidity	Not more than 90%
c. Barometric pressure	28 to 30 inches Hg

4.2.2 **DESCRIPTION OF TESTS** The inspection and testing of the resolver assembly shall be classified as follows:

4.2.2.1 Acceptance Tests. Each resolver assembly being submitted for acceptance under the contract shall be tested by the supplier as stated below. Only those resolver assemblies meeting all of these requirements shall be considered acceptable. Those failing must be rejected. Acceptance test data on each unit accepted must accompany shipment to the purchaser. Acceptance tests shall be witnessed by the cognizant government inspector, a representative of the purchaser, or as the purchaser may direct in the procurement order.

4.2.2.2 Visual and Mechanical Inspection A comprehensive inspection shall be made of the resolver assembly to determine the extent of compliance with the requirements of this specification and drawing 1000033 and shall at least include determination of the following:

a) Size, dimension, tolerances, weight, appearance and markings.

b) Adequacy of materials, parts, and subassemblies; compliance with specific ratings, and conformance to applicable specifications.

c) Finish, coatings, construction, markings, and nameplates as applicable.

d) Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.

e) Workmanship and cleanup

4.2.2.3 Coincidence of Electrical Zero With the locating dowel pins aligned as specified on drawing 1000030, the pitch-yaw resolver shall be within +3 minutes of electrical zero as specified on drawing 1000031. The electrical zero of the pitch-yaw resolver shall be determined with the specified loads and rated test voltage to both resolvers. Each resolver shall be excited with P3 high, P1 low and the P2-P4 windings shorted and ungrounded.

4.2.2.4 Cross Coupling. With the single speed transmitter excited at 28 volts ±2 percent, 800 cps +0.5 percent on a single input winding and the primary windings of the pitch-yaw resolver shorted P2 (Yel) to P4 (Blu), and P1 (Red) to P3 (Blk), the maximum voltage measured at either output phase of the pitch-yaw resolver shall not exceed 10 millivolts total. The single speed resolver shall be excited with black high, red grounded and the yellow and blue primary windings commoned and ungrounded.

4.2.3 Qualification Tests. Qualification tests shall be accomplished by the supplier or other activity pursuant to the recommendations of NASA or the purchaser. Initial qualification tests will be conducted after the award of the contract to determine that the production will meet the requirements of this specification. Failure of the resolver assembly to meet these requirements may result in disqualification of the supplier as determined by NASA or the purchaser. Requalification will be required at the discretion of NASA or the purchaser in the event that (a) the supplier has modified the item; (b) the supplier has instituted a change in the materials used or in his processing and (c) the specification requirements for the item have been amended or revised sufficiently to affect the character of the item.

4.2.3.1 Samples Not less than 5 samples shall be submitted for initial qualification of this item. One or more specimens may be adequate for requalification tests as determined by NASA or the purchaser. Specimens submitted for these tests shall have been produced under conditions representative of the supplier's normal production and shall have passed the acceptance tests listed above.

4.2.3.2 Initial Conditions. During the qualification tests, the locating dowel pins shall be aligned as specified on drawing 1000030. The individual resolvers shall be energized at rated test voltage and frequency and the output windings connected to their respective loads as specified in the individual detail specifications.

4.2.3.3 Vibration, Operating Condition. With the resolver assembly mounted in a suitable test fixture, it shall be subjected to the following vibration requirements: 20g (0 to peak) 5 to 2000 to 5 cps at 1 min/oct, logarithmic sweep once along each of three orthgonal axes, 0.12 inch maximum amplitude. Throughout these tests, both resolvers shall be locked at the position defined in 4.2.3.2 and the pitch-yaw resolver monitored with a resolver bridge and null meter. During and after the test, the angular deviation shall not exceed ±0.5 minute. The angle of the resolver may be reset each time the fixture is remounted to vibrate on another axis.

4.2.3.4 Shock, Operating Condition. With the resolver assembly mounted in a suitable test fixture, it shall be subjected to two shock pulses along each axis in each direction. The shock pulses shall have a

50g, minimum, 6 msec sawtooth wave shape. Throughout these tests, both resolvers shall be locked at the position defined in 4.2.3.2 and the pitch-yaw resolver monitored with a resolver bridge and null meter to indicate any deviations in electrical angle. Angular deviation shall not exceed ± 0.5 minute.

4.2.3.5 Humidity, Operating Condition. The resolver assembly shall be subjected to the humidity conditions of Standard MIL-STD-810, method 507, for five cycles only. During and after this test the resolver assembly shall be checked according to 4.2.2.4 and shall meet the requirements specified therein.

4.2.3.6 Temperature.

4.2.3.6.1 Low. The resolver assembly shall be maintained at a temperature of 0° ± 3°C for 48 hours at nonoperating conditions. Upon completion of the test, the unit shall successfully meet the acceptance test requirements.

4.2.3.6.2 High. The resolver assembly shall be maintained at a temperature of 93° ± 3°C for 48 hours at nonoperating conditions. Upon completion of the test, the unit shall meet the acceptance test requirements.

4.2.3.7 Disposition of Samples. Samples used in test shall not be shipped to the purchaser in compliance with a procurement order.

4.2.3.8 Reliability. The reliability requirements contained in Section 3 of this specification are design objectives. Unless specifically called for in the procurement contract, it shall not be necessary for the supplier to demonstrate his compliance with requirement. The supplier will furnish the purchaser or NASA such data as he may have available for establishing the current reliability of these units. Additional data shall be accumulated to as great a degree as possible from the tests specified herein or any other tests the supplier may conduct which will tend to support or verify attainment of the reliability objectives specified.

5. PREPARATION FOR DELIVERY

5.1 PRESERVATION AND PACKAGING. The resolver assembly shall be preserved and packaged in accordance with Specification MIL-E-17555, level B, as specified in the contract or purchase order.

5.1.1 Unit Protection. The resolver assembly shall be individually afforded unit protection in accordance with method III of Specification MIL-P-116. In addition, equipment packaged for level B protection shall be sealed against water and dust by means of suitable wrapping.

5.1.2 Vibration and Shock, Shipping Condition. Equipment packaging for shipment shall provide adequate protection from all anticipated shipping environments.

5.2 **MARKING.** In addition to any special marking required by the contractor or order, the marking of unit, interior packages, and exterior shipping containers shall be in accordance with level B of Specification MIL-E-17555.

6. NOTES

6.1 Terminology

6.1.1 Environmental Terms. Terms and descriptions applicable to the environmental requirements of this specification are set forth in Standard MIL-STD-202.

6.2 DEFINITIONS

6.2.1 Direction of Rotation The direction of rotation is viewed from the shaft extension end of the resolvers or of the mounting end in the case where no shaft extension exists.

6.2.2 Angular Position The angular position of the resolver is the angular displacement of its secondary about the axis of the secondary from the resolver's zero position measured as an increasing positive angle in the counterclockwise direction.

6.2.3 Resolver or Electrical Zero Resolver or electrical zero is defined as the position of the secondary produced under the following conditions:

That position of the secondary for which windings (P1-P3) and (S2-S4) experience minimum coupling (null) and for which established vector convention is in accordance with figure 1 and the equations specified herein for positive (ccw) rotation.

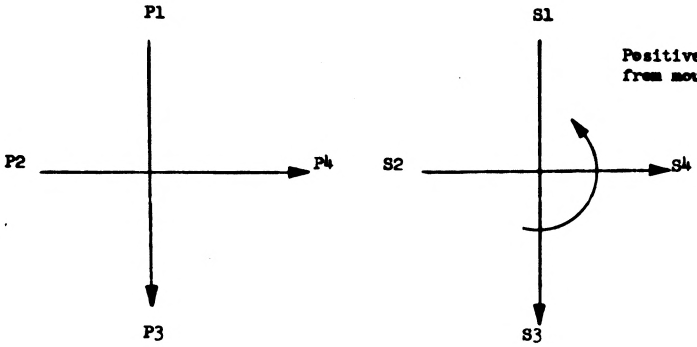
Resolver Equations

$$E(S1-S3) = KE\ (P1-P3)\cos\theta + KE\ (P2-P4)\sin\theta$$

$$E(S2-S4) = KE\ (P2-P4)\cos\theta - KE\ (P1-P3)\sin\theta$$

6.2.4 Total Null Voltage. The total null voltage is the minimum secondary voltage including harmonics.

NOTICE: When Apollo G&N drawings, specifications, or other data are used for any purpose other than in connection with a definitely related NASA procurement operation, NASA thereby incurs no responsibility nor any obligation whatsoever, and the fact that NASA may have formulated, furnished, or in any way supplied the said drawings, specifications or any other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related therein.

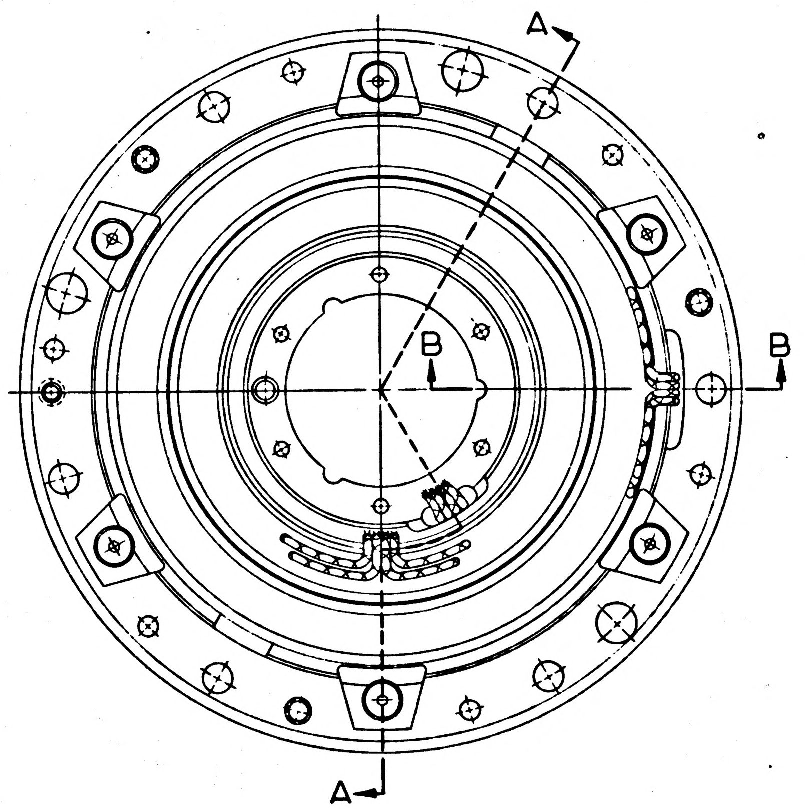

P1
P2
P4
P3
S1
S2
S4
S3

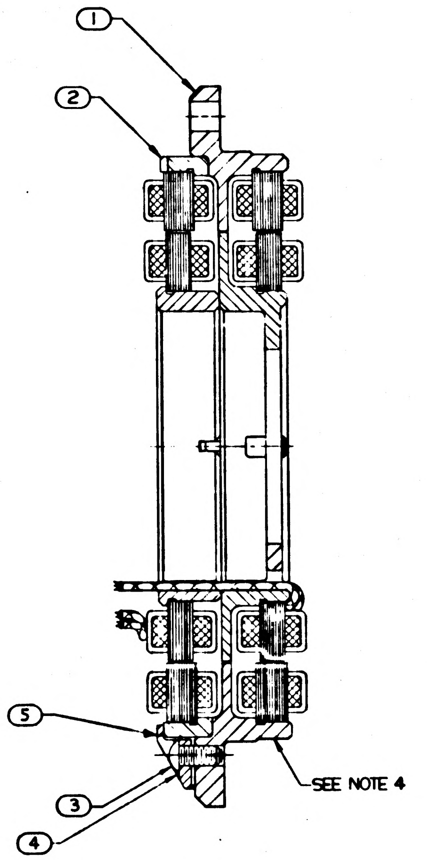
Positive θ as viewed from mounting end.

Established Vector Convention

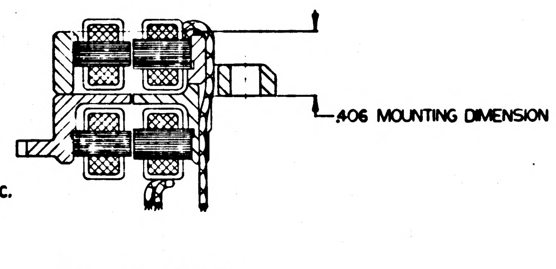
Figure 1

REVISIONS TDRC0028				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS		ajB wk
	B1	TDRR 00038	10-1-62	ajB wk
	C	TDRR 00358	2-12-63	ajB wk
	D	TDRR 01674	6-9-63	ajB wk





SECTION A-A



SECTION B-B

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE ITEM ② TO ITEM ① WITH ITEMS ③ & ⑤ PER NOTE 5 TORQUE TO BE $\frac{5.0}{5.5}$ INCH LBS. AND BOND USING ITEM ④
3. ASSEMBLY MUST CONFORM TO PS 1000033
4. IDENTIFY PER MIL-STD-130 AT INDICATED LOCATION AS FOLLOWS:

1000033	REV LETTER	SERIAL NO.	MFG SYMBOL
MATCHED	1000031-2	REV LETTER	SERIAL NO.
WITH	1000030	REV LETTER	SERIAL NO.

5. ITEM ② SHALL BE AT ELECTRICAL ZERO AS DEFINED BY PS 1000031-2 WHEN CLAMPED TO ITEM ① WHEN ITEM ① IS AT ELECTRICAL ZERO AS DEFINED BY PS 1000030 CLAMP WITH ITEMS ③ & ⑤ PER NOTE 2 CAUTION: DO NOT DISTURB ITEMS ③ & ⑤ AFTER ALIGNMENT

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY

CLIFTON PRECISION PRODUCTS CO. INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA

Ⓒ Ⓑ Ⓓ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
6	CLAMP, RESOLVER	1000094			5
AS REQD	ADH. GOODYEAR [illegible] 923A		MIL-A-13883		4
6	SCR, BUT, HD, SELF LOCK, SOC, SPL	1000250-13			3
1	RSVR, PITCH YAW	1000031 2			2
1	RSVR, ONE SPEED XMTR	1000030			1

LIST OF PARTS AND MATERIALS

Ⓒ MASTER

	DLIC00201
10000[illegible]	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED J Boyce 7-2[illegible]
CHECKED
DRAWN L. MILLS 4-20-62
APPROVED FOR MSC 9-20-62
BY DIRECTION MIT APPROVED 7/20/62

RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH YAW SPECIFICATION CONTROL DWG

SCALE 2-1
UNIT WT. —
CODE IDENT. —

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000033
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000033

NASA DOCUMENT
~~XD~~ PS-1000033
28 December 1962
Class A Release
TDRR 00210

This document has been prepared for the purchase of material used in the manufacture of components, the performance requirements and tolerance of the components, the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

28 Dec 62
MIT Instrumentation Laboratory Date

12/20/62
NASA/MSC Approval Date

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DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment

This specification consists of page i to [illegible] and 1 to 9 inclusive.

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW

TABLE OF CONTENTS

Section	Title	Page
1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	2
4	QUALITY ASSURANCE PROVISIONS	4
5	PREPARATION FOR DELIVERY	6
6	NOTES	7

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
RESOLVER ASSEMBLY, ONE SPEED TRANSMITTER AND PITCH-YAW

1. SCOPE

1.1 SCOPE This specification establishes the requirements for the procurement of the One-Speed Transmitter and Pitch-Yaw Resolver Assembly hereinafter called resolver assembly.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS	
Military	
MIL-P-116	Preservation, Method of
MIL-S-901	Shockproof Equipment, Class Hi (High-Impact) Shipboard Application, Tests for
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of
NASA	
ND-1015404	Quality Control, Configuration Control, Process Control Requirements, Suppliers of High Reliability Articles for use in Spacecraft and Supporting Equipment.
STANDARDS	
Military	
MIL-STD-167	Mechanical Vibrations of Shipboard Equipment
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
DRAWINGS	
NASA	
1000030	Resolver, One Speed Transmitter Specification Control Drawing
1000031	Resolvers, Gyro Error & Pitch-Yaw, Specification Control Drawing
1000033	Resolver Assembly, One Speed Transmitter and Pitch-Yaw, Specification Control Drawing

APPLICATION	
NEXT ASSY	USED ON
1000202	DL1000201

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED COND. LENGTHS TDRR 03011	10-1-63	WSK.

REV STATUS OF SHEETS	REV	A	–	–	A	A
	SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL:

		DATE
APPROVED	A. E. Winder	7-16-63
CHECKED	WINBERG	6-10-63
DRAWN	THENO	6-7-63
APPROVED FOR MSC		7/17/63
BY DIRECTION		17 Jul 63

WIRING HARNESS "B"
OUTER AXIS

SCALE
REVISION A

DWG NO.
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NASA DRAWING NO. 1000034
SHEET 1 OF 5

TDRR 01980

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION		TOTAL LENGTH
1	1	MIL-W-16878 E28	Wire, 28AWG	RED	3 ft 2.50 inch
2	1	↓	↓	BRN	1 ft 6.00 inch
3	1	↓	↓	GY	2 ft 9.75 inch
4	1	↓	↓	VIO	5.00 inch
5	1	1000222	Connector-Plug (J26)		
6	7	1006776-18	Insulation, Sleeving 5/16 long		
7	AR	QQ-S-571 (SN60 WARP2)	Solder		
8	AR	MIL-T-713 Type P	Twine, Nylon, Waxes		

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SHEET 2 of 5

TDRR 01980

NOTES

1. Twisted conductors are to consist of 4 full turns per inch.
2. Conductors with the same number are twisted together.
3. "Y" or "N" in tinned column indicates yes or no
4. Dimensions are in inches & 2 place decimals
5. Interpret drawing in accordance with MIL-D-70327
6. Solder per MIL-STD-440 using item 9
7. Lace cable using item 19
8. Mark characters on connector $\overset{.10}{.14}$ high, color black per ND 1002019 at location shown
9. Lengths in conductor chart are for reference only.

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SHEET 3 of 5

TDRR 01980

CONDUCTOR				FROM							TO					
FIND NUMBER	NO.	INDIVIDUAL LENGTH		CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			T/N	TERMINATION SPEC FIND NO.		NO.	CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			T/N	TERMINATION SPEC FIND NO.	NO.
B1	1	6	00	J26	A	10	Y		6	1	A21	5	13	Y		25
B2	2	4	62	J26	B	10	Y		6	1	R5		13	Y		22
B3	1	4	75	A21	5	13	Y			24	A22	5	13	Y		6
B4	2	4	00	A21	6	13	Y			26	R5		13	Y		23
B5	1	7	62	A22	2	13	Y			3	A21	1	13	Y		14
B6	1	5	25	J26	D	10	Y		6	1	A21	2	13	Y		15
B7	1	4	62	J26	E	10	Y		6	1	A22	1	13	Y		2
B8	1	2	50	A22	3	13	Y			4	A22	4	13	Y		5
B9	3	4	75	J26	H	10	Y		6	1	E19		13	Y		20
B10	3	3	37	E19		13	Y			19	E21		13	Y		12
B11	3	4	87	E20		13	Y			18	A21	7	13	Y		27
B12	3	3	25	E22		13	Y			13	A22	7	13	Y		8
B13	3	7	00	J26	J	10	Y		6	1	A21	6	13	Y		28
B14	4	4	57	J26	K	10	Y		6	1	E18		13	Y		29
B15	2	3	37	A22	6	13	Y			7	R6		13	Y		10
B16	1	2	75	A21	4	13	Y			17	A21	3	13	Y		16
B17	2	4	12	R5		13	Y			21	R6		13	Y		11
B18	3	6	37	A22	8	13	Y			9	E16		13	Y		30

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SHEET 4 of 5

INCHES
0 1 2
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4 3 2 1

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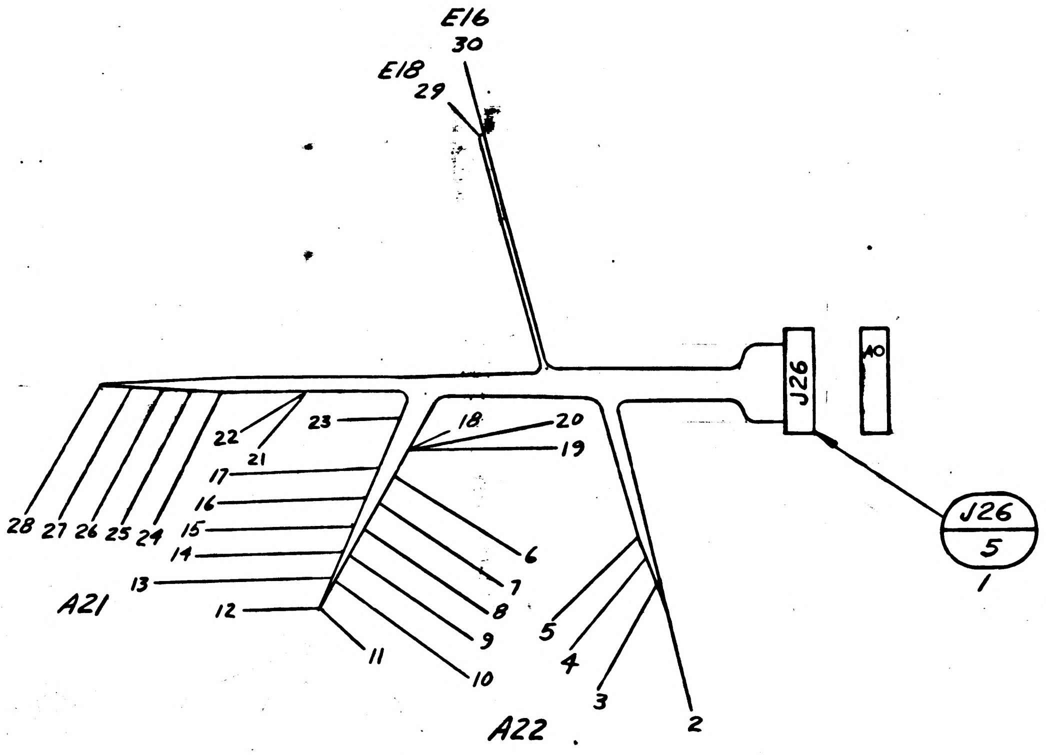
1000034 (M)

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED CONDUCTOR LENGTHS TDRR 03011	10-1-63	WK



THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1000202	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN THENO DATE 6-7-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL A J Boyce 7/17/63
NASA APPROVAL 7/17/63
MIT APPROVAL W Kupfer 17 July 63

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HOUSTON, TEXAS

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OUTER AXIS

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000034
SCALE 1-1
WT
SHEET 5 OF 5

MASTER

4 3 2 1

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0 1 2
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TDRR 01980

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED COND. LENGTHS TDRR 03011	10-7-63	WSK
B	TDRR 04294	11-6-63	WK

APPLICATION

NEXT ASSY	USED ON
1000202	DL1000201

REV STATUS OF SHEETS					
REV	B	B	B	B	A
SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES

MATERIAL:

APPROVED [illegible] 7-16-63
CHECKED [illegible] 6-16-63
DRAWN [illegible] 6-7-63
APPROVED FOR MSC [illegible] 9/17/63
BY DIRECTION [illegible] 17 [illegible]

WIRING HARNESS "B"
OUTER AXIS

SCALE
REVISION B

DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000034
SHEET 1 OF 5

TDRR 01980

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION	TOTAL LENGTH
1	1	MIL-W-16878 E28	Wire, 28AWG RED	3 ft 6.50 inch
2	1	↓	↓ BRN	1 ft 2.00 inch
3	1	↓	↓ GY	2 ft 9.75 inch
4	1	↓	↓ VIO	5.00 inch
5	1	1000222	Connector-Plug (J26)	
6	7	1006776-18	Insulation, Sleeving 5/16 long	
7	AR	QQ-S-571 (SN60 WARP2)	Solder	
8	AR	MIL-T-713 Type P CLASS 2 BLACK	TAPE, Nylon, Waxes	

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REVISION B
NASA DRAWING NO. 1000034
SHEET 2 of 5

TDRR 01980

NOTES

1. Twisted conductors are to consist of 4 full turns per inch MINIMUM
2. Conductors with the same number are twisted together.
3. "Y" or "N" in tinned column indicates yes or no
4. Dimensions are in inches & 2 place decimals
5. Interpret drawing in accordance with MIL-D-70327
6. Solder per MIL-STD-440 using item 7
7. Lace cable using item 8
8. Mark characters on connector ~~.14~~ .10 high, color black per MD 1002019 at location shown
9. Lengths in conductor chart are for reference only.

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REVISION B
NASA DRAWING NO. 1000034
SHEET 3 of 5

TDRR 01980

CONDUCTOR			FROM					TO				
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT		Y/N	TERMINATION SPEC FIND NO.	NO.	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT		Y/N	TERMINATION SPEC FIND NO.	NO.
B1	2	6.00	J26 A	10	Y	6	1	R5	13	Y		22
B2	1	4.62	J26 B	10	Y	6	1	A21 5	13	Y		25
B3	2	4.75	A21 5	13	Y		24	A22 5	13	Y		6
B4	1	4.00	A21 6	13	Y		26	R5	13	Y		23
B5	1	7.62	A22 2	13	Y		3	A21 1	13	Y		14
B6	1	5.25	J26 D	10	Y	6	1	A21 2	13	Y		15
B7	1	4.62	J26 E	10	Y	6	1	A22 1	13	Y		2
B8	1	2.50	A22 3	13	Y		4	A22 4	13	Y		5
B9	3	4.75	J26 H	10	Y	6	1	E19	13	Y		20
B10	3	3.37	E19	13	Y		19	E21	13	Y		12
B11	3	4.87	E20	13	Y		18	A21 7	13	Y		27
B12	3	3.25	E22	13	Y		13	A22 7	13	Y		8
B13	3	7.00	J26 J	10	Y	6	1	A21 8	13	Y		28
B14	4	4.37	J26 K	10	Y	6	1	E18	13	Y		29
B15	1	3.37	A22 6	13	Y		7	R6	13	Y		10
B16	1	2.75	A21 4	13	Y		17	A21 3	13	Y		16
B17	1	4.12	R5	13	Y		21	R6	13	Y		11
B18	3	6.37	A22 8	13	Y		9	E16	13	Y		30

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NASA DRAWING NO. 1000034
SHEET 4 of 5

INCHES
0 1 2
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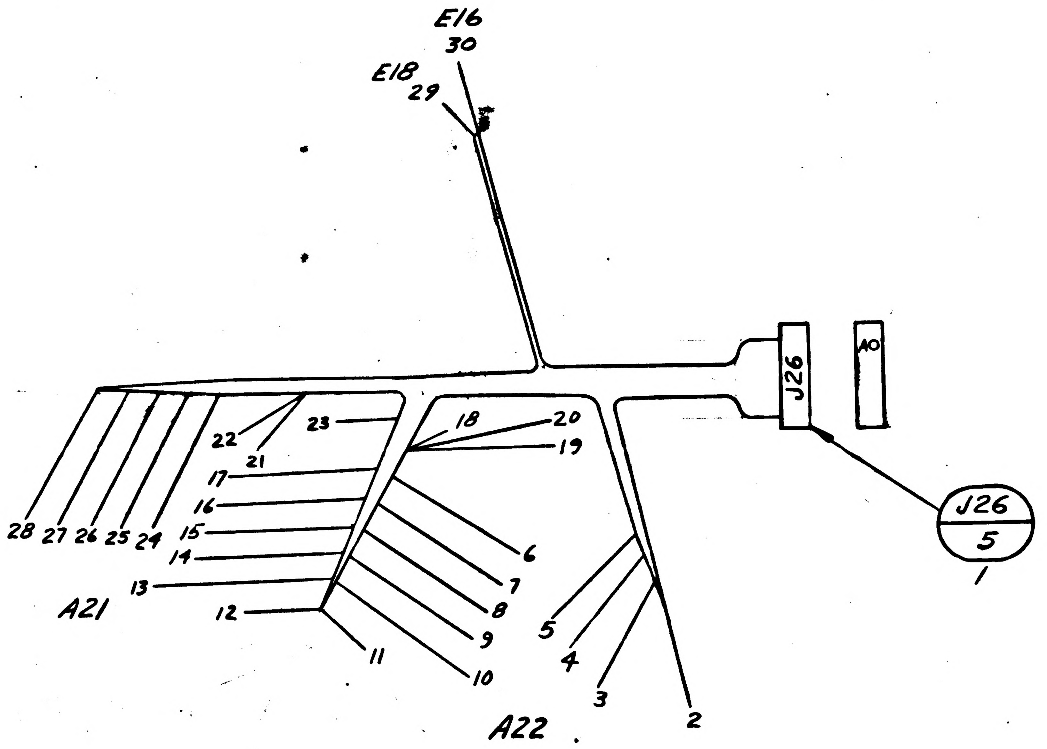
1000034

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED CONDUCTOR LENGTHS TDRR 03011	10-1-63	WK



THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT

DRAWN THENO DATE 6-7-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL A J Boyce 7/17/63
NASA APPROVAL 7/17/63
MIT APPROVAL W Kupfer 17 July 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "B"
OUTER AXIS

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000034
SCALE 1-1
WT
SHEET 5 OF 5

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

APPLICATION	
NEXT ASSY	USED ON
1000202	DL1000201

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED COND. LENGTHS TDRR 03011	10-1-63	WSK
B	TDRR 04294	11-6-63	WK
C	REVISED PER TDRR 11888	1 SEP 64	JWP EF

REV STATUS OF SHEETS					
REV	C	C	B	C	C
SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL:

		DATE
APPROVED	[illegible]	7-16-63
CHECKED	WINBERG	6-10-63
DRAWN	[illegible]	6-7-63

APPROVED FOR MSC [illegible] 7/17/63
BY DIRECTION

WIRING HARNESS "B"
OUTER AXIS

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000034
SCALE
REVISION C
SHEET 1 OF 5

TDRR 01980

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION	TOTAL LENGTH
1	1	MIL-W-16878 E28	Wire, 28AWG RED	3 ft ~~[illegible]~~ inch
2	1	→	→ BRN	9.00 ~~[illegible]~~ inch
3	1	→	→ GY	2 ft 4.00 ~~[illegible]~~ inch
4	1	→	→ VIO	5.06 ~~[illegible]~~ inch
5	1	1000222	Connector-Plug (J26)	
6	7	1006776-18	Insulation, Sleeving 5/16 long	
7	AR	QQ-S-571 (SN60 WARP2)	Solder	
8	AR	MIL-T-713 Type P CLASS 2 BLACK	TAPE, Nylon, Waxes	

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REVISION C

NASA DRAWING NO. 1000034
SHEET 2 of 5

TDRR 01980

NOTES

1. Twisted conductors are to consist of 4 full turns per inch MINIMUM
2. Conductors with the same number are twisted together.
3. "Y" or "N" in tinned column indicates yes or no
4. Dimensions are in inches & 2 place decimals
5. Interpret drawing in accordance with MIL-D-70327
6. Solder per MIL-STD-440 using item 7
7. Lace cable using item 8

8. Mark characters on connector $\overset{.10}{.14}$ high, color black per ND 1002019 at location shown

9. Lengths in conductor chart are for reference only.

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REVISION B

NASA DRAWING NO. 1000034
SHEET 3 of 5

TDRR 01980

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD / STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.	FROM NO.	TO CUT WIRE OR SHIELD / STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.	TO NO.
B1	1	4	[illegible]2	J26	A	10	Y	6	1	R5		13	Y		22
B2	2	6	25	J26	B	10	Y	6	1	A21	5	13	Y		25
B3	2	4	37	A21	5	13	Y		24	A22	5	13	Y		6
B4	1	4	12	A21	6	13	Y		26	R5		13	Y		23
B5	1	6	12	A22	2	13	Y		3	A21	1	13	Y		14
B6	1	5	56	J26	D	10	Y	6	1	A21	2	13	Y		15
B7	1	4	06	J26	E	10	Y	6	1	[illegible]	1	13	Y		2
B8	1	1	31	A22	3	13	Y		4	A22		13	Y		5
B9	3	3	25	J26	H	10	Y	6	1	[illegible]		13	Y		20
B10	3	4	81	E19		13	Y		19	A21		13	Y		12
B11	3	3	94	E20		13	Y		18	A21	7	13	Y		27
B12	3	2	62	E22		13	Y		13	A22	7	13	Y		8
B13	3	7	00	J26	J	10	Y	6	1	A21		13	Y		28
B14	4	5	06	J26	K	10	Y	6	1	[illegible]		13	Y		29
B15	1	2	18	A22	6	13	Y		7	R6		13	Y		10
B16	1	1	75	A21	4	13	Y		17	A21	3	13	Y		16
B17	1	4	62	R5		13	Y		21	R6		13	Y		11
B18	3	5	81	A22	8	13	Y		9	[illegible]16		13	Y		30

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

REVISION C

NASA DRAWING NO.
[illegible]000034

SHEET 4 of 5

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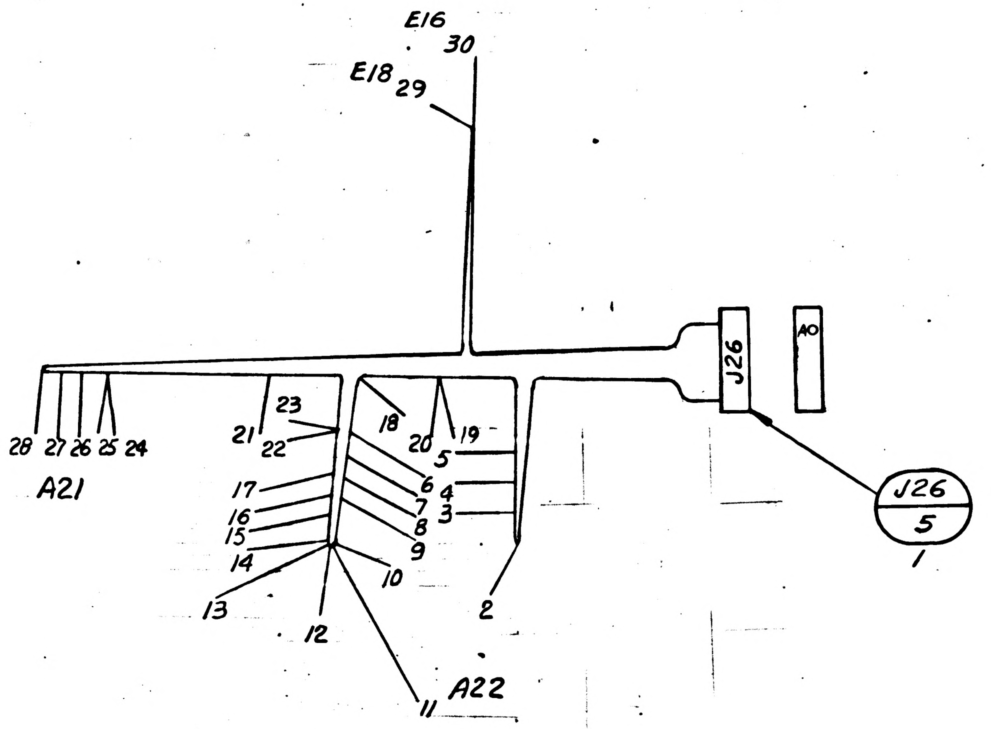
1000034 C

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED CONDUCTOR LENGTHS TDRR 03011	10-1-63	WK
C	REVISED PER TDRR 11888	1 SEP 64	JWP EJ



THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1000202	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN THENO DATE 6-7-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL A J Boyce 7/17/63
NASA APPROVAL 7/17/63
MIT APPROVAL W Kupfer 17 July 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "B"
OUTER AXIS

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000034
SCALE 1-1
WT
SHEET 5 OF 5

APPLICATION	
NEXT ASSY	USED ON
1000202	DL1000201

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED COND LENGTHS TDRR 03011	10/63	WSK
B	TDRR 04294	11-6-63	WK
Ⓜ C	REVISED PER TDRR 11888	SEP 64	JWP EF
D	REVISED PER TDRR 14549	7 DEC 64	JJJ EF

REV STATUS OF SHEETS					
REV	D	C	B	D	C
SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL:

APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
BY DIRECTION
DATE

WIRING HARNESS "B"
OUTER AXIS

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000034

SCALE
REVISION D

SHEET 1 OF 5

TDRR 01980

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION		TOTAL LENGTH
1	1	MIL-W-16878 E28	Wire, 28AWG	RED	3 ft ~~4.50~~ inch
2	1	↓	↓	BRN	9.00 inch
3	1	↓	↓	GY	2 ft 4.00 inch
4	1	↓	↓	VIO	5.06 inch
5	1	1000222	Connector-Plug (J26)		
6	7	1006776-18	Insulation, Sleeving 5/16 long		
7	AR	QQ-S-571 (SN60 WARP2)	Solder		
8	AR	MIL-T-713 Type P CLASS 2 BLACK	TAPE, Nylon, Waxes		

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION C

NASA DRAWING NO.

SHEET

TDRR 01980

1. Twisted conductors are to consist of [illegible] turns per inch MINIMUM
2. Conductors with the same number are twisted together.
3. "Y" or "N" in tinned column indicates yes or no
4. Dimensions are in inches & 2 place decimals
5. Interpret drawing in accordance with MIL-D-70327
6. Solder per MIL-STD-440 using item 7
7. Lace cable using item 8
8. Mark characters on connector .10 .14 high, color black per ND 1002019 at location shown
9. Lengths in conductor chart are for reference only.

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REVISION B

NASA DRAWING NO.

SHEET

TDRR 01980

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD CIRCUIT POINT		STRIP WIRE OR JACKET	TIN Y/N	TERMINATION FIND NO.	SPEC	NO.	TO CUT WIRE OR SHIELD CIRCUIT POINT		STRIP WIRE OR JACKET	TIN Y/N	TERMINATION FIND NO.	SPEC	NO.
B1	1	4	62	J26	A	13	Y	6		1	R5		13	Y			22
B2	2	6	25	J26	B	13	Y	6		1	A21	5	13	Y			25
B3	2	4	37	A21	5	13	Y			24	A22	5	13	Y			6
B4	1	4	12	A21	6	13	Y			26	R5		13	Y			23
B5	1	6	12	A22	2	13	Y			3	A21	1	13	Y			14
B6	1	5	56	J26	D	13	Y	6		1	A21	2	13	Y			15
B7	1	4	06	J26	E	13	Y	6		1	[illegible]	1	13	Y			2
B8	1	1	31	A22	3	13	Y			4	A22	[illegible]	13	Y			5
B9	3	3	25	J26	H	13	Y	6		1	[illegible]		13	Y			20
B10	[illegible]	4	81	[illegible]19		13	Y			19	[illegible]		13				12
B11	[illegible]	3	04	[illegible]20		13	Y			18	A21	7	13				27
B12	[illegible]	2	62	[illegible]22		13				13	A22	7	13				8
B13	3		10	J26	J	13	Y	6		1	A21	[illegible]	13				28
B14	[illegible]	5	06	J26	K	13	Y	6		1	[illegible]		13				29
B 5	1	2	[illegible]	A22	6	13	Y			7	R6		13	Y			10
B16	1	1	[illegible]	A21	4	13	Y			17	A21	3	13				16
B17	1	4	62	K5		13				21	F6		13	Y			11
B18	3	5	81	[illegible]		13				9	[illegible]5		13				30

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION D

NASA DRAWING NO. 1000034

SHEET 4 of 5

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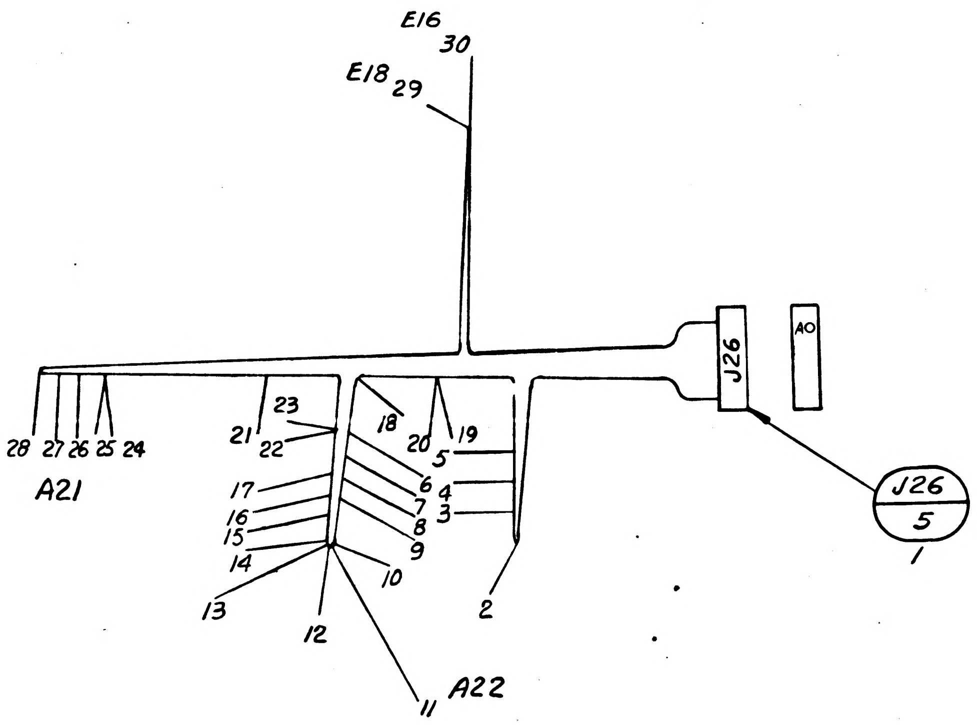
1000034 C

REVISIONS TDRR 01930

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED CONDUCTOR LENGTHS TDRR 03011	10-1-63	WK
C	REVISED PER TDRR 11888	1 SEP 64	JWP / EJ



THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN THENO DATE 6-7-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL A J Boyce 7/17/63
NASA APPROVAL 7/17/63
MIT APPROVAL W Kupfer 17 July 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "B"
OUTER AXIS

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000034
SCALE 1-1
WT
SHEET 5 OF 5

TDRR 01980

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL

APPLICATION

NEXT ASSY	USED ON
1000202	01/1000201

REV					
SHEET					
REV STATUS OF SHEETS	REV	-	-	-	-
	SHEET	1	2	3	4 5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES

MATERIAL:

APPROVED
CHECKED
DRAWN
APPROVED FOR MSC 7/17/63
BY DIRECTION

WIRING HARNESS "B"
OUTER AXIS

DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000034
SHEET 1 OF 5
SCALE
REVISION

MASTER

TDRR 01980

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION		TOTAL LENGTH
1	1	MIL-W-16878 E28	Wire, 28AWG	RED	3 ft 2.50 inch
2	1	↓	↓	BRN	1 ft 6.00 inch
3	1			GY	2 ft 9.75 inch
4	1			VIO	5.00 inch
5	1	1000222	Connector-Plug (J26)		
6	7	1006776-18	Insulation, Sleeving 5/16 long		
7	AR	QQ-S-571 (SN60 WARP2)	Solder		
8	AR	MIL-T-713 Type P	Twine, Nylon, Waxes		

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
REVISION
NASA DRAWING NO.
1000034
SHEET 2 of 5

MASTER

TDRR 01980

NOTES

1. Twisted conductors are to consist of 4 full turns per inch.
2. Conductors with the same number are twisted together.
3. "Y" or "N" in tinned column indicates yes or no
4. Dimensions are in inches & 2 place decimals
5. Interpret drawing in accordance with MIL-D-70327
6. Solder per MIL-STD-440 using item 9
7. Lace cable using item 10
8. Mark characters on connector .10 .14 high, color black per MD 1002019 at location shown
9. Lengths in conductor chart are for reference only.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
REVISION
NASA DRAWING NO.
1000034
SHEET 3 of 5

MASTER

TDRR 01980

CONDUCTOR			FROM					TO				
INDIVIDUAL LENGTH			CUT WIRE OR SHIELD			TERMINATION		CUT WIRE OR SHIELD			TERMINATION	
FIND NUMBER	NO.		CIRCUIT POINT	STRIP WIRE OR JACKET	T/N	SPEC FIND NO.	NO.	CIRCUIT POINT	STRIP WIRE OR JACKET	T/N	SPEC FIND NO.	NO.
B1	1	7.25	J26 A	10	Y	6	1	A21 5	13	Y		25
B2	2	5.50	J26 B	10	Y	6	1	R5	13	Y		22
B3	1	7.25	A21 5	13	Y		24	A22 5	13	Y		6
B4	2	3.00	A21 6	13	Y		26	R5	13	Y		23
B5	1	7.50	A22 2	13	Y		3	A21 1	13	Y		14
B6	1	6.50	J26 D	10	Y	6	1	A21 2	13	Y		15
B7	1	5.00	J26 E	10	Y	6	1	A22 1	13	Y		2
B8	1	2.50	A22 3	13	Y		4	A22 4	13	Y		5
B9	3	5.00	J26 H	10	Y	6	1	E19	13	Y		20
B10	3	3.50	E19	13	Y		19	E21	13	Y		12
B11	3	7.75	E20	13	Y		18	A21 7	13	Y		27
B12	3	2.50	E22	13	Y		13	A22 7	13	Y		8
B13	3	8.00	J26 J	10	Y	6	1	A21 8	13	Y		28
B14	4	5.00	J26 K	10	Y	6	1	E18	13	Y		29
B15	2	[illegible]	A22 6	13	Y		7	R6	13	Y		10
B16	1	2.50	A21 4	13	Y		17	A21 3	13	Y		16
B17	2	6.00	R5	13	Y		21	R6	13	Y		11
B18	3	7.00	A22 8	13	Y		9	E16	13	Y		30

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
REVISION
NASA DRAWING NO.
1000034
SHEET 4 of 5

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

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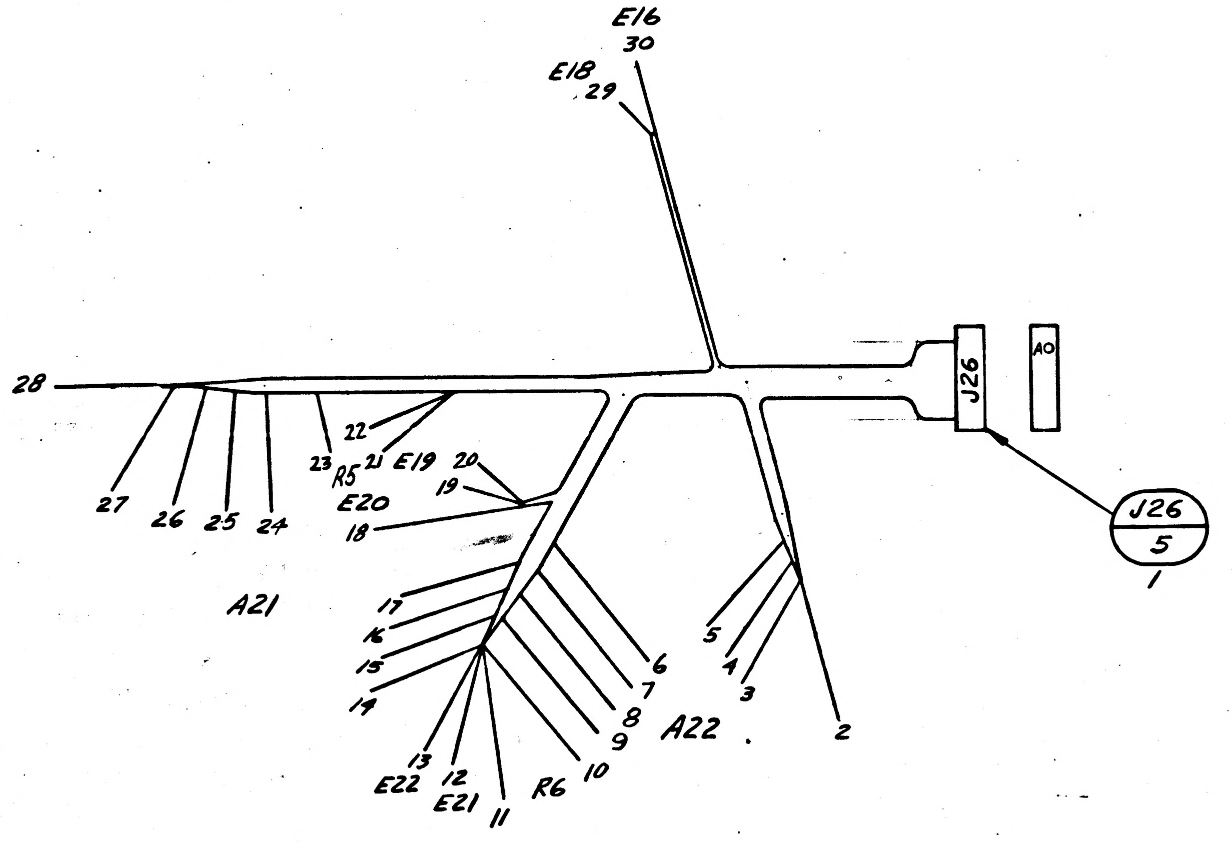
1000034

REVISIONS TDRR 01980

SYM	DESCRIPTION	DATE	APPROVAL



THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN THENO DATE 6-7-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL A J Boyce 7/17/63
NASA APPROVAL 7/17/63
MIT APPROVAL W Kupfer 17 Jul 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "B"
OUTER AXIS

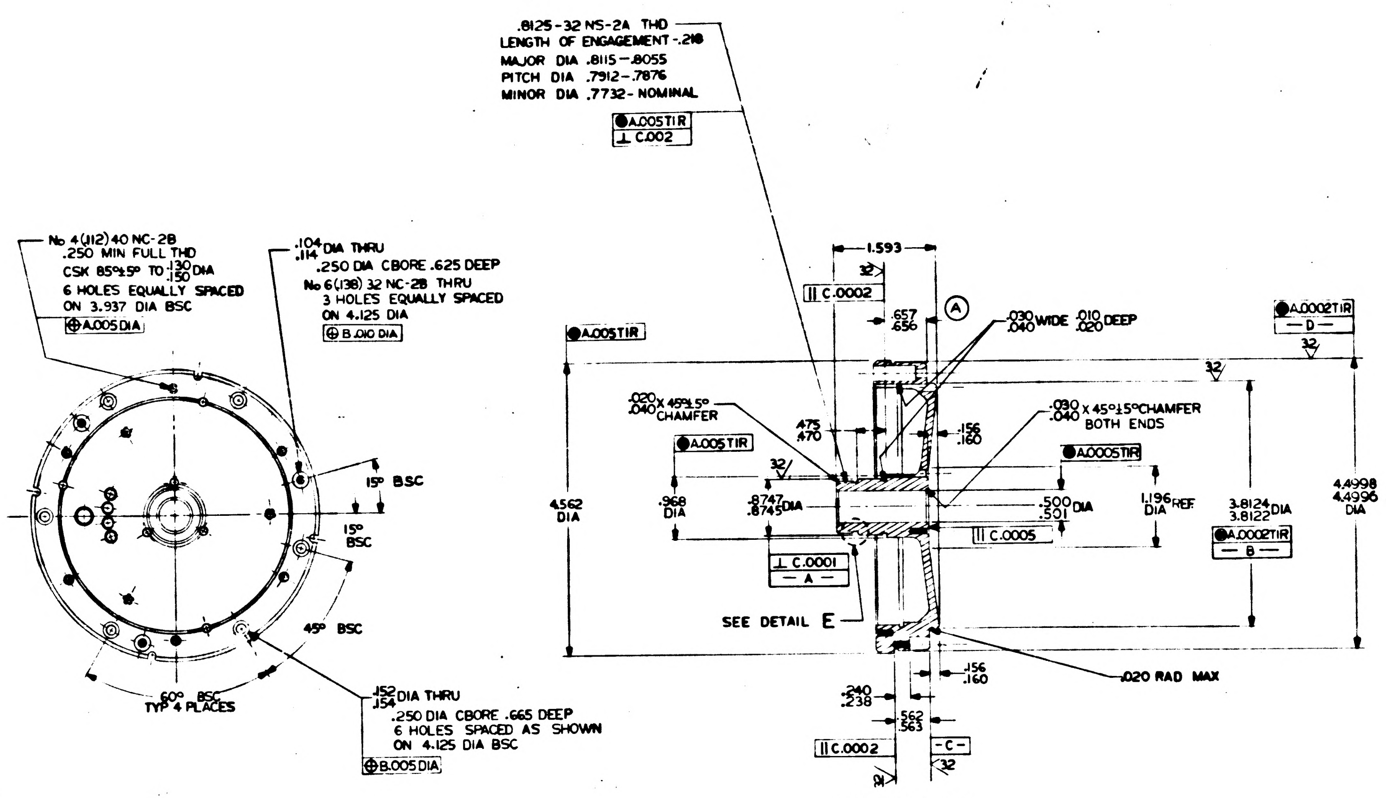
CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000034
SCALE 1-1
WT
SHEET 5 OF 5

MASTER

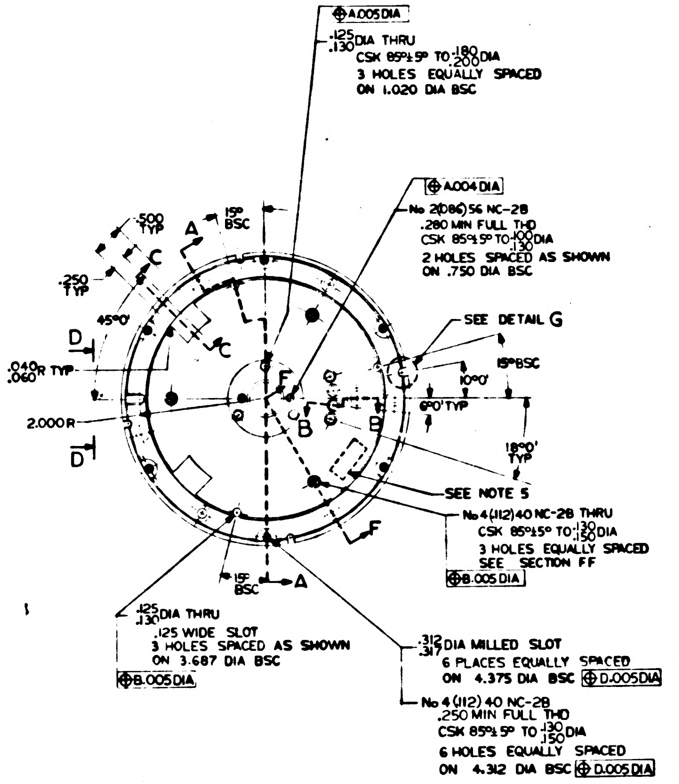
4 3 2 1

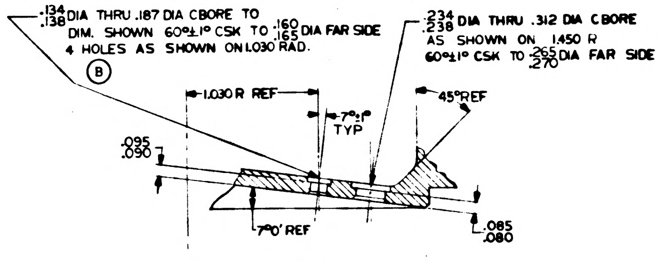
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS		TDRR 00021			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
E-4	A	.656 WAS .655	7-24-62		
C-5 B-2	B	4 HOLES WAS 7 HOLES ADDED 7°0' TYP	8-6-62	ajs	WK

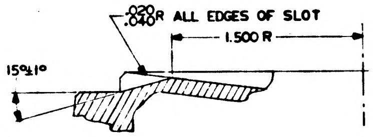

.8125-32 NS-2A THD
LENGTH OF ENGAGEMENT -.218
MAJOR DIA .8115-.8055
PITCH DIA .7912-.7876
MINOR DIA .7732- NOMINAL
A.005TIR
⊥ C.002
No 4(.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES EQUALLY SPACED
ON 3.937 DIA BSC
⊕A.005DIA
.104/.114 DIA THRU
.250 DIA CBORE .625 DEEP
No 6(.138) 32 NC-2B THRU
3 HOLES EQUALLY SPACED
ON 4.125 DIA
⊕ B.010 DIA
15° BSC
15° BSC
45° BSC
60° BSC TYP 4 PLACES
.152/.154 DIA THRU
.250 DIA CBORE .665 DEEP
6 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
⊕B.005DIA
1.593
|| C.0002
.657/.656
Ⓐ
.030/.040 WIDE .010/.020 DEEP
A.0002TIR
— D —
A.005TIR
.020/.040 X 45°±5° CHAMFER
.475/.470
.156/.160
.030/.040 X 45°±5° CHAMFER BOTH ENDS
A.0005TIR
4.562 DIA
.968 DIA
.8747/.8745 DIA
.500/.501 DIA
1.196 REF DIA
3.8124/3.8122 DIA
4.4998/4.4996 DIA
|| C.0005
A.0002TIR
— B —
⊥ C.0001
— A —
SEE DETAIL E
.020 RAD MAX
.156/.160
.240/.238
.562/.563
|| C.0002
— C —
32

SECTION A-A

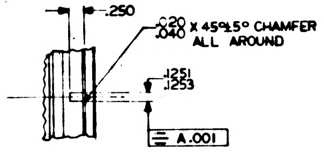

⊕A.005DIA
.125/.130 DIA THRU
CSK 85°±5° TO .180/.200 DIA
3 HOLES EQUALLY SPACED
ON 1.020 DIA BSC
⊕A.004DIA
No 2(.086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100/.130 DIA
2 HOLES SPACED AS SHOWN
ON .750 DIA BSC
.500 TYP
15° BSC
A
C
.250 TYP
45°0'
D
.040/.060 R TYP
2.000 R
D
SEE DETAIL G
15° BSC
10°0'
6°0' TYP
B
F
18°0' TYP
SEE NOTE 5
No 4(.112) 40 NC-2B THRU
CSK 85°±5° TO .130/.150 DIA
3 HOLES EQUALLY SPACED
SEE SECTION FF
⊕B.005 DIA
15° BSC
A
.125/.130 DIA THRU
.125 WIDE SLOT
3 HOLES SPACED AS SHOWN
ON 3.687 DIA BSC
⊕B.005DIA
.312/.317 DIA MILLED SLOT
6 PLACES EQUALLY SPACED
ON 4.375 DIA BSC ⊕D.005DIA
No 4(.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES EQUALLY SPACED
ON 4.312 DIA BSC ⊕D.005DIA


.134/.138 DIA THRU .187 DIA CBORE TO
DIM. SHOWN 60°±1° CSK TO .160/.165 DIA FAR SIDE
4 HOLES AS SHOWN ON 1.030 RAD.
Ⓑ
.234/.238 DIA THRU .312 DIA CBORE
AS SHOWN ON 1.450 R
60°±1° CSK TO .265/.270 DIA FAR SIDE
1.030 R REF
7°±1° TYP
45° REF
.095/.090
7°0' REF
.085/.080

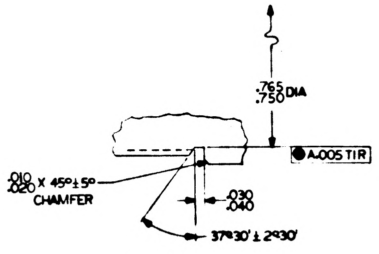
SECTION B-B
SCALE: 2/1


.020/.040 R ALL EDGES OF SLOT
1.500 R
15°±1°

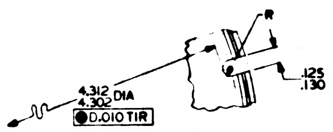
SECTION C-C
SCALE: 2/1
2 PLACES


.250
.020/.040 X 45°±5° CHAMFER ALL AROUND
.1251/.1253
A.001

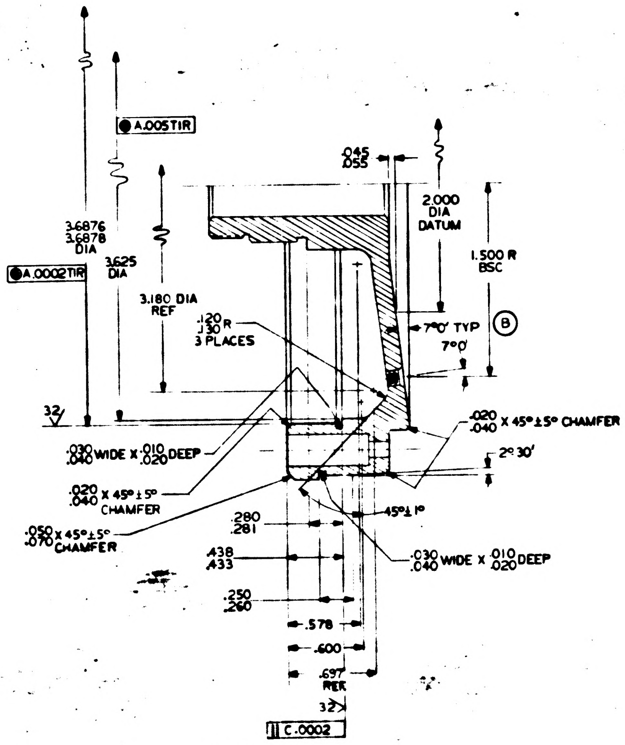
VIEW D-D
SCALE 1/1


.765/.750 DIA
A.005 TIR
.010/.020 X 45°±5° CHAMFER
.030/.040
37°30' ± 2°30'

DETAIL E
SCALE 4/1


R
.125/.130
4.312/4.302 DIA
D.010 TIR

DETAIL G
4 PLACES EQUALLY SPACED
WITHIN ±.005
SCALE 2/1


A.005TIR
.045/.055
2.000 DIA DATUM
3.6876/3.6878 DIA
3.625 DIA
A.0002TIR
3.180 DIA REF
.120/.130 R 3 PLACES
1.500 R BSC
7°0' TYP
Ⓑ
7°0'
32
.020/.040 X 45°±5° CHAMFER
.030/.040 WIDE X .010/.020 DEEP
2°30'
.020/.040 X 45°±5° CHAMFER
45°±1°
.050/.070 X 45°±5° CHAMFER
.280/.281
.438/.433
.250/.260
.030/.040 WIDE X .010/.020 DEEP
.578
.600
.697 REF
|| C.0002

SECTION F-F
SCALE 2/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED.
3. BREAK SHARP EDGES .005/.015.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNFORM PART TEMPERATURE OF 68°F ±1°.

INCHES
PHOTOGRAPHIC SCALE GRIDS

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
1000015	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING

MATERIAL: BERYLLIUM — BRUSH SPEC S-200
ALT. SPEC MIL-B-21531

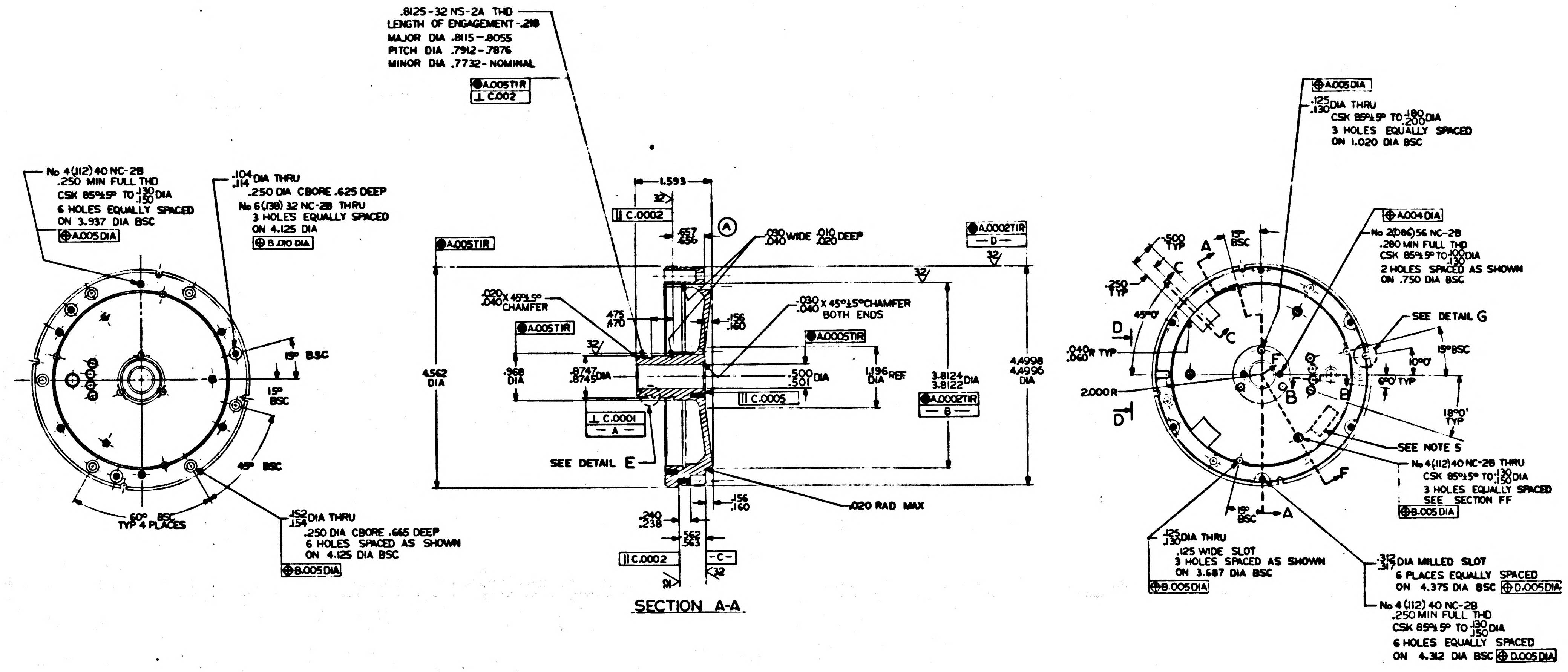
MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED: C.J. Bryne DATE 8/24/62
CHECKED:
DRAWN: V. GREGORY
APPROVED FOR MSC
Jack Barnard
BY DIRECTION M.I.T. APPROVED
W.A. Koppes 9/5/62

SHAFT, STUB
15 SPEED
INNER AND MIDDLE
AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

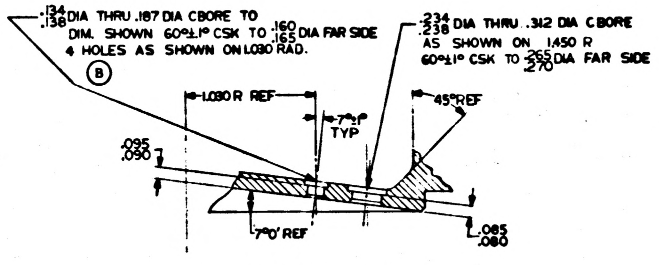
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO. 1000035
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00021			
E-4	A	.656 WAS .655	7-24-62		
C-5 B-2	B	4 HOLES WAS 7 HOLES ADDED 7°0' TYP	8-6-62		
	C	TDRR 01426	6-3-63		



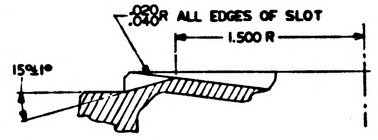
.8125-32 NS-2A THD
LENGTH OF ENGAGEMENT -.218
MAJOR DIA .8115-.8055
PITCH DIA .7912-.7876
MINOR DIA .7732-NOMINAL
A.005TIR
⊥ C.002
No 4(.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES EQUALLY SPACED
ON 3.937 DIA BSC
A.005DIA
.104/.114 DIA THRU
.250 DIA CBORE .625 DEEP
No 6(.138) 32 NC-2B THRU
3 HOLES EQUALLY SPACED
ON 4.125 DIA
B.010 DIA
15° BSC
15° BSC
45° BSC
60° BSC
TYP 4 PLACES
.152/.154 DIA THRU
.250 DIA CBORE .665 DEEP
6 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
B.005DIA
1.593
32
∥ C.0002
.657/.656
A
.030/.040 WIDE .010/.020 DEEP
A.0002TIR
— D —
A.005TIR
.020/.040 X 45°±5° CHAMFER
.475/.470
.156/.160
.030/.040 X 45°±5° CHAMFER BOTH ENDS
A.0005TIR
4.562 DIA
.968 DIA
.8747/.8745 DIA
.500/.501 DIA
1.196 DIA REF
3.8124/3.8122 DIA
4.4998/4.4996 DIA
∥ C.0005
A.0002TIR
— B —
⊥ C.0001
— A —
SEE DETAIL E
.020 RAD MAX
.156/.160
.240/.238
.562/.563
∥ C.0002
— C —
32
A.005DIA
.125/.130 DIA THRU
CSK 85°±5° TO .180/.200 DIA
3 HOLES EQUALLY SPACED
ON 1.020 DIA BSC
A.004DIA
No 2(.086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100/.130 DIA
2 HOLES SPACED AS SHOWN
ON .750 DIA BSC
.500 TYP
15° BSC
.250 TYP
45°0'
.040/.060 R TYP
2.000 R
SEE DETAIL G
15° BSC
10°0'
6°0' TYP
18°0' TYP
SEE NOTE 5
No 4(.112) 40 NC-2B THRU
CSK 85°±5° TO .130/.150 DIA
3 HOLES EQUALLY SPACED
SEE SECTION FF
B.005 DIA
15° BSC
.125/.130 DIA THRU
.125 WIDE SLOT
3 HOLES SPACED AS SHOWN
ON 3.687 DIA BSC
B.005DIA
.312/.317 DIA MILLED SLOT
6 PLACES EQUALLY SPACED
ON 4.375 DIA BSC D.005DIA
No 4(.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES EQUALLY SPACED
ON 4.312 DIA BSC D.005DIA
A
B
C
D
E
F

SECTION A-A



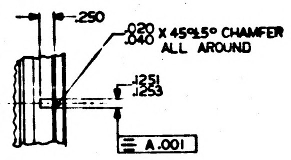
.134/.138 DIA THRU .187 DIA CBORE TO
DIM. SHOWN 60°±1° CSK TO .160/.165 DIA FAR SIDE
4 HOLES AS SHOWN ON 1.030 RAD.
B
.234/.238 DIA THRU .312 DIA CBORE
AS SHOWN ON 1.450 R
60°±1° CSK TO .265/.270 DIA FAR SIDE
1.030 R REF
7°±1° TYP
45° REF
.095/.090
7°0' REF
.085/.080

SECTION B-B
SCALE: 2/1



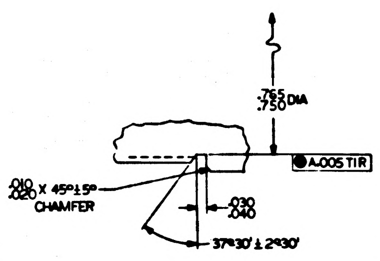
.020/.040 R ALL EDGES OF SLOT
1.500 R
15°±1°

SECTION C-C
SCALE: 2/1
2 PLACES



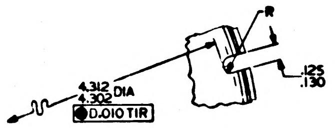
.250
.020/.040 X 45°±5° CHAMFER ALL AROUND
.1251/.1253
≡ A.001

VIEW D-D
SCALE 1/1



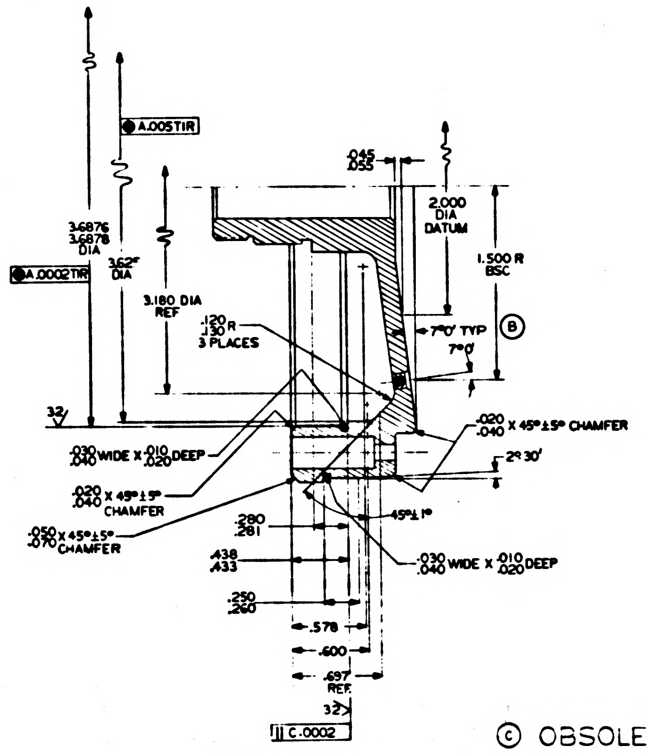
.765/.750 DIA
A.005 TIR
.010/.020 X 45°±5° CHAMFER
.030/.040
37°30' ± 2°30'

DETAIL E
SCALE 4/1



R
4.312/4.302 DIA
D.010 TIR
.125/.130

DETAIL G
4 PLACES EQUALLY SPACED
WITHIN ±.005
SCALE 2/1



A.005TIR
.045/.055
2.000 DIA DATUM
3.6876/3.6878 DIA
A.0002TIR
3.62 DIA
3.180 DIA REF
1.500 R BSC
.120/.130 R 3 PLACES
7°0' TYP
B
7°0'
32
.030/.040 WIDE X .010/.020 DEEP
.020/.040 X 45°±5° CHAMFER
2°30'
.020/.040 X 45°±5° CHAMFER
.050/.070 X 45°±5° CHAMFER
45°±1°
.280/.281
.438/.433
.030/.040 WIDE X .010/.020 DEEP
.250/.260
.578
.600
.697 REF
32
∥ C.0002

SECTION F-F
SCALE 2/1

© OBSOLETE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED.
3. BREAK SHARP EDGES .005/.015.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNFORM PART TEMPERATURE OF 68°F ±1°.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000015	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
— ±.005 ±0°30'
DO NOT SCALE THIS DRAWING

MATERIAL:
BERYLLIUM — BRUSH SPEC S-200
ALT. SPEC MIL-B-21531

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN V. GREGORY
APPROVED FOR MSC
BY DIRECTION

SHAFT, STUB
15 SPEED
INNER AND MIDDLE
AXIS

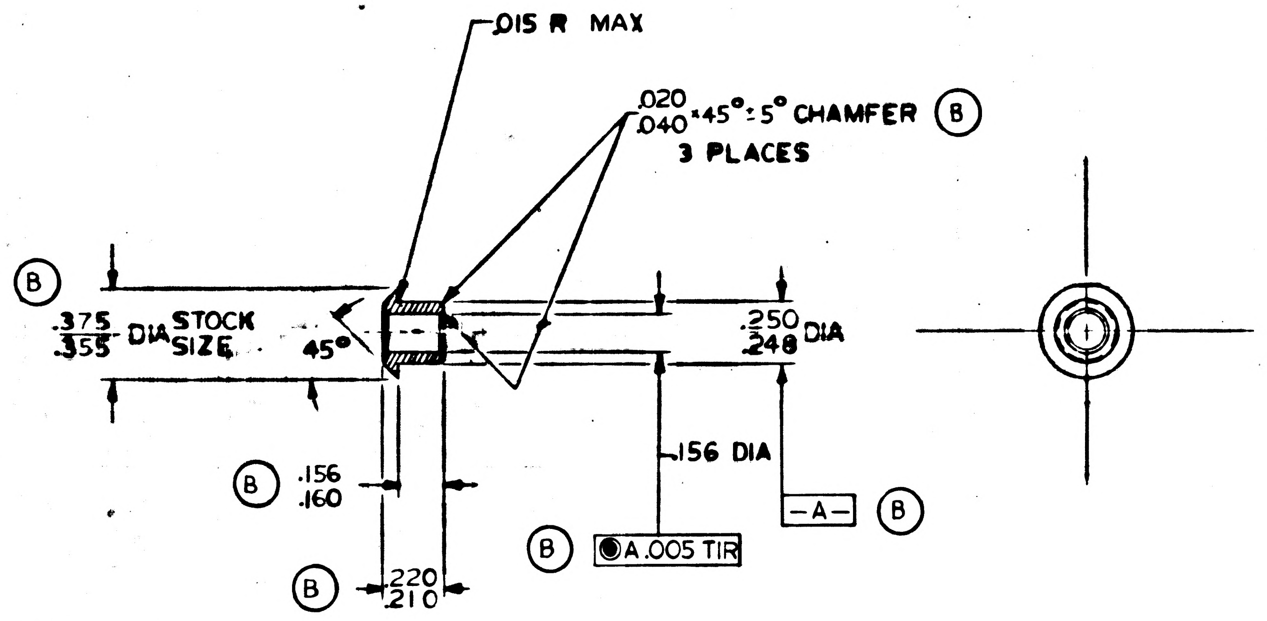
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000035
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

C 1000036 Ⓜ

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	.140WAS $\frac{.207}{.187}$, .186WAS $\frac{.270}{.250}$, .156WAS $\frac{.156}{.166}$	5-24-62	
B	GENERAL REVISIONS	7-13-62	
C	TDR 00009	8-10-62	a80



NOTES:

1. 63/ MACHINE FINISH ALL OVER
2. REMOVE ALL BURRS & BREAK SHARP EDGES $\frac{.005}{.015}$ Ⓑ
3. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
4. Ⓒ IDENTIFY USING DWG NO REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓒ 1000015	
Ⓑ 1000014	
1000010	
1000008	
1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —//— DECIMALS —— ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL: DUPONT ZYTEL #101 (OR EQUIV)

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		7-31-62
CHECKED		
DRAWN	R.W.C.	4-12-62

APPROVED FOR MSC
Jack Barnard 7/31/62
BY DIRECTION
MIT APPROVAL: W. Kupfer 7/31/62

BUSHING, INSULATOR

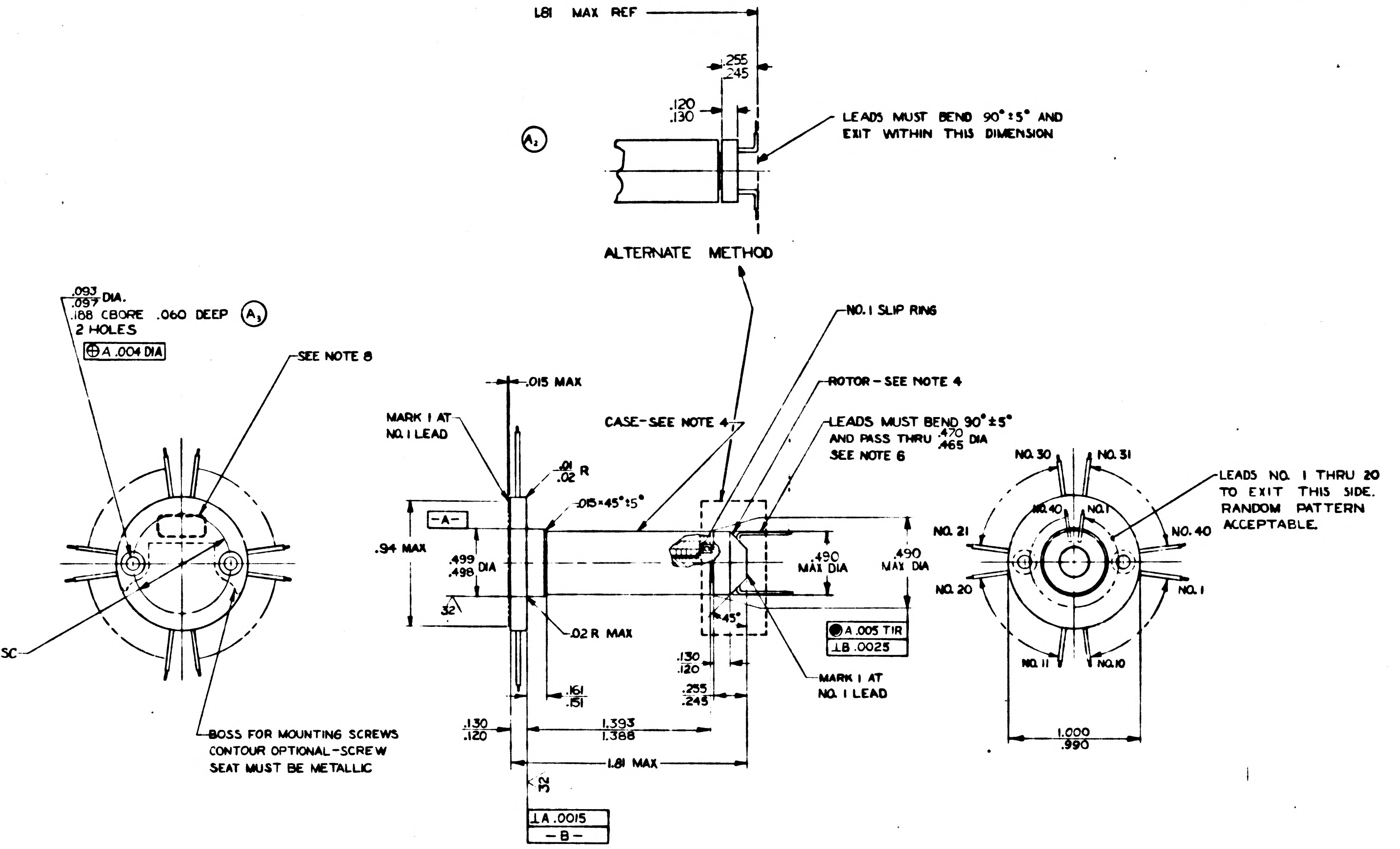
SCALE 2-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000036
SHEET 1 OF 1

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
A-3	A₁	ADDED APPLICATION + TOLERANCE	7-13-62	
D-3	A₂	ADDED ALTERNATE METHOD	7-13-62	
C-6	A₃	.188 CBORE .060 DP was CSK 81° TO [illegible] DIA	7-13-62	

COLOR CODING OF SLIP RING WIRES USING MIL-STD-681

WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	16	WHT-GRN	31	WHT-BRN-GRN
2	BROWN	17	WHT-BLU	32	WHT-BRN-BLU
3	RED	18	WHT-VIO	33	WHT-BRN-VIO
4	ORANGE	19	WHT-GY	34	WHT-BRN-GY
5	YELLOW	20	WHT-BLK-BRN	35	WHT-RED-ORN
6	GREEN	21	WHT-BLK-RED	36	WHT-RED-YEL
7	BLUE	22	WHT-BLK-ORN	37	WHT-RED-GRN
8	VIOLET	23	WHT-BLK-YEL	38	WHT-RED-BLU
9	GRAY	24	WHT-BLK-GRN	39	WHT-RED-VIO
10	WHITE	25	WHT-BLK-BLU	40	WHT-RED-GY
11	WHT-BLK	26	WHT-BLK-VIO		
12	WHT-BRN	27	WHT-BLK-GY		
13	WHT-RED	28	WHT-BRN-RED		
14	WHT-ORN	29	WHT-BRN-ORN		
15	WHT-YEL	30	WHT-BRN-YEL		



1.81 MAX REF
.255
.245
.120
.130
(A₂)
LEADS MUST BEND 90°±5° AND EXIT WITHIN THIS DIMENSION
ALTERNATE METHOD
.093
.097 DIA.
.188 CBORE .060 DEEP (A₃)
2 HOLES
⊕ A .004 DIA
SEE NOTE 8
.750 BSC
BOSS FOR MOUNTING SCREWS CONTOUR OPTIONAL-SCREW SEAT MUST BE METALLIC
.015 MAX
MARK 1 AT NO. 1 LEAD
CASE-SEE NOTE 4
NO. 1 SLIP RING
ROTOR-SEE NOTE 4
LEADS MUST BEND 90°±5° AND PASS THRU .470 .465 DIA SEE NOTE 6
.01 .02 R
.015×45°±5°
-A-
.94 MAX
.499 .498 DIA
32
.02 R MAX
.490 MAX DIA
.490 MAX DIA
45°
● A .005 TIR
⊥ B .0025
MARK 1 AT NO. 1 LEAD
.130 .120
.255 .245
.161 .151
.130 .120
1.393 1.388
1.81 MAX
32
⊥ A .0015
-B-
NO. 30
NO. 31
NO. 40
NO. 1
NO. 21
NO. 40
NO. 20
NO. 1
NO. 11
NO. 10
1.000 .990
LEADS NO. 1 THRU 20 TO EXIT THIS SIDE. RANDOM PATTERN ACCEPTABLE.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO -A- WITHIN .015 TIR
3. BREAK ALL SHARP EDGES .005 .015
4. CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
   - A. AL 6061-T6 PER SPEC QQ-A-327 ANODIZE PER MIL-A-8625 TYPE I, DYED BLACK
   - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FINE 300
5. NO. OF RINGS: 40
6. LEADS: MIL-W-16878 TYPE E 28, EXTRUDED WHEN NECESSARY-LENGTH 12 INCHES MIN
7. MANUFACTURE IN ACCORDANCE WITH (LATER)
8. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED

SPECIFICATION CONTROL DRAWING

QTY. REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

(A₁)

1000011	
1000010	
1000009	
1000008	DL 000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED C. J. Rogers 7-31-62
CHECKED
DRAWN D.M. WHITE 4-13-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL: W. [illegible] 7/31/62

SLIP RING ASSY,
ELECTRICAL,
40 CONTACT

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000037
SHEET 1 OF 1

1000037 A

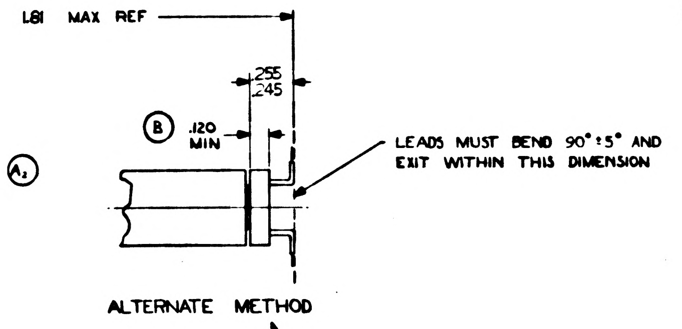
COLOR CODING OF SLIP RING WIRES USING MIL-STD-681

WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	16	WHT-GRN	31	WHT-BRN-GRN
2	BROWN	17	WHT-BLU	32	WHT-BRN-BLU
3	RED	18	WHT-VIO	33	WHT-BRN-VIO
4	ORANGE	19	WHT-GY	34	WHT-BRN-GY
5	YELLOW	20	WHT-BLK-BRN	35	WHT-RED-ORN
6	GREEN	21	WHT-BLK-RED	36	WHT-RED-YEL
7	BLUE	22	WHT-BLK-ORN	37	WHT-RED-GRN
8	VIOLET	23	WHT-BLK-YEL	38	WHT-RED-BLU
9	GRAY	24	WHT-BLK-GRN	39	WHT-RED-VIO
10	WHITE	25	WHT-BLK-BLU	40	WHT-RED-GY
11	WHT-BLK	26	WHT-BLK-VIO		
12	WHT-BRN	27	WHT-BLK-GY		
13	WHT-RED	28	WHT-BRN-RED		
14	WHT-ORN	29	WHT-BRN-ORN		
15	WHT-YEL	30	WHT-BRN-YEL		

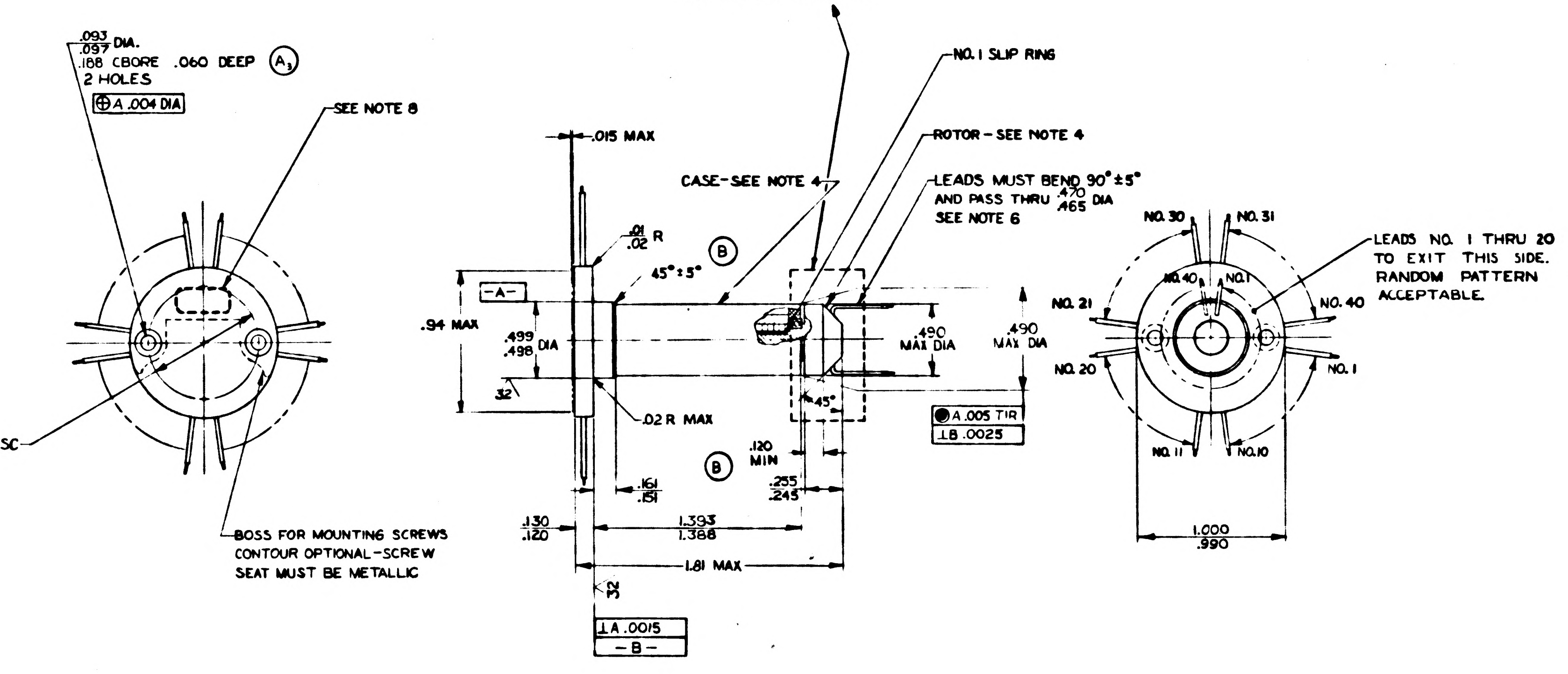
REVISIONS TDR 00003

Ⓜ

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
A-3	A₁	ADDED APPLICATION + TOLERANCE	7-13-62	
D-3	A₂	ADDED ALTERNATE METHOD	7-13-62	
C-6	A₃	.188 CBORE .060 DP. ~~CSK 81° TO [illegible] DIA~~	7-13-62	
	B₆	TDR 00012	8-13-62	AJB
	C₂	TDR 00197	1-2-63	AJB


1.81 MAX REF
.255
.245
Ⓑ
.120 MIN
Ⓐ₂
LEADS MUST BEND 90° ± 5° AND EXIT WITHIN THIS DIMENSION

ALTERNATE METHOD


.093
.097 DIA.
.188 CBORE .060 DEEP Ⓐ₃
2 HOLES
⊕ A .004 DIA
SEE NOTE 8
.750 BSC
BOSS FOR MOUNTING SCREWS CONTOUR OPTIONAL-SCREW SEAT MUST BE METALLIC
.015 MAX
CASE-SEE NOTE 4
NO. 1 SLIP RING
ROTOR - SEE NOTE 4
LEADS MUST BEND 90° ± 5° AND PASS THRU .470 .465 DIA SEE NOTE 6
.01
.02 R
Ⓑ
45° ± 5°
-A-
.94 MAX
.499
.498 DIA
32
.02 R MAX
.490 MAX DIA
.490 MAX DIA
45°
● A .005 TIR
⊥ B .0025
.120 MIN
Ⓑ
.161
.151
.255
.245
.130
.120
1.393
1.388
1.81 MAX
32
⊥ A .0015
- B -
NO. 30
NO. 31
NO. 40
NO. 1
NO. 21
NO. 40
NO. 20
NO. 1
NO. 11
NO. 10
LEADS NO. 1 THRU 20 TO EXIT THIS SIDE. RANDOM PATTERN ACCEPTABLE.
1.000
.990

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO -A- WITHIN .015 TIR
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
4. CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
   - A. AL 6061-T6 PER SPEC QQ-A-327 ANODIZE PER MIL-A-8625 TYPE I, DYED BLACK
   - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. NO. OF RINGS: 40
6. Ⓑ LEADS: MIL-W-16878 TYPE E-28, OR E-30 EXTRUDED WHEN NECESSARY-LENGTH 12 INCHES MIN
7. Ⓒ ASSEMBLY MUST MEET REQUIREMENTS OF PS 1000037
8. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. $^{125}\surd$ ALL OVER UNLESS OTHERWISE SPECIFIED

ⒷⒸ

ORIGINAL SOURCES OF SUPPLY:

ELECTRO-TEK CORP.
WEST CALDWELL
NEW JERSEY
PART NO. 13346

POLY-SCIENTIFIC CORP
BLACKSBURG
VIRGINIA
PART NO. AU 1264

Ⓑ

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓒ Ⓐ₁

NEXT ASSY	USED ON
1000207	
1000206	
10000[illegible]	
10000[illegible]0	
1000009	DL1000201
1000008	DL 000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 7-31-62
CHECKED
DRAWN D.M. WHITE 4-13-62
APPROVED FOR MSC
BY DIRECTION

SLIP RING ASSY,
ELECTRICAL, 40 CONTACT
SPECIFICATION CONTROL DWG.

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

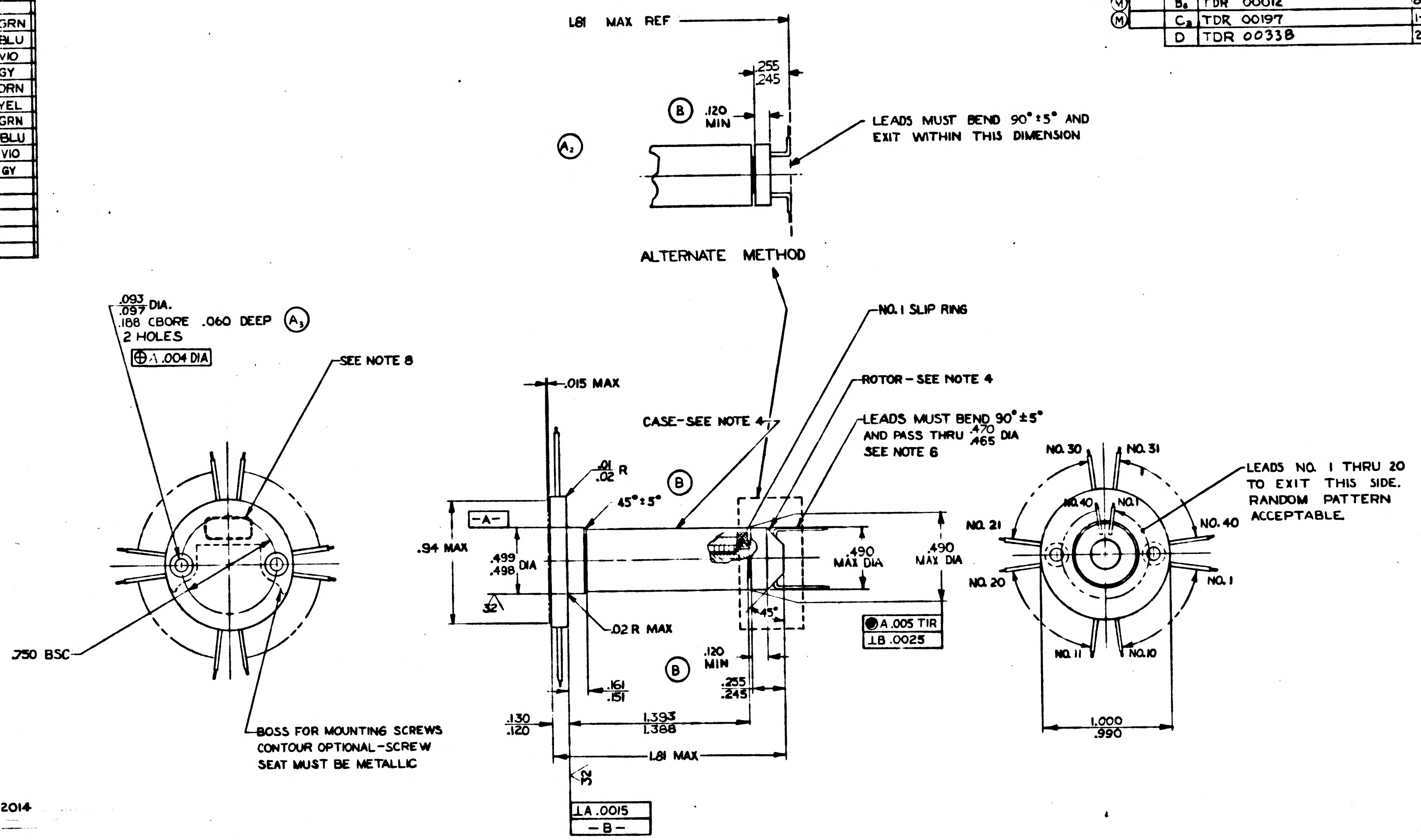
NASA DRAWING NO.
1000037
SHEET 1 OF 1

1000037B

REVISIONS TDR 00003				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
A-3	A_1	ADDED APPLICATION + TOLERANCE	7-13-62	
D-3	A_2	ADDED ALTERNATE METHOD	7-13-62	
C-6	A_3	.188 CBORE .060 DP. was CSK 81° TO .188 DIA	7-13-62	
	B_6	TDR 00012	8-13-62	
	C_2	TDR 00197	1-2-63	
	D	TDR 00338	2-5-63	

COLOR CODING OF SLIP RING WIRES USING MIL-STD-681

WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	16	WHT-GRN	31	WHT-BRN-GRN
2	BROWN	17	WHT-BLU	32	WHT-BRN-BLU
3	RED	18	WHT-VIO	33	WHT-BRN-VIO
4	ORANGE	19	WHT-GY	34	WHT-BRN-GY
5	YELLOW	20	WHT-BLK-BRN	35	WHT-RED-ORN
6	GREEN	21	WHT-BLK-RED	36	WHT-RED-YEL
7	BLUE	22	WHT-BLK-ORN	37	WHT-RED-GRN
8	VIOLET	23	WHT-BLK-YEL	38	WHT-RED-BLU
9	GRAY	24	WHT-BLK-GRN	39	WHT-RED-VIO
10	WHITE	25	WHT-BLK-BLU	40	WHT-RED-GY
11	WHT-BLK	26	WHT-BLK-VIO		
12	WHT-BRN	27	WHT-BLK-GY		
13	WHT-RED	28	WHT-BRN-RED		
14	WHT-ORN	29	WHT-BRN-ORN		
15	WHT-YEL	30	WHT-BRN-YEL		


1.81 MAX REF
.255
.245
B
.120 MIN
LEADS MUST BEND 90°±5° AND EXIT WITHIN THIS DIMENSION
A_2
ALTERNATE METHOD
.093
.097 DIA.
.188 CBORE .060 DEEP A_3
2 HOLES
⊕ A .004 DIA
SEE NOTE 8
.750 BSC
BOSS FOR MOUNTING SCREWS CONTOUR OPTIONAL-SCREW SEAT MUST BE METALLIC
.015 MAX
CASE-SEE NOTE 4
.01
.02 R
45°±5°
B
-A-
.94 MAX
.499
.498 DIA
32
.02 R MAX
NO.1 SLIP RING
ROTOR-SEE NOTE 4
LEADS MUST BEND 90°±5° AND PASS THRU .470 .465 DIA SEE NOTE 6
.490 MAX DIA
.490 MAX DIA
45°
A .005 TIR
⊥B .0025
.120 MIN
B
.161
.151
.255
.245
.130
.120
1.393
1.388
1.81 MAX
32
⊥A .0015
-B-
NO. 30
NO. 31
NO. 40
NO. 1
NO. 21
NO. 40
NO. 20
NO. 1
NO. 11
NO. 10
LEADS NO. 1 THRU 20 TO EXIT THIS SIDE. RANDOM PATTERN ACCEPTABLE.
1.000
.990

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO -A- WITHIN .015 TIR
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
4. CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
   - A. AL 6061-T6 PER SPEC QQ-A-327 ANODIZE PER MIL-A-8625 TYPE I, DYED BLACK
   - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. NO. OF RINGS: 40
6. Ⓑ LEADS: MIL-W-16878 TYPE E-28, OR E-30 EXTRUDED WHEN NECESSARY-LENGTH 12 INCHES MIN
7. Ⓓ Ⓒ ASSEMBLY MUST MEET REQUIREMENTS OF NASA SPEC ND 1002014
8. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED
10. Ⓓ MAX. ALLOWABLE TORQUE: 125 GM-CM

Ⓑ Ⓒ

ORIGINAL SOURCES OF SUPPLY:

ELECTRO-TEK CORP.
WEST CALDWELL
NEW JERSEY
PART NO. 13346

POLY-SCIENTIFIC CORP
BLACKSBURG
VIRGINIA
PART NO. AU 1264

MASTER

Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
Ⓒ 1000206	
1000011	
Ⓐ₁ 1000010	
1000009	DL1000201
1000008	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		7-31-62
CHECKED		
DRAWN	D.M. WHITE	4-13-62

APPROVED FOR MSC
BY DIRECTION
MIT : W. Kupfer

SLIP RING ASSY, ELECTRICAL, 40 CONTACT SPECIFICATION CONTROL DWG.

SCALE 2/1
UNIT WT.
CODE IDENT.

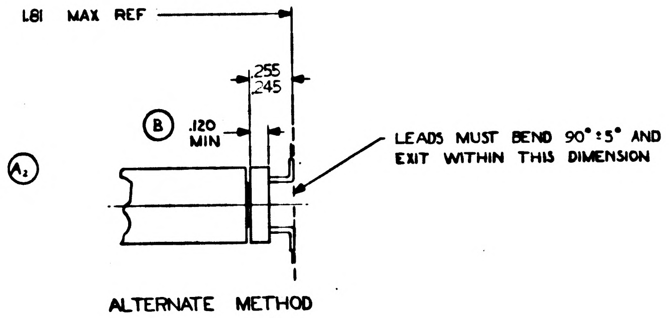
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000037
SHEET 1 OF 1

1000037 C

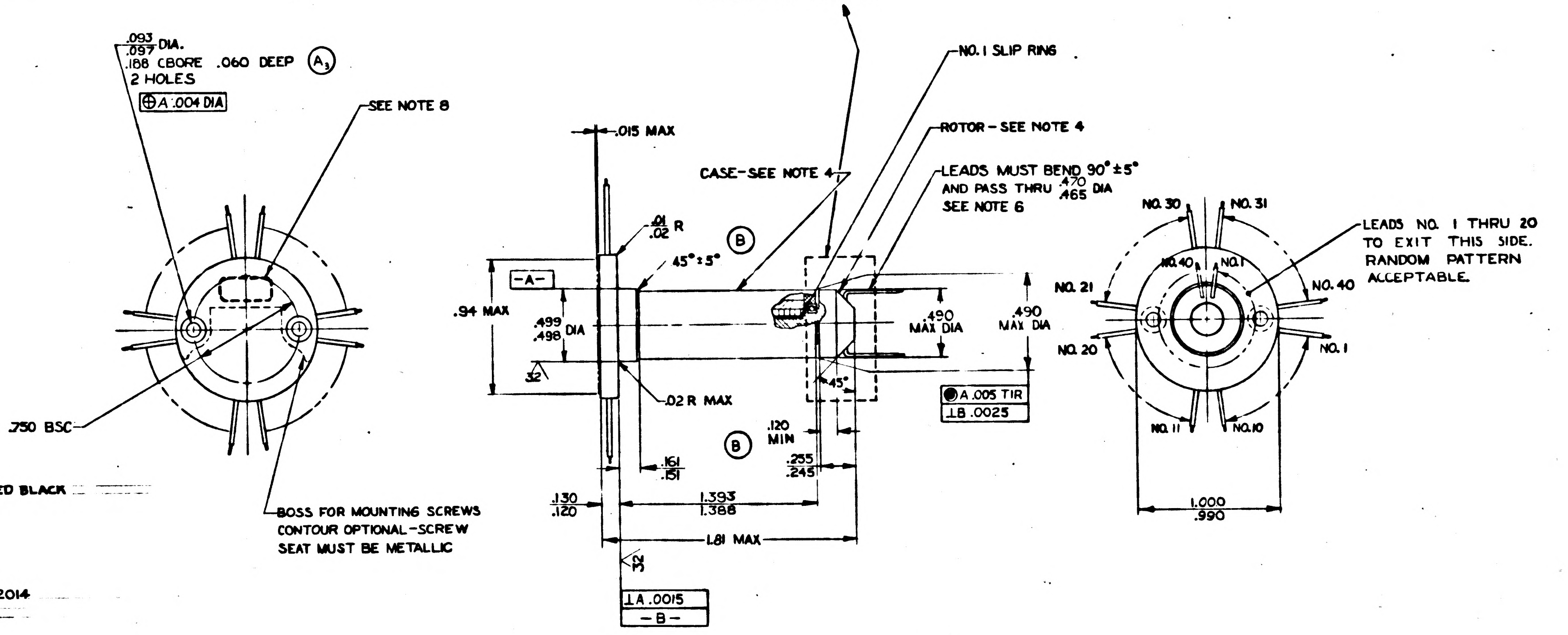
REVISIONS TDR 00003				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
A-3	A_1	ADDED APPLICATION + TOLERANCE	7-13-62	
D-3	A_2	ADDED ALTERNATE METHOD	7-13-62	
C-6	A_3	.188 CBORE .060 DP. ~~CSK 81° TO $\frac{.18}{.20}$ DIA~~	7-13-62	
	B_6	TDR 00012	8-13-62	ajB
	C_3	TDR 00197	1-2-63	ajB
	D	TDR 00338	2-5-63	ajB WK
	E	TDRR 00775	4-9-63	ajB

COLOR CODING OF SLIP RING WIRES USING MIL-STD-681

WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	16	WHT-GRN	31	WHT-BRN-GRN
2	BROWN	17	WHT-BLU	32	WHT-BRN-BLU
3	RED	18	WHT-VIO	33	WHT-BRN-VIO
4	ORANGE	19	WHT-GY	34	WHT-BRN-GY
5	YELLOW	20	WHT-BLK-BRN	35	WHT-RED-ORN
6	GREEN	21	WHT-BLK-RED	36	WHT-RED-YEL
7	BLUE	22	WHT-BLK-ORN	37	WHT-RED-GRN
8	VIOLET	23	WHT-BLK-YEL	38	WHT-RED-BLU
9	GRAY	24	WHT-BLK-GRN	39	WHT-RED-VIO
10	WHITE	25	WHT-BLK-BLU	40	WHT-RED-GY
11	WHT-BLK	26	WHT-BLK-VIO		
12	WHT-BRN	27	WHT-BLK-GY		
13	WHT-RED	28	WHT-BRN-RED		
14	WHT-ORN	29	WHT-BRN-ORN		
15	WHT-YEL	30	WHT-BRN-YEL		


1.81 MAX REF
.255
.245
Ⓑ .120 MIN
LEADS MUST BEND 90°±5° AND EXIT WITHIN THIS DIMENSION
A_2

ALTERNATE METHOD


.093
.097 DIA.
.188 CBORE .060 DEEP A_3
2 HOLES
⊕A .004 DIA
SEE NOTE 8
.750 BSC
BOSS FOR MOUNTING SCREWS CONTOUR OPTIONAL-SCREW SEAT MUST BE METALLIC
.015 MAX
CASE-SEE NOTE 4
NO. 1 SLIP RING
ROTOR - SEE NOTE 4
LEADS MUST BEND 90°±5° AND PASS THRU .470 .465 DIA SEE NOTE 6
.01 .02 R
45°±5°
Ⓑ
-A-
.94 MAX
.499 .498 DIA
32
.02 R MAX
.490 MAX DIA
.490 MAX DIA
45°
A .005 TIR
⊥B .0025
.120 MIN
.255 .245
Ⓑ
.161 .151
.130 .120
1.393 1.388
1.81 MAX
32
⊥A .0015
-B-
NO. 30
NO. 31
NO. 40
NO. 1
NO. 21
NO. 40
NO. 20
NO. 1
NO. 11
NO. 10
LEADS NO. 1 THRU 20 TO EXIT THIS SIDE. RANDOM PATTERN ACCEPTABLE.
1.000 .990

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO [-A-] WITHIN .015 TIR
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
4. Ⓔ CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
   - A. AL 6061-T6 PER SPEC QQ-A-325 ANODIZE PER MIL-A-8625 TYPE OPTIONAL, CLEAR OR DYED BLACK
   - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. NO. OF RINGS: 40
6. Ⓑ LEADS: MIL-W-16878 TYPE E-28, OR E-30 EXTRUDED WHEN NECESSARY-LENGTH 12 INCHES MIN
7. Ⓓ Ⓒ ASSEMBLY MUST MEET REQUIREMENTS OF NASA SPEC ND 1002014
8. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. $\sqrt[125]{}$ ALL OVER UNLESS OTHERWISE SPECIFIED
10. Ⓓ MAX. ALLOWABLE TORQUE: 125 GM-CM

Ⓑ Ⓒ

ORIGINAL SOURCES OF SUPPLY:

ELECTRO-TEK CORP.
WEST CALDWELL
NEW JERSEY
PART NO. 13346

POLY-SCIENTIFIC CORP
BLACKSBURG
VIRGINIA
PART NO. AU 1264

MASTER

Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
1000206	
1000011	
1000010	
1000009	DL 1000201
1000008	DL 1000001

Ⓒ A_1

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		7-31-62
CHECKED		
DRAWN	D.M. WHITE	4-13-62

APPROVED FOR MSC
BY DIRECTION
MIT

SLIP RING ASSY,
ELECTRICAL, 40 CONTACT
SPECIFICATION CONTROL DWG.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

SCALE	UNIT WT.	CODE IDENT.	NASA DRAWING NO.
2/1			1000037

SHEET 1 OF 1

1000037 F

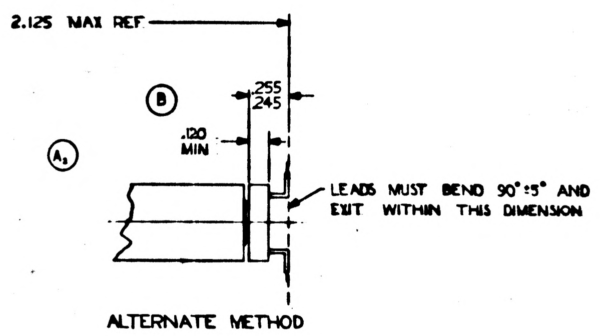
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
A-3	A₁	ADDED APPLICATION - TOLERANCES	7-13-62	
D-3	A₂	ADDED ALTERNATE METHOD	7-13-62	
C-6	A₃	.188 CBORE .060 DP. ~~CSK 81° TO DA~~	7-13-62	
	B₆	TDR 00011	8-13-62	2RB B.B.

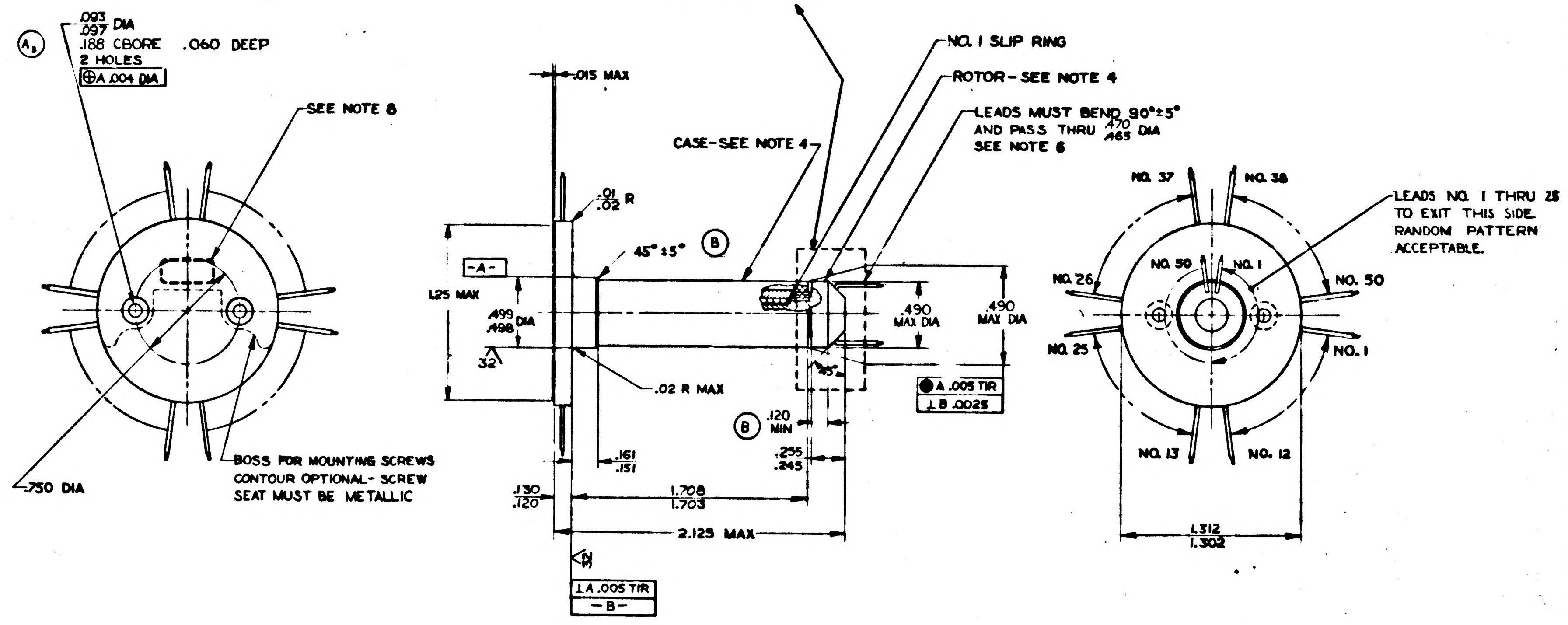
COLOR CODING OF SLIP RING WIRES USING MIL-STD-681

WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	18	WHT-VIO	35	WHT-RED-ORN
2	BROWN	19	WHT-GY	36	WHT-RED-YEL
3	RED	20	WHT-BLK-BRN	37	WHT-RED-GRN
4	ORANGE	21	WHT-BLK-RED	38	WHT-RED-BLU
5	YELLOW	22	WHT-BLK-ORN	39	WHT-RED-VIO
6	GREEN	23	WHT-BLK-YEL	40	WHT-RED-GY
7	BLUE	24	WHT-BLK-GRN	41	WHT-ORN-YEL
8	VIOLET	25	WHT-BLK-BLU	42	WHT-ORN-GRN
9	GRAY	26	WHT-BLK-VIO	43	WHT-ORN-BLU
10	WHITE	27	WHT-BLK-GY	44	WHT-ORN-VIO
11	WHT-BLK	28	WHT-BRN-RED	45	WHT-ORN-GY
12	WHT-BRN	29	WHT-BRN-ORN	46	WHT-YEL-GRN
13	WHT-RED	30	WHT-BRN-YEL	47	WHT-YEL-BLU
14	WHT-ORN	31	WHT-BRN-GRN	48	WHT-YEL-VIO
15	WHT-YEL	32	WHT-BRN-BLU	49	WHT-YEL-GY
16	WHT-GRN	33	WHT-BRN-VIO	50	WHT-GRN-BLU
17	WHT-BLU	34	WHT-BRN-GY		

Ⓐ₃


2.125 MAX REF
Ⓑ
.255
.245
.120
MIN
Ⓐ₂
LEADS MUST BEND 90°±5° AND EXIT WITHIN THIS DIMENSION

ALTERNATE METHOD


Ⓐ₃
.093
.097 DIA
.188 CBORE .060 DEEP
2 HOLES
⊕ A .004 DIA
SEE NOTE 8
.750 DIA
BOSS FOR MOUNTING SCREWS CONTOUR OPTIONAL - SCREW SEAT MUST BE METALLIC
.015 MAX
CASE - SEE NOTE 4
NO. 1 SLIP RING
ROTOR - SEE NOTE 4
LEADS MUST BEND 90°±5° AND PASS THRU .470 .485 DIA SEE NOTE 6
.01
.02 R
45°±5°
Ⓑ
-A-
1.25 MAX
.499
.498 DIA
32
.02 R MAX
.490 MAX DIA
.490 MAX DIA
45°
A .005 TIR
⊥ B .002S
.120 MIN
Ⓑ
.255
.245
.161
.151
.130
.120
1.708
1.703
2.125 MAX
⊥ A .005 TIR
-B-
NO. 37
NO. 38
NO. 26
NO. 50
NO. 1
NO. 50
NO. 25
NO. 1
NO. 13
NO. 12
LEADS NO. 1 THRU 25 TO EXIT THIS SIDE. RANDOM PATTERN ACCEPTABLE.
1.312
1.302

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO -A- WITHIN .015 TIR
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
    - A. AL 6061-T6 PER SPEC QQ-A-327 ANODIZE PER MIL-A-8625 TYPE I, DYED BLACK
    - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. NO. OF RINGS: 50
6. Ⓑ LEADS: MIL-W-16878 TYPE E-28, OR E-30 EXTRUDED WHEN NECESSARY. LENGTH 12 INCHES MIN.
7. MANUFACTURE IN ACCORDANCE WITH (LATER)
8. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED

Ⓑ

ORIGINAL SOURCES OF SUPPLY:

ELECTRO-TEK CORP.
WEST CALDWELL
NEW JERSEY

POLY-SCIENTIFIC CORP.
BLACKSBURG
VIRGINIA

Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ₁

NEXT ASSY	USED ON
1000007	
1000006	DL100000I

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS: —— DECIMALS: ±.005 ANGLES: ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED: [illegible] DATE: 8-3-62
CHECKED:
DRAWN: D.M. WHITE 6-18-62
APPROVED FOR MSC
Jack Bernard [illegible]
BY DIRECTION
MIT: W. [illegible] 7/16/62

SLIP RING ASSY, ELECTRICAL, 50 CONTACT SPECIFICATION CONTROL DWG.

SCALE 2/1
UNIT WT.
CODE IDENT.

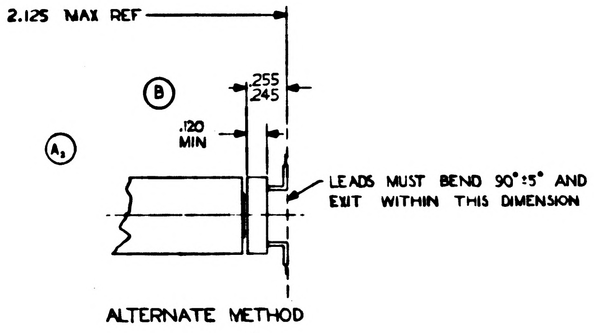
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000038
SHEET 1 OF 1

1000038B

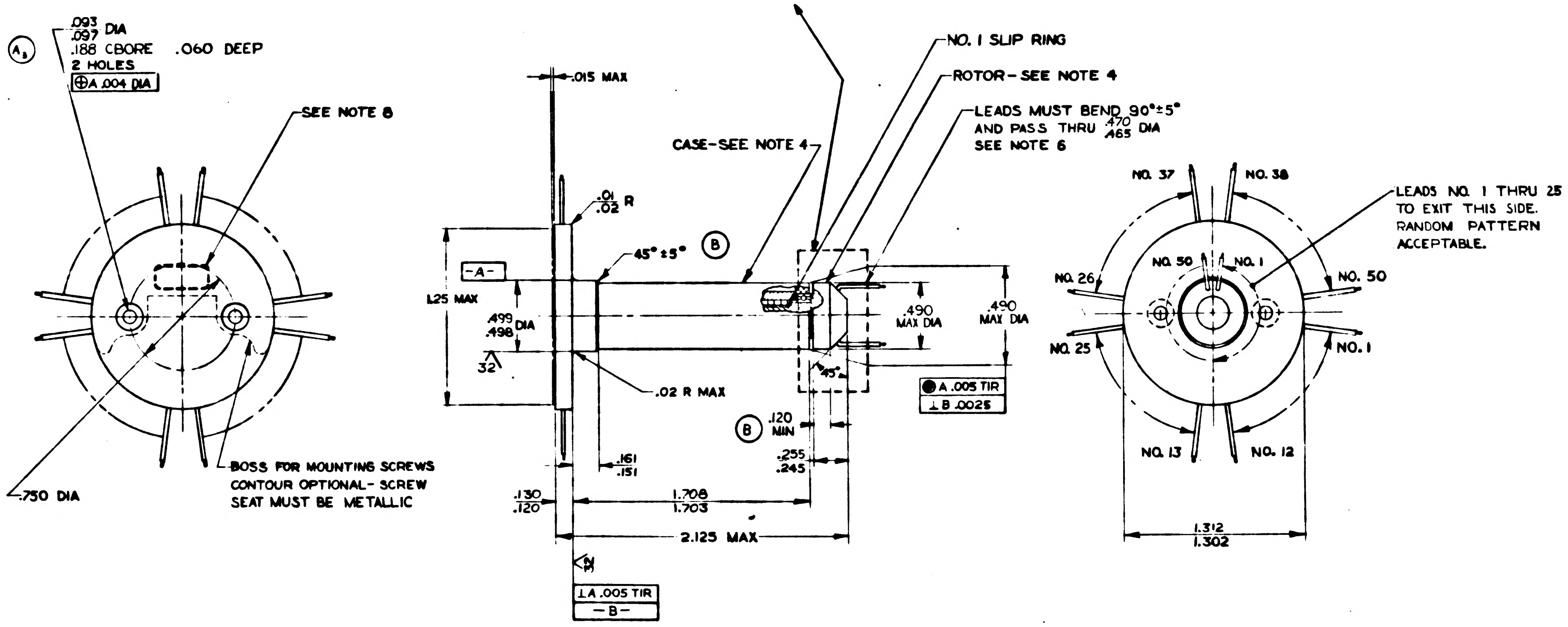
REVISIONS TDR 000C3				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
A-3	A₁	ADDED APPLICATION + TOLERANCES	7-13-62	
D-3	A₂	ADDED ALTERNATE METHOD	7-13-62	
C-6	A₃	.188 CBORE .060 DP. was CSK 81° TO .20 DIA	7-13-62	
	B₀	TDR 00011	8-13-62	ajb B.B
	C₀	TDR 00196	1-2-63	ajb

COLOR CODING OF SLIP RING WIRES USING MIL-STD-681

WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	18	WHT-VIO	35	WHT-RED-ORN
2	BROWN	19	WHT-GY	36	WHT-RED-YEL
3	RED	20	WHT-BLK-BRN	37	WHT-RED-GRN
4	ORANGE	21	WHT-BLK-RED	38	WHT-RED-BLU
5	YELLOW	22	WHT-BLK-ORN	39	WHT-RED-VIO
6	GREEN	23	WHT-BLK-YEL	40	WHT-RED-GY
7	BLUE	24	WHT-BLK-GRN	41	WHT-ORN-YEL
8	VIOLET	25	WHT-BLK-BLU	42	WHT-ORN-GRN
9	GRAY	26	WHT-BLK-VIO	43	WHT-ORN-BLU
10	WHITE	27	WHT-BLK-GY	44	WHT-ORN-VIO
11	WHT-BLK	28	WHT-BRN-RED	45	WHT-ORN-GY
12	WHT-BRN	29	WHT-BRN-ORN	46	WHT-YEL-GRN
13	WHT-RED	30	WHT-BRN-YEL	47	WHT-YEL-BLU
14	WHT-ORN	31	WHT-BRN-GRN	48	WHT-YEL-VIO
15	WHT-YEL	32	WHT-BRN-BLU	49	WHT-YEL-GY
16	WHT-GRN	33	WHT-BRN-VIO	50	WHT-GRN-BLU
17	WHT-BLU	34	WHT-BRN-GY		


2.125 MAX REF
Ⓑ
.255
.245
.120
MIN
(A₂)
LEADS MUST BEND 90°±5° AND EXIT WITHIN THIS DIMENSION

ALTERNATE METHOD


(A₃)
.093
.097 DIA
.188 CBORE .060 DEEP
2 HOLES
⊕A .004 DIA
SEE NOTE 8
.750 DIA
BOSS FOR MOUNTING SCREWS CONTOUR OPTIONAL- SCREW SEAT MUST BE METALLIC
.015 MAX
CASE-SEE NOTE 4
.01
.02 R
45°±5°
Ⓑ
-A-
1.25 MAX
.499
.498 DIA
32
.02 R MAX
.161
.151
.130
.120
1.708
1.703
2.125 MAX
⊥A .005 TIR
-B-
Ⓑ
.120
MIN
.255
.245
45°
.490
MAX DIA
.490
MAX DIA
●A .005 TIR
⊥B .0025
NO. 1 SLIP RING
ROTOR- SEE NOTE 4
LEADS MUST BEND 90°±5° AND PASS THRU .470 .465 DIA SEE NOTE 6
NO. 37
NO. 38
NO. 50
NO. 1
NO. 26
NO. 50
NO. 25
NO. 1
NO. 13
NO. 12
1.312
1.302
LEADS NO. 1 THRU 25 TO EXIT THIS SIDE. RANDOM PATTERN ACCEPTABLE.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO -A- WITHIN .015 TIR
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
4. CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
    - A. AL 6061-T6 PER SPEC QQ-A-327 ANODIZE PER MIL-A-8625 TYPE I, DYED BLACK
    - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. NO. OF RINGS: 50
6. Ⓑ LEADS: MIL-W-16878 TYPE E-28, OR E-30 EXTRUDED WHEN NECESSARY. LENGTH 12 INCHES MIN.
7. Ⓒ ASSEMBLY TO MEET REQUIREMENTS OF PS 1000038
8. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED

ⒷⒸ

ORIGINAL SOURCES OF SUPPLY:

ELECTRO-TEK CORP.
WEST CALDWELL
NEW JERSEY
PART NO. 13360

POLY-SCIENTIFIC CORP.
BLACKSBURG
VIRGINIA
PART NO. AU 1265

Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
(A₁) 1000205	
(C) 1000007	DL1000201
1000006	D_1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Boyce DATE 7-31-62
CHECKED
DRAWN D.M. WHITE 4-18-62
APPROVED FOR MSC
Jack Barnard 7/31/62
BY DIRECTION
MIT APPROVAL: W. Kupfer 7/31/62

SLIP RING ASSY,
ELECTRICAL, 50 CONTACT
SPECIFICATION CONTROL DWG.

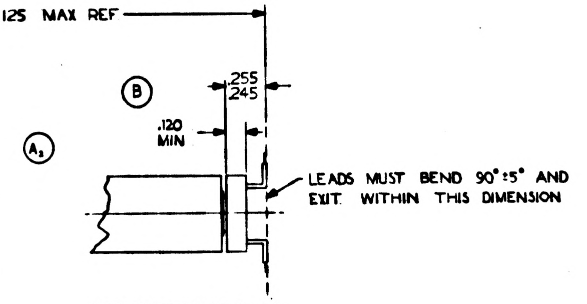
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000038
SHEET 1 OF 1

1000038B

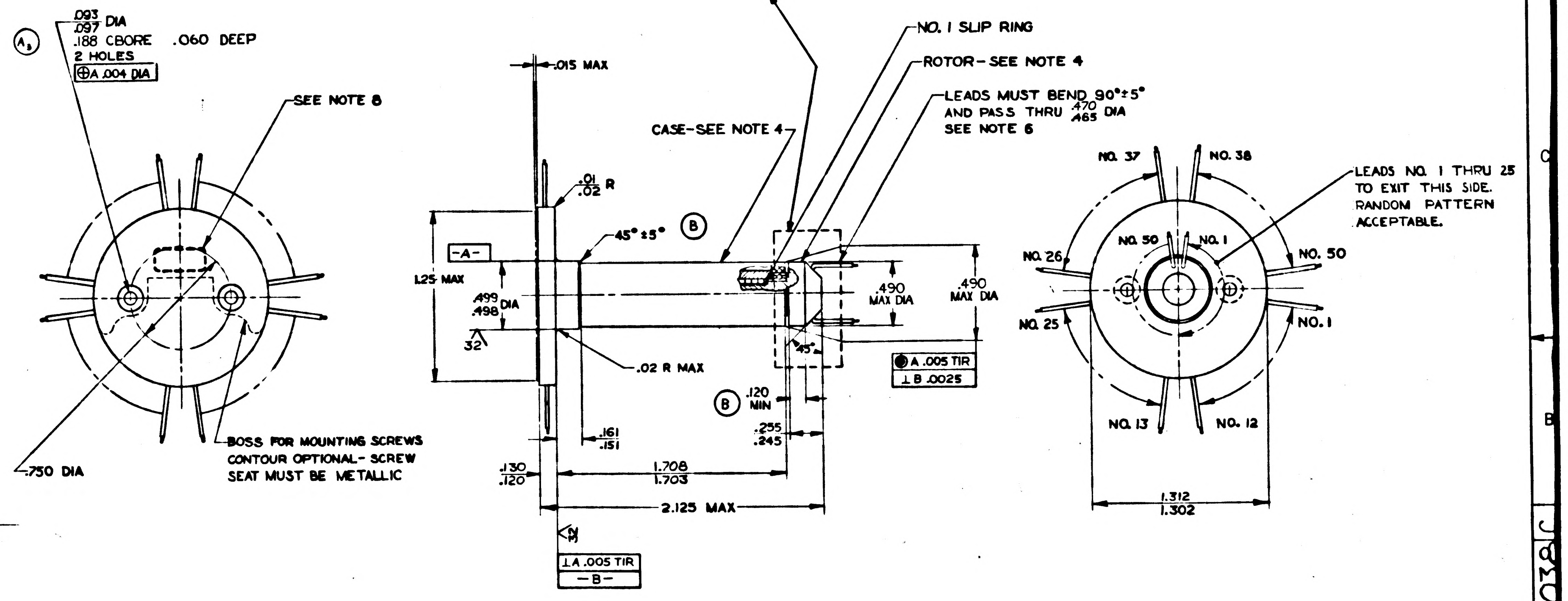
REVISIONS TDR 00003					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
A-3	A₁	ADDED APPLICATION - TOLERANCES	7-13-62		
D-3	A₂	ADDED ALTERNATE METHOD	7-13-62		
C-6	A₃	.188 CBORE .060 DP. was CSK 81° TO .120 DIA	7-13-62		
	B₆	TDR 00011	8-13-62	AJB	
	C₃	TDR 00196	1-2-63	AJB	HM
	D	TDR 00339	2-6-63	AJB	WK.

COLOR CODING OF SLIP RING WIRES USING MIL-STD-681					
WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	18	WHT-VIO	35	WHT-RED-ORN
2	BROWN	19	WHT-GY	36	WHT-RED-YEL
3	RED	20	WHT-BLK-BRN	37	WHT-RED-GRN
4	ORANGE	21	WHT-BLK-RED	38	WHT-RED-BLU
5	YELLOW	22	WHT-BLK-ORN	39	WHT-RED-VIO
6	GREEN	23	WHT-BLK-YEL	40	WHT-RED-GY
7	BLUE	24	WHT-BLK-GRN	41	WHT-ORN-YEL
8	VIOLET	25	WHT-BLK-BLU	42	WHT-ORN-GRN
9	GRAY	26	WHT-BLK-VIO	43	WHT-ORN-BLU
10	WHITE	27	WHT-BLK-GY	44	WHT-ORN-VIO
11	WHT-BLK	28	WHT-BRN-RED	45	WHT-ORN-GY
12	WHT-BRN	29	WHT-BRN-ORN	46	WHT-YEL-GRN
13	WHT-RED	30	WHT-BRN-YEL	47	WHT-YEL-BLU
14	WHT-ORN	31	WHT-BRN-GRN	48	WHT-YEL-VIO
15	WHT-YEL	32	WHT-BRN-BLU	49	WHT-YEL-GY
16	WHT-GRN	33	WHT-BRN-VIO	50	WHT-GRN-BLU
17	WHT-BLU	34	WHT-BRN-GY		



2.125 MAX REF
B
.255
.245
.120
MIN
A₂
LEADS MUST BEND 90°±5° AND
EXIT WITHIN THIS DIMENSION

ALTERNATE METHOD



A₃
.093
.097 DIA
.188 CBORE .060 DEEP
2 HOLES
⊕A .004 DIA
SEE NOTE 8
BOSS FOR MOUNTING SCREWS
CONTOUR OPTIONAL - SCREW
SEAT MUST BE METALLIC
.750 DIA
.015 MAX
CASE-SEE NOTE 4
NO. 1 SLIP RING
ROTOR-SEE NOTE 4
LEADS MUST BEND 90°±5°
AND PASS THRU .470/.465 DIA
SEE NOTE 6
.01
.02 R
45°±5°
B
-A-
1.25 MAX
.499
.498 DIA
32
.02 R MAX
.490
MAX DIA
.490
MAX DIA
45°
A .005 TIR
⊥ B .0025
B
.120
MIN
.161
.151
.255
.245
.130
.120
1.708
1.703
2.125 MAX
⊥A .005 TIR
-B-
NO. 37
NO. 38
NO. 26
NO. 50
NO. 1
NO. 50
NO. 25
NO. 1
NO. 13
NO. 12
LEADS NO. 1 THRU 25
TO EXIT THIS SIDE.
RANDOM PATTERN
ACCEPTABLE.
1.312
1.302

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO -A- WITHIN .015 TIR
3. BREAK ALL SHARP EDGES .005/.015
4. CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
   - A. AL 6061-T6 PER SPEC QQ-A-327 ANODIZE PER MIL-A-8625 TYPE I, DYED BLACK
   - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. NO. OF RINGS: 50
6. (B) LEADS: MIL-W-16878 TYPE E-28, OR E-30 EXTRUDED WHEN NECESSARY. LENGTH 12 INCHES MIN.
7. (D)(C) ASSEMBLY MUST MEET REQUIREMENTS OF NASA SPEC ND 1002014
8. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED
10. (D) MAX. ALLOWABLE TORQUE: 150 GM-CM

(B)(C)

ORIGINAL SOURCES OF SUPPLY:

ELECTRO-TEK CORP.
WEST CALDWELL
NEW JERSEY
PART NO. 13360

POLY-SCIENTIFIC CORP.
BLACKSBURG
VIRGINIA
PART NO. AU 1265

MASTER

(B)

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000205	
1000007	DL 1000201
1000006	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

(A₁) (C)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A.J. Boyce DATE 7-31-62
CHECKED
DRAWN D.M. WHITE 4-19-62
APPROVED FOR MSC
Jack Barnard 7/31/62
BY DIRECTION
MIT APPROVAL: W. Kopf 7/31/62

SLIP RING ASSY,
ELECTRICAL, 50 CONTACT
SPECIFICATION CONTROL DWG.

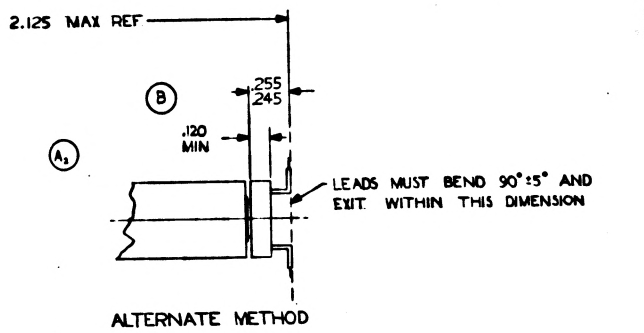
SCALE 2/1
UNIT WT.
CODE IDENT.

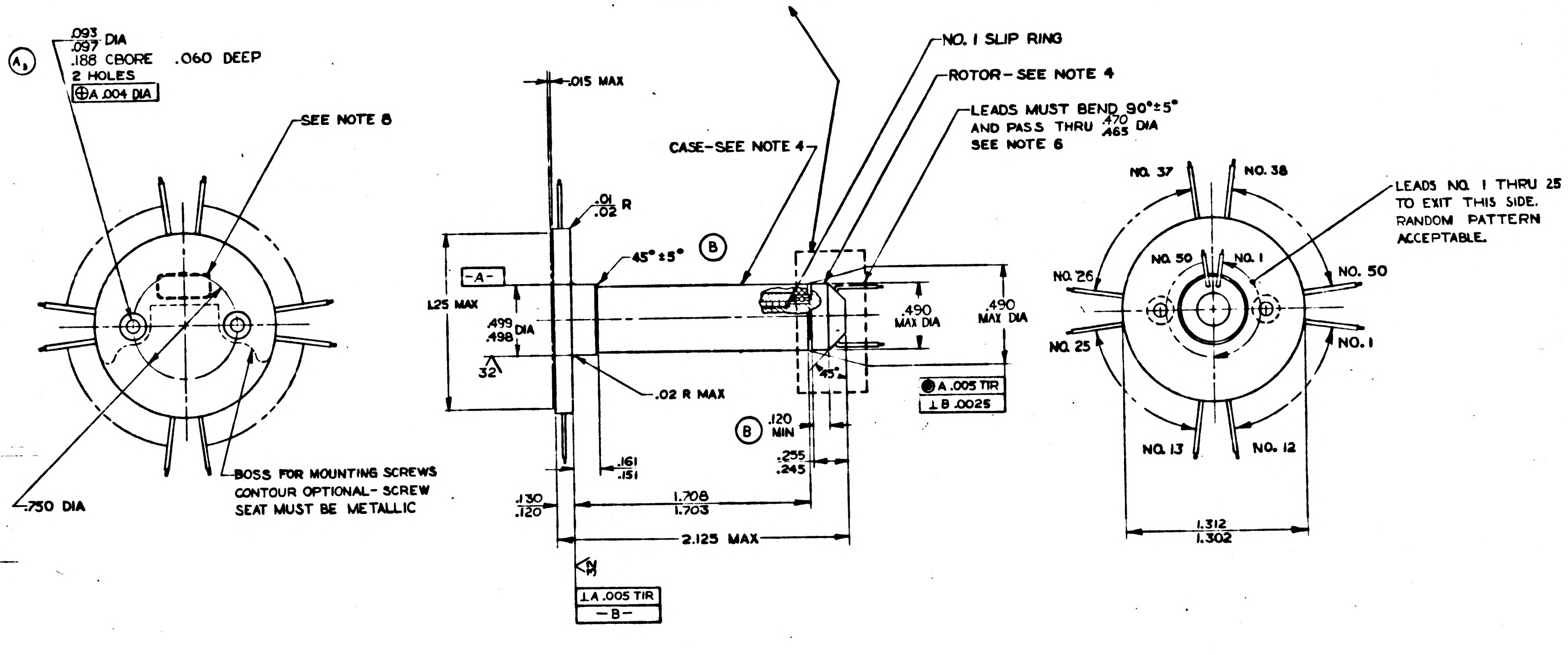
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000038
SHEET 1 OF 1

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
			REVISIONS TDR 00003			
Ⓜ	A-3	A₁	ADDED APPLICATION - TOLERANCES	7-13-62		
	D-3	A₂	ADDED ALTERNATE METHOD	7-13-62		
	C-6	A₃	.188 CBORE .060 DP. WAS CSK 81° TO [illegible] DIA	7-13-62		
Ⓜ		B₆	TDR 00011	8-13-62	ajB	
Ⓜ		C₂	TDR 00196	1-2-63	ajB	
		D	TDR 00339	2-6-63	ajB	WK
		E	TDRR 00776	4-9-63	ajB	WK

COLOR CODING OF SLIP RING WIRES USING MIL-STD-681

WIRE NO.	COLOR	WIRE NO.	COLOR	WIRE NO.	COLOR
1	BLACK	18	WHT-VIO	35	WHT-RED-ORN
2	BROWN	19	WHT-GY	36	WHT-RED-YEL
3	RED	20	WHT-BLK-BRN	37	WHT-RED-GRN
4	ORANGE	21	WHT-BLK-RED	38	WHT-RED-BLU
5	YELLOW	22	WHT-BLK-ORN	39	WHT-RED-VIO
6	GREEN	23	WHT-BLK-YEL	40	WHT-RED-GY
7	BLUE	24	WHT-BLK-GRN	41	WHT-ORN-YEL
8	VIOLET	25	WHT-BLK-BLU	42	WHT-ORN-GRN
9	GRAY	26	WHT-BLK-VIO	43	WHT-ORN-BLU
10	WHITE	27	WHT-BLK-GY	44	WHT-ORN-VIO
11	WHT-BLK	28	WHT-BRN-RED	45	WHT-ORN-GY
12	WHT-BRN	29	WHT-BRN-ORN	46	WHT-YEL-GRN
13	WHT-RED	30	WHT-BRN-YEL	47	WHT-YEL-BLU
14	WHT-ORN	31	WHT-BRN-GRN	48	WHT-YEL-VIO
15	WHT-YEL	32	WHT-BRN-BLU	49	WHT-YEL-GY
16	WHT-GRN	33	WHT-BRN-VIO	50	WHT-GRN-BLU
17	WHT-BLU	34	WHT-BRN-GY		


2.125 MAX REF
Ⓑ
.255
.245
Ⓐ₂
.120
MIN
LEADS MUST BEND 90°±5° AND EXIT WITHIN THIS DIMENSION
ALTERNATE METHOD


Ⓐ₃
.093
.097 DIA
.188 CBORE .060 DEEP
2 HOLES
⊕A .004 DIA
SEE NOTE 8
.750 DIA
BOSS FOR MOUNTING SCREWS CONTOUR OPTIONAL- SCREW SEAT MUST BE METALLIC
.015 MAX
CASE-SEE NOTE 4
NO. 1 SLIP RING
ROTOR-SEE NOTE 4
LEADS MUST BEND 90°±5° AND PASS THRU .470 .465 DIA SEE NOTE 6
.01
.02 R
45°±5°
Ⓑ
-A-
1.25 MAX
.499
.498 DIA
32
.02 R MAX
.490 MAX DIA
.490 MAX DIA
45°
◉A .005 TIR
⊥B .0025
Ⓑ
.120 MIN
.255
.245
.161
.151
.130
.120
1.708
1.703
2.125 MAX
⊥A .005 TIR
-B-
NO. 37
NO. 38
NO. 50
NO. 1
NO. 26
NO. 50
NO. 25
NO. 1
NO. 13
NO. 12
LEADS NO. 1 THRU 25 TO EXIT THIS SIDE. RANDOM PATTERN ACCEPTABLE.
1.312
1.302

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED DECIMAL DIAMETERS TO BE CONCENTRIC TO -A- WITHIN .015 TIR
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. Ⓔ CASE AND ROTOR FLANGE MATERIAL OPTIONAL, ONE OF THE FOLLOWING MAY BE USED WITH APPLICABLE FINISH
   - A. AL 6061-T6 PER SPEC QQ-A-325 ANODIZE PER MIL-A-8625 TYPE OPTIONAL, CLEAR OR DYED BLACK
   - B. CRES, CL 303, COND A FINISH HOT PER SPEC QQ-S-763 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. NO. OF RINGS: 50
6. Ⓑ LEADS: MIL-W-16878 TYPE E-28, OR E-30 EXTRUDED WHEN NECESSARY. LENGTH 12 INCHES MIN.
7. ⒹⒸ ASSEMBLY MUST MEET REQUIREMENTS OF NASA SPEC ND 1002014
8. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130 (NAMEPLATE PERMISSIBLE)
9. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
10. Ⓓ MAX. ALLOWABLE TORQUE: 150 GM-CM

ⒷⒸ

ORIGINAL SOURCES OF SUPPLY:

ELECTRO-TEK CORP.
WEST CALDWELL
NEW JERSEY
PART NO. 13360

POLY-SCIENTIFIC CORP.
BLACKSBURG
VIRGINIA
PART NO. AU 1265

MASTER

Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	LIST OF PARTS AND MATERIALS				

NEXT ASSY	USED ON
Ⓐ₁ 1000205	
Ⓒ 1000007	DL1000201
1000006	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
DATE
APPROVED A.J. Bergan 7-3-62
CHECKED
DRAWN D.M. WHITE 4-19-62
APPROVED FOR MSC Jack Barnard 7/24/63
BY DIRECTION
MIT APPROVAL: W. Kupfer 7/8/63

SLIP RING ASSY,
ELECTRICAL, 50 CONTACT
SPECIFICATION CONTROL DWG.

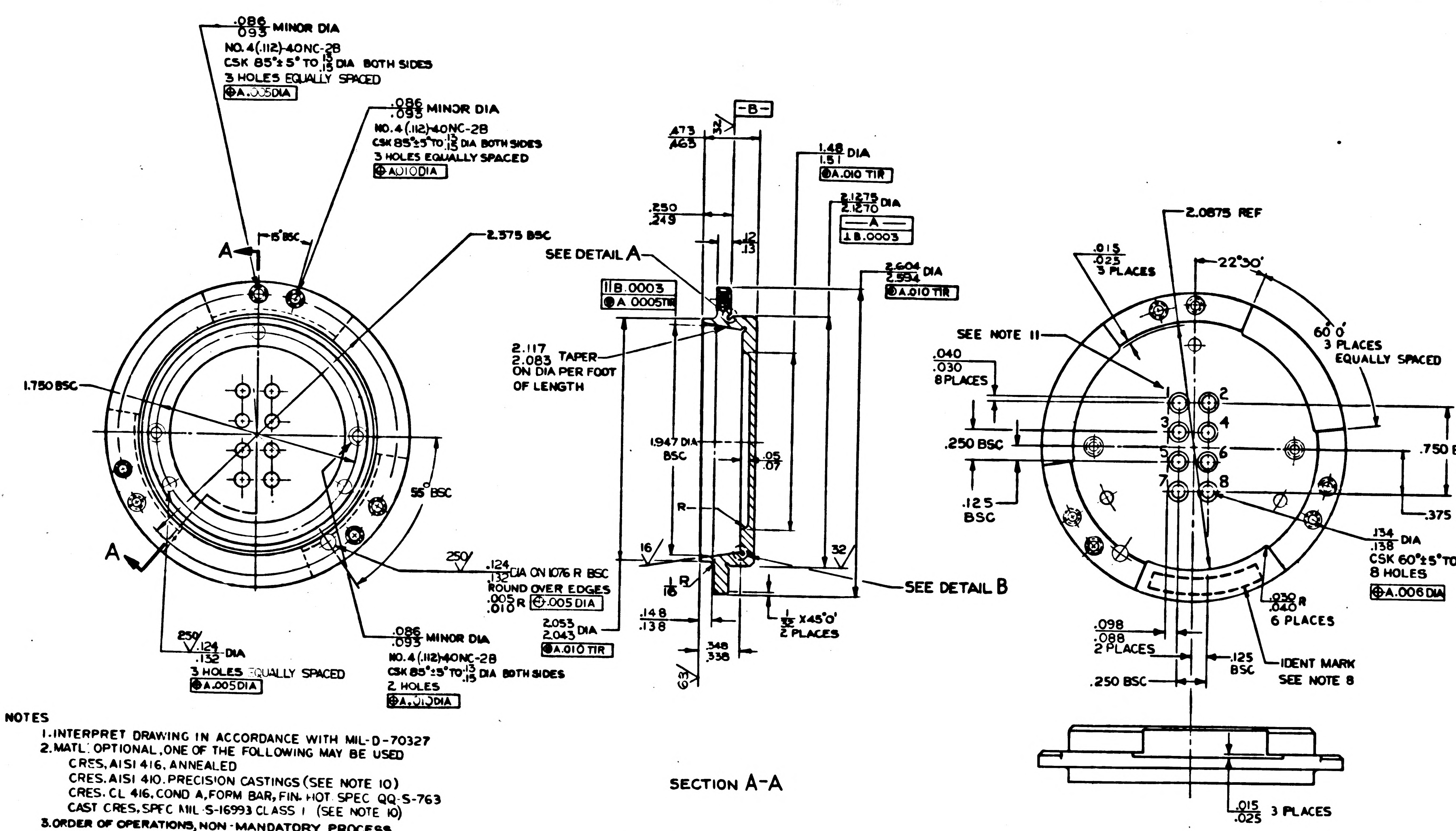
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000038
SHEET 1 OF 1

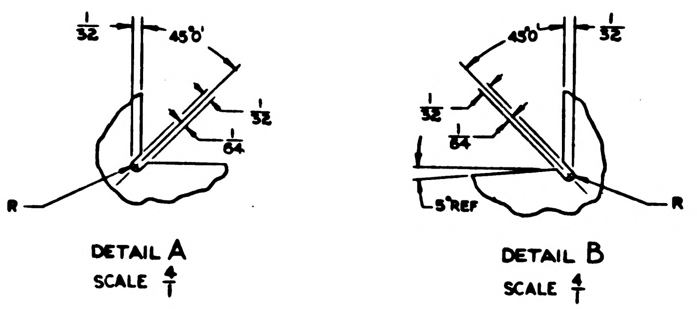
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000038

SYM	DESCRIPTION	DATE	APPROVAL
C	REVISED, REDRAWN	1H3-62	WK


.086 .093 MINOR DIA
NO. 4 (.112)-40NC-2B
CSK 85°±5° TO .13 .15 DIA BOTH SIDES
3 HOLES EQUALLY SPACED
A .005 DIA
A .010 DIA
2.375 BSC
15° BSC
1.750 BSC
55° BSC
A
.124 .132 DIA ON 1.076 R BSC
ROUND OVER EDGES
.005 .010 R
.005 DIA
.124 .132 DIA
2 HOLES
.473 .463
.250 .249
B
1.48 1.51 DIA
A .010 TIR
2.1275 2.1270 DIA
A
B .0003
.12 .13
SEE DETAIL A
B .0003
A .0005 TIR
2.604 2.594 DIA
A .010 TIR
2.117 2.083 TAPER ON DIA PER FOOT OF LENGTH
1.947 DIA BSC
.05 .07
R
16
32
.148 .138
2.053 2.043 DIA
A .010 TIR
1/32 X 45°0' 2 PLACES
.348 .338
63
SEE DETAIL B
2.0875 REF
.015 .025 3 PLACES
22°30'
SEE NOTE 11
60°0' 3 PLACES EQUALLY SPACED
.040 .030 8 PLACES
.250 BSC
.750 BSC
.125 BSC
.375 BSC
.134 .138 DIA
CSK 60°±5° TO .160 .165 DIA
8 HOLES
A .006 DIA
.030 .040 R 6 PLACES
.098 .088 2 PLACES
.125 BSC
IDENT MARK SEE NOTE 8
.250 BSC
.015 .025 3 PLACES
1 2 3 4 5 6 7 8

SECTION A-A


1/32
45°0'
1/32
1/64
R
5° REF

DETAIL A
SCALE 4/1

DETAIL B
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATL: OPTIONAL, ONE OF THE FOLLOWING MAY BE USED
   CRES, AISI 416, ANNEALED
   CRES. AISI 410. PRECISION CASTINGS (SEE NOTE 10)
   CRES. CL 416, COND A, FORM BAR, FIN. HOT SPEC QQ-S-763
   CAST CRES, SPEC MIL-S-16993 CLASS I (SEE NOTE 10)
3. ORDER OF OPERATIONS, NON-MANDATORY PROCESS
   A. ROUGH MACHINE TO WITHIN .010 TO .020 OF FINISH DIMENSIONS
   B. HEAT TREATMENT:
      1. 1750°F ±2° 30 MINUTES ± 5 MINUTES, OIL QUENCH.
      2. 600°F ±2°, TWO (2) HOURS ± 5 MINUTES (TEMPER)
   C. FINISH MACHINE
   D. STABILIZE AT 200°F ±5° 2.0 HOURS ± 10 MINUTES, AIR COOL
4. HARDEN TO ROCKWELL R_C 40-45 PER MIL-H-6875
5. 125√ ALL OVER UNLESS OTHERWISE SPECIFIED, CASTING ONLY
6. BREAK SHARP EDGES $^{.005}_{.015}$
7. BLACK PASSIVATE IN ACCORDANCE WITH MIL-C-13924 CLASS 3.
8. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
9. INSIDE RADII .005 MAX
10. IF PART IS CAST, CASTING TO CONFORM TO MIL-C-10005
11. MARK IN .09 HIGH CHARACTERS BY ENGRAVING

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000126	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64
DECIMALS —
ANGLES ± 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED G. J. [illegible] DATE 11/21/62
CHECKED
DRAWN L. MILLS 6-31-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL W. [illegible] 21 NOV 62

MOUNT, TAPERED
25 IRIG

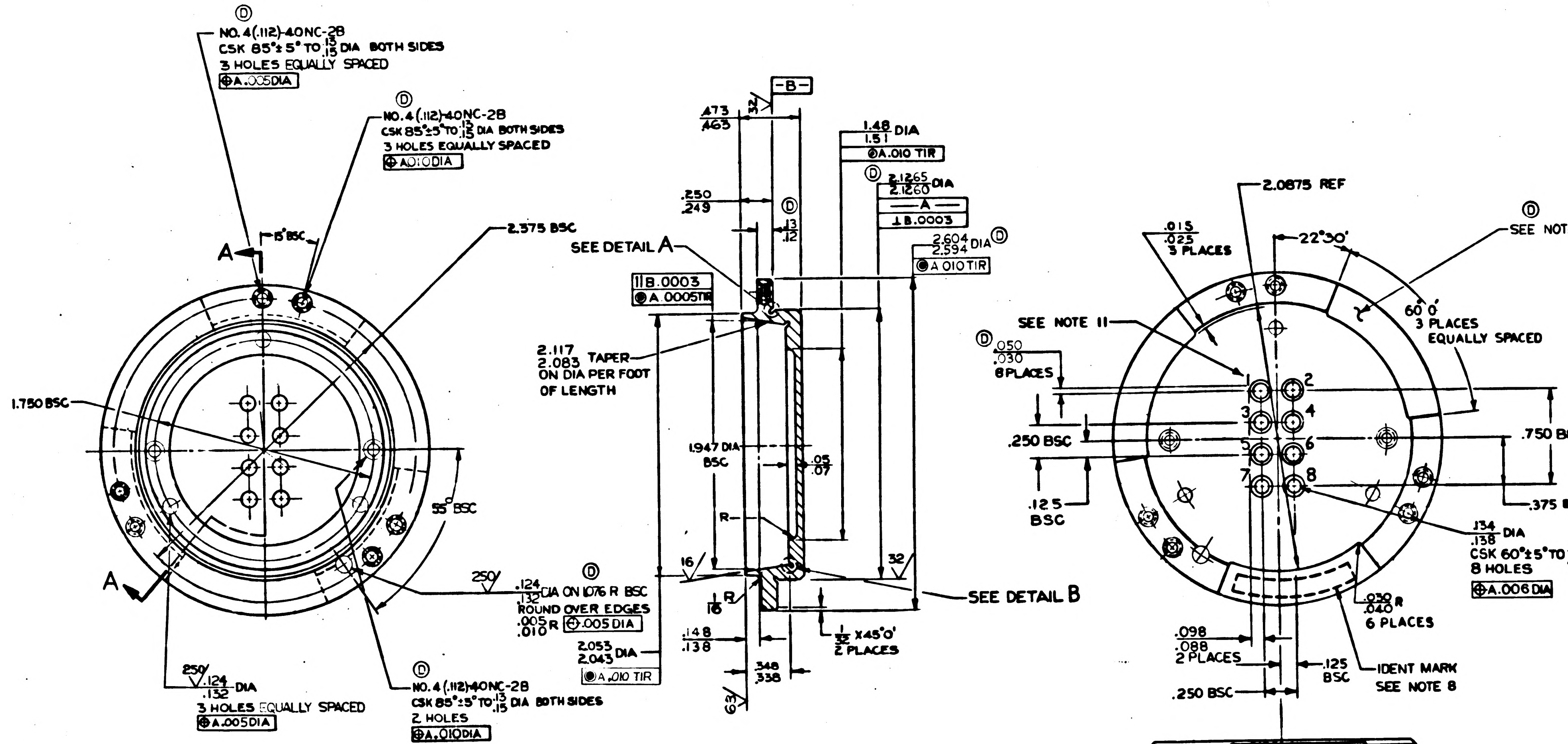
SCALE 2-1
UNIT WT. —
CODE IDENT —

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000039
SHEET 1 OF 1

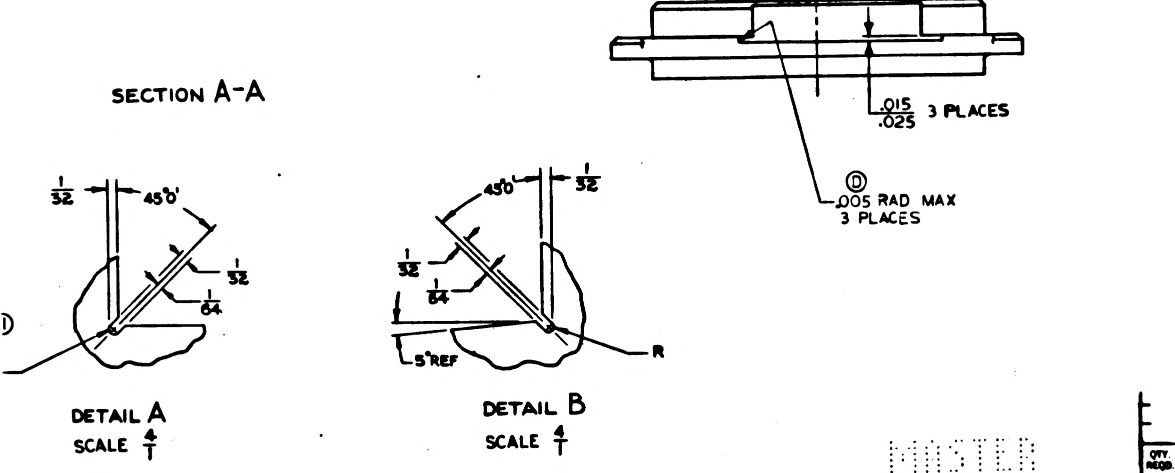
1000039 C

		TDRR 00 05	
SYM	DESCRIPTION	DATE	APPROVAL
C	REVISED, REDRAWN	11-13-62 ajB	WK
D	TDRR 00301	2-4-63 ajB	WK
E	TDRR 00336	2-4-63 ajB	WK

Ⓜ



Ⓓ NO. 4(.112)-40NC-2B
CSK 85°±5° TO .13/.15 DIA BOTH SIDES
3 HOLES EQUALLY SPACED
⊕A.005DIA
Ⓓ NO. 4(.112)-40NC-2B
CSK 85°±5° TO .13/.15 DIA BOTH SIDES
3 HOLES EQUALLY SPACED
⊕A.010DIA
A
15° BSC
2.375 BSC
1.750 BSC
55° BSC
A
250 .124/.132 DIA
3 HOLES EQUALLY SPACED
⊕A.005DIA
Ⓓ NO. 4(.112)-40NC-2B
CSK 85°±5° TO .13/.15 DIA BOTH SIDES
2 HOLES
⊕A.010DIA
250 Ⓓ .124/.132 DIA ON 1.076 R BSC
ROUND OVER EDGES
.005/.010 R ⊕.005 DIA
2.053/2.043 DIA
◉A .010 TIR
-B-
32
.473/.463
.250/.249
Ⓓ .13/.12
SEE DETAIL A
∥B.0003
◉A .0005TIR
2.117/2.083 TAPER ON DIA PER FOOT OF LENGTH
1.947 DIA BSC
.05/.07
R
16
1/16 R
.148/.138
.348/.338
63
1.48/1.51 DIA
◉A.010 TIR
Ⓓ 2.1265/2.1260 DIA
—A—
⊥B.0003
2.604/2.594 DIA Ⓓ
◉A .010 TIR
32
1/32 X45°0' 2 PLACES
SEE DETAIL B
2.0875 REF
.015/.025 3 PLACES
22°30'
Ⓓ SEE NOTE 4
60°0' 3 PLACES EQUALLY SPACED
SEE NOTE 11
Ⓓ .050/.030 8 PLACES
1
2
3
4
5
6
7
8
.250 BSC
.125 BSC
.750 BSC
.375 BSC
.134/.138 DIA
CSK 60°±5° TO .160/.165 DIA
8 HOLES
⊕A.006 DIA
.030/.040 R
6 PLACES
.098/.088 2 PLACES
.125 BSC
.250 BSC
IDENT MARK
SEE NOTE 8



.015/.025 3 PLACES
Ⓓ .005 RAD MAX 3 PLACES
SECTION A-A
1/32
45°0'
1/32
1/64
R
DETAIL A
SCALE 4/1
45°0'
1/32
1/32
1/64
5° REF
R
DETAIL B
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATL: OPTIONAL, ONE OF THE FOLLOWING MAY BE USED
   - CRES, AISI 416, ANNEALED
   - CRES. AISI 410. PRECISION CASTINGS (SEE NOTE 10)
   - Ⓔ CRES. CL 416, COND A, FORM BAR, FIN. COLD SPEC QQ-S-763
   - CAST CRES, SPEC MIL-S-16993 CLASS I (SEE NOTE 10)
3. ORDER OF OPERATIONS, NON-MANDATORY PROCESS
   - A. ROUGH MACHINE TO WITHIN .010 TO .020 OF FINISH DIMENSIONS
   - B. HEAT TREATMENT:
     - Ⓓ 1) 1750°F ±2° 30 MINUTES ±5 MINUTES, OIL QUENCH.
     - Ⓓ 2) 600°F ±2°, TWO (2) HOURS ±5 MINUTES (TEMPER)
   - C. FINISH MACHINE
   - D. STABILIZE AT 200°F ±5° 20 HOURS ±10 MINUTES, AIR COOL
4. Ⓓ HARDNESS: ROCKWELL R_C 36-40 TO BE CHECKED AT INDICATED AREA ONLY (SEE NOTE 11)
5. Ⓓ Ⓓ BREAK SHARP EDGES .005/.015
6. Ⓓ PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FINISH E-300
7. Ⓓ IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
8. Ⓓ Ⓓ IF PART IS CAST, CASTING TO CONFORM TO MIL-C-10005
9. Ⓓ ENGRAVE .090 ±.015 HIGH CHARACTERS GOTHIC TYPE FILLED LETTERS OPTIONAL
10. Ⓓ IF NOTE 3 IS NOT FOLLOWED, HARDEN TO ROCKWELL R_C 36-40 PER MIL-H-6875
11. Ⓓ SURFACE FINISH UNLESS OTHERWISE SPECIFIED: CASTING 125√ MACHINING 63√

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201 Ⓓ
1000126	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS — ANGLES ± 2°0'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	G J Bergen	11/21/62
CHECKED		
DRAWN	L MILLS	5-31-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL W Kupfer 21 Nov 62

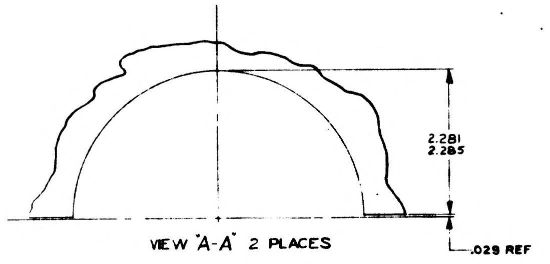
MOUNT, TAPERED
25 IRIG

SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000039
SHEET 1 OF 1

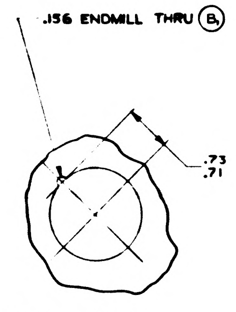
1000039 E

REVISIONS TDR 00025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
1-A	A	CHANGED TITLE	6-11-62	
	B1	ADDED .56 ENDMILL SLOTS	6-28-62	
	B2	ADDED VIEWS C-C & D-D	6-28-62	
	C	TDRR 00213	1-8-63	



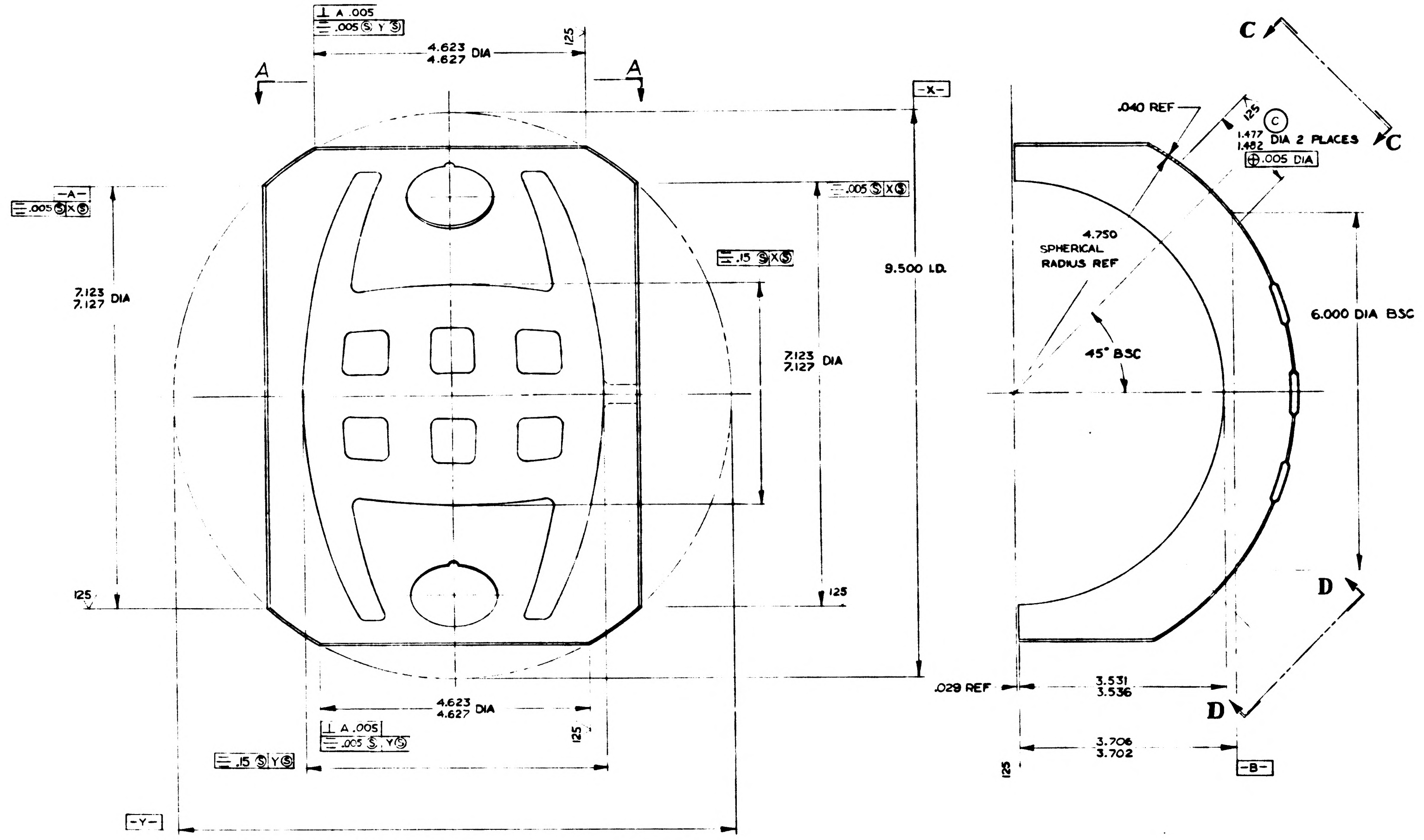
2.281
2.285
.029 REF

VIEW "A-A" 2 PLACES

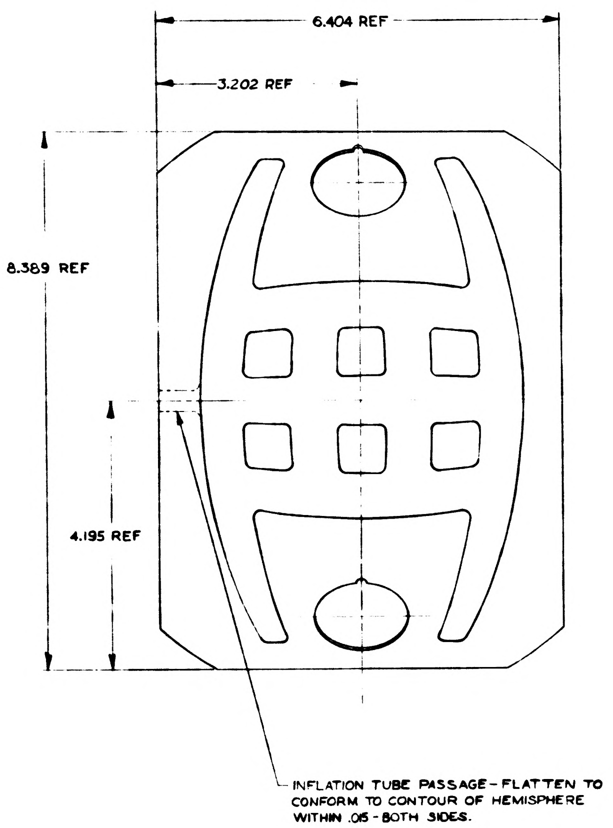


.156 ENDMILL THRU (B1)
.73
.71

(B1) VIEW C-C

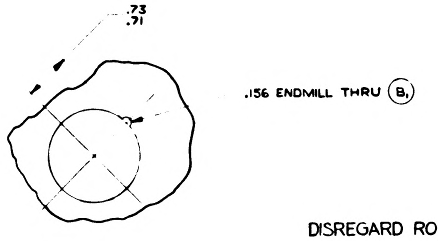


⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
.125
A
A
-X-
-A-
⌯ .005 Ⓢ X Ⓢ
⌯ .005 Ⓢ X Ⓢ
⌯ .15 Ⓢ X Ⓢ
7.123
7.127 DIA
7.123
7.127 DIA
9.500 I.D.
.125
.125
4.623
4.627 DIA
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
.125
⌯ .15 Ⓢ Y Ⓢ
-Y-
C
C
.040 REF
.125
(C)
1.477
1.482 DIA 2 PLACES
⌖ .005 DIA
4.750
SPHERICAL
RADIUS REF
45° BSC
6.000 DIA BSC
D
D
.029 REF
3.531
3.536
3.706
3.702
.125
-B-



6.404 REF
3.202 REF
8.389 REF
4.195 REF

INFLATION TUBE PASSAGE - FLATTEN TO CONFORM TO CONTOUR OF HEMISPHERE WITHIN .05 - BOTH SIDES.



.73
.71
.156 ENDMILL THRU (B1)

(B1) VIEW D-D

DISREGARD ROLLBOND PATTERN & RELATED NOTES & DIMENSIONS.

NOTES:
1. MATERIAL: 1000042 (DEVELOPMENT-HYDROFORMED HEMISPHERE 9.500 I.D.)
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES .005 .015

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000063	DL 1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED 9-13-62
CHECKED
DRAWN D.M.WHITE 5-16-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

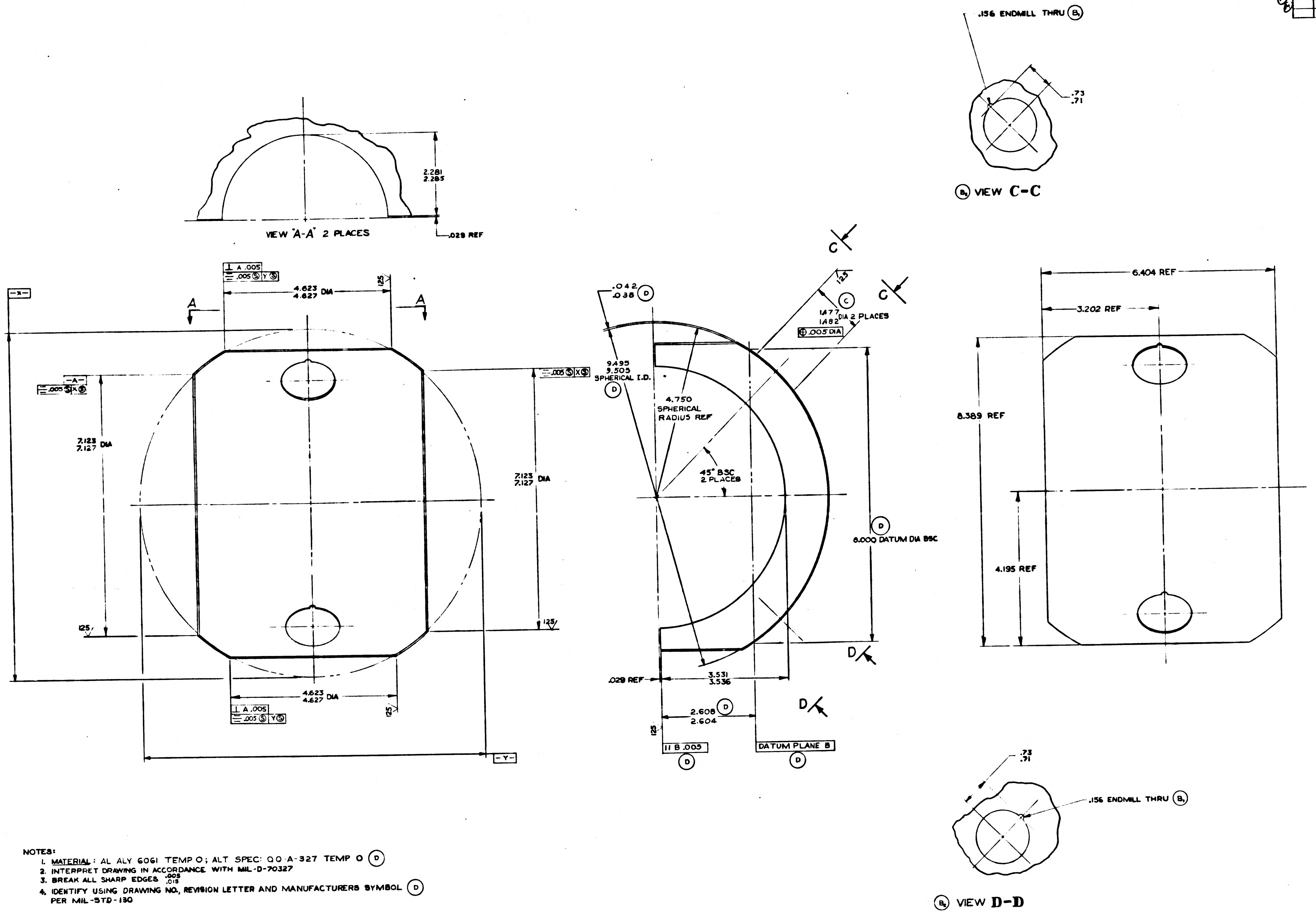
(A) HEMISPHERE
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000041
SHEET 1 OF 1

1000041 C

REVISIONS TDR 00025					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
1-A	A	CHANGED TITLE	6-11-62		
	B1	ADDED .156 ENDMILL SLOTS	6-28-62		
	B2	ADDED VIEWS C-C & D-D	6-28-62		WDH
	C	TDRR 00213	1-8-63		
	D	TDRR 00364	2-6-63		



.156 ENDMILL THRU (B1)
.73
.71
(B2) VIEW C-C
2.281
2.285
VIEW "A-A" 2 PLACES
.029 REF
⊥ A .005
= .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
A
A
-X-
-A-
= .005 Ⓢ X Ⓢ
7.123
7.127 DIA
7.123
7.127 DIA
= .005 Ⓢ X Ⓢ
125
125
4.623
4.627 DIA
⊥ A .005
= .005 Ⓢ Y Ⓢ
125
-Y-
.042
.038 (D)
9.495
9.505
SPHERICAL I.D. (D)
4.750
SPHERICAL
RADIUS REF
45° BSC
2 PLACES
C
C
125
(C)
.1477
.1482 DIA 2 PLACES
⊕ .005 DIA
(D)
8.000 DATUM DIA BSC
D
D
.029 REF
3.531
3.536
2.608 (D)
2.604
125
∥ B .005
(D)
DATUM PLANE B
(D)
6.404 REF
3.202 REF
8.389 REF
4.195 REF
.73
.71
.156 ENDMILL THRU (B1)
(B2) VIEW D-D

NOTES:

1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O (D)
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL (D) PER MIL-STD-130

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000063	DL 1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

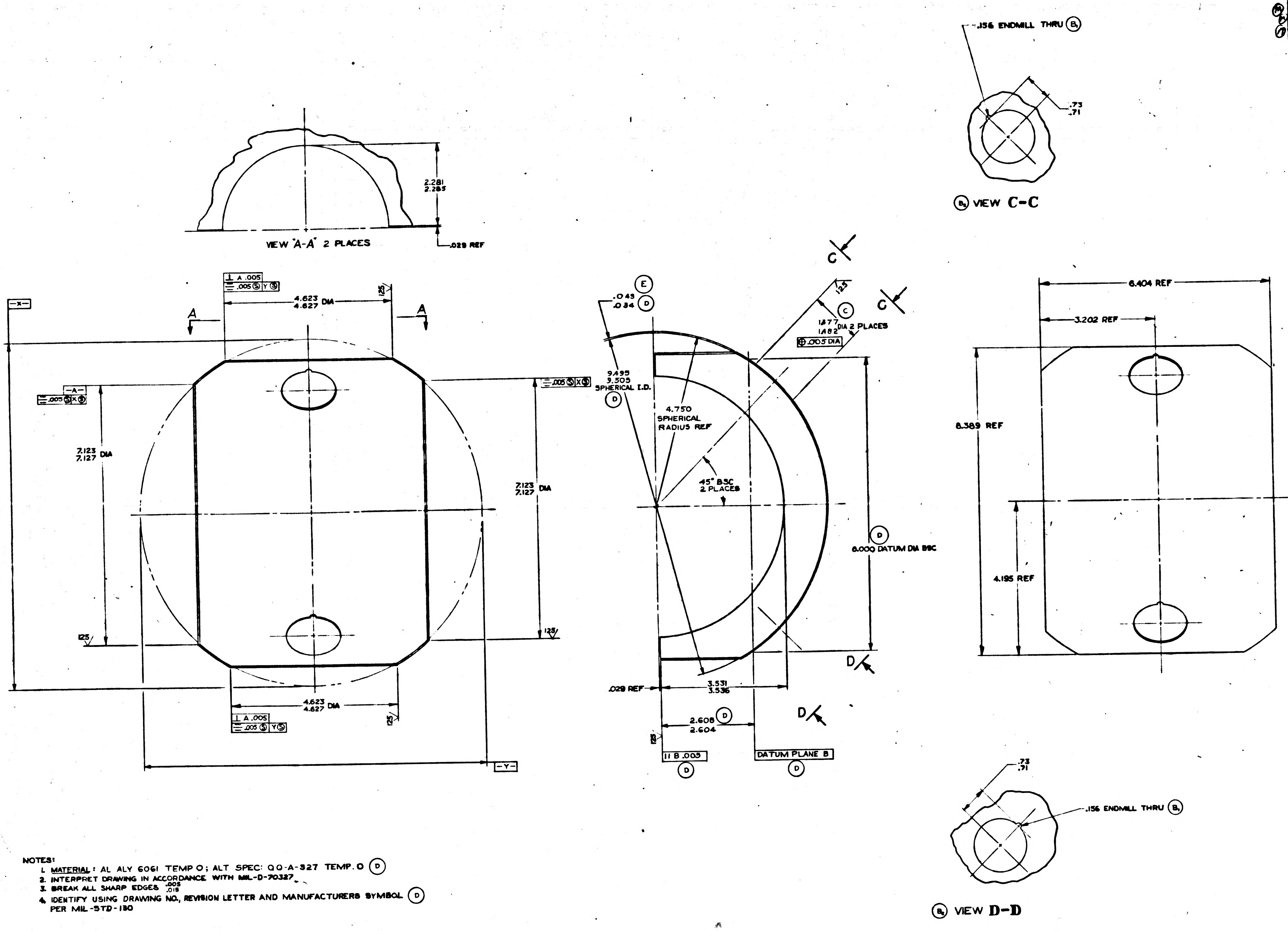
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED | DATE 9-13-62
CHECKED
DRAWN D.M.WHITE 5-16-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 9/13/62

(A) HEMISPHERE
FIXED
MIDDLE GIMBAL

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000041

SCALE 1/1
UNIT WT.
CODE IDENT.
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDR 00025			
1-A	A	CHANGED TITLE	6-11-62		
	B1	ADDED .156 ENDMILL SLOTS	6-28-62		
	B2	ADDED VIEWS C-C & D-D	6-28-62		
	C	TDRR 00213	1-8-63		
	D	TDRR 00364	2-6-63		
	E	TDRR 00783	4-9-63		



.156 ENDMILL THRU (B1)
.73
.71
(B2) VIEW C-C
VIEW "A-A" 2 PLACES
2.281
2.285
.029 REF
⊥ A .005
═ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
A
A
-X-
-A-
═ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
═ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
125
4.623
4.627 DIA
⊥ A .005
═ .005 Ⓢ Y Ⓢ
-Y-
(E)
.043
.034 (D)
9.495
9.505
SPHERICAL I.D. (D)
4.750
SPHERICAL
RADIUS REF
45° BSC
2 PLACES
C
C
125
(C)
1.877
1.882 DIA 2 PLACES
⊕ .005 DIA
(D)
8.000 DATUM DIA BSC
D
D
.029 REF
3.531
3.536
2.608 (D)
2.604
11 B .005 (D)
DATUM PLANE B (D)
6.404 REF
3.202 REF
8.389 REF
4.195 REF
.73
.71
.156 ENDMILL THRU (B1)
(B2) VIEW D-D

NOTES:

1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP. O (D)
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL (D) PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000063	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DRAWN D.M.WHITE 5-15-62
APPROVED FOR MSC
BY DIRECTION

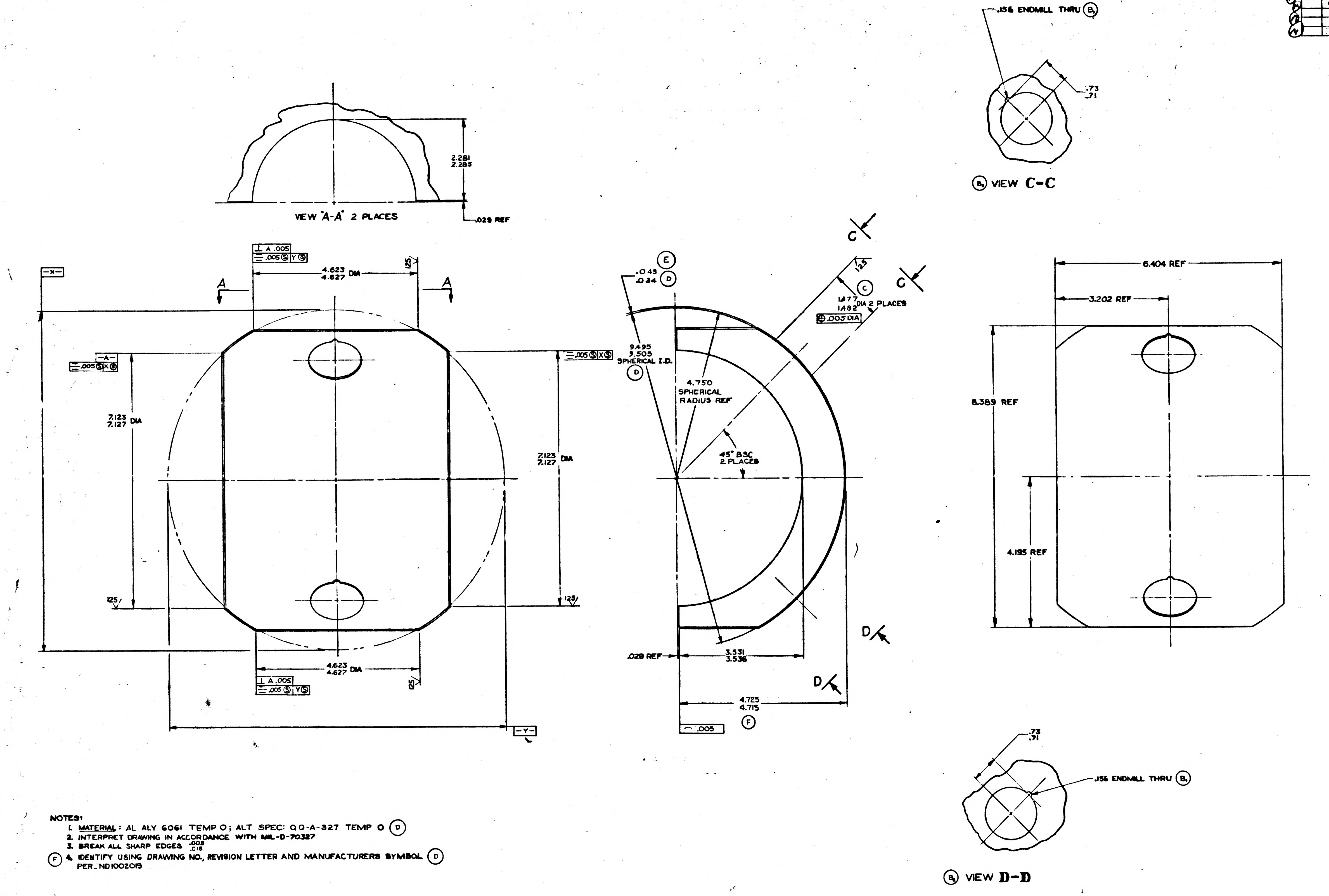
(A) HEMISPHERE
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000041
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS		TDR 00025		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
1-A	A	CHANGED TITLE	6-11-62	
	B₁	ADDED .156 ENDMILL SLOTS	6-28-62	
	B₂	ADDED VIEWS C-C & D-D	6-28-62	
	C	TDRR 00213	1-8-63	
	D	TDRR 00364	2-6-63	
	E	TDRR 00783	4-9-63	
	F	TDRR 04562	11-12-63	



.156 ENDMILL THRU (B₁)
.73
.71
(B₁) VIEW C-C
2.281
2.285
VIEW "A-A" 2 PLACES
.029 REF
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
A
A
-X-
-A-
⌯ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
125
4.623
4.627 DIA
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
-Y-
.043 (E)
.034 (D)
9.495
9.505
SPHERICAL I.D. (D)
4.750
SPHERICAL
RADIUS REF
45° BSC
2 PLACES
C
C
125
(C)
1.477
1.482 DIA 2 PLACES
⊕ .005 DIA
.029 REF
3.531
3.536
D
D
4.725
4.715 (F)
⌒ .005
6.404 REF
3.202 REF
8.389 REF
4.195 REF
(B₁) VIEW D-D

NOTES:

1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O (D)
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. (F) IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL (D) PER ND1002019

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000063	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DRAWN D.M.WHITE 5-16-62
APPROVED FOR MSC
BY DIRECTION

(A) HEMISPHERE
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

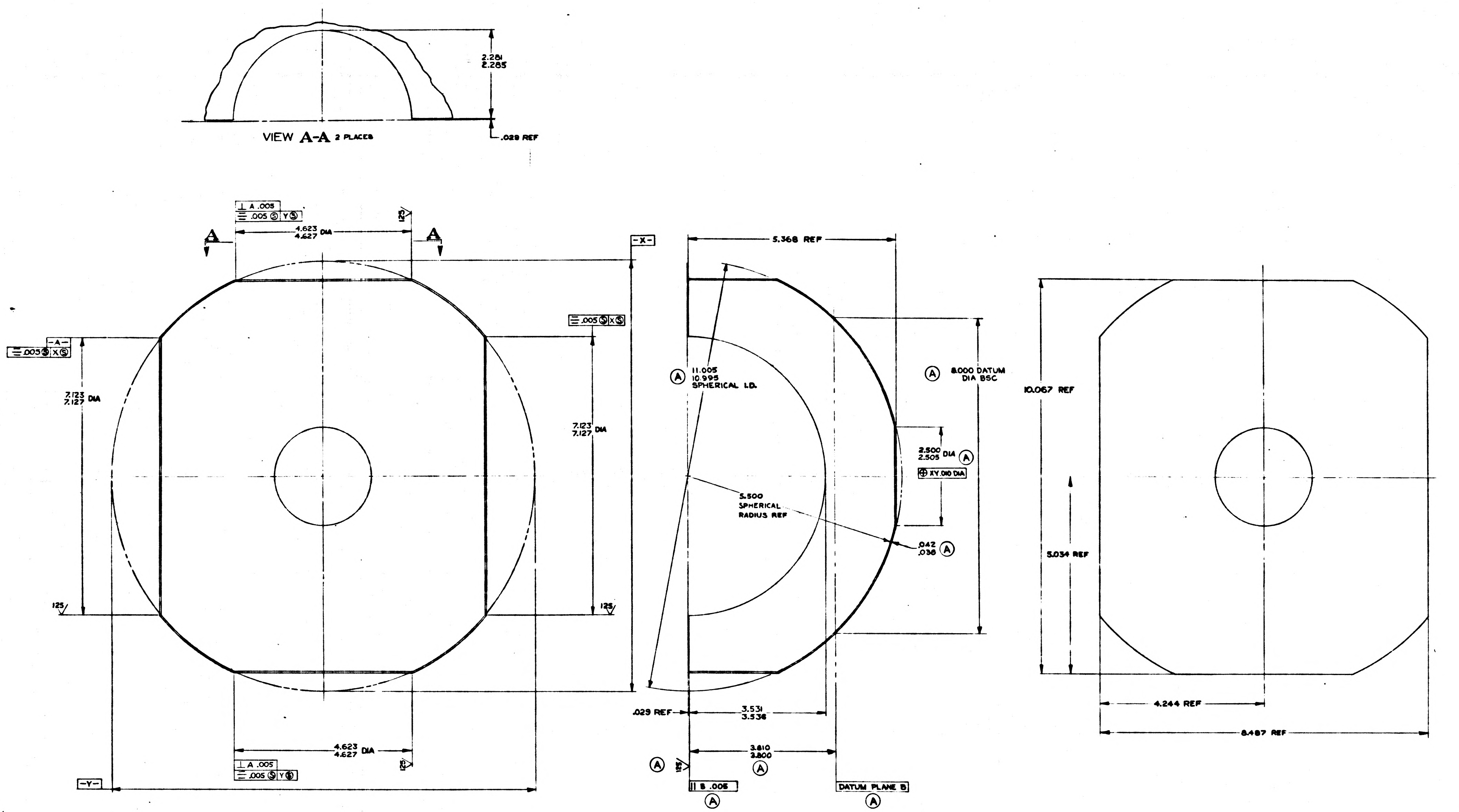
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000041

SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS		TDR 00025		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00426	1-15-63	9/16 WK



VIEW A-A 2 PLACES
2.281
2.285
.029 REF
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
A
A
125
-A-
≡ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
7.123
7.127 DIA
≡ .005 Ⓢ X Ⓢ
125
125
-X-
-Y-
4.623
4.627 DIA
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
5.368 REF
Ⓐ 11.005
10.995
SPHERICAL I.D.
5.500
SPHERICAL
RADIUS REF
Ⓐ 8.000 DATUM
DIA BSC
2.500
2.505 DIA Ⓐ
⊕ X Y .010 DIA
.042
.038 Ⓐ
.029 REF
3.531
3.536
3.810
3.800
Ⓐ
Ⓐ 125
∥ B .005
Ⓐ
DATUM PLANE B
Ⓐ
10.067 REF
5.034 REF
4.244 REF
8.487 REF

NOTES:

Ⓐ 1. MATERIAL: AL ALY 6061 TEMP O ; ALT SPEC: QQ-A-327 TEMP O

2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

3. BREAK ALL SHARP EDGES $^{.005}_{.015}$

Ⓐ 4. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

Ⓐ C000066	DL1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
C00059	DL100000	DO NOT SCALE THIS DRAWING
NEXT ASSY	USED ON	MATERIAL: SEE NOTE 1
APPLICATION		

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

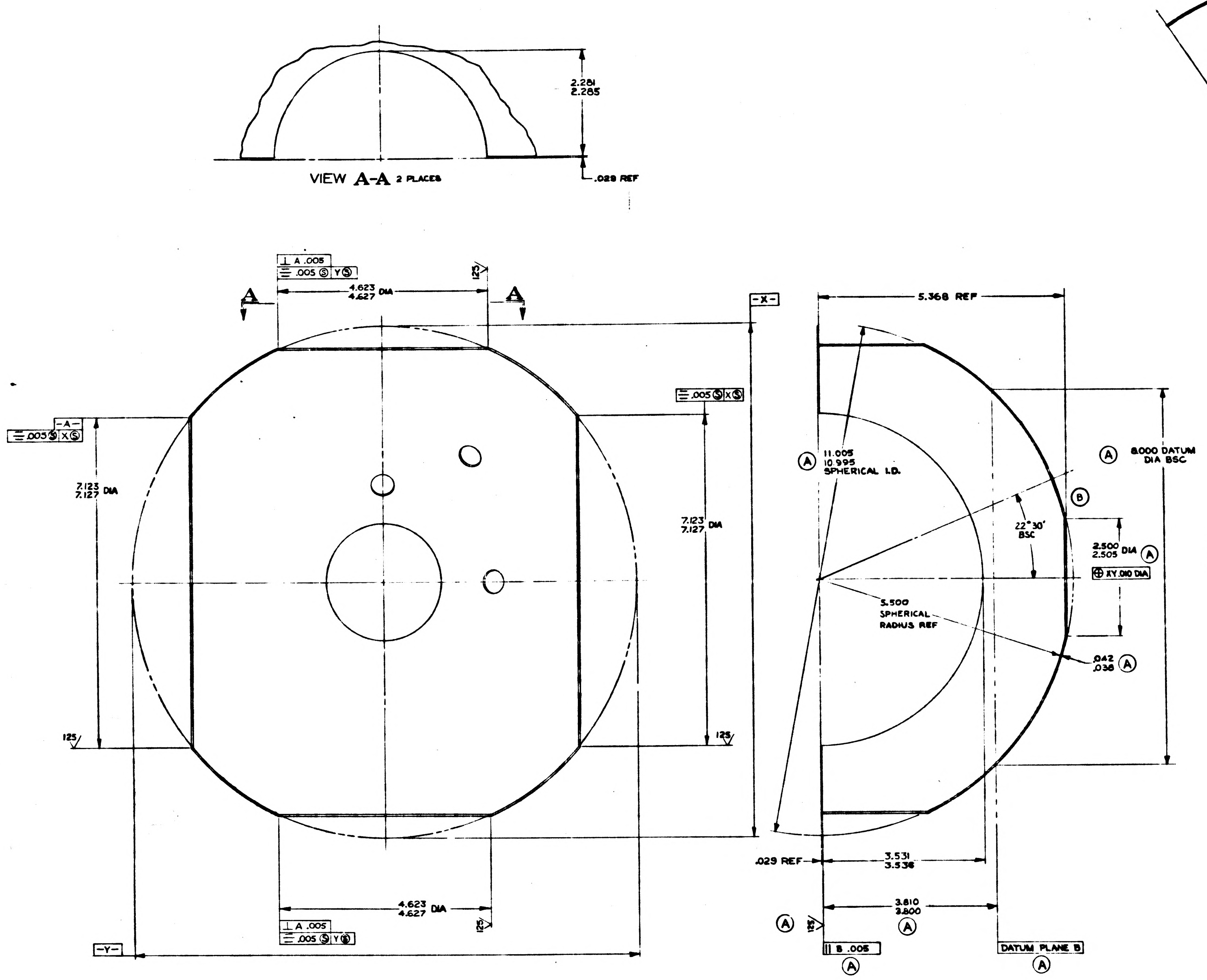
		DATE
APPROVED	[illegible]	9-13-62
CHECKED		
DRAWN	D.M. WHITE	5-11-62
APPROVED FOR MSC	W J Rhine	9-13-62
BY DIRECTION		
MIT APPROVAL	W. J. Koff	9/13/62

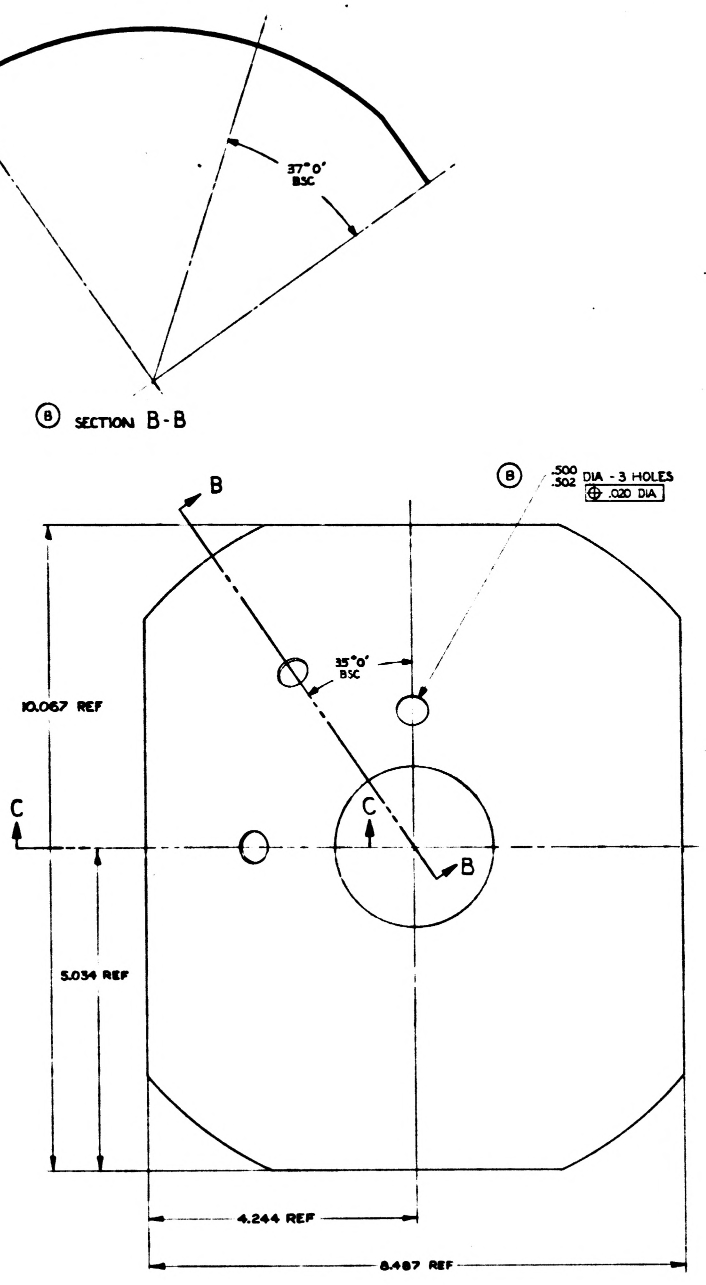
Ⓐ HEMISPHERE
MOVABLE
OUTER GIMBAL

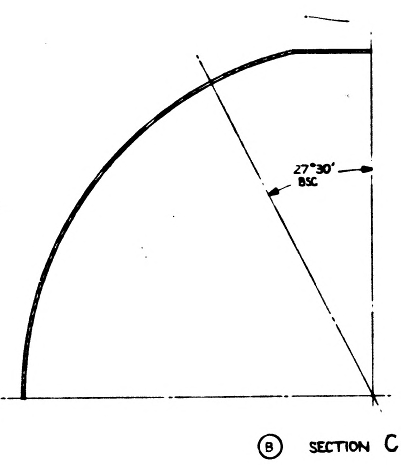
SCALE	UNIT WT.	CODE IDENT.
1/1		

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
C000043
SHEET 1 OF 1

		REVISIONS	TDR 00025	
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00426	1-5-63	4/16 WK
	B	TDRR 00612	3-5-63	4/16 WK


VIEW A-A 2 PLACES
2.281
2.285
.029 REF
A
A
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
-X-
-A-
⌯ .003 Ⓢ X Ⓢ
7.123
7.127 DIA
⌯ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
125
125
4.623
4.627 DIA
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
125
-Y-
5.368 REF
Ⓐ 11.005
10.995
SPHERICAL I.D.
Ⓐ 8.000 DATUM DIA BSC
Ⓑ
22°30′
BSC
2.500
2.505 DIA Ⓐ
⊕ X Y .010 DIA
5.500
SPHERICAL
RADIUS REF
.042
.038 Ⓐ
.029 REF
3.531
3.536
3.810
3.800 Ⓐ
Ⓐ 125
∥ B .005
Ⓐ
DATUM PLANE B
Ⓐ


37°0′
BSC
Ⓑ SECTION B-B
B
Ⓑ .500
.502 DIA - 3 HOLES
⊕ .020 DIA
35°0′
BSC
10.067 REF
C
C
B
5.034 REF
4.244 REF
8.487 REF



Ⓑ SECTION C-C

NOTES:

Ⓐ 1. MATERIAL: AL ALY 6061 TEMP O ; ALT SPEC: QQ-A-327 TEMP O

2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$

Ⓐ 4. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY Ⓑ Ⓐ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000059	DL100000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Bryce	9-13-62
CHECKED		
DRAWN	D.M.WHITE	5-16-62
APPROVED FOR MSC	WJ Rhine	9-1962
BY DIRECTION		
MIT APPROVAL	W K	9/13/62

Ⓐ HEMISPHERE
MOVABLE
OUTER GIMBAL

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

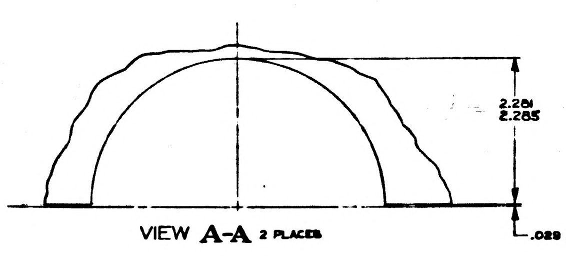
NASA DRAWING NO.
1000043

SHEET 1 OF 1

1000043 B

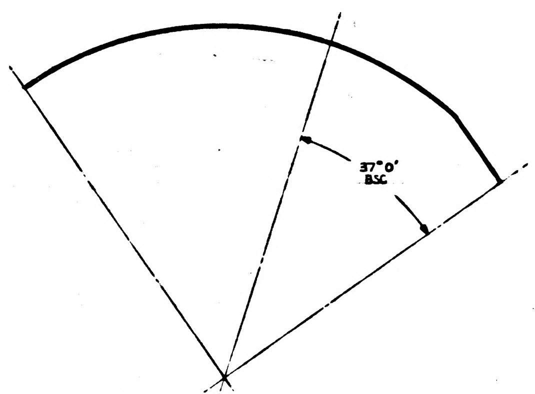
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS		TDR 00025		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00426	1-5-62	WK
	B	TDRR 00612	3-5-63	WK.
	C	TDRR 00779	4-9-63	WK

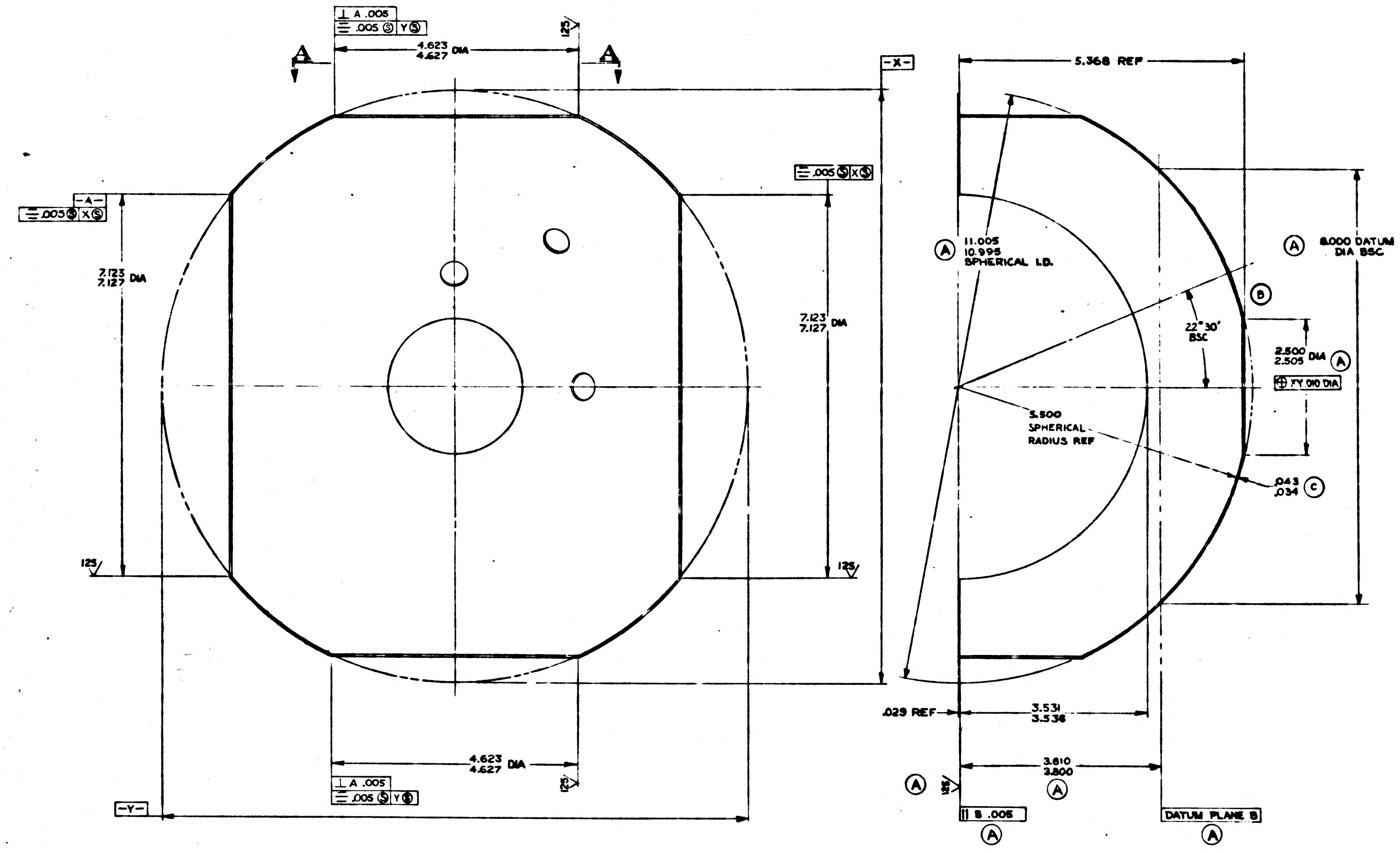


2.281
2.285
.029 REF

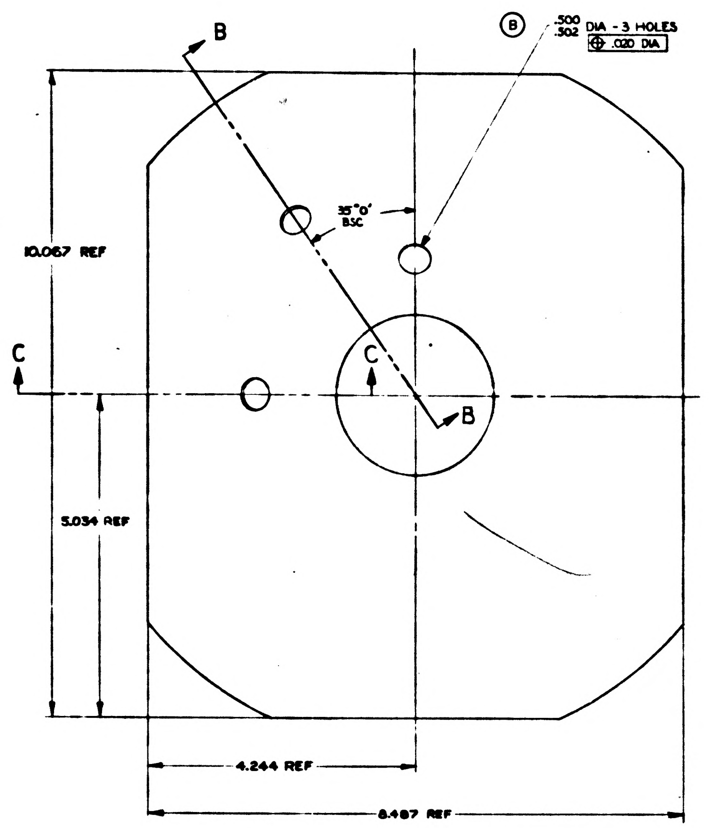
VIEW A-A 2 PLACES



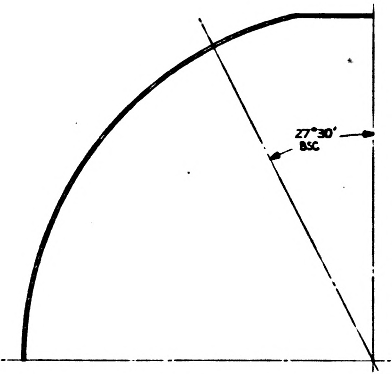
Ⓑ SECTION B-B



⊥ A .005
≡ .005 Ⓢ Y Ⓢ
A
A
4.623
4.627 DIA
125
-X-
-A-
≡ .005 Ⓢ X Ⓢ
≡ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
7.123
7.127 DIA
125
125
4.623
4.627 DIA
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
125
-Y-
5.368 REF
Ⓐ 11.005
10.995
SPHERICAL I.D.
Ⓐ 8.000 DATUM
DIA BSC
Ⓑ
22°30'
BSC
2.500
2.505 DIA Ⓐ
⊕ Y .010 DIA
5.500
SPHERICAL
RADIUS REF
.043
.034 Ⓒ
.029 REF
3.531
3.536
3.810
3.800
Ⓐ
Ⓐ 125
∥ B .005
Ⓐ
DATUM PLANE B
Ⓐ



B
Ⓑ .500
.502 DIA - 3 HOLES
⊕ .020 DIA
10.067 REF
35°0'
BSC
C
C
B
5.034 REF
4.244 REF
8.487 REF



Ⓑ SECTION C-C

NOTES:

Ⓐ 1. MATERIAL: AL ALY 6061 TEMP O ; ALT SPEC: QQ-A-327 TEMP O
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
Ⓐ 4. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY Ⓑ Ⓐ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000059	DL1000000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED [illegible] 7-13-62
CHECKED
DRAWN D.M.WHITE 5-18-62
APPROVED FOR MSC
W J Rhine 9-13-62
BY DIRECTION
MIT APPROVAL W.K. 9/13/62

Ⓐ HEMISPHERE
MOVABLE
OUTER GIMBAL

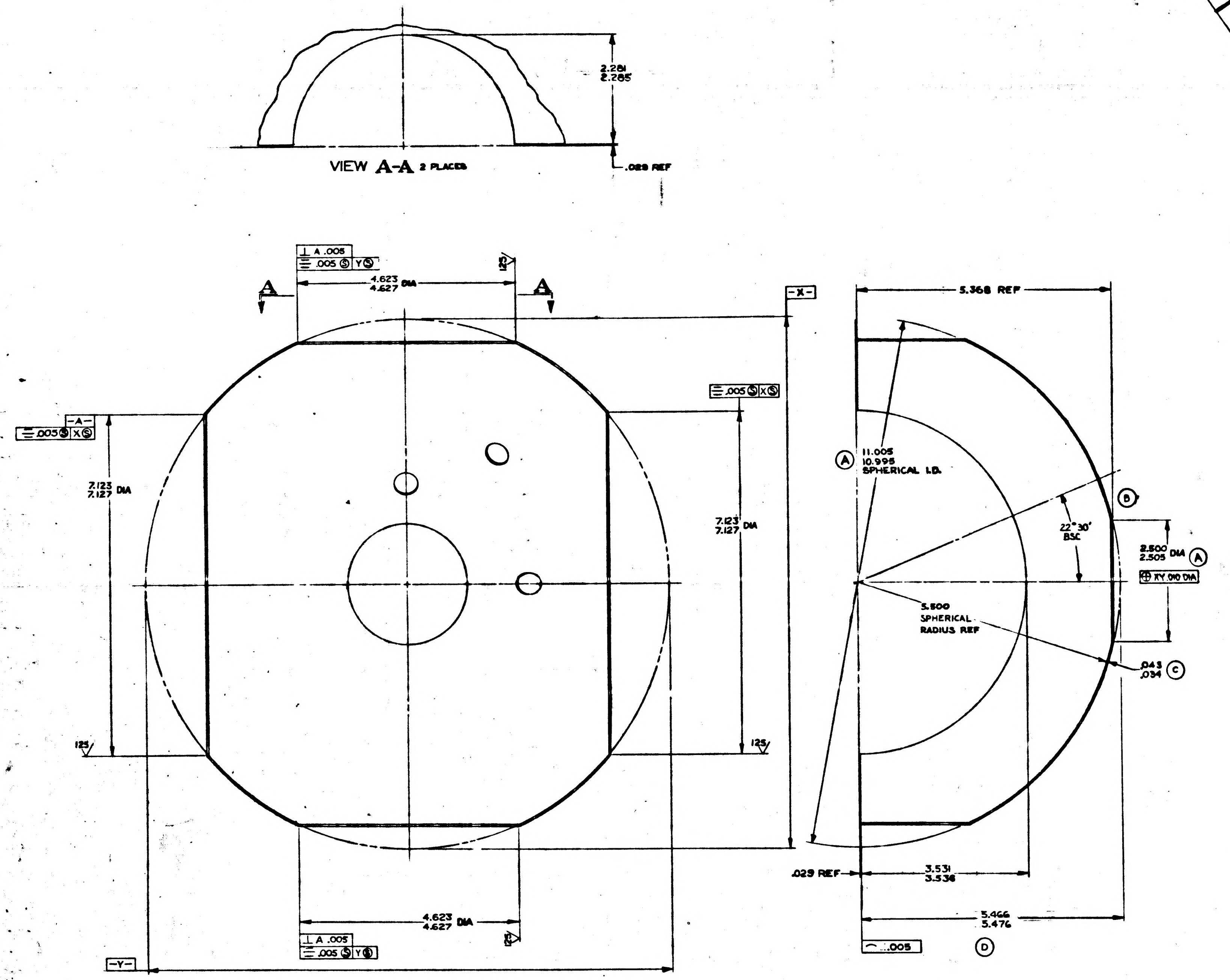
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000043
SHEET 1 OF 1

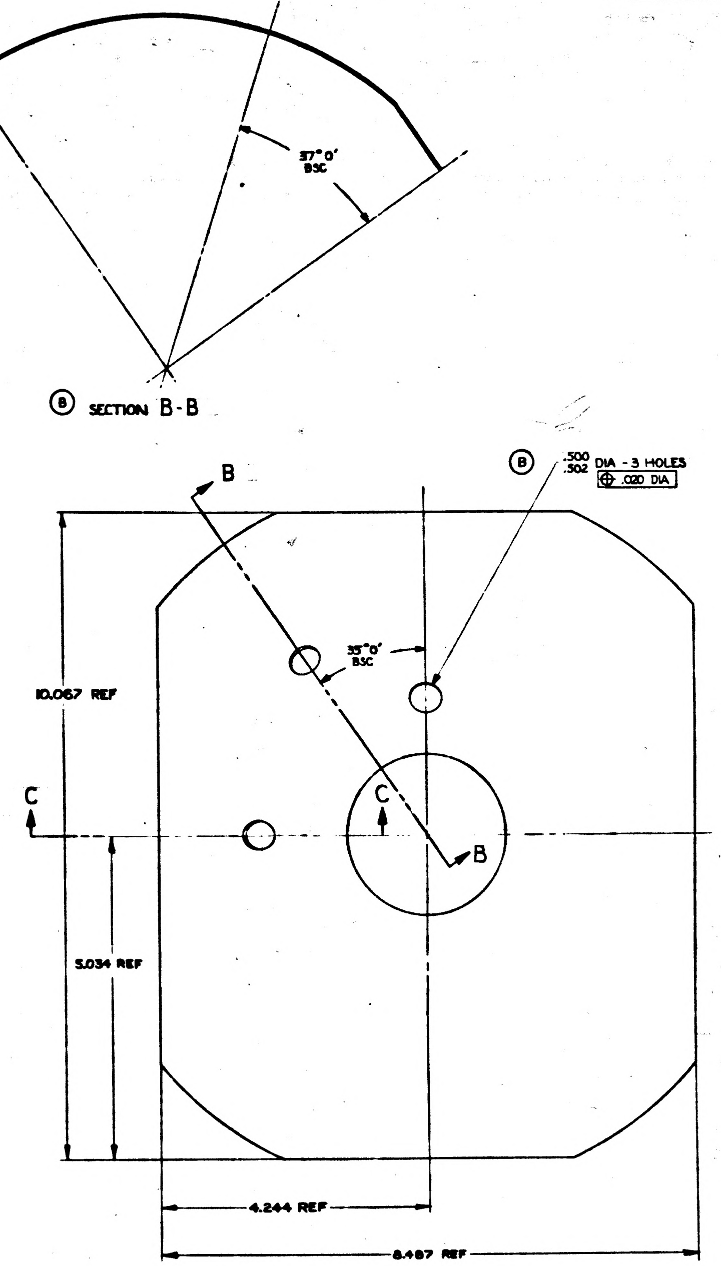
1000043 C

INCHES
PHOTOGRAPHIC SCALE ONLY

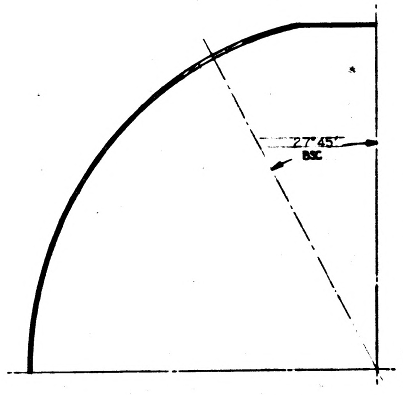
REVISIONS		TDR 00025		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00426	1-8-63	WK
	B	TDRR 00612	3-5-63	WK
	C	TDRR 00779	4-9-63	WK
	D	TDRR 04566	11-13-63	WR



2.281
2.285
VIEW A-A 2 PLACES
.029 REF
A
A
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
-X-
-A-
⌯ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
⌯ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
125
125
4.623
4.627 DIA
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
-Y-
5.368 REF
Ⓐ 11.005
10.995
SPHERICAL I.D.
Ⓑ
22°30' BSC
2.500
2.505 DIA Ⓐ
⊕ XY .010 DIA
5.500
SPHERICAL
RADIUS REF
.043
.034 Ⓒ
.029 REF
3.531
3.536
5.466
5.476
⌒ .005
Ⓓ



37°0' BSC
Ⓑ SECTION B-B
B
Ⓑ .500
.502 DIA - 3 HOLES
⊕ .020 DIA
10.067 REF
35°0' BSC
C
C
B
5.034 REF
4.244 REF
8.487 REF



Ⓑ SECTION C-C

NOTES:

Ⓐ 1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O

2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

3. BREAK ALL SHARP EDGES $^{.005}_{.015}$

Ⓐ Ⓓ 4. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY Ⓑ Ⓐ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201	DO NOT SCALE THIS DRAWING
1000059	DL1000000	MATERIAL: SEE NOTE 1
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED: 9-13-62
CHECKED
DRAWN: D.M.WHITE 5-14-62
APPROVED FOR MSC: W.G. 9-1962
BY DIRECTION
MIT APPROVAL: 9/13/62

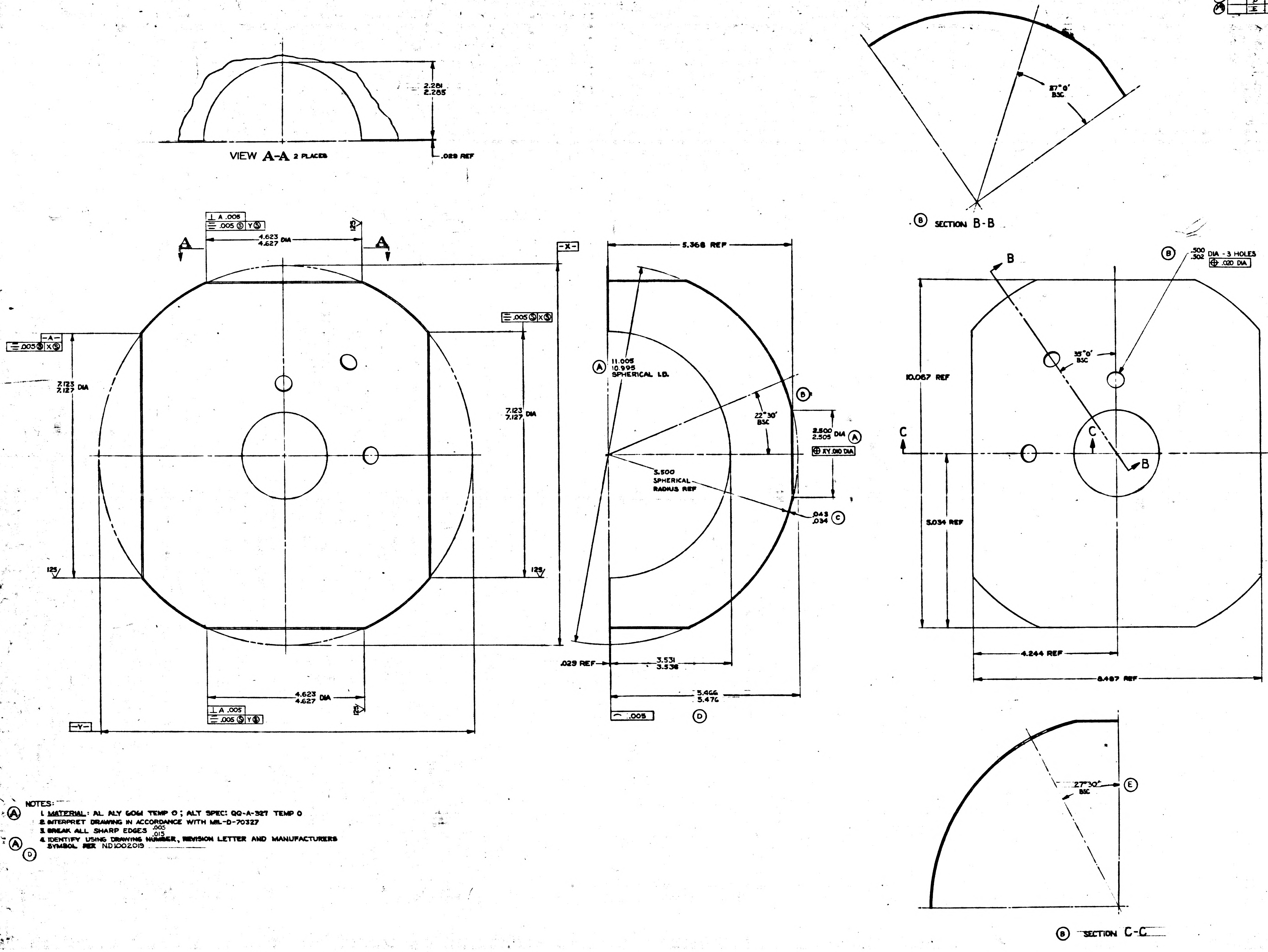
Ⓐ HEMISPHERE
MOVABLE
OUTER GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000043
SHEET 1 OF 1

1000043 D

ZONE	SYM	REVISIONS T 2 00025 DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00426	1-5-63	[illegible]	WK
	B	TDRR 00612	3-5-63	[illegible]	WK
	C	TDRR 00779	4-9-63	[illegible]	[illegible]
	D	TDRR 04566	11-13-63	[illegible]	WR
	E	TDRR 05746	[illegible]-14-64	[illegible]	[illegible]



2.281
2.285
VIEW A-A 2 PLACES
.029 REF
B SECTION B-B
27°0' BSC
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
A
A
-X-
5.368 REF
⌯ .005 Ⓢ X Ⓢ
-A-
⌯ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
7.123
7.127 DIA
125
125
A 11.005
10.995
SPHERICAL I.D.
B
22°30' BSC
2.500
2.505 DIA A
⊕ X Y .010 DIA
5.500
SPHERICAL
RADIUS REF
.043
.034 C
.029 REF
3.531
3.536
5.466
5.476
⌒ .005
D
4.623
4.627 DIA
⊥ A .005
⌯ .005 Ⓢ Y Ⓢ
-Y-
B
B .500
.502 DIA - 3 HOLES
⊕ .020 DIA
10.067 REF
35°0' BSC
C
C
B
5.034 REF
4.244 REF
8.487 REF
27°30' BSC
E
B SECTION C-C

NOTES:

(A) 1. MATERIAL: AL ALY 6061 TEMP O ; ALT SPEC: QQ-A-327 TEMP O

2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

3. BREAK ALL SHARP EDGES .005 / .015

(A) (D) 4. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

MASTER

INCHES 0 1 2 (B) (A)
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201	
1000059	DL1000000	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

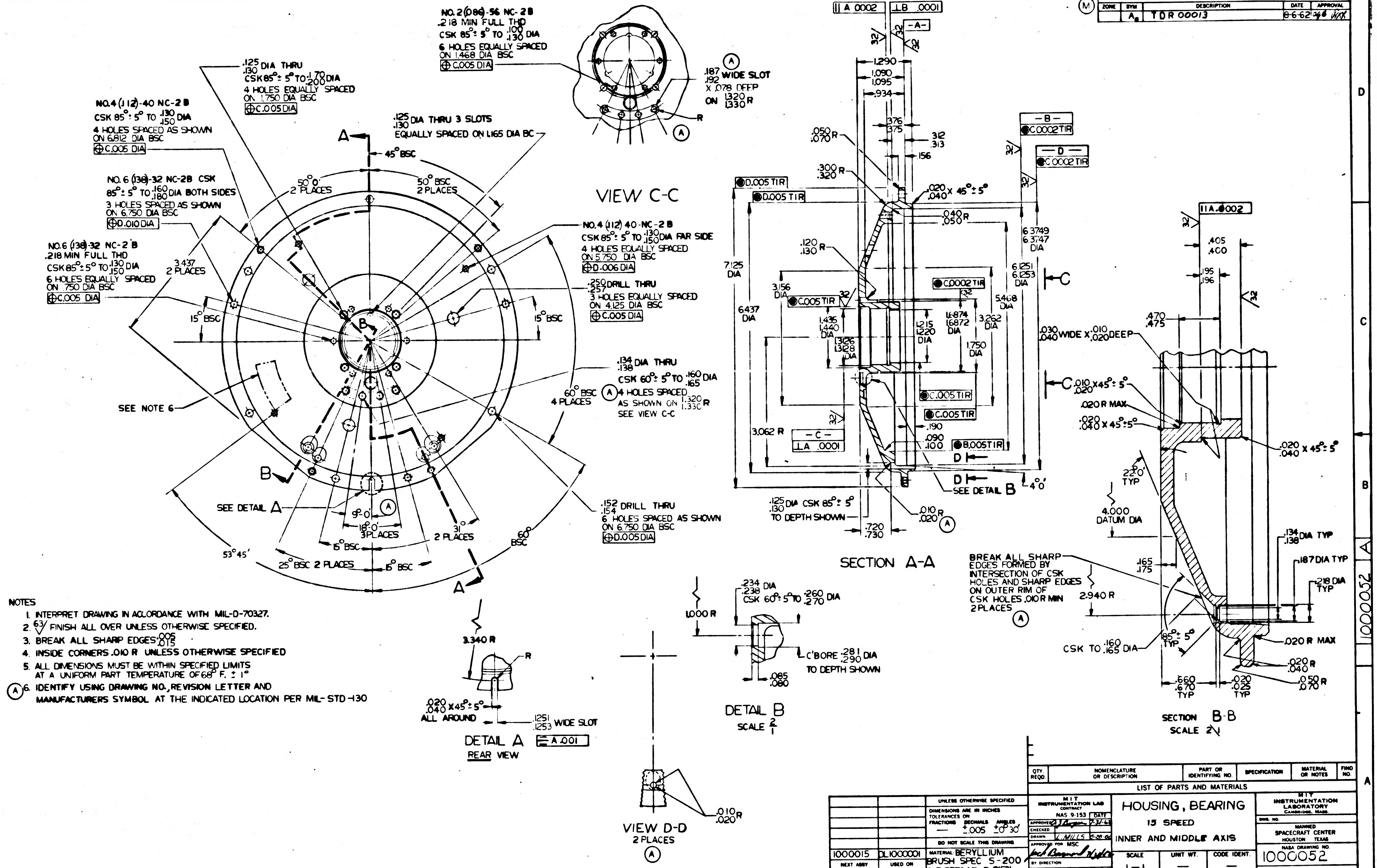
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED [illegible] 9-13-62
CHECKED
DRAWN D.M.WHITE 9-11-62
APPROVED FOR MSC
W J [illegible] 9-1962
BY DIRECTION
MIT ACCEPTANCE [illegible] 9/13/62

(A) HEMISPHERE
MOVABLE
OUTER GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000043
SHEET 1 OF

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDR 00013	8-6-62	



8
7
6
5
4
3
2
1
D
C
B
A
NO. 2 (.086)-56 NC-2B
.218 MIN FULL THD
CSK 85° ± 5° TO .100 .130 DIA
6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
⊕ C .005 DIA
.187 .192 WIDE SLOT X .078 DEEP ON 1.320 1.330 R
Ⓐ
R
VIEW C-C
.125 .130 DIA THRU
CSK 85° ± 5° TO .170 .200 DIA
4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕ C .005 DIA
NO. 4 (.112)-40 NC-2B
CSK 85° ± 5° TO .130 .150 DIA
4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC
⊕ C .005 DIA
.125 .130 DIA THRU 3 SLOTS
EQUALLY SPACED ON 1.165 DIA BC
A
45° BSC
50° 0' 2 PLACES
50° BSC 2 PLACES
NO. 6 (.138)-32 NC-2B CSK
85° ± 5° TO .160 .180 DIA BOTH SIDES
3 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
⊕ D .010 DIA
NO. 6 (.138)-32 NC-2B
.218 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA
6 HOLES EQUALLY SPACED ON .750 DIA BSC
⊕ C .005 DIA
3.437 2 PLACES
15° BSC
15° BSC
B
NO. 4 (.112) 40-NC-2B
CSK 85° ± 5° TO .130 .150 DIA FAR SIDE
4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
⊕ D .006 DIA
.250 .257 DRILL THRU
3 HOLES EQUALLY SPACED ON 4.125 DIA BSC
⊕ C .005 DIA
.134 .138 DIA THRU
CSK 60° ± 5° TO .160 .165 DIA
Ⓐ 4 HOLES SPACED AS SHOWN ON 1.320 1.330 R
SEE VIEW C-C
60° BSC 4 PLACES
SEE NOTE 6
B
SEE DETAIL A
9° 0'
Ⓐ
18° 0' 3 PLACES
31° 2 PLACES
60° BSC
.152 .154 DRILL THRU
6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
⊕ D .005 DIA
53° 45'
15° BSC
25° BSC 2 PLACES
15° BSC
A
3.340 R
R
.020 .040 X 45° ± 5°
ALL AROUND
.1251 .1253 WIDE SLOT
DETAIL A
A .001
REAR VIEW
VIEW D-D
2 PLACES
Ⓐ
.010 .020 R
1.000 R
.234 .238 DIA
CSK 60° ± 5° TO .260 .270 DIA
C'BORE .281 .290 DIA
TO DEPTH SHOWN
.085 .080
DETAIL B
SCALE 2/1
|| A .0002
⊥ B .0001
-A-
32
1.290
1.090 1.095
.934
.376 .375
.312 .313
.156
.050 .070 R
.300 .320 R
◉ D .005 TIR
◉ D .005 TIR
.020 .040 X 45° ± 5°
.040 .050 R
-B-
◉ C .0002 TIR
-D-
◉ C .0002 TIR
6.3749 6.3747 DIA
6.1251 6.1253 DIA
C
.120 .130 R
7.125 DIA
6.437 DIA
3.156 DIA
◉ C .005 TIR
◉ C .0002 TIR
1.435 1.440 DIA
1.3126 1.3128 DIA
1.215 1.220 DIA
1.6874 1.6872 DIA
3.262 DIA
5.468 DIA
1.750 DIA
.030 .040 WIDE X .010 .020 DEEP
C
◉ C .005 TIR
◉ C .005 TIR
.190
.090 .100
◉ B .005 TIR
3.062 R
-C-
⊥ A .0001
D
D
SEE DETAIL B
4° 0'
.125 .130 DIA CSK 85° ± 5°
TO DEPTH SHOWN
.720 .730
.010 .020 R
Ⓐ
SECTION A-A
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
Ⓐ
2.940 R
CSK TO .160 .165 DIA
85° ± 5° TYP
|| A .0002
.405 .400
.195 .196
.470 .475
.010 .020 X 45° ± 5°
.020 R MAX
.020 .040 X 45° ± 5°
.020 .040 X 45° ± 5°
22° 0' TYP
4.000 DATUM DIA
.165 .175
.134 .138 DIA TYP
.187 DIA TYP
.218 DIA TYP
.020 R MAX
.020 .040 R
.050 .070 R
.660 .670 TYP
.020 .025 TYP
SECTION B-B
SCALE 2/1
Ⓜ
1000052 A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES .005 .015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F. ± 1°
6. Ⓐ IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000015	DL1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM
BRUSH SPEC S-200
ALT: SPEC MIL-B-21531

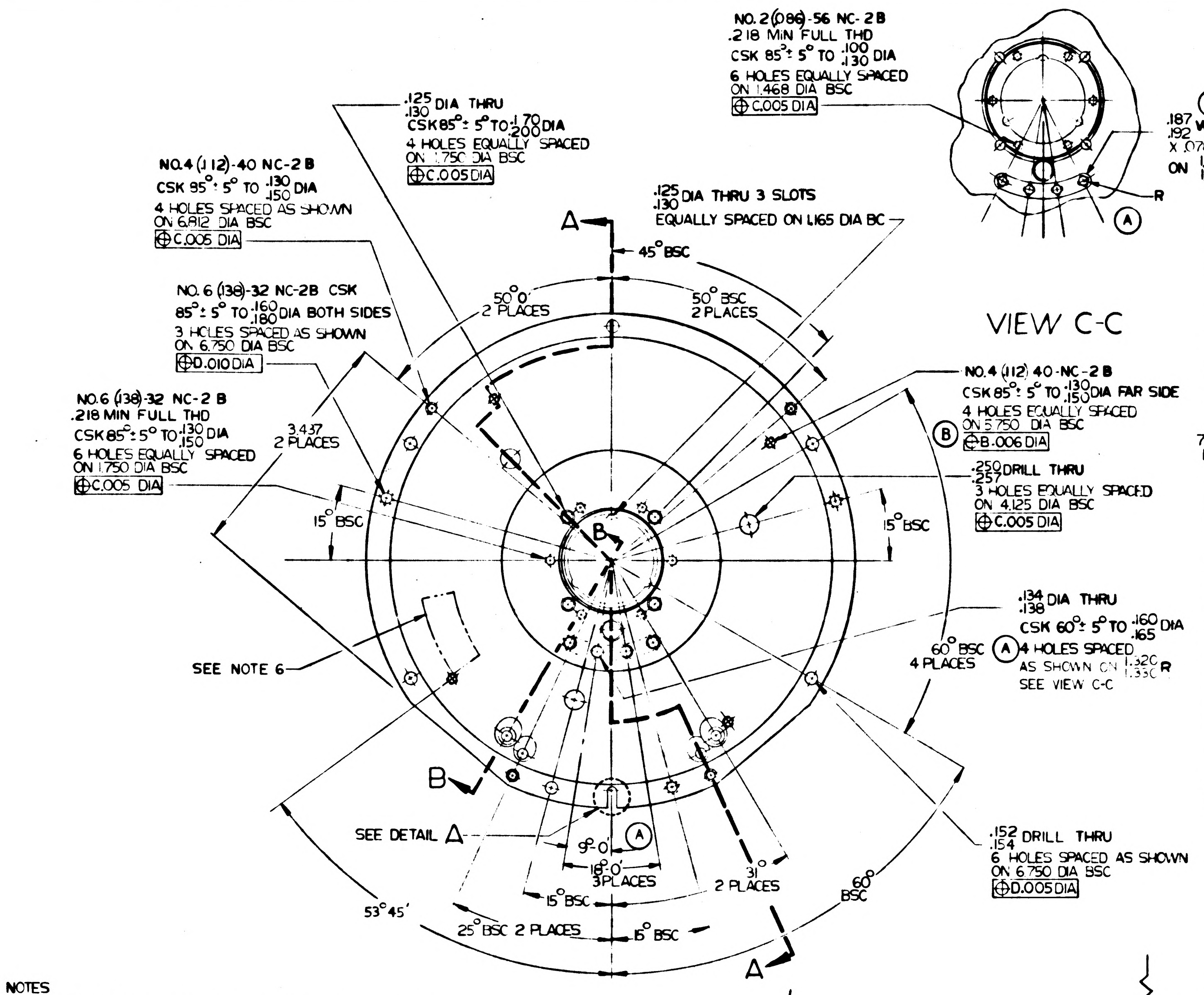
MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED | 7-31-62
CHECKED
DRAWN L. MILLS 5-28-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 7/31/62

HOUSING, BEARING
15 SPEED
INNER AND MIDDLE AXIS

SCALE 1-1
UNIT WT. —
CODE IDENT. —

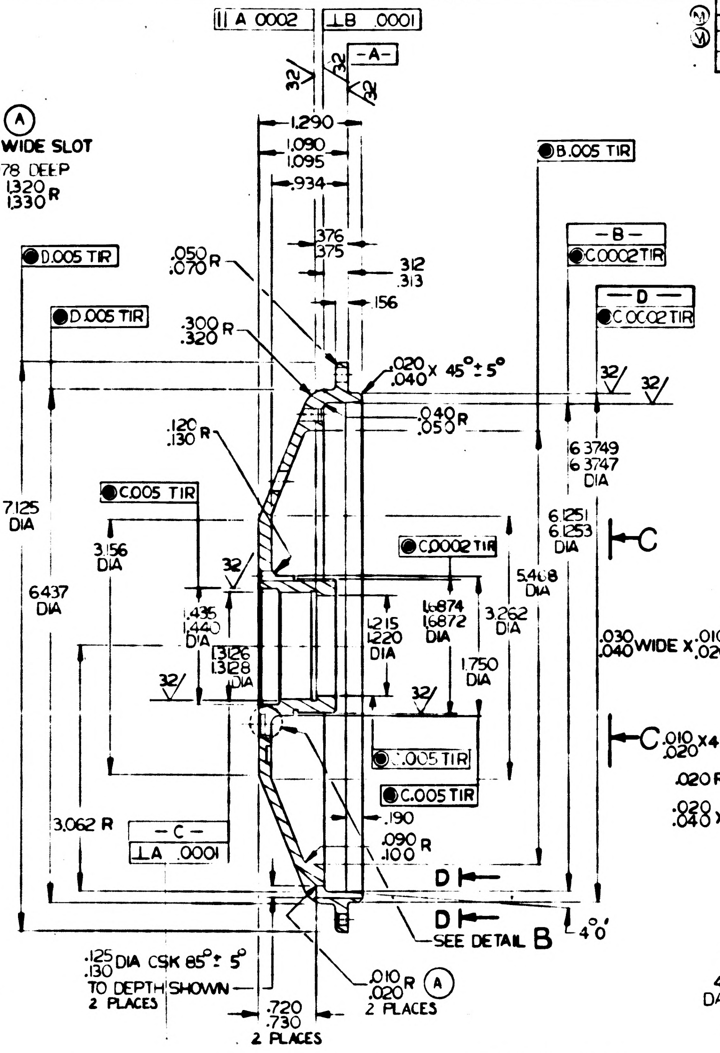
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000052
SHEET 1 OF 1

REVISIONS TDR 00003				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDR 00013	8-6-62	
	B	TDR 00042	10-8-62	



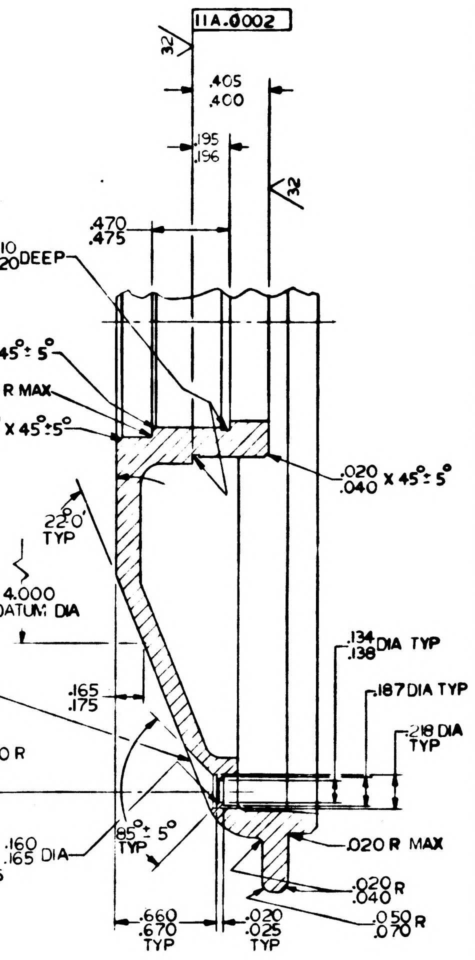
NO. 2 (.086)-56 NC-2B
.218 MIN FULL THD
CSK 85° ± 5° TO .100 .130 DIA
6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
⊕ C.005 DIA
.187 .192 WIDE SLOT X .078 DEEP ON 1.320 1.330 R
R
A
.125 .130 DIA THRU
CSK 85° ± 5° TO .170 .200 DIA
4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕ C.005 DIA
NO.4 (.112)-40 NC-2B
CSK 95° ± 5° TO .130 .150 DIA
4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC
⊕ C.005 DIA
.125 .130 DIA THRU 3 SLOTS
EQUALLY SPACED ON 1.165 DIA BC
NO. 6 (.138)-32 NC-2B CSK
85° ± 5° TO .160 .180 DIA BOTH SIDES
3 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
⊕ D.010 DIA
NO.6 (.138)-32 NC-2B
.218 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA
6 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕ C.005 DIA
A
45° BSC
50°0' 2 PLACES
50° BSC 2 PLACES
3.437 2 PLACES
15° BSC
15° BSC
B
NO.4 (.112) 40-NC-2B
CSK 85° ± 5° TO .130 .150 DIA FAR SIDE
4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
⊕ B.006 DIA
.250 .257 DRILL THRU
3 HOLES EQUALLY SPACED ON 4.125 DIA BSC
⊕ C.005 DIA
.134 .138 DIA THRU
CSK 60° ± 5° TO .160 .165 DIA
4 HOLES SPACED AS SHOWN ON 1.320 1.330 R
SEE VIEW C-C
60° BSC 4 PLACES
SEE NOTE 6
B
SEE DETAIL A
9°0'
18°0' 3 PLACES
31 2 PLACES
15° BSC
25° BSC 2 PLACES
15° BSC
53°45'
60° BSC
A
.152 .154 DRILL THRU
6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
⊕ D.005 DIA

VIEW C-C



∥ A .0002
⊥ B .0001
-A-
32
1.290
1.090 1.095
.934
.376 .375
.312 .313
.156
.050 .070 R
.300 .320 R
● D.005 TIR
● D.005 TIR
● B.005 TIR
-B-
● C.0002 TIR
-D-
● C.0002 TIR
.020 .040 X 45° ± 5°
.040 .050 R
.120 .130 R
7.125 DIA
● C.005 TIR
3.56 DIA
6.437 DIA
1.435 1.440 DIA
1.3126 1.3128 DIA
1.215 1.220 DIA
1.6874 1.6872 DIA
● C.0002 TIR
3.262 DIA
5.408 DIA
1.750 DIA
6.3749 6.3747 DIA
6.1251 6.1253 DIA
C
.030 .040 WIDE X .010 .020 DEEP
C .010 .020 X 45° ± 5°
.005 TIR
● C.005 TIR
.190
.090 .100 R
3.062 R
-C-
⊥ A .0001
D
D
SEE DETAIL B
4°0'
.125 .130 DIA CSK 85° ± 5°
TO DEPTH SHOWN 2 PLACES
.010 .020 R
2 PLACES
.720 .730 2 PLACES

SECTION A-A



∥ A .0002
32
.405 .400
.195 .156
32
.470 .475
.020 R MAX
.020 .040 X 45° ± 5°
.020 .040 X 45° ± 5°
22°0' TYP
4.000 DATUM DIA
.165 .175
2.940 R
.134 .138 DIA TYP
.187 DIA TYP
.218 DIA TYP
85° ± 5° TYP
.020 R MAX
.020 .040 R
.050 .070 R
.660 .670 TYP
.020 .025 TYP

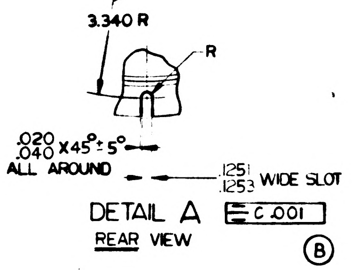
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES Ⓐ

CSK TO .160 .165 DIA 2 PLACES

SECTION B-B
SCALE 2/1

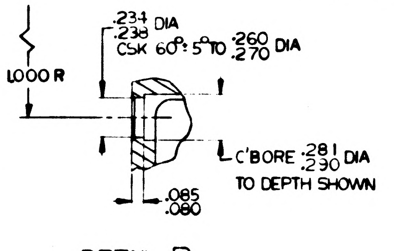
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES .005 .015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F. ± 1°
6. Ⓐ IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130



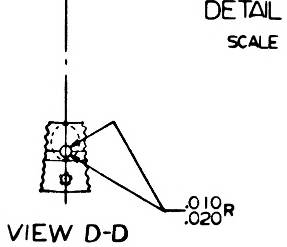
3.340 R
R
.020 .040 X 45° ± 5°
ALL AROUND
.1251 .1253 WIDE SLOT
⊟ C.001
Ⓑ

DETAIL A
REAR VIEW



.234 .238 DIA
CSK 60° ± 5° TO .260 .270 DIA
1.000 R
C'BORE .281 .230 DIA TO DEPTH SHOWN
.085 .080

DETAIL B
SCALE 2/1



VIEW D-D
2 PLACES
Ⓐ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000015	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM BRUSH SPEC S-200
ALT: SPEC MIL-B-21531

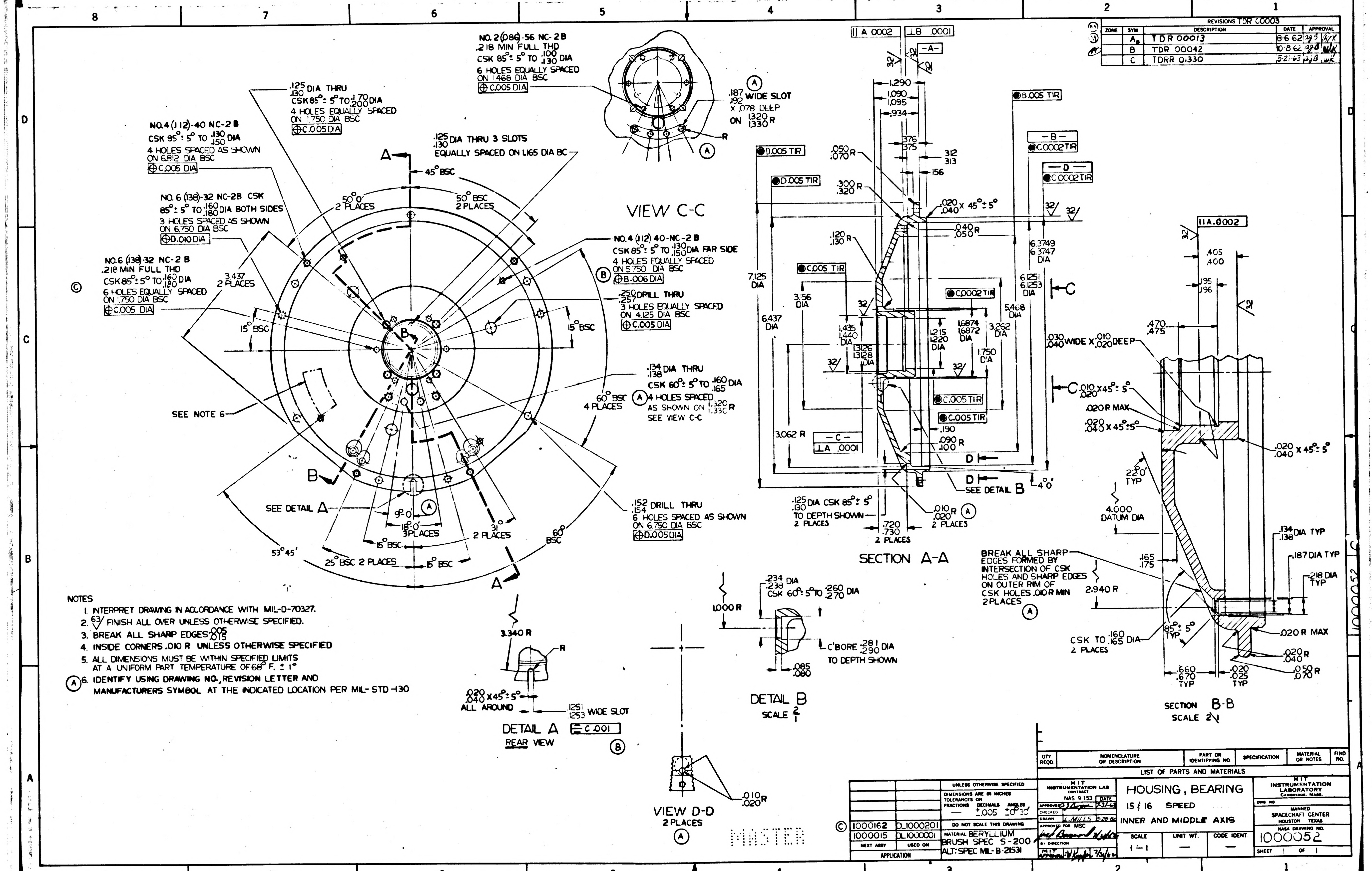
MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED 7-31-62
CHECKED
DRAWN L. MILLS 5-20-62
APPROVED FOR MSC
BY DIRECTION
MIT 7/31/62

HOUSING, BEARING
15 SPEED
INNER AND MIDDLE AXIS

SCALE 1—1
UNIT WT. —
CODE IDENT. —

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000052
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDR C0003				
	A	TDR 00013	8-6-62	ag3	
	B	TDR 00042	10-8-62	agB	wk
	C	TDRR 01330	5-21-63	ajB	wk



VIEW C-C
SECTION A-A
SECTION B-B
SCALE 2/1
DETAIL A
REAR VIEW
DETAIL B
SCALE 2/1
VIEW D-D
2 PLACES
NO. 2 (.086)-56 NC-2B .218 MIN FULL THD CSK 85° ± 5° TO .100/.130 DIA 6 HOLES EQUALLY SPACED ON 1.466 DIA BSC ⊕C.005 DIA
.125/.130 DIA THRU CSK 85° ± 5° TO .170/.200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
NO. 4 (.112)-40 NC-2B CSK 85° ± 5° TO .130/.150 DIA 4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC ⊕C.005 DIA
.125/.130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.187/.192 WIDE SLOT X .078 DEEP ON 1.320/1.330 R
NO. 6 (.138)-32 NC-2B CSK 85° ± 5° TO .160/.180 DIA BOTH SIDES 3 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕D.010 DIA
NO. 6 (.138)-32 NC-2B .218 MIN FULL THD CSK 85° ± 5° TO .160/.180 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
NO. 4 (.112) 40-NC-2B CSK 85° ± 5° TO .130/.150 DIA FAR SIDE 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC ⊕B.006 DIA
.250/.257 DRILL THRU 3 HOLES EQUALLY SPACED ON 4.125 DIA BSC ⊕C.005 DIA
.134/.138 DIA THRU CSK 60° ± 5° TO .160/.165 DIA 4 HOLES SPACED AS SHOWN ON 1.320/1.330 R SEE VIEW C-C
.152/.154 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕D.005 DIA
SEE NOTE 6
SEE DETAIL A
45° BSC
50° 0' 2 PLACES
50° BSC 2 PLACES
3.437 2 PLACES
15° BSC
60° BSC 4 PLACES
53° 45'
25° BSC 2 PLACES
15° BSC
18° 0' 3 PLACES
9° 0'
31° 2 PLACES
60° BSC
3.340 R
.020/.040 X 45° ± 5° ALL AROUND
.1251/.1253 WIDE SLOT
C .001
.234/.238 DIA CSK 60° ± 5° TO .260/.270 DIA
1.000 R
C'BORE .281/.290 DIA TO DEPTH SHOWN
.085/.080
.010/.020 R
A .0002
B .0001
-A-
1.290
1.090/1.095
.934
.376/.375
.312/.313
.156
.050/.070 R
.300/.320 R
D.005 TIR
B.005 TIR
-B-
C.0002 TIR
-D-
C.0002 TIR
.020/.040 X 45° ± 5°
.040/.050 R
.120/.130 R
7.125 DIA
6.437 DIA
3.156 DIA
C.005 TIR
C.0002 TIR
1.435/1.440 DIA
1.3126/1.3128 DIA
1.215/1.220 DIA
1.6874/1.6872 DIA
3.262 DIA
1.750 DIA
5.408 DIA
6.3749/6.3747 DIA
6.1251/6.1253 DIA
C.005 TIR
C.005 TIR
.190
.090/.100 R
3.062 R
-C-
A .0001
SEE DETAIL B
4° 0'
.125/.130 DIA CSK 85° ± 5° TO DEPTH SHOWN 2 PLACES
.720/.730 2 PLACES
.010/.020 R 2 PLACES
A .0002
.405/.400
.195/.196
.470/.475
.030/.040 WIDE X .010/.020 DEEP
.010/.020 X 45° ± 5°
.020 R MAX
.020/.040 X 45° ± 5°
.020/.040 X 45° ± 5°
22° 0' TYP
4.000 DATUM DIA
.134/.138 DIA TYP
.187 DIA TYP
.218 DIA TYP
.165/.175
2.940 R
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
CSK TO .160/.165 DIA 2 PLACES
85° ± 5° TYP
.020 R MAX
.020/.040
.050/.070 R
.660/.670 TYP
.020/.025 TYP
MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES .005/.015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F. ± 1°
Ⓐ 6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000162	DL1000201
1000015	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM BRUSH SPEC S-200
ALT: SPEC MIL-B-21531

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED: AJ Bayer 7-31-62
CHECKED
DRAWN: L. MILLS 5-20-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL: W. Kupfer 7/31/62

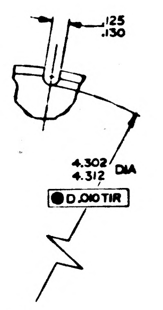
HOUSING, BEARING
15 & 16 SPEED
INNER AND MIDDLE AXIS

SCALE 1-1
UNIT WT. —
CODE IDENT. —

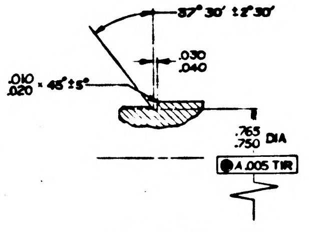
MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000052
SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

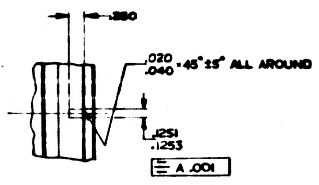
REVISIONS				TDRR 00021
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	MOVED .234/.236 DIA HOLE MOVED .125/.130 DIA HOLES	8-7-62	
B-2	A	ADDED SECTION H-H	8-7-62	


.125
.130
4.302
4.312 DIA
D .010 TIR

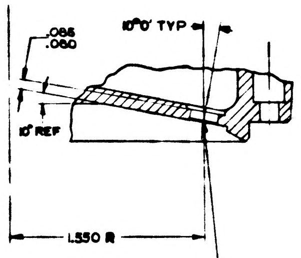
DETAIL G
4 PLACES EQUALLY SPACED WITHIN ±.005
SCALE 2/1


37° 30' ±2°30'
.010
.020 × 45°±5°
.030
.040
.765
.750 DIA
A .005 TIR

DETAIL F
SCALE 2/1

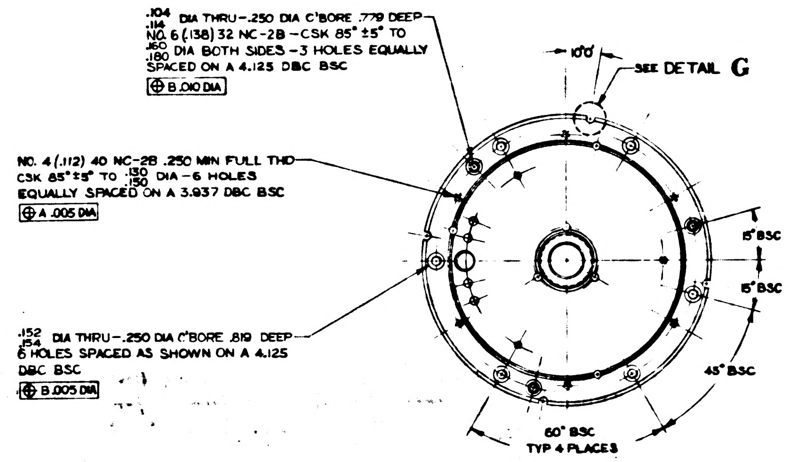

.380
.020
.040 × 45°±5° ALL AROUND
.1251
.1253
A .001

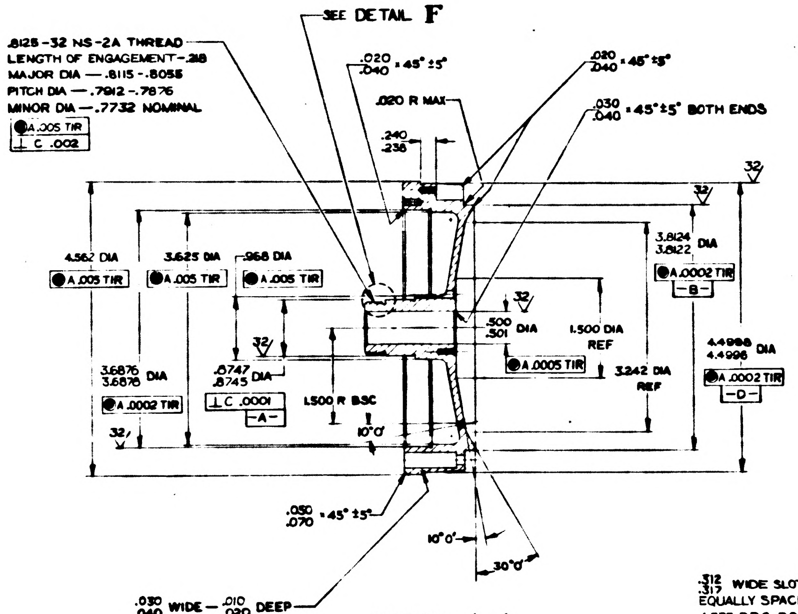
VIEW E-E
SCALE 1/1


10°0' TYP
.066
.060
10° REF
1.550 R

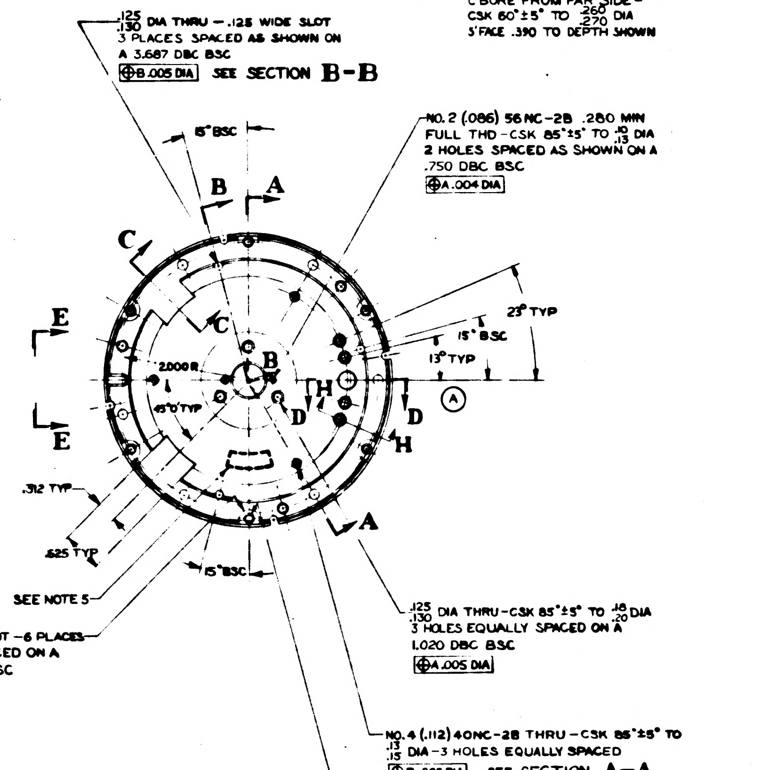
SECTION D-D
SCALE 2/1

Ⓐ
.234
.236 DRILL THRU - .312 DIA
C'BORE FROM FAR SIDE -
CSK 60°±5° TO .260/.270 DIA
S'FACE .390 TO DEPTH SHOWN

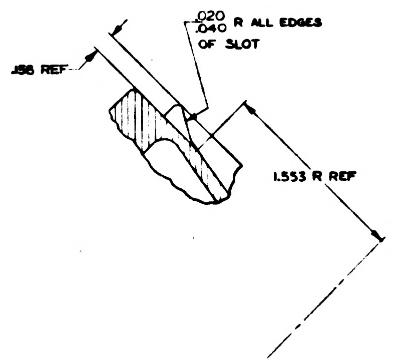

.104
.114 DIA THRU - .250 DIA C'BORE .779 DEEP -
NO. 6 (.138) 32 NC-2B - CSK 85° ±5° TO
.160
.180 DIA BOTH SIDES - 3 HOLES EQUALLY
SPACED ON A 4.125 DBC BSC
B .010 DIA
10°0'
SEE DETAIL G
NO. 4 (.112) 40 NC-2B .250 MIN FULL THD -
CSK 85°±5° TO .130/.150 DIA - 6 HOLES
EQUALLY SPACED ON A 3.937 DBC BSC
A .005 DIA
15° BSC
15° BSC
.152
.154 DIA THRU - .250 DIA C'BORE .819 DEEP -
6 HOLES SPACED AS SHOWN ON A 4.125
DBC BSC
B .005 DIA
45° BSC
60° BSC
TYP 4 PLACES


SEE DETAIL F
.8125-32 NS-2A THREAD
LENGTH OF ENGAGEMENT - .28
MAJOR DIA - .8115 - .8055
PITCH DIA - .7912 - .7876
MINOR DIA - .7732 NOMINAL
A .005 TIR
⊥ C .002
.020 × 45°±5°
.040
.020 R MAX
.240
.236
.020
.040 × 45°±5°
.030
.040 × 45°±5° BOTH ENDS
32
4.562 DIA
A .005 TIR
3.625 DIA
A .005 TIR
.968 DIA
A .005 TIR
3.8124
3.8122 DIA
A .0002 TIR
-B-
.500
.501 DIA
1.500 DIA REF
A .0005 TIR
3.242 DIA REF
4.4998
4.4996 DIA
A .0002 TIR
-D-
3.6876
3.6878 DIA
A .0002 TIR
.6747
.6743 DIA
⊥ C .0001
-A-
1.500 R BSC
10°0'
32
.050
.070 × 45°±5°
10°0'
30°0'
.030
.040 WIDE - .010/.020 DEEP

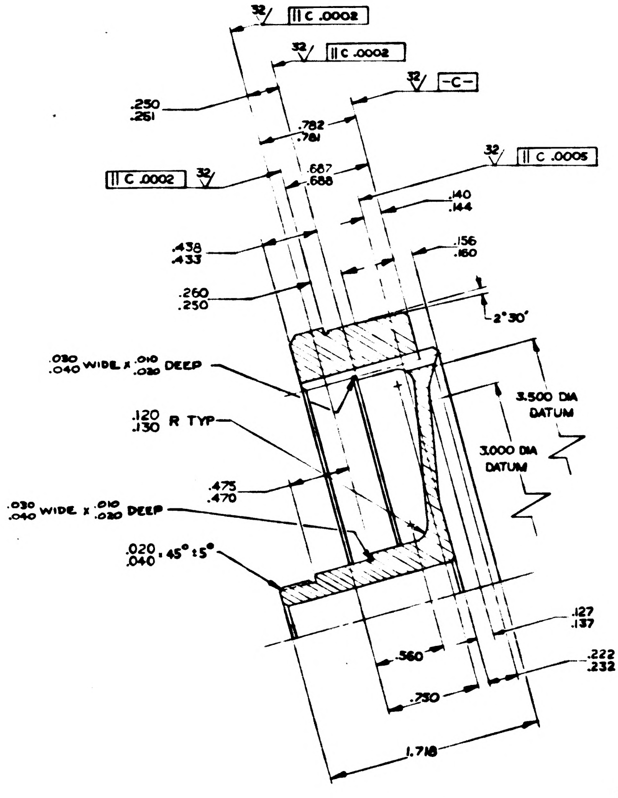
SECTION A-A


.125
.130 DIA THRU - .125 WIDE SLOT
3 PLACES SPACED AS SHOWN ON
A 3.687 DBC BSC
B .005 DIA SEE SECTION B-B
15° BSC
NO. 2 (.086) 56 NC-2B .280 MIN
FULL THD - CSK 85°±5° TO .10/.13 DIA
2 HOLES SPACED AS SHOWN ON A
.750 DBC BSC
A .004 DIA
B A
C
C
B
E
E
23° TYP
15° BSC
13° TYP
2.000 R
45°0' TYP
H
D
D
H
Ⓐ
.312 TYP
A
.625 TYP
SEE NOTE 5
15° BSC
.125
.130 DIA THRU - CSK 85°±5° TO .16/.20 DIA
3 HOLES EQUALLY SPACED ON A
1.020 DBC BSC
A .005 DIA
.312
.317 WIDE SLOT - 6 PLACES
EQUALLY SPACED ON A
4.375 DBC BSC
D .005 DIA
NO. 4 (.112) 40NC-2B THRU - CSK 85°±5° TO
.13
.15 DIA - 3 HOLES EQUALLY SPACED
B .005 DIA SEE SECTION A-A
NO. 4 (.112) 40NC-2B .250 MIN FULL THD - CSK 85°±5° TO
.13
.15 DIA - 6 HOLES EQUALLY SPACED ON A 4.312 DBC BSC
D .005 DIA

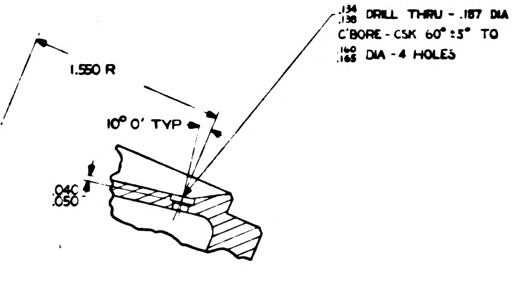
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005/.015
4. INSIDE CORNERS .010 RADIUS MAX UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS TO BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°


.020
.040 R ALL EDGES
OF SLOT
.158 REF
1.553 R REF

SECTION C-C
2 PLACES
SCALE 2/1


32 ‖ C .0002
32 ‖ C .0002
32 -C-
.250
.261
.782
.781
.687
.688
‖ C .0002 32
32 ‖ C .0005
.140
.144
.438
.433
.156
.160
.260
.250
2°30'
.030
.040 WIDE × .010/.020 DEEP
3.500 DIA
DATUM
.120
.130 R TYP
3.000 DIA
DATUM
.475
.470
.030
.040 WIDE × .010/.020 DEEP
.020
.040 × 45°±5°
.127
.137
.222
.232
.560
.750
1.718

SECTION B-B
SCALE 2/1


.134
.138 DRILL THRU - .187 DIA
C'BORE - CSK 60°±5° TO
.160
.165 DIA - 4 HOLES
1.550 R
10° 0' TYP
.040
.050

SECTION H-H
SCALE 2/1
Ⓐ

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000014	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM-
BRUSH SPEC: S-200
ALT: SPEC MIL-B-21531

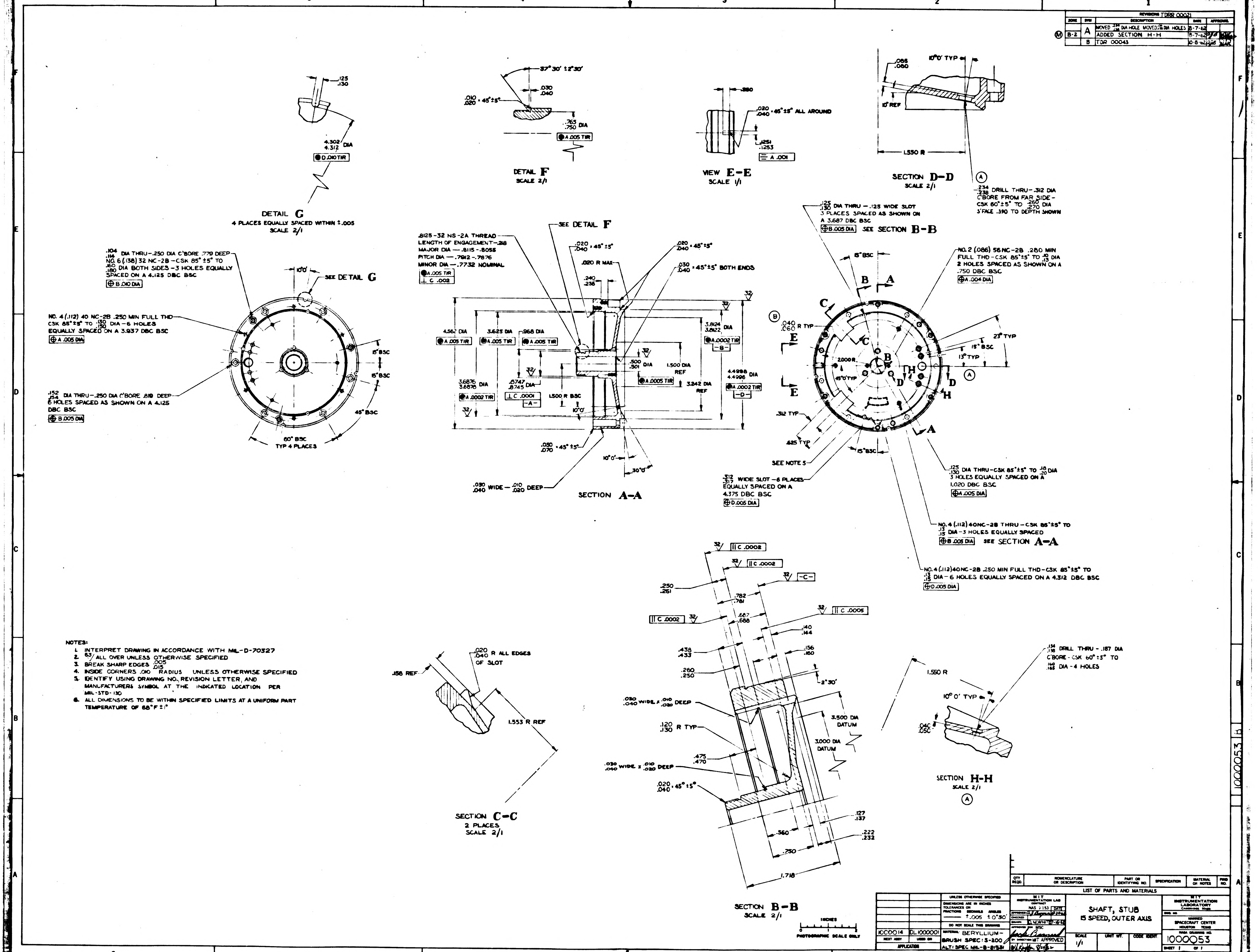
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED
CHECKED
DRAWN D.M.WHITE 7-16-62
APPROVED FOR MSC
BY DIRECTION MIT APPROVED

SHAFT, STUB
15 SPEED, OUTER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000053
SHEET 1 OF 1

1000053 A


DETAIL G
4 PLACES EQUALLY SPACED WITHIN ±.005
SCALE 2/1
.125 .130
4.302 4.312 DIA
D .010 TIR
DETAIL F
SCALE 2/1
37° 30' ±2° 30'
.010 .020 × 45° ±5°
.030 .040
.765 .750 DIA
A .005 TIR
VIEW E–E
SCALE 1/1
.280
.020 .040 × 45° ±5° ALL AROUND
.1251 .1253
A .001
SECTION D–D
SCALE 2/1
.085 .060
10° 0' TYP
10° REF
1.550 R
Ⓐ
.234 .238 DRILL THRU – .312 DIA
C'BORE FROM FAR SIDE –
CSK 60° ± 5° TO .260 .270 DIA
S'FACE .390 TO DEPTH SHOWN
.104 .114 DIA THRU – .250 DIA C'BORE .779 DEEP
NO. 6 (.138) 32 NC-2B – CSK 85° ± 5° TO
.160 .180 DIA BOTH SIDES – 3 HOLES EQUALLY
SPACED ON A 4.125 DBC BSC
B .010 DIA
10° 0'
SEE DETAIL G
NO. 4 (.112) 40 NC-2B .250 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA – 6 HOLES
EQUALLY SPACED ON A 3.937 DBC BSC
A .005 DIA
15° BSC
15° BSC
45° BSC
.152 .154 DIA THRU – .250 DIA C'BORE .819 DEEP
6 HOLES SPACED AS SHOWN ON A 4.125
DBC BSC
B .005 DIA
60° BSC
TYP 4 PLACES
.8125 – 32 NS – 2A THREAD
LENGTH OF ENGAGEMENT – .218
MAJOR DIA – .8115 – .8055
PITCH DIA – .7912 – .7876
MINOR DIA – .7732 NOMINAL
A .005 TIR
⊥ C .002
SEE DETAIL F
.020 .040 × 45° ±5°
.020 R MAX
.240 .238
.020 .040 × 45° ±5°
.030 .040 × 45° ±5° BOTH ENDS
32
4.562 DIA
A .005 TIR
3.625 DIA
A .005 TIR
.968 DIA
A .005 TIR
3.8124 3.8122 DIA
A .0002 TIR
–B–
.500 .501 DIA
1.500 DIA REF
A .0005 TIR
3.242 DIA REF
4.4998 4.4996 DIA
A .0002 TIR
–D–
3.6876 3.6878 DIA
A .0002 TIR
.8747 .8745 DIA
⊥ C .0001
–A–
1.500 R BSC
10° 0'
.050 .070 × 45° ±5°
10° 0'
30° 0'
.030 .040 WIDE – .010 .020 DEEP
SECTION A–A
.125 .130 DIA THRU – .125 WIDE SLOT
3 PLACES SPACED AS SHOWN ON
A 3.687 DBC BSC
B .005 DIA
SEE SECTION B–B
15° BSC
B
A
C
Ⓑ
.040 .060 R TYP
E
E
NO. 2 (.086) 56 NC-2B .280 MIN
FULL THD – CSK 85° ± 5° TO .10 .13 DIA
2 HOLES SPACED AS SHOWN ON A
.750 DBC BSC
A .004 DIA
23° TYP
15° BSC
13° TYP
Ⓐ
2.000 R
45° 0' TYP
C
B
H
D
D
H
.312 TYP
.625 TYP
SEE NOTE 5
15° BSC
A
.125 .130 DIA THRU – CSK 85° ± 5° TO .18 .20 DIA
3 HOLES EQUALLY SPACED ON A
1.020 DBC BSC
A .005 DIA
.312 .317 WIDE SLOT – 6 PLACES
EQUALLY SPACED ON A
4.375 DBC BSC
D .005 DIA
NO. 4 (.112) 40NC-2B THRU – CSK 85° ± 5° TO
.13 .15 DIA – 3 HOLES EQUALLY SPACED
B .005 DIA
SEE SECTION A–A
NO. 4 (.112) 40NC-2B .250 MIN FULL THD – CSK 85° ± 5° TO
.13 .15 DIA – 6 HOLES EQUALLY SPACED ON A 4.312 DBC BSC
D .005 DIA
.158 REF
.020 .040 R ALL EDGES OF SLOT
1.553 R REF
SECTION C–C
2 PLACES
SCALE 2/1
32
∥ C .0002
32
∥ C .0002
32
–C–
.250 .251
.782 .781
∥ C .0002
32
.687 .688
32
∥ C .0005
.140 .144
.438 .433
.136 .160
.260 .250
2° 30'
.030 .040 WIDE × .010 .020 DEEP
.120 .130 R TYP
3.500 DIA DATUM
3.000 DIA DATUM
.475 .470
.030 .040 WIDE × .010 .020 DEEP
.020 .040 × 45° ±5°
.127 .137
.360
.222 .232
.750
1.718
SECTION B–B
SCALE 2/1
INCHES
PHOTOGRAPHIC SCALE ONLY
.134 .138 DRILL THRU – .187 DIA
C'BORE – CSK 60° ± 5° TO
.160 .165 DIA – 4 HOLES
1.550 R
10° 0' TYP
.040 .050
SECTION H–H
SCALE 2/1
Ⓐ
6
5
4
3
2
1
F
E
D
C
B
A
1000053 B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005 .015
4. INSIDE CORNERS .010 RADIUS UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS TO BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°

REVISIONS TDRR 00021

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	MOVED .234 .238 DIA HOLE MOVED .134 .138 DIA HOLES	8-7-62		
Ⓜ B-2		ADDED SECTION H-H	8-7-62		
	B	TDR 00043	10-8-62		

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

10C0014	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM-BRUSH SPEC: S-200
ALT: SPEC MIL-B-21531

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED C.J. [illegible] DATE 8-[illegible]
CHECKED
DRAWN D.M.WHIT[illegible] 7-16-62
APPROVED FOR MSC Jack Barnard
BY DIRECTION MIT APPROVED
[illegible] 8/24/62

SHAFT, STUB
15 SPEED, OUTER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000053
SHEET 1 OF 1

PART NO.	DIM A
1000054-1	.29 .27
1000054-2	.54 .52

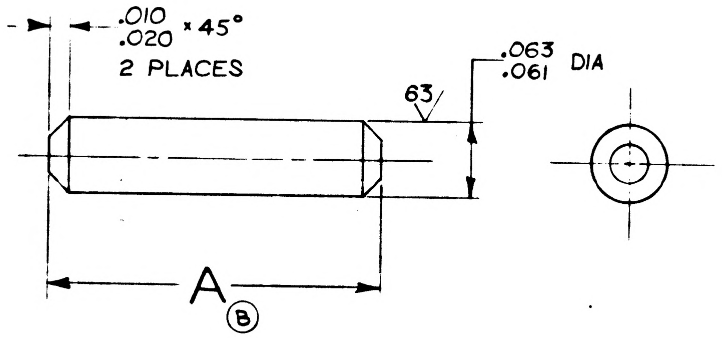
Ⓑ

C 1000054

Ⓜ

REVISIONS TDRR 00025

SYM	DESCRIPTION	DATE	APPROVAL	
A	GENERAL CHANGES	9-11-62	ajB	WAK
B	TDRR 00145	10-31-62	ajB	WAK
C	TDRR 00145	11-29-62	ajB	WAK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. $\overset{125}{\vee}$ ALL OVER UNLESS OTHERWISE SPECIFIED.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE USAGE	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ± 0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY ROD Ⓒ
1100 TEMP H 14
ALT SPEC QQ-A-411 D

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		9-13-62
CHECKED		
DRAWN	D.M.WHITE	6-6-62

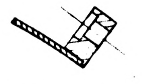
APPROVED FOR MSC 9-13-62
BY DIRECTION
MIT APPROVAL 9/13/62

PIN, STRAIGHT, HEADLESS

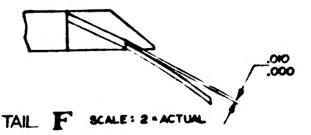
SCALE	UNIT WT.	CODE IDENT.
10/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000054
SHEET 1 OF 1

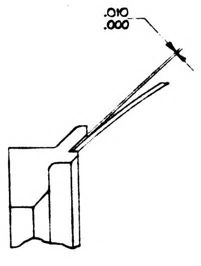
REVISIONS TDRR 00025			
LTR	DESCRIPTION	DATE	APPROVED
A	TDRR 00'14	11-26-62	



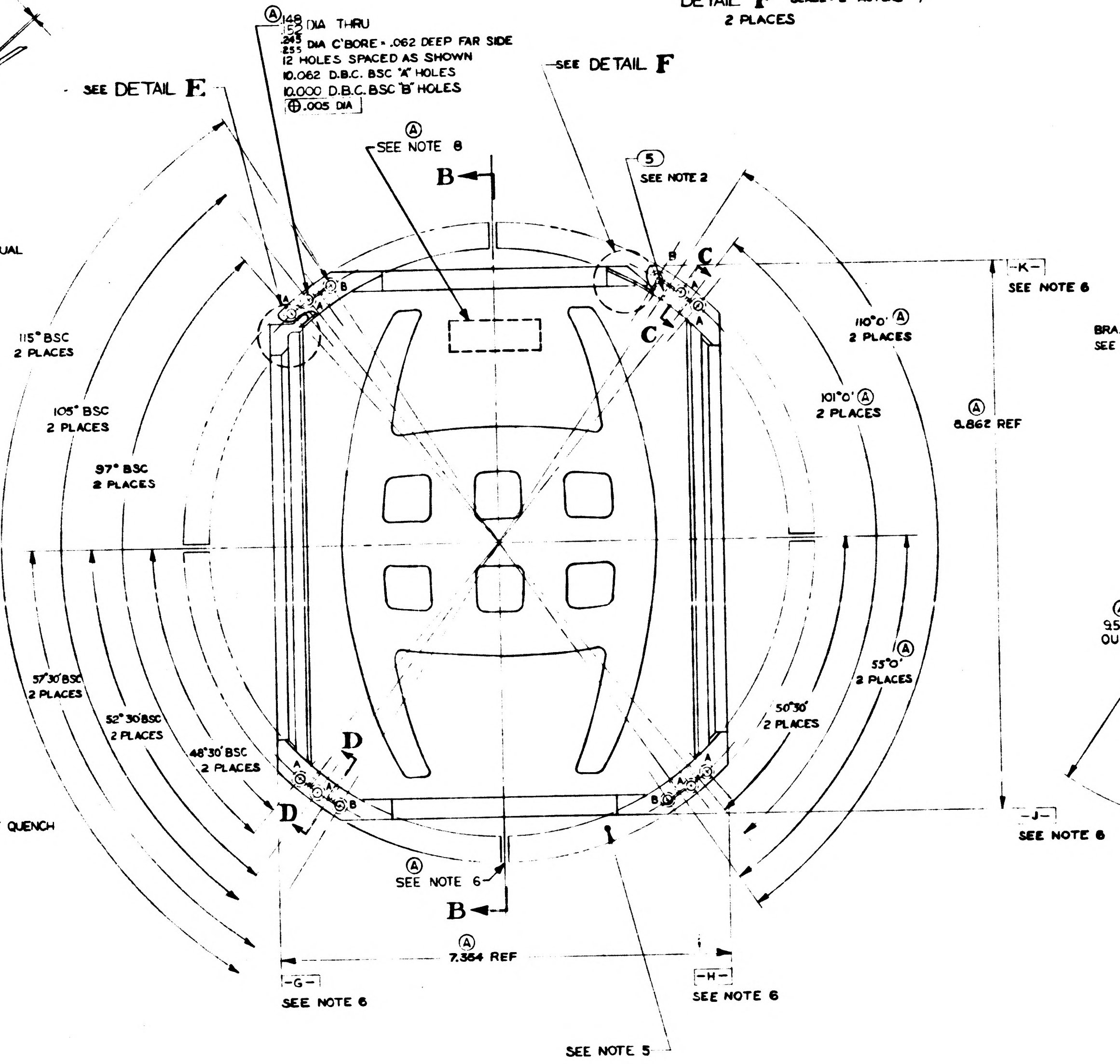
SECTION C–C SCALE: 2×ACTUAL
12 PLACES



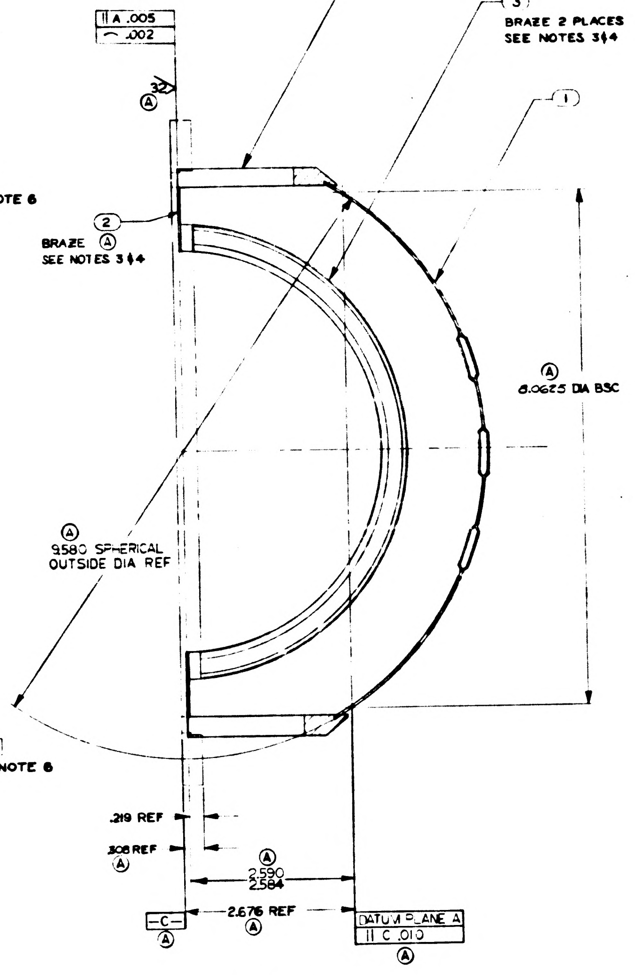
DETAIL F SCALE: 2×ACTUAL
2 PLACES



DETAIL E SCALE: 2×ACTUAL
2 PLACES

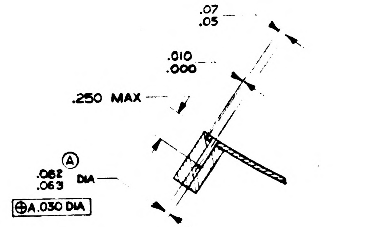


Ⓐ .148/.152 DIA THRU
.245/.251 DIA C'BORE × .062 DEEP FAR SIDE
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
⊕ .005 DIA
SEE DETAIL E
SEE DETAIL F
Ⓐ SEE NOTE 8
B
⑤ SEE NOTE 2
C
C
–K–
SEE NOTE 6
110°0' Ⓐ 2 PLACES
101°0' Ⓐ 2 PLACES
Ⓐ 8.862 REF
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
57°30' BSC 2 PLACES
52°30' BSC 2 PLACES
48°30' BSC 2 PLACES
Ⓐ 55°0' 2 PLACES
50°30' 2 PLACES
D
D
Ⓐ SEE NOTE 6
B
1
–J–
SEE NOTE 6
Ⓐ 7.384 REF
–G–
SEE NOTE 6
–H–
SEE NOTE 6
SEE NOTE 5



④ BRAZE 2 PLACES SEE NOTES 3 & 4
③ BRAZE 2 PLACES SEE NOTES 3 & 4
①
// A .005
⌒ .002
32 Ⓐ
② BRAZE Ⓐ SEE NOTES 3 & 4
Ⓐ 8.0625 DIA BSC
Ⓐ 9.580 SPHERICAL OUTSIDE DIA REF
.219 REF
.308 REF Ⓐ
Ⓐ 2.590/2.584
–C– Ⓐ
2.676 REF Ⓐ
DATUM PLANE A
// C .010 Ⓐ

SECTION B–B



.07
.05
.010
.000
.250 MAX
.062/.063 DIA
⊕ A .030 DIA

SECTION D–D SCALE: 2×ACTUAL
8 PLACES – SHOWN WITH ⑤ REMOVED

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70237.
2. ITEM ⑤ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.

Ⓐ5. HEAT TREAT PER MIL H 6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN AIR BLAST QUENCH
   B. AGE AT 350°F ±10°F FOR 6 HOURS ± 5 MIN

Ⓐ6. ITEM ② MAY BE MACHINED WITHIN .020–.010 OF SURFACES –G– –H– –J– & –K– OR SAWCUT 4 PLACES

7. BREAK SHARP EDGES .005–.015.

Ⓐ8. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130

Ⓐ9. ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ±10° FOR 6 HRS ±5 MIN
   C. FINISH MACHINE

DISREGARD ROLLBOND PATTERN

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
Ⓐ	8	PIN, STRAIGHT, HEADLESS	1000054-			5
Ⓐ	2	FLANGE, STUB SHAFT, MID. GMBL	1000051			4
Ⓐ	2	FLANGE, BRG. HSG. MIDDLE GIMBAL	1000050			3
	1	FLANGE, MIDDLE GIMBAL	1000049			2
	1	HEMISPHERE, MOVABLE MID GMBL	1000056			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	1000074
USED ON	DL 1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED DATE 9-12-62
CHECKED
DRAWN D.M.WINT 6-6-62
APPROVED MSC 9-13-62
MIT APPROVAL 9/13/62

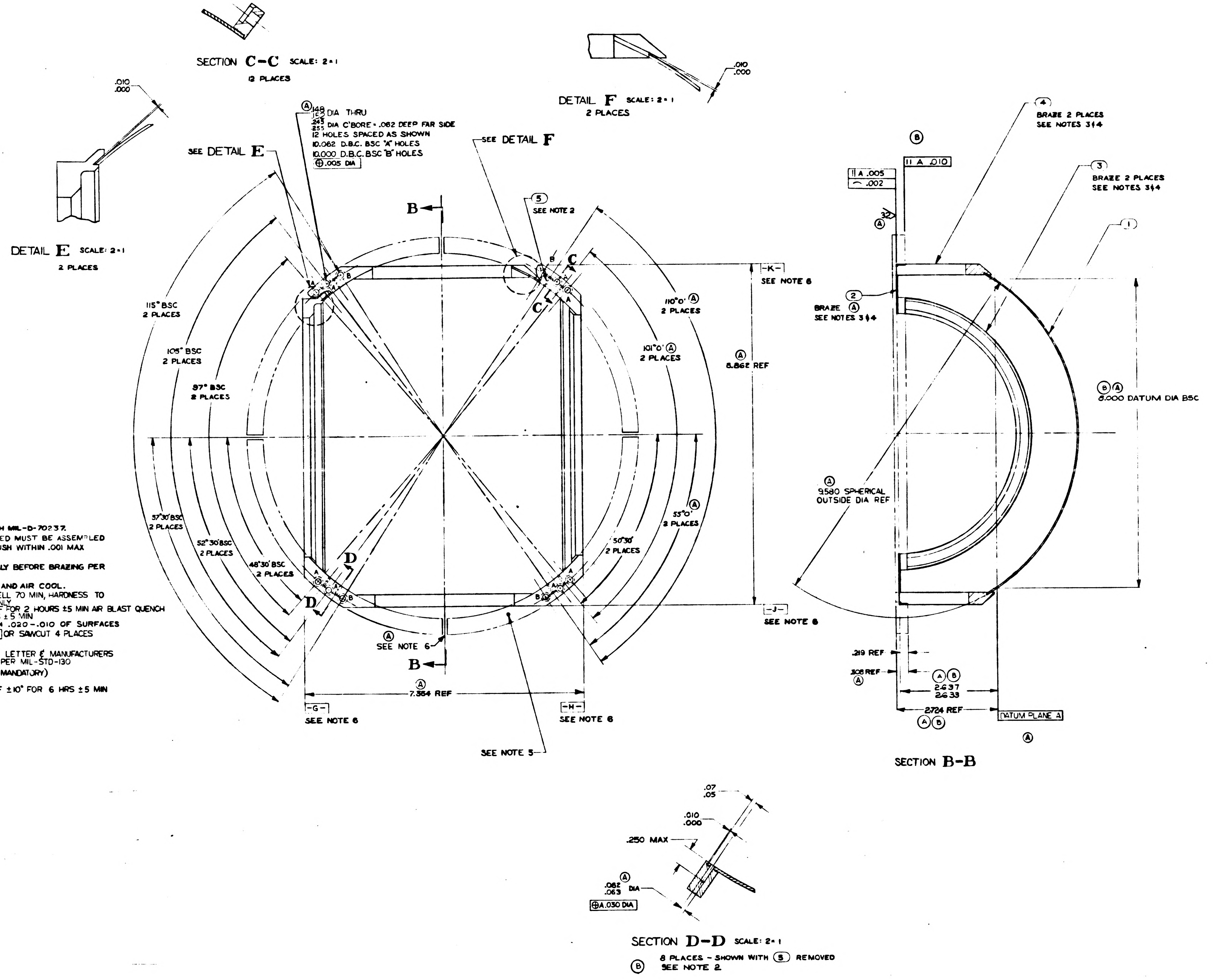
HEMISPHERE ASSEMBLY, MOVABLE MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000055
SHEET OF

1000055 A

M	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00114	2662	316	W
B	TDRR 00368	2-8-63	316	


SECTION C-C SCALE: 2=1
12 PLACES
DETAIL F SCALE: 2=1
2 PLACES
.010
.000
DETAIL E SCALE: 2=1
2 PLACES
SEE DETAIL E
Ⓐ .148/.152 DIA THRU
.245/.255 DIA C'BORE × .062 DEEP FAR SIDE
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
⊕ .005 DIA
SEE DETAIL F
⑤ SEE NOTE 2
B
C
D
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
110°0' Ⓐ 2 PLACES
101°0' Ⓐ 2 PLACES
57°30' BSC 2 PLACES
52°30' BSC 2 PLACES
48°30' BSC 2 PLACES
53°0' Ⓐ 2 PLACES
50°30' 2 PLACES
-K- SEE NOTE 6
Ⓐ 8.862 REF
-J- SEE NOTE 6
Ⓐ SEE NOTE 6
Ⓐ 7.384 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
SEE NOTE 5
Ⓑ
// A .005
⌒ .002
// A .010
④ BRAZE 2 PLACES SEE NOTES 3 & 4
③ BRAZE 2 PLACES SEE NOTES 3 & 4
①
② BRAZE Ⓐ SEE NOTES 3 & 4
Ⓑ Ⓐ 8.000 DATUM DIA BSC
Ⓐ 9.580 SPHERICAL OUTSIDE DIA REF
.219 REF
.308 REF Ⓐ
Ⓐ Ⓑ 2.437 2.633
2.724 REF Ⓐ Ⓑ
DATUM PLANE A Ⓐ
SECTION B-B
.07 .05
.010 .000
.250 MAX
Ⓐ .082 .063 DIA
⊕ A .030 DIA
SECTION D-D SCALE: 2=1
8 PLACES - SHOWN WITH ⑤ REMOVED
Ⓑ SEE NOTE 2

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70237.
2. ITEM ⑤ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.

Ⓐ 5. HEAT TREAT PER MIL H 6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN AIR BLAST QUENCH
   B. AGE AT 350°F ±10°F FOR 6 HOURS ± 5 MIN

Ⓐ 6. ITEM ② MAY BE MACHINED WITHIN .020 -.010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES

7. BREAK SHARP EDGES .005 -.015.

Ⓐ 8. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL ~~AT THE INDICATED LOCATION~~ PER MIL-STD-130

Ⓐ 9. ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ±10° FOR 6 HRS ±5 MIN
   C. FINISH MACHINE

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MAT. RML OR NOTES	
Ⓐ	8	PIN, STRAIGHT, HEADLESS	1000054-			5
Ⓐ	2	FLANGE, STUB SHAFT, MID. GMBL	1000051			4
Ⓐ	2	FLANGE, BRG, HSG, MIDDLE GMBAL	1000050			3
	1	FLANGE, MIDDLE GIMBAL	1000049			2
	1	HEMISPHERE, MOVABLE MID GMBL	1000056			1

LIST OF PARTS AND MATERIALS

MASTER

Ⓑ

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	DL 1000201
1000074	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ± 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
~

M.I.T.
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED 9-13-62
CHECK.
DRAWN D.M.WHITE 6-6-62
APPROVED MSC 9-13-62
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY, MOVABLE
MIDDLE GIMBAL

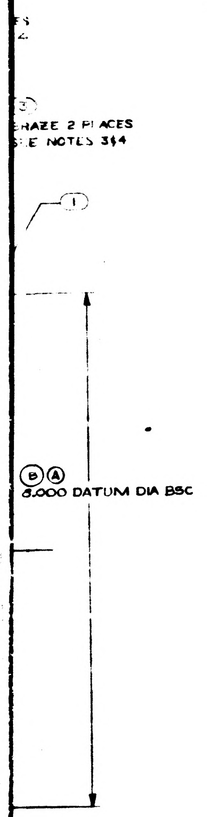
SCALE 1/1 | UNIT WT | CODE IDENT

M.I.T.
INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000055
SHEET OF

Ⓐ

1000055	REV.	SH'T 1

REVISIONS TDR 00025				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00114	11-26-62	ajb	WK
B	TDRR 00368	2-8-63	ajb	WK
C	TDRR 01045	4-30-63	ajb	WK



MASTER

	QTY RQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
Ⓐ	8	PIN, STRAIGHT, HEADLESS	1000054-1			5
Ⓐ	2	FLANGE, STUB SHAFT MID. GMBL	1000051			4
Ⓐ	2	FLANGE BRG HSG, MIDDLE GMBAL	1000050			3
	1	FLANGE, MIDDLE GIMBAL	1000049			2
	1	HEMISPHERE, MOVABLE MID GMBL	1000056			1

LIST OF PARTS AND MATERIALS

Ⓑ

	DL 1000201
1000074	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ______ DECIMALS ______ ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED 9-13-62
CHECK
DRAWN D.M.WHITE 6-6-62
APPROVED FOR MSC
W.J. Rhine 9-13-62
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY, MOVABLE
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

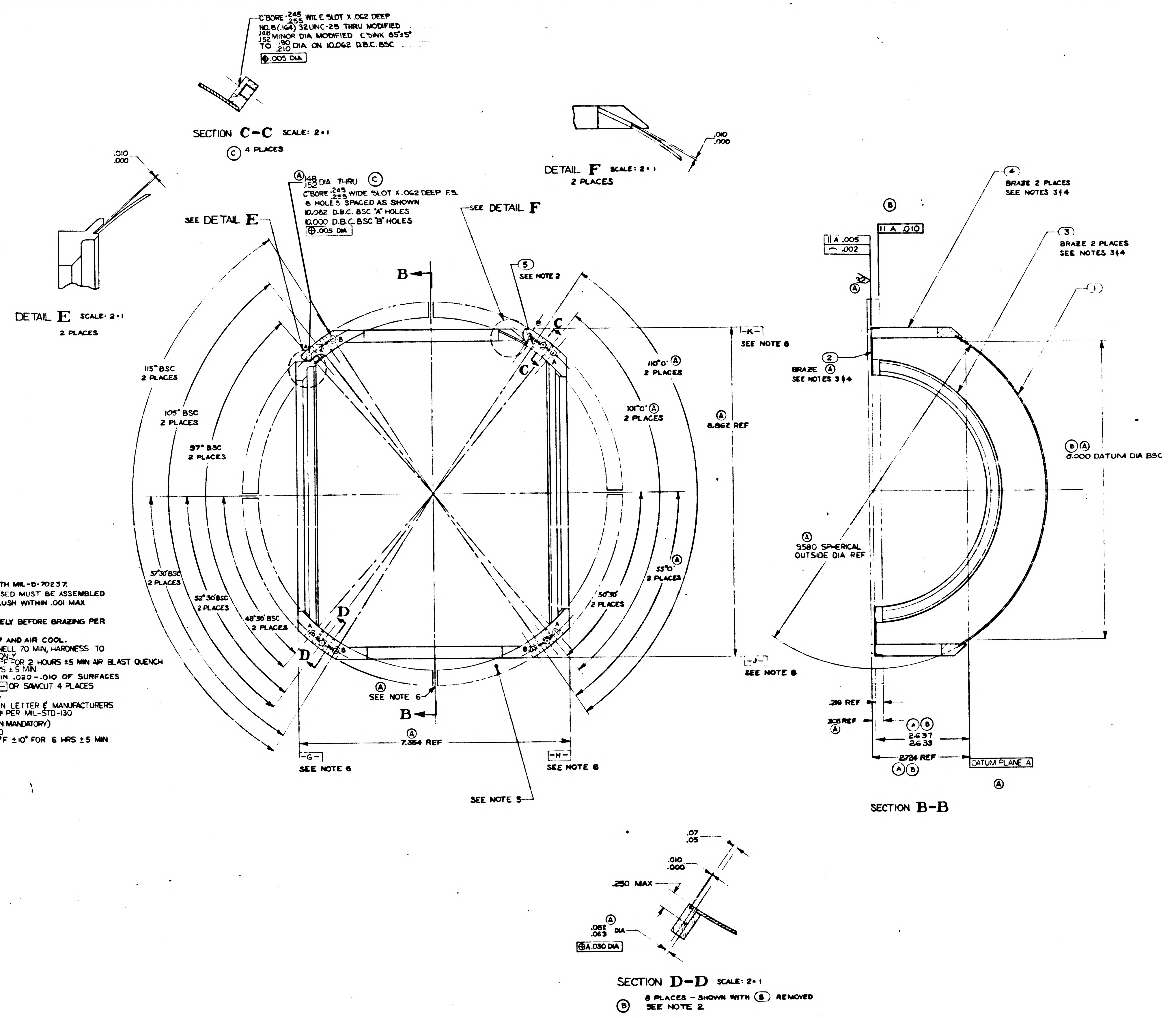
M I T
INSTRUMENTATION
LABORATORY
Cambridge Mass
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000055
SHEET 1 OF 1

1000055 C

1000055

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	DESCRIPTION	DATE
A	TDRR 00114	11-26
B	TDRR 00368	2-84
C	TDRR 01C45	4-30



C'BORE .245/.255 WIDE SLOT X .062 DEEP
NO.8(.164) 32UNC-2B THRU MODIFIED
.148/.152 MINOR DIA MODIFIED C'SINK 85°±5°
TO .190/.210 DIA ON 10.062 D.B.C. BSC
⊕ .005 DIA
SECTION C-C SCALE: 2:1
Ⓒ 4 PLACES
DETAIL F SCALE: 2:1
2 PLACES
.010
.000
DETAIL E SCALE: 2:1
2 PLACES
SEE DETAIL E
Ⓐ .148/.152 DIA THRU Ⓒ
C'BORE .245/.255 WIDE SLOT X .062 DEEP F.S.
8 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC 'A' HOLES
10.000 D.B.C. BSC 'B' HOLES
⊕ .005 DIA
SEE DETAIL F
⑤ SEE NOTE 2
B
C
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
110°0' Ⓐ 2 PLACES
101°0' Ⓐ 2 PLACES
Ⓐ 8.862 REF
-K- SEE NOTE 6
-J- SEE NOTE 6
57°30' BSC 2 PLACES
52°30' BSC 2 PLACES
48°30' BSC 2 PLACES
55°0' Ⓐ 2 PLACES
50°30' 2 PLACES
D
Ⓐ SEE NOTE 6
Ⓐ 7.384 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
SEE NOTE 5
Ⓑ
∥ A .005
⌒ .002
∥ A .010
④ BRAZE 2 PLACES SEE NOTES 3 & 4
③ BRAZE 2 PLACES SEE NOTES 3 & 4
①
② BRAZE Ⓐ SEE NOTES 3 & 4
Ⓑ Ⓐ 8.000 DATUM DIA BSC
Ⓐ 9.580 SPHERICAL OUTSIDE DIA REF
.219 REF
.308 REF Ⓐ
Ⓐ Ⓑ 2.637 2.633
2.724 REF Ⓐ Ⓑ
DATUM PLANE A Ⓐ
SECTION B-B
.07 .05
.010 .000
.250 MAX
Ⓐ .062/.063 DIA
⊕ A .030 DIA
SECTION D-D SCALE: 2:1
Ⓑ 8 PLACES - SHOWN WITH Ⓑ REMOVED SEE NOTE 2

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70237.
2. ITEM ⑤ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
Ⓐ5. HEAT TREAT PER MIL H 6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN AIR BLAST QUENCH
   B. AGE AT 350°F ±10°F FOR 6 HOURS ±5 MIN
Ⓐ6. ITEM ② MAY BE MACHINED WITHIN .020-.010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES
7. BREAK SHARP EDGES .005-.015.
Ⓐ8. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL ~~AT THE INDICATED LOCATION~~ PER MIL-STD-130
Ⓐ9. ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ±10° FOR 6 HRS ±5 MIN
   C. FINISH MACHINE

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION
Ⓐ	8	PIN, STRAIGHT, HEADLESS	1000054-1	
Ⓐ	2	FLANGE STUB SHAFT MID. GMBL	1000051	
Ⓐ	2	FLANGE BRG HSG MIDDLE GMBAL	1000050	
		FLANGE, MIDDLE GIMBAL	1000049	
	1	HEMISPHERE, MOVABLE MID GMBL	1000036	

LIST OF PARTS AND MATERIALS

MASTER

Ⓑ

	DL 1000201
1000074	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
DATE
APPROVED
DRAWN D.M.WHIT
9-13-62
9/13/62

HEMISPHERE ASSEMBLY, MOVABLE
MIDDLE GIMBAL

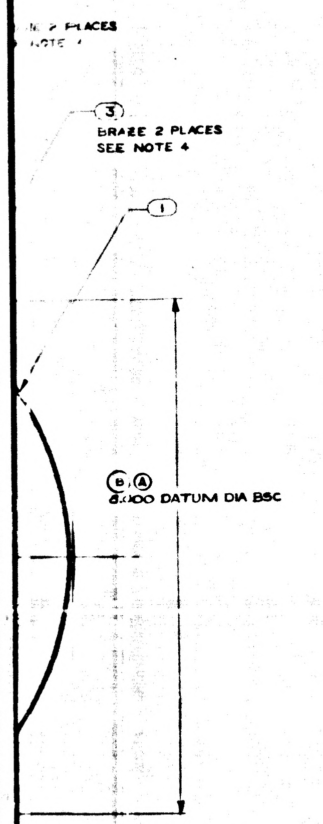
SCALE 1/1
UNIT WT.
CODE IDENT.
100

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

Ⓐ
1000055 REV. C SH'T 1

REVISIONS TDR 00025

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00114	11-26-62	ajb	WK
B	TDRR 00368	2-8-63	ajb	WK
C	TDRR 01045	4-30-63	ajb	WK
D	TDRR 01443	6-5-63	ajb	KB



1000055 D

MASTER

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
Ⓐ	8	PIN, STRAIGHT, HEADLESS	1000054-1			5
Ⓐ	2	FLANGE, STUB SHAFT, MID. GMBL	1000051			4
Ⓐ	2	FLANGE BRG. HSG, MIDDLE GMBAL	1000050			3
	1	FLANGE, MIDDLE GIMBAL	1000049			2
	1	HEMISPHERE, MOVABLE MID GMBL	1000056			1

LIST OF PARTS AND MATERIALS

Ⓑ

NEXT ASSY	USED ON
	DL 1000201
1000074	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: ~

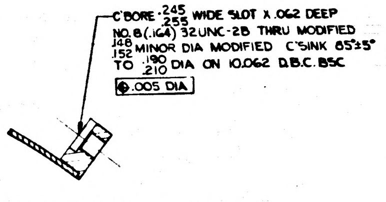
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN DMWHITE
APPROVED FOR MSC 9-12-62
MIT

HEMISPHERE ASSEMBLY, MOVABLE MIDDLE GIMBAL

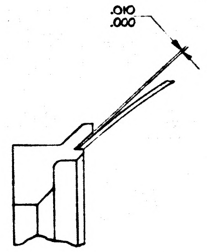
SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000055
SHEET 1 OF 1

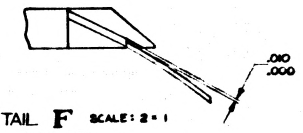
INCHES
PHOTOGRAPHIC SCALE ONLY


C'BORE .245/.255 WIDE SLOT X .062 DEEP
NO. 8 (.164) 32UNC-2B THRU MODIFIED
.148/.152 MINOR DIA MODIFIED C'SINK 85°35'
TO .190/.210 DIA ON 10.062 D.B.C. BSC
.005 DIA

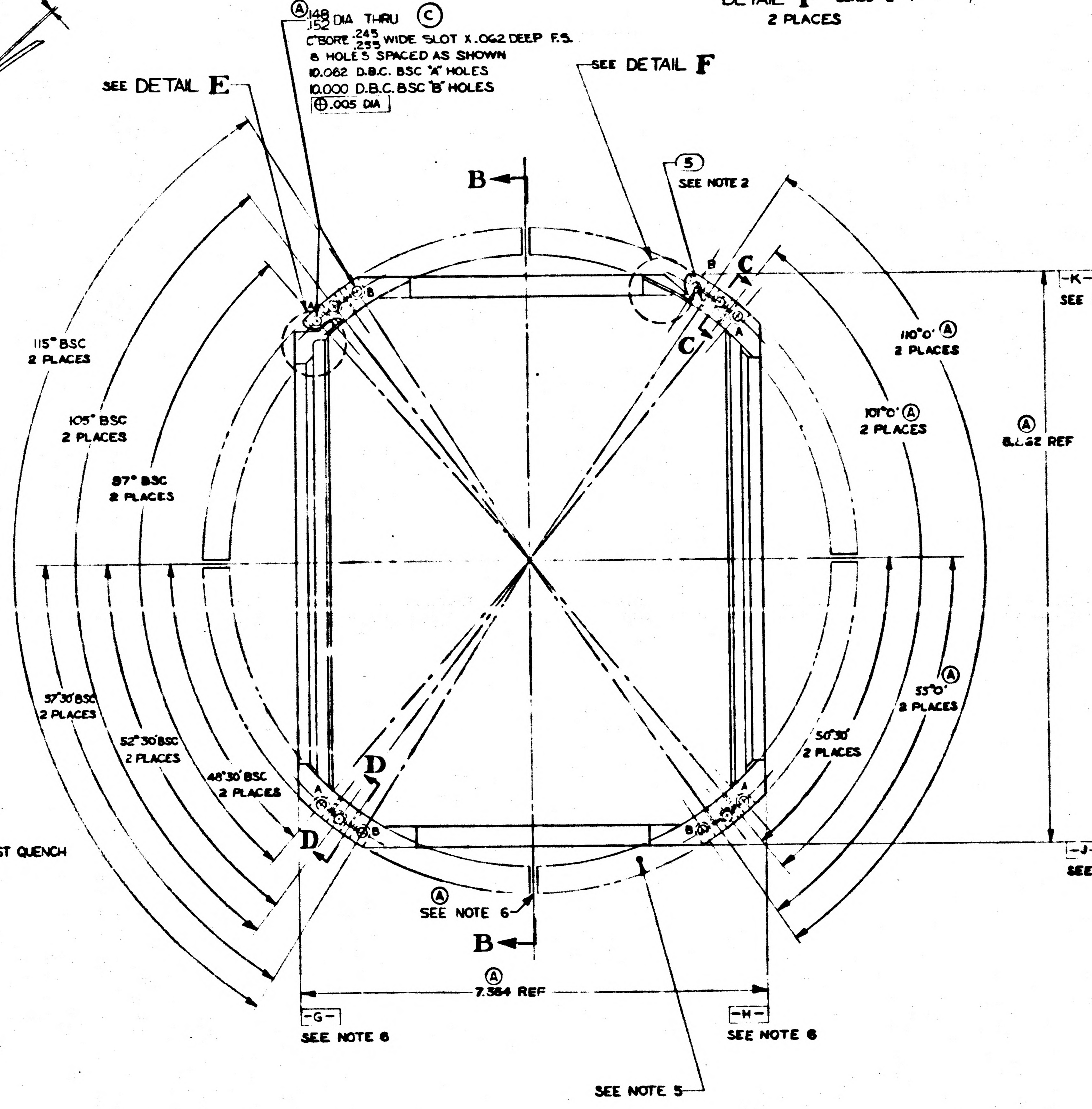
SECTION C—C SCALE: 2=1
Ⓒ 4 PLACES

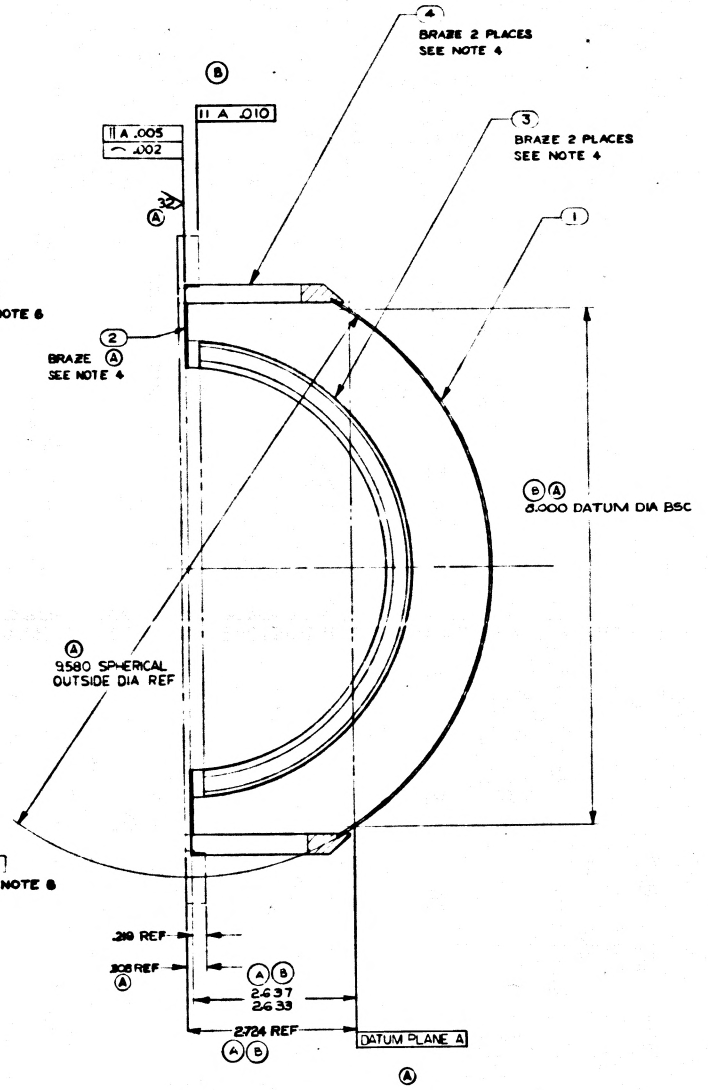


DETAIL E SCALE: 2=1
2 PLACES

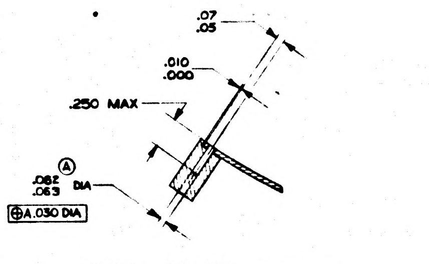


DETAIL F SCALE: 2=1
2 PLACES


Ⓐ .148/.152 DIA THRU Ⓒ
C'BORE .245/.255 WIDE SLOT X .062 DEEP F.S.
8 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
.005 DIA
SEE DETAIL E
SEE DETAIL F
B
⑤ SEE NOTE 2
C
C
115° BSC 2 PLACES
105° BSC 2 PLACES
87° BSC 2 PLACES
110°0' Ⓐ 2 PLACES
101°0' Ⓐ 2 PLACES
-K- SEE NOTE 6
Ⓐ 8.162 REF
57°30' BSC 2 PLACES
52°30' BSC 2 PLACES
48°30' BSC 2 PLACES
53°0' Ⓐ 2 PLACES
50°30' 2 PLACES
D
D
Ⓐ SEE NOTE 6
B
-J- SEE NOTE 6
Ⓐ 7.354 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
SEE NOTE 5


Ⓑ
.005 A
.002
.010 A
32
Ⓐ
④ BRAZE 2 PLACES SEE NOTE 4
③ BRAZE 2 PLACES SEE NOTE 4
①
② BRAZE Ⓐ SEE NOTE 4
Ⓑ Ⓐ 8.000 DATUM DIA BSC
Ⓐ 9.580 SPHERICAL OUTSIDE DIA REF
.219 REF
.208 REF Ⓐ
Ⓐ Ⓑ 2.637 2.633
2.724 REF Ⓐ Ⓑ
DATUM PLANE A
Ⓐ

SECTION B—B


.07
.05
.010
.000
.250 MAX
Ⓐ .082/.063 DIA
A .030 DIA

SECTION D—D SCALE: 2=1
8 PLACES – SHOWN WITH ⑧ REMOVED
Ⓑ SEE NOTE 2

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70237.
2. ITEM ⑤ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.

Ⓓ ~~3. CLEAN COMPONENT [illegible] [illegible] BEFORE BRAZING PER [illegible] 00 7894.~~

Ⓓ

4. DIP BRAZE PER ND 1002073

Ⓐ 5. HEAT TREAT PER MIL H 6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   - A. SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN AIR BLAST QUENCH
   - B. AGE AT 350°F ±10°F FOR 6 HOURS ±5 MIN

Ⓐ 6. ITEM ② MAY BE MACHINED WITHIN .020 -.010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES

7. BREAK SHARP EDGES .005 -.015.

Ⓐ 8. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL ~~AT THE INDICATED LOCATION~~ PER MIL-STD-130

Ⓐ 9. ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ±10° FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE

REV	DESCRIPTION		DATE	
A	TDRR 0[illegible]4		11-2[illegible]	
B	TDRR 00368		2-5-63	
C	TDRR 01045		4-30-63	
D	TDRR 01443		6-5-63	

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION
Ⓐ	8	PIN, STRAIGHT, HEADLESS	1000054-	
Ⓐ	2	FLANGE STUB SHAFT MID. GMBL	1000051	
Ⓐ	2	FLANGE BRG HSG MIDDLE GMBAL	1000050	
	1	FLANGE, MIDDLE GIMBAL	1000049	
	1	HEMISPHERE, MOVABLE MID GMBL	1000036	

LIST OF PARTS AND MATERIALS

Ⓑ MASTER

NEXT ASSY	USED ON
	DL 1000201
1000074	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED [illegible]
CHECKED
DRAWN D.M.WHITE 6-6-62
APPROVED NASA 9-13-62
MIT APPROVAL 9/13/62

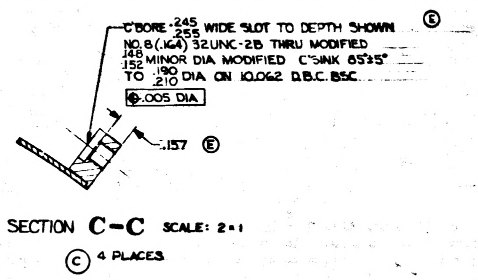
HEMISPHERE ASSEMBLY
MOVABLE
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

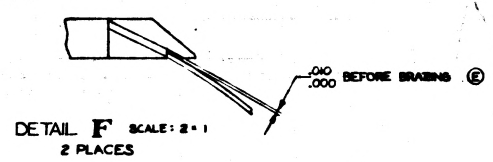
Ⓐ
1000055 REV D SH 1

INCHES
PHOTOGRAPHIC SCALE ONLY

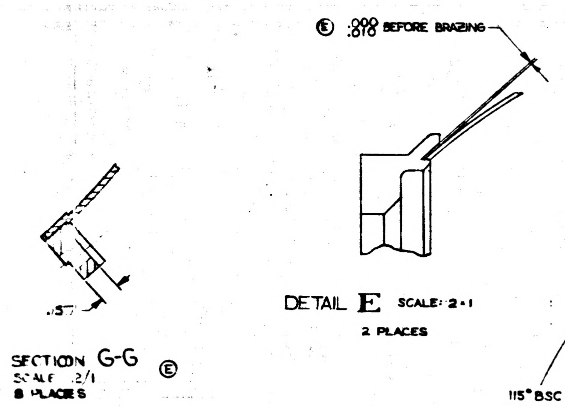
SYM	DESCRIPTION	DATE		APPROVAL
A	TDRR 00114	11-21-62	ajb	WK
B	TDRR 00368	2-8-63	ajb	WK
C	TDRR 01045	4-30-63	ajb	WK
D	TDRR 01443	6-5-63	ajb	IKB
E	TDRR 04564	12-5-63		WK


C'BORE .245/.255 WIDE SLOT TO DEPTH SHOWN Ⓔ
NO.8(.164) 32UNC-2B THRU MODIFIED
.148/.152 MINOR DIA MODIFIED C'SINK 85°±5°
TO .190/.210 DIA ON 10.062 D.B.C. BSC
⊕.005 DIA
.157 Ⓔ

SECTION **C–C** SCALE: 2=1
Ⓒ 4 PLACES

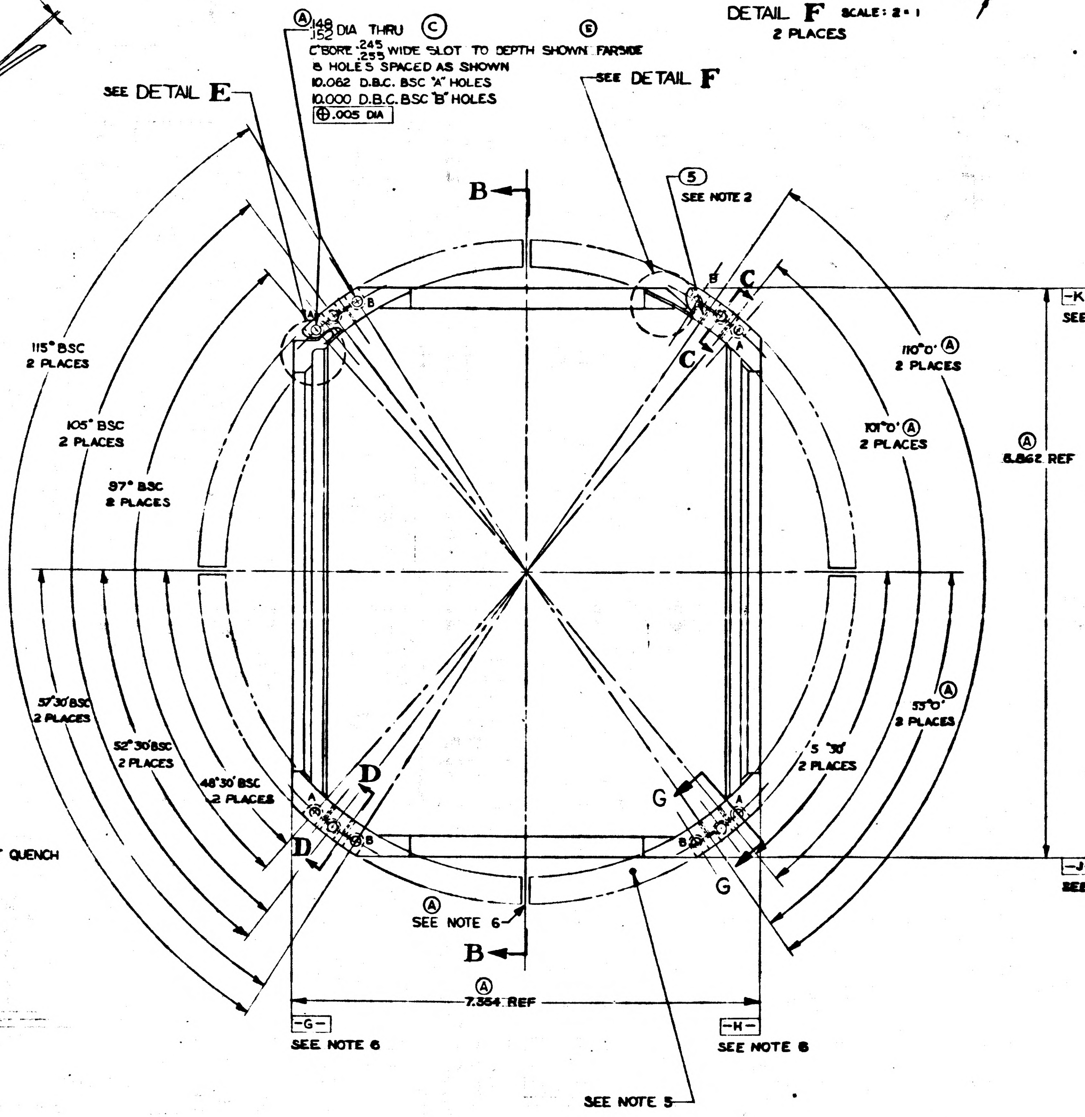

.010/.000 BEFORE BRAZING Ⓔ

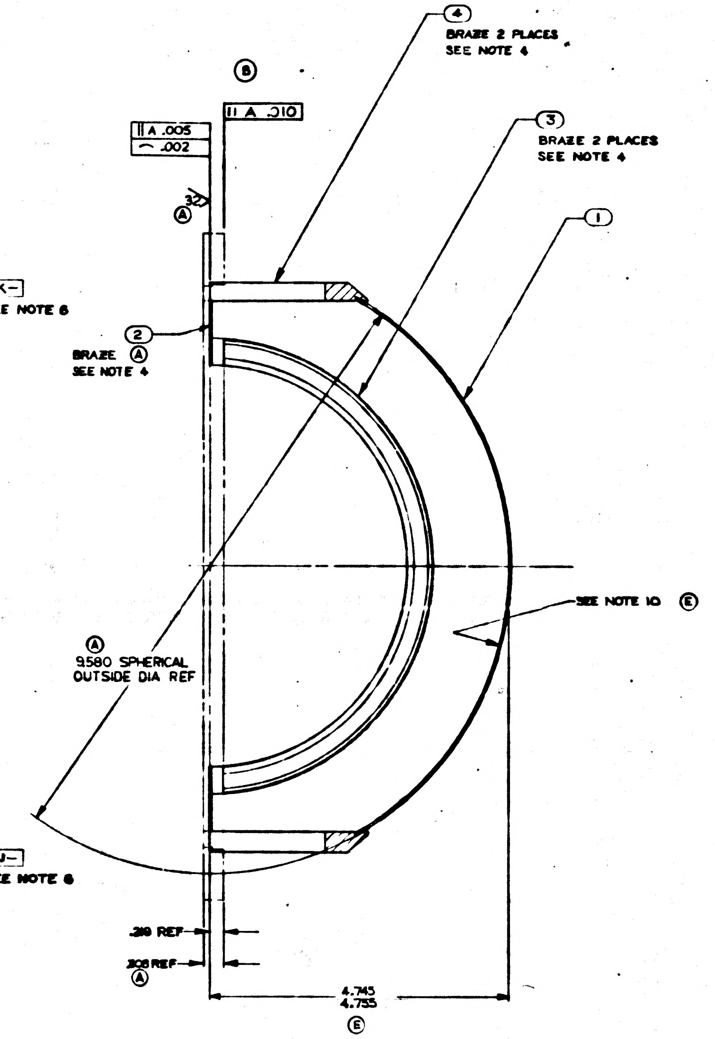
DETAIL **F** SCALE: 2=1
2 PLACES


Ⓔ .000/.010 BEFORE BRAZING
.157

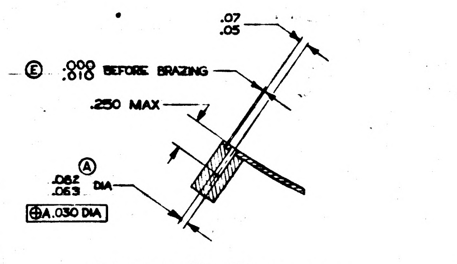
DETAIL **E** SCALE: 2=1
2 PLACES

SECTION G-G Ⓔ
SCALE 2/1
8 PLACES


Ⓐ .148/.152 DIA THRU Ⓒ Ⓔ
C'BORE .245/.255 WIDE SLOT TO DEPTH SHOWN FARSIDE
8 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
⊕.005 DIA
SEE DETAIL E
SEE DETAIL F
B
B
5
SEE NOTE 2
C
C
D
D
G
G
A
B
-K-
SEE NOTE 6
-J-
SEE NOTE 6
-G-
SEE NOTE 6
-H-
SEE NOTE 6
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
57°30' BSC 2 PLACES
52°30' BSC 2 PLACES
48°30' BSC 2 PLACES
110°0' Ⓐ 2 PLACES
101°0' Ⓐ 2 PLACES
53°0' Ⓐ 2 PLACES
5°30' 2 PLACES
Ⓐ 8.862 REF
Ⓐ 7.354 REF
SEE NOTE 6
SEE NOTE 5


Ⓑ
‖ A .005
⌒ .002
‖ A .010
32
Ⓐ
4
BRAZE 2 PLACES
SEE NOTE 4
3
BRAZE 2 PLACES
SEE NOTE 4
1
2
BRAZE Ⓐ
SEE NOTE 4
SEE NOTE 10 Ⓔ
Ⓐ 9.580 SPHERICAL OUTSIDE DIA REF
.310 REF
.308 REF
Ⓐ
4.745/4.755
Ⓔ

SECTION **B–B**


.07/.05
Ⓔ .000/.010 BEFORE BRAZING
.250 MAX
Ⓐ .062/.053 DIA
⊕A .030 DIA

SECTION **D–D** SCALE: 2=1
Ⓑ 8 PLACES – SHOWN WITH ⑤ REMOVED
SEE NOTE 2

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70237.
2. ITEM ⑤ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. Ⓓ ~~[illegible]~~
4. Ⓔ DIP BRAZE PER ND 1002073 EXCEPT AIR BLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING.
5. Ⓐ HEAT TREAT PER MIL H 6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN AIR BLAST QUENCH
   B. AGE AT 350°F ±10°F FOR 6 HOURS ±5 MIN
6. Ⓐ ITEM ② MAY BE MACHINED WITHIN .020–.010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES
7. BREAK SHARP EDGES .005–.015.
8. Ⓐ IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL ~~AT THE INDICATED LOCATION~~ PER ND 1002019.
9. Ⓐ ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ±10° FOR 6 HRS ±5 MIN
   C. FINISH MACHINE
10. Ⓔ INSIDE SPHERICAL RADIUS OF 4.750/4.770 MUST BE MAINTAINED AFTER BRAZING & HEAT TREAT.

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓐ	8	PIN, STRAIGHT, HEADLESS	1000054-1			5
Ⓐ	2	FLANGE, STUB SHAFT, MID. GMBL	1000051			4
Ⓐ	2	FLANGE, BRG, HSG, MIDDLE GMBAL	1000050			3
	1	FLANGE, MIDDLE GIMBAL	1000049			2
	1	HEMISPHERE, MOVABLE MID GMBL	1000056			1

LIST OF PARTS AND MATERIALS

Ⓑ MASTER

NEXT ASSY	USED ON
	DL 1000201
1000074	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D.M.WHITE 6-6-6
APPROVED FOR MSC 9-13-62
BY DIRECTION
MIT APPROVAL 9/13/62

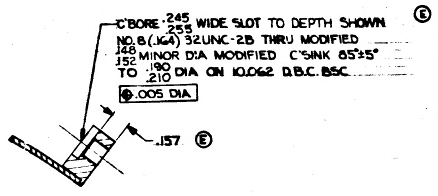
HEMISPHERE ASSEMBLY,
MOVABLE
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000055
SHEET 1 OF 1

Ⓐ 1000055 E 1

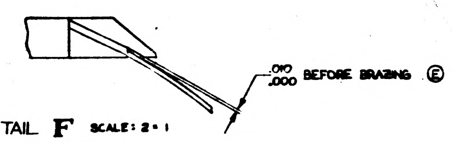
M	DESCRIPTION
A	TDRR 00114
B	TDRR 00368
C	TDRR 00045
D	TDRR 00143
E	TDRR 04564



C'BORE .245/.255 WIDE SLOT TO DEPTH SHOWN Ⓔ
NO.8(.164) 32UNC-2B THRU MODIFIED
.148/.152 MINOR DIA MODIFIED C'SINK 85°±5°
TO .190/.210 DIA ON 10.062 D.B.C. BSC
⊕ .005 DIA
.157 Ⓔ

SECTION C–C SCALE: 2=1

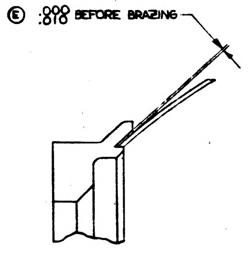
Ⓒ 4 PLACES



.010/.000 BEFORE BRAZING Ⓔ

DETAIL F SCALE: 2=1

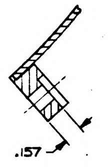
2 PLACES



Ⓔ .000/.010 BEFORE BRAZING

DETAIL E SCALE: 2=1

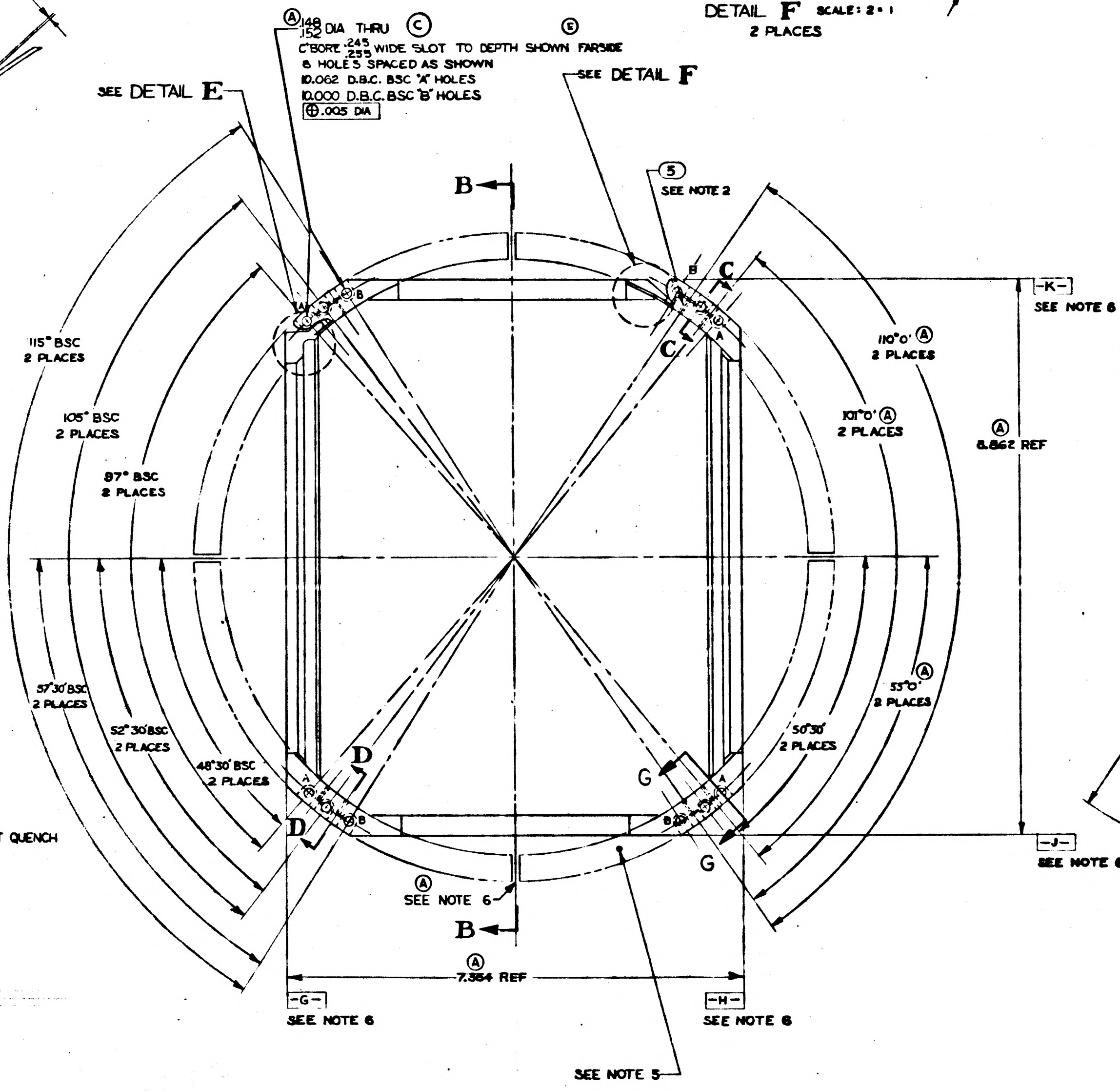
2 PLACES



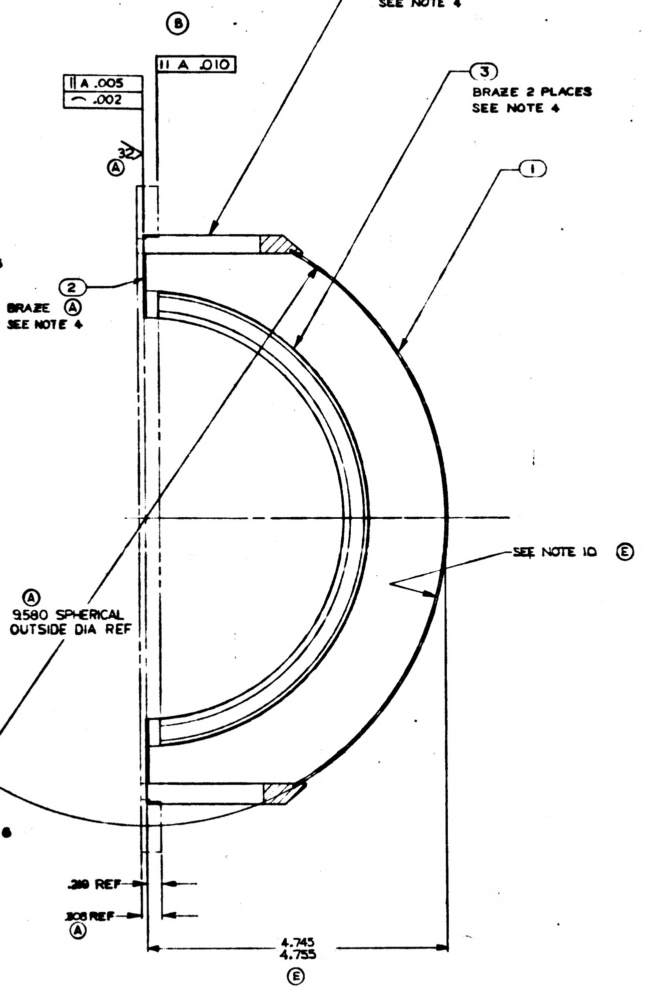
SECTION G-G Ⓔ

SCALE 2/1

8 PLACES



Ⓐ .148/.152 DIA THRU Ⓒ Ⓔ
C'BORE .245/.255 WIDE SLOT TO DEPTH SHOWN FARSIDE
8 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
⊕ .005 DIA
SEE DETAIL E
SEE DETAIL F
5
SEE NOTE 2
B
C
C
D
D
G
G
A
B
115° BSC
2 PLACES
105° BSC
2 PLACES
97° BSC
2 PLACES
110°0' Ⓐ
2 PLACES
101°0' Ⓐ
2 PLACES
Ⓐ
8.862 REF
-K-
SEE NOTE 6
57°30' BSC
2 PLACES
52°30' BSC
2 PLACES
48°30' BSC
2 PLACES
Ⓐ 53°0'
2 PLACES
50°30'
2 PLACES
-J-
SEE NOTE 6
Ⓐ
SEE NOTE 6
Ⓐ
7.384 REF
-G-
SEE NOTE 6
-H-
SEE NOTE 6
SEE NOTE 5



4
BRAZE 2 PLACES
SEE NOTE 4
3
BRAZE 2 PLACES
SEE NOTE 4
1
Ⓑ
‖ A .010
‖ A .005
⌒ .002
32
Ⓐ
-K-
SEE NOTE 6
2
BRAZE Ⓐ
SEE NOTE 4
SEE NOTE 10 Ⓔ
Ⓐ
9.580 SPHERICAL
OUTSIDE DIA REF
-J-
SEE NOTE 6
.219 REF
.108 REF
Ⓐ
4.745/4.755
Ⓔ

SECTION B–B

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70237.
2. ITEM (5) OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.

Ⓓ ~~3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER~~

Ⓓ Ⓔ 4. DIP BRAZE PER ND1002073 EXCEPT AIR BLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING.

Ⓐ 5. HEAT TREAT PER MIL H 6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN AIR BLAST QUENCH
   B. AGE AT 350°F ±10°F FOR 6 HOURS ±5 MIN

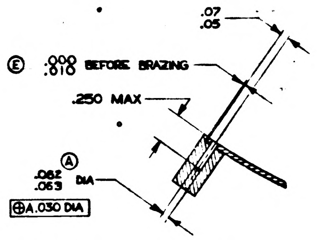
Ⓐ 6. ITEM (2) MAY BE MACHINED WITHIN .020–.010 OF SURFACES [-G-] [-H-] [-J-] & [-K-] OR SAWCUT 4 PLACES

7. BREAK SHARP EDGES .005–.015.

Ⓐ 8. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL ~~AT THE INDICATED LOCATION~~ PER ND1002019.

Ⓐ 9. ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ±10° FOR 6 HRS ±5 MIN
   C. FINISH MACHINE

Ⓔ 10. INSIDE SPHERICAL RADIUS OF 4.730/4.770 MUST BE MAINTAINED AFTER BRAZING & HEAT TREAT.



.07/.05
Ⓔ .000/.010 BEFORE BRAZING
.250 MAX
Ⓐ
.062/.063 DIA
⊕ A .030 DIA

SECTION D–D SCALE: 2=1

Ⓑ 8 PLACES – SHOWN WITH (5) REMOVED

SEE NOTE 2

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.
Ⓐ	8	PIN, STRAIGHT, HEADLESS	C00054-1
Ⓐ	2	FLANGE, STUB SHAFT, MID. GMBL.	000051
Ⓐ	2	FLANGE, BRG, HSG, MIDDLE GMBAL	1000050
	1	FLANGE, MIDDLE GIMBAL	000049
	1	HEMISPHERE, MOVABLE MID GMBL	1000056

LIST OF PARTS AND MATERIALS

MASTER

Ⓑ

INCHES

PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
	DL1000201
1000074	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
DRAWN D.M.WHITE 6-8-62
APPROVED NASA MSC 9-13-62
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY, MOVABLE MIDDLE GIMBAL

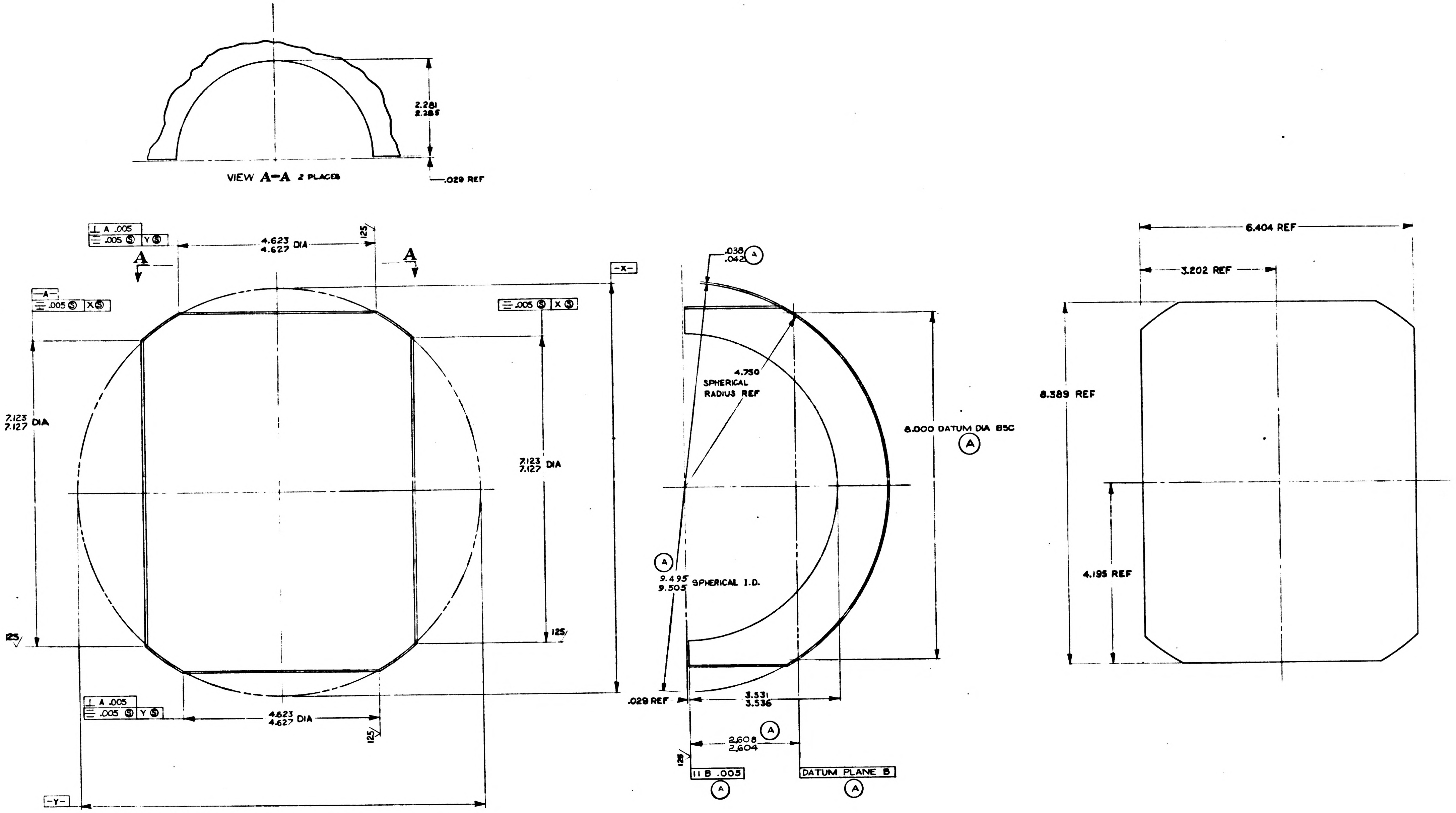
SCALE 1/1

UNIT WT.

Ⓐ 1000055 REV. E SH. 1

REVISIONS TDRR 00028

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00365	2-6-63	



2.281
2.285
VIEW A-A 2 PLACES
.029 REF
A .005
.005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
A
-A-
.005 Ⓢ X Ⓢ
-X-
7.123
7.127 DIA
7.123
7.127 DIA
125
125
A .005
.005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
-Y-
.038
.042 Ⓐ
4.750
SPHERICAL
RADIUS REF
8.000 DATUM DIA BSC Ⓐ
Ⓐ
9.495
9.505
SPHERICAL I.D.
.029 REF
3.531
3.536
2.608
2.604 Ⓐ
125
B .005 Ⓐ
DATUM PLANE B Ⓐ
6.404 REF
3.202 REF
8.389 REF
4.195 REF

NOTES:

Ⓐ 1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
Ⓐ 4. IDENTIFY USING DRAWING NO; REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

Ⓐ

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000055	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

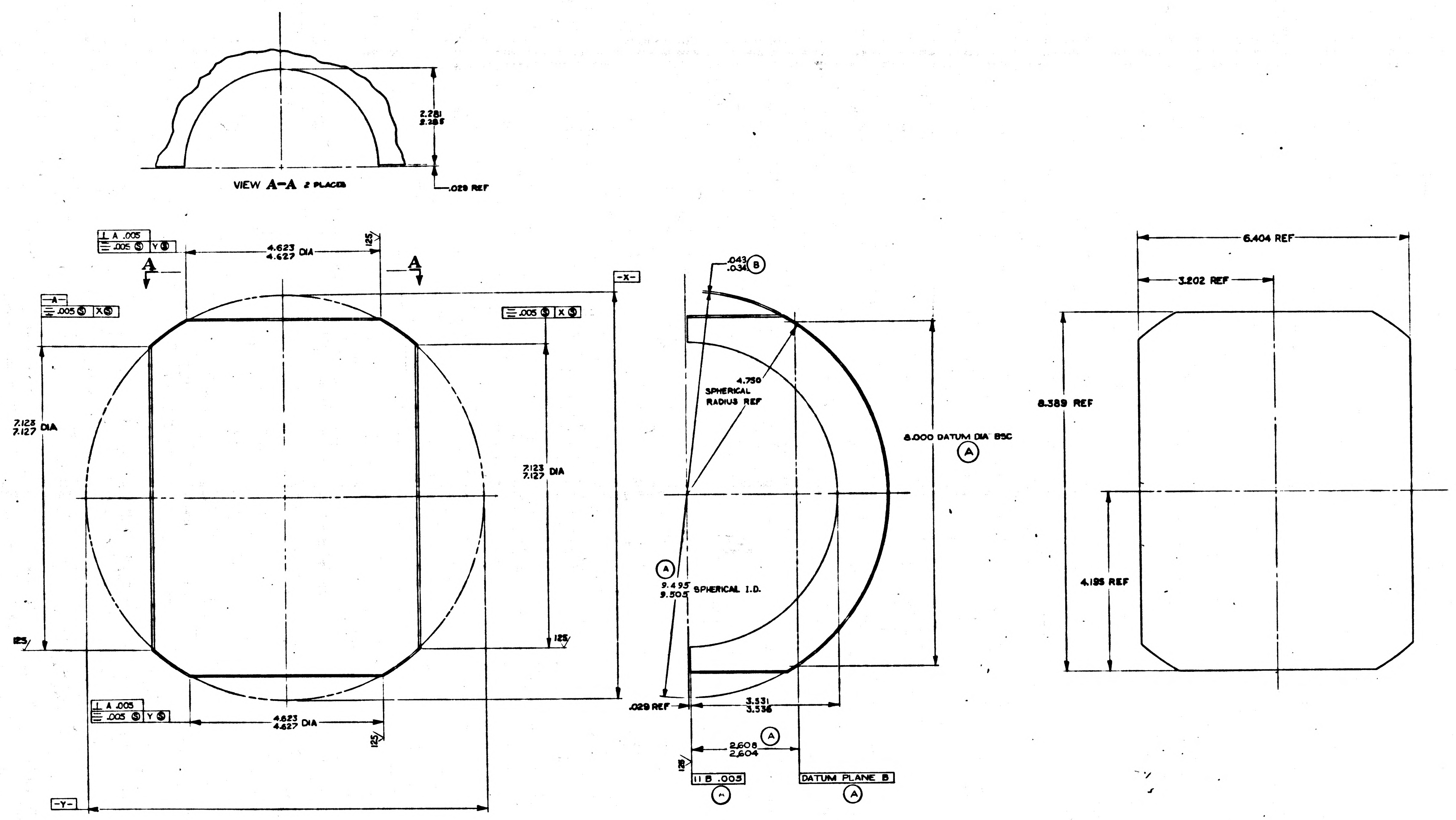
MIT INSTRUMENTATION LAB CONTRACT
NAS 9-153 DATE
APPROVED A J Boyce 9-13-62
CHECKED
DRAWN D.M.WHITE 6-11-62
APPROVED FOR MSC W J Rhine 9-13-62
BY DIRECTION
MIT APPROVAL 9/13/62

HEMISPHERE
MOVABLE
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000056
SHEET 1 OF 1

		REVISIONS	TDRR 00025	
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00365	2-6-63	
	B	TDRR 00782	4-9-63	



VIEW A-A 2 PLACES
2.281
2.285
.029 REF
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
A
A
-A-
≡ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
125
-Y-
-X-
.043
.034 Ⓑ
4.750
SPHERICAL
RADIUS REF
Ⓐ
9.495
9.505 SPHERICAL I.D.
.029 REF
3.531
3.536
2.608
2.604
Ⓐ
125
∥ B .005
DATUM PLANE B
Ⓐ
8.000 DATUM DIA BSC
Ⓐ
6.404 REF
3.202 REF
8.389 REF
4.195 REF

NOTES:

Ⓐ 1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O

2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

3. BREAK ALL SHARP EDGES $^{.005}_{.015}$

Ⓐ 4. IDENTIFY USING DRAWING NO; REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ

NEXT ASSY	USED ON
	DL 1000201
1000065	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 1

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED 9-13-62
CHECKED
DRAWN D.M. WHITE 6-11-62
APPROVED FOR MSC
9-13-62
BY DIRECTION
MIT APPROVAL 9/13/62

HEMISPHERE
MOVABLE
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000056
SHEET 1 OF 1

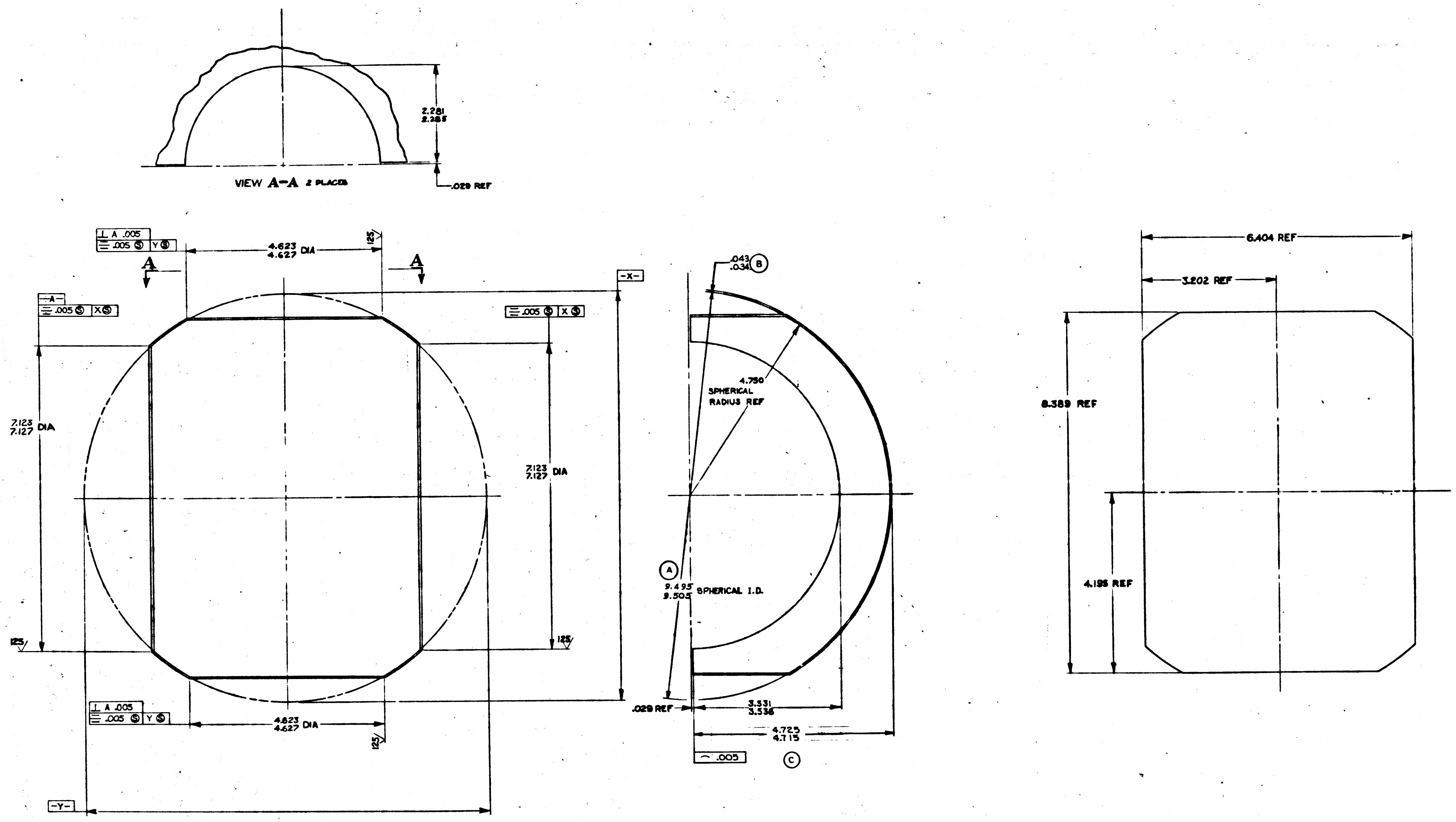
INCHES
PHOTOGRAPHIC SCALE ONLY

INCHES
PHOTOGRAPHIC SCALE ONLY

1000056 B

REVISIONS TDRR 0002

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00365	2-6-63	
	B	TDRR 00782	4-9-63	
	C	TDRR 04569	11-12-63	



VIEW A-A 2 PLACES
2.281
2.285
.029 REF
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
A
A
-X-
-A-
≡ .005 Ⓢ X Ⓢ
≡ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
7.123
7.127 DIA
125
125
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
-Y-
.043
.034 B
4.750
SPHERICAL
RADIUS REF
A
9.495
9.505 SPHERICAL I.D.
.029 REF
3.531
3.536
4.725
4.715
⌒ .005
C
6.404 REF
3.202 REF
8.389 REF
4.195 REF

NOTES:

Ⓐ 1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
Ⓐ 4. IDENTIFY USING DRAWING NO; REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
Ⓒ

MASTER

Ⓐ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000055	DL 1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED 9-13-63
CHECKED
DRAWN D.M.WHITE 6-11-62
APPROVED FOR MSC
W J 9-13-63
BY DIRECTION
MIT APPROVAL 9/13/63

HEMISPHERE
MOVABLE
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

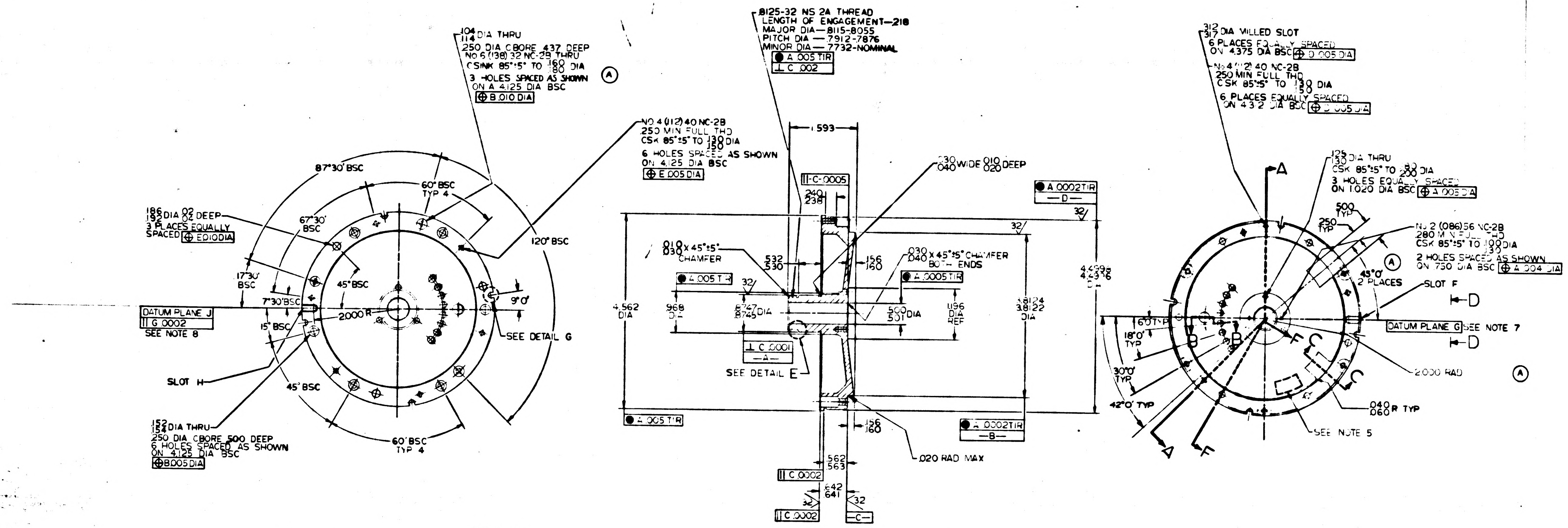
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000056
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

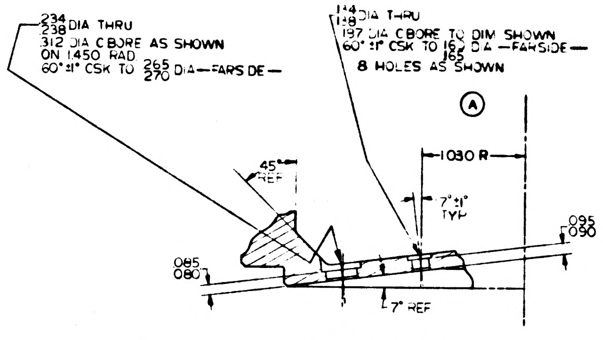
INCHES
PHOTOGRAPHIC SCALE ONLY

1000056

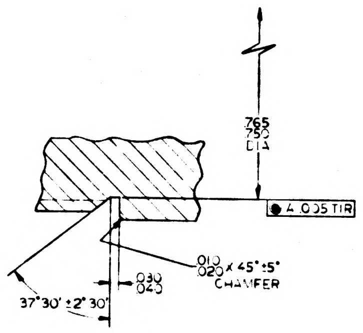
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00026				
	A	TDRR 00044	10-5-62	0296 NK


.104/.114 DIA THRU
.250 DIA C BORE .437 DEEP
NO 6 (.138) 32 NC-2B THRU
CSINK 85°±5° TO .160/.180 DIA
3 HOLES SPACED AS SHOWN
ON A 4.125 DIA BSC
⊕ B .010 DIA
87°30' BSC
60° BSC TYP 4
67°30' BSC
120° BSC
.186/.192 DIA .02 DEEP
3 PLACES EQUALLY SPACED ⊕ E .010 DIA
17°30' BSC
7°30' BSC
45° BSC
2.000 R
9°0'
DATUM PLANE J
∥ G .0002
SEE NOTE 8
15° BSC
SEE DETAIL G
SLOT H
45° BSC
.152/.154 DIA THRU
.250 DIA CBORE .500 DEEP
6 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
⊕ B .005 DIA
60° BSC TYP 4
NO 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
⊕ E .005 DIA
.8125-32 NS 2A THREAD
LENGTH OF ENGAGEMENT—.218
MAJOR DIA—.8115-.8055
PITCH DIA—.7912-.7876
MINOR DIA—.7732-NOMINAL
● A .005 TIR
⊥ C .002
1.593
∥ C .0005
.240/.238
.030/.040 WIDE .010/.020 DEEP
● A .0002 TIR
—D—
.010/.030 X 45°±5° CHAMFER
.532/.530
.156/.160
.030/.040 X 45°±5° CHAMFER BOTH ENDS
4.562 DIA
.968 DIA
● A .005 TIR
.8747/.8745 DIA
● A .0005 TIR
.500/.501 DIA
1.186 DIA REF
3.8124/3.8122 DIA
4.499/4.498
⊥ C .0001
—A—
SEE DETAIL E
● A .005 TIR
.156/.160
● A .0002 TIR
—B—
.020 RAD MAX
.562/.563
∥ C .0002
.642/.641
∥ C .0002
—C—
.312/.317 DIA MILLED SLOT
6 PLACES EQUALLY SPACED
ON 4.375 DIA BSC ⊕ D .005 DIA
NO 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 PLACES EQUALLY SPACED
ON 4.3 2 DIA BSC ⊕ D .005 DIA
.125/.130 DIA THRU
CSK 85°±5° TO .180/.200 DIA
3 HOLES EQUALLY SPACED
ON 1.020 DIA BSC ⊕ A .005 DIA
.500 TYP
.250 TYP
NO 2 (.086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100/.120 DIA
2 HOLES SPACED AS SHOWN
ON .750 DIA BSC ⊕ A .004 DIA
45°0' 2 PLACES
SLOT F
DATUM PLANE G SEE NOTE 7
60° TYP
18°0' TYP
30°0' TYP
42°0' TYP
2.000 RAD
.040/.060 R TYP
SEE NOTE 5
A
D
F
B
C

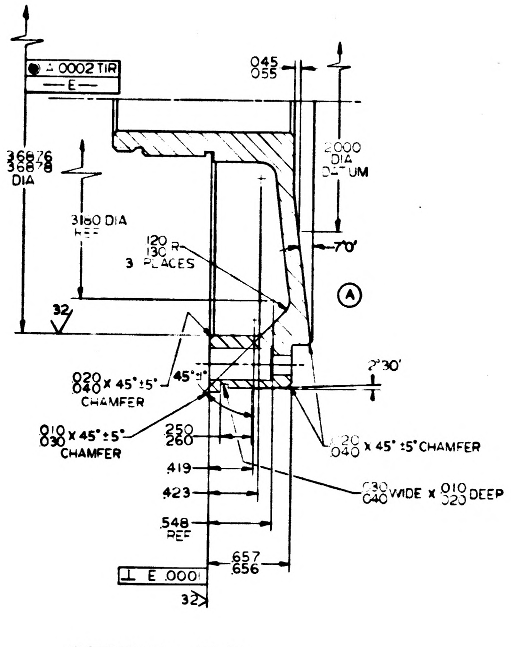
SECTION A-A


.234/.238 DIA THRU
.312 DIA C BORE AS SHOWN
ON 1.450 RAD
60°±1° CSK TO .265/.270 DIA—FARSIDE—
.114/.118 DIA THRU
.197 DIA C BORE TO DIM SHOWN
60°±1° CSK TO .16/.165 DIA—FARSIDE—
8 HOLES AS SHOWN
45° REF
1.030 R
7°±1° TYP
.095/.090
.085/.080
7° REF

SECTION B-B
SCALE: 2/1

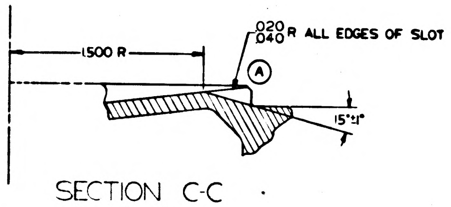

.765/.750 DIA
● A .005 TIR
.015/.025 X 45°±5° CHAMFER
.030/.040
37°30'±2°30'

DETAIL E
SCALE 4/1

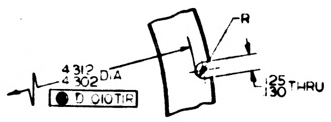

● A .0002 TIR
—E—
.045/.055
3.6876/3.6878 DIA
4.000 DIA DATUM
3.180 DIA REF
.120/.130 R 3 PLACES
7°0'
.020/.040 X 45°±5° CHAMFER
45°
2°30'
.010/.030 X 45°±5° CHAMFER
.250/.260
.419
.423
.548 REF
.020/.040 X 45°±5° CHAMFER
.030/.040 WIDE X .010/.020 DEEP
⊥ E .0001
.657/.656

SECTION F-F
SCALE: 2/1

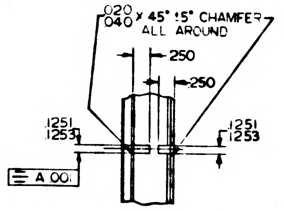
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005/.015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J


.020/.040 R ALL EDGES OF SLOT
1.500 R
15°±1°

SECTION C-C
SCALE 2/1
2 PLACES


R
.4312/.4302 DIA
⊕ D .010 TIR
.125/.130 THRU

DETAIL G
4 PLACES EQUALLY SPACED
WITHIN .005
SCALE 2/1


.020/.040 X 45°±5° CHAMFER ALL AROUND
.250
.250
1.251/1.253
1.251/1.253
≡ A .001

VIEW D-D
SCALE: 1/1

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000010	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ∽ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM—BRUSH SPEC S-200
ALT: SPEC MIL-B-21531

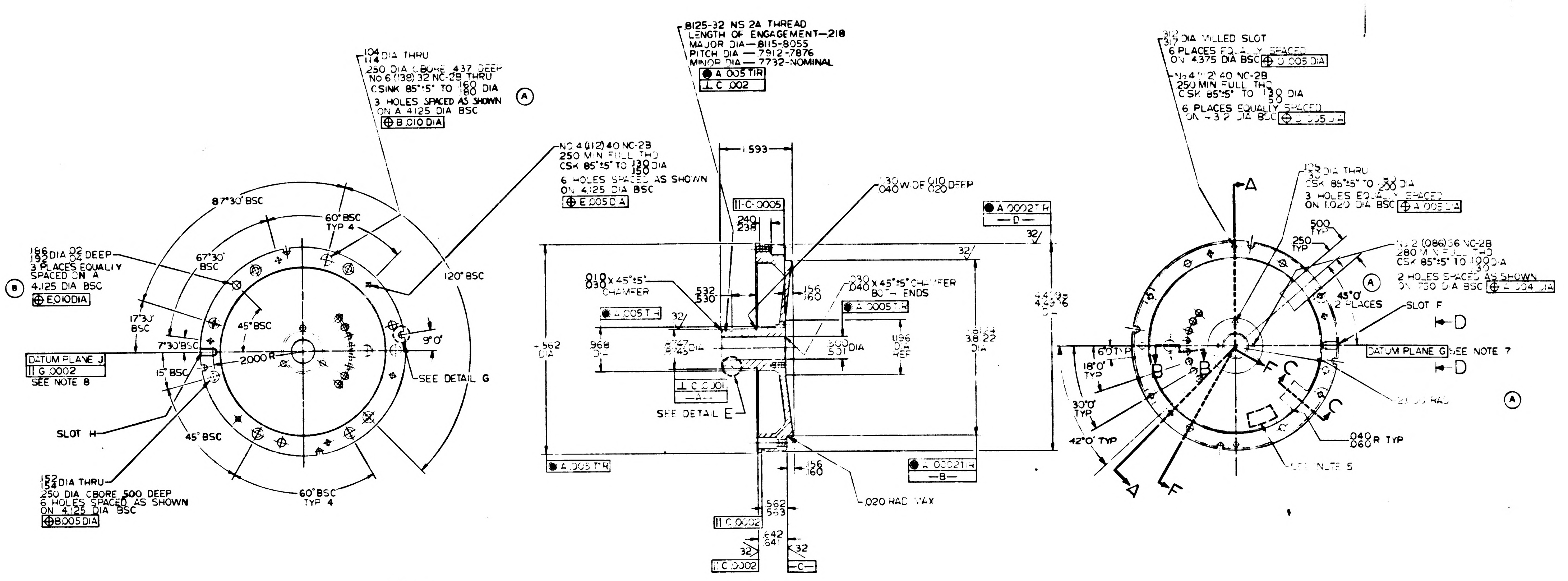
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED — DATE 9-13-62
CHECKED
DRAWN MCROE 7-10-62
APPROVED FOR MSC 9-13-62
BY DIRECTION
MIT 9/13/62

SHAFT, STUB
ONE SPEED
INNER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

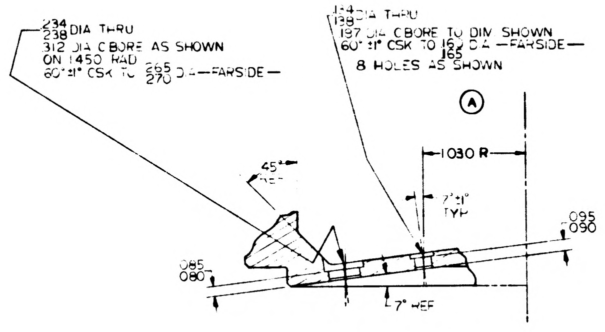
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
ENG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000057
SHEET 1 OF 1 SHEET

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00026				
	A	TDRR 00044	10-5-62	096 MK
	B	TDRR 00212	1-8-63	MK



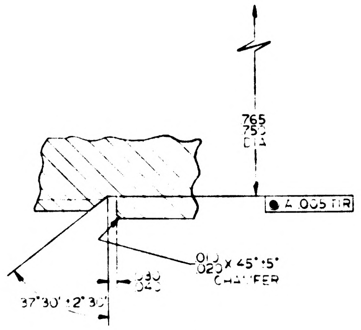
.104/.114 DIA THRU
.250 DIA CBORE .437 DEEP
No 6 (.138) 32 NC-2B THRU
CSINK 85°±5° TO .160/.180 DIA
3 HOLES SPACED AS SHOWN ON A 4.125 DIA BSC
⊕ B .010 DIA
A
87°30' BSC
60° BSC TYP 4
67°30' BSC
120° BSC
.186/.192 DIA .02/.04 DEEP
3 PLACES EQUALLY SPACED ON A 4.125 DIA BSC
⊕ E .010 DIA
B
17°30' BSC
7°30' BSC
45° BSC
2.000 R
9°0'
DATUM PLANE J
∥ G .0002
SEE NOTE 8
15° BSC
SEE DETAIL G
SLOT H
45° BSC
.152/.154 DIA THRU
.250 DIA CBORE .500 DEEP
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ B .005 DIA
60° BSC TYP 4
.8125-32 NS 2A THREAD
LENGTH OF ENGAGEMENT—.218
MAJOR DIA—.8115-.8055
PITCH DIA—.7912-.7876
MINOR DIA—.7732-NOMINAL
● A .005 TIR
⊥ C .002
NO. 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ E .005 DIA
1.593
∥ C .0005
.240/.238
.030/.040 WIDE .010/.020 DEEP
● A .0002 TIR
—D—
32
.010/.030 X 45°±5° CHAMFER
.532/.530
.156/.160
.030/.040 X 45°±5° CHAMFER BOTH ENDS
● A .005 TIR
● A .0005 TIR
4.562 DIA
.968 DIA
.747/.745 DIA
.500/.501 DIA
1.196 DIA REF
3.824/3.822 DIA
4.4298/4.4296 DIA
⊥ C .0001
—A—
SEE DETAIL E
● A .005 TIR
.156/.160
● A .0002 TIR
—B—
.020 RAD MAX
.562/.563
∥ C .0002
.642/.641
32
∥ C .0002
—C—
.312/.317 DIA MILLED SLOT
6 PLACES EQUALLY SPACED ON 4.375 DIA BSC
⊕ D .005 DIA
No 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 PLACES EQUALLY SPACED ON 4.312 DIA BSC
⊕ D .005 DIA
A
.125/.130 DIA THRU
CSK 85°±5° TO .180/.200 DIA
3 HOLES EQUALLY SPACED ON 1.020 DIA BSC
⊕ A .005 DIA
.500 TYP
.250 TYP
No 2 (.086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100/.130 DIA
2 HOLES SPACED AS SHOWN ON .750 DIA BSC
⊕ A .004 DIA
45°0' 2 PLACES
SLOT F
D
6°0' TYP
18°0' TYP
30°0' TYP
42°0' TYP
B
B
F
C
C
DATUM PLANE G
SEE NOTE 7
D
2.000 RAD
.040/.060 R TYP
SEE NOTE 5
A
F

SECTION A-A



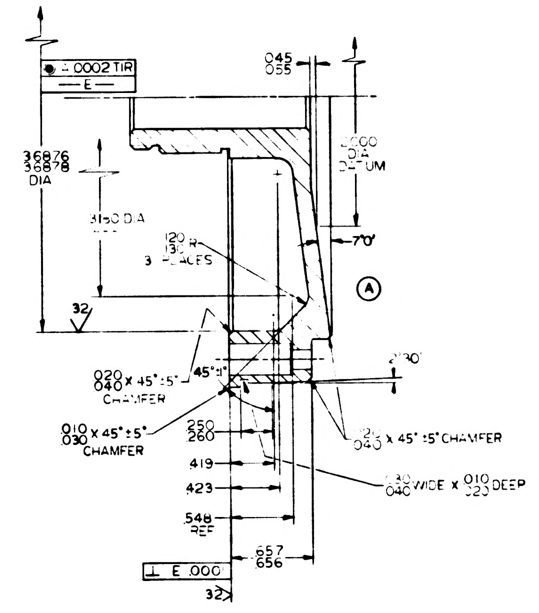
.234/.238 DIA THRU
.312 DIA CBORE AS SHOWN ON 1.450 RAD
60°±1° CSK TO .265/.270 DIA —FARSIDE—
.134/.138 DIA THRU
.197 DIA CBORE TO DIM SHOWN
60°±1° CSK TO .160/.165 DIA —FARSIDE—
8 HOLES AS SHOWN
A
45° REF
1.030 R
7°±1° TYP
.095/.090
.085/.080
7° REF

SECTION B-B
SCALE: 2/1



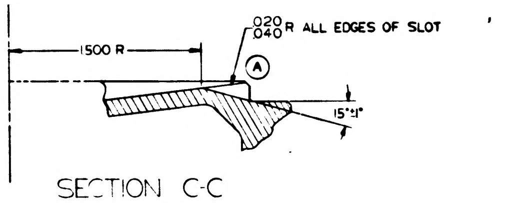
.765/.750 DIA
● A .005 TIR
.010/.020 X 45°±5° CHAMFER
.030/.040
37°30' ±2°30'

DETAIL E
SCALE: 4/1



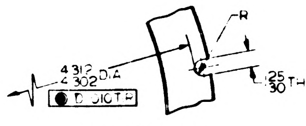
● A .0002 TIR
—E—
.045/.055
2.000 DIA DATUM
3.6876/3.6878 DIA
3.150 DIA
.120/.130 R 3 PLACES
7°0'
A
32
2°30'
.020/.040 X 45°±5° CHAMFER
45°±1°
.010/.030 X 45°±5° CHAMFER
.020/.040 X 45° ±5° CHAMFER
.250/.260
.419
.423
.030/.040 WIDE X .010/.020 DEEP
.548 REF
.657/.656
⊥ E .0001
32

SECTION F-F
SCALE: 2/1



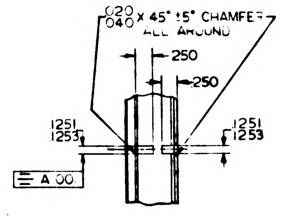
1.500 R
.020/.040 R ALL EDGES OF SLOT
A
15°±1°

SECTION C-C
SCALE 2/1
2 PLACES



4.312/4.302 DIA
● D .010 TIR
R
.125/.130 THRU

DETAIL G
4 PLACES EQUALLY SPACED
WITHIN .005
SCALE 2/1



.020/.040 X 45° ±5° CHAMFER ALL AROUND
.250
.250
.1251/.1253
.1251/.1253
≡ A .001

VIEW D-D
SCALE: 1/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005/.015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. IDENTIFY [illegible] DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J

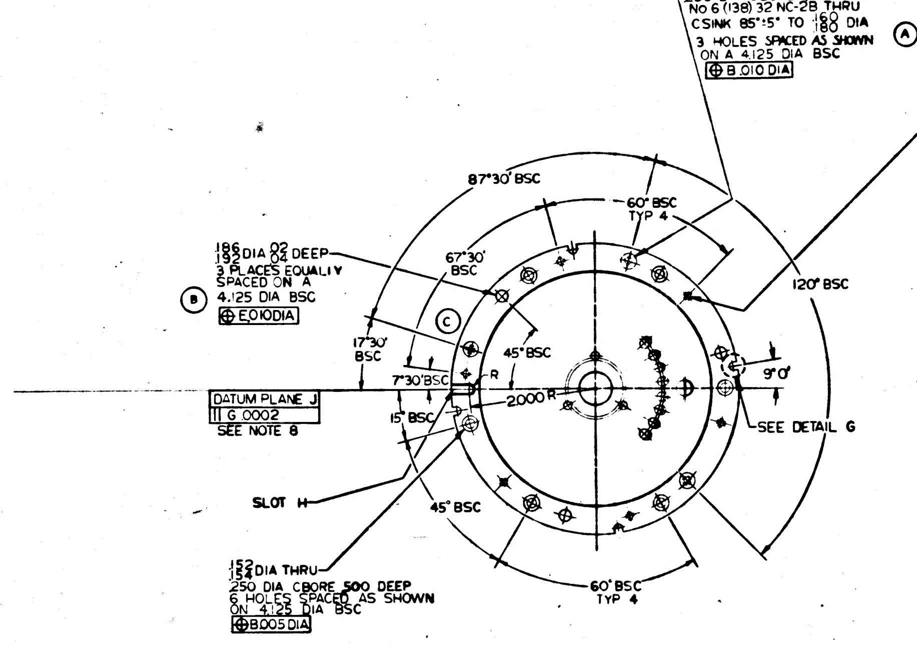
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

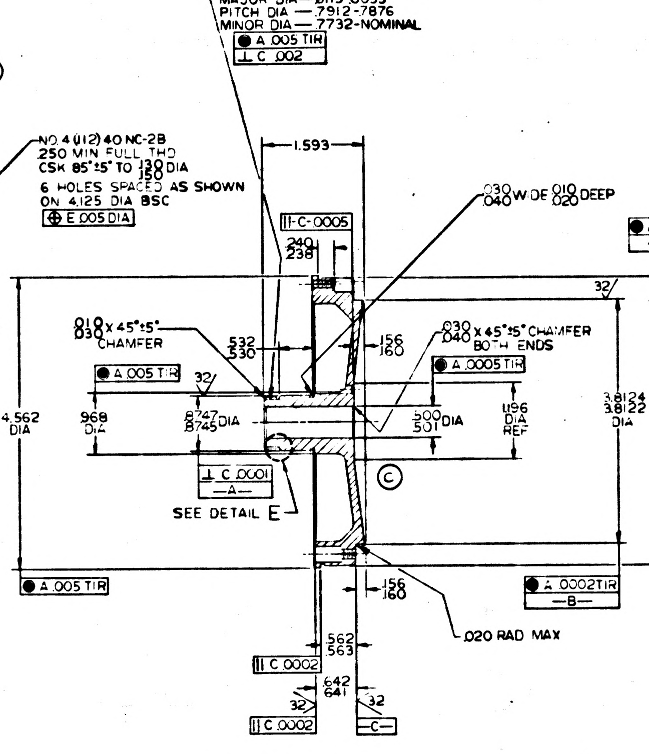
LIST OF PARTS AND MATERIALS

NEXT ASSY	1000010
USED ON	DL1000001
APPLICATION	
UNLESS OTHERWISE SPECIFIED	DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
	DO NOT SCALE THIS DRAWING
MATERIAL	BERYLLIUM—BRUSH SPEC S-200 ALT SPEC MIL-B 21531
MIT INSTRUMENTATION LAB CONTRACT	NAS 9-153
APPROVED	A. J. Bryson 9-13-62
CHECKED	
DRAWN	MORSE 7-10-62
APPROVED FOR MSC	9-13-62
BY DIRECTION MIT	9/13/62
TITLE	SHAFT, STUB ONE SPEED INNER AXIS
SCALE	1/1
UNIT WT.	
CODE IDENT.	
	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.	
	MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO.	1000057
SHEET	1 OF 1 SHEET

REVISIONS TDRR 00026				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00044	10-5-62	296 MR
	B	TDRR 00212	1-8-63	
	C	TDRR 00590	10-3-63	

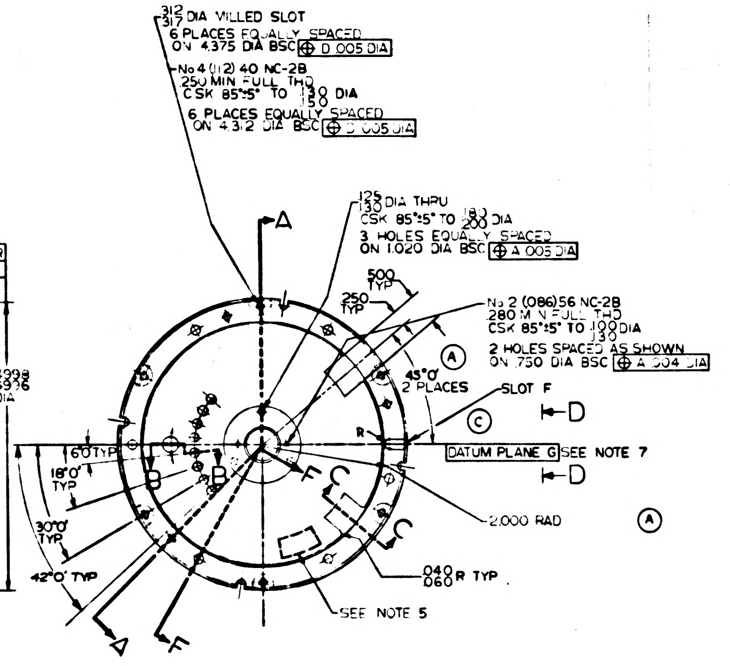


.104/.114 DIA THRU
.250 DIA CBORE .437 DEEP
No 6 (138) 32 NC-2B THRU
CSINK 85°±5° TO .160/.180 DIA
3 HOLES SPACED AS SHOWN ON A 4.125 DIA BSC
⊕ B .010 DIA
Ⓐ
NO. 4 (112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ E .005 DIA
87°30' BSC
60° BSC TYP 4
120° BSC
.186/.192 DIA .02/.04 DEEP
3 PLACES EQUALLY SPACED ON A 4.125 DIA BSC
⊕ E .010 DIA
Ⓑ
Ⓒ
67°30' BSC
17°30' BSC
45° BSC
7°30' BSC
R
2.000 R
9°0'
DATUM PLANE J
∥ G .0002
SEE NOTE 8
15° BSC
SEE DETAIL G
SLOT H
45° BSC
.152/.154 DIA THRU
.250 DIA CBORE .500 DEEP
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ B .005 DIA
60° BSC TYP 4

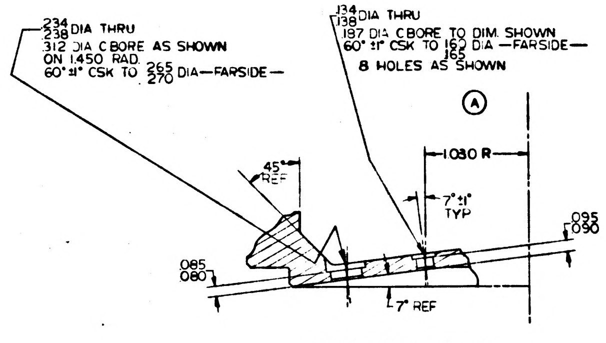


.8125-32 NS 2A THREAD
LENGTH OF ENGAGEMENT—.218
MAJOR DIA—.8115-.8055
PITCH DIA—.7912-.7876
MINOR DIA—.7732-NOMINAL
● A .005 TIR
⊥ C .002
1.593
∥-C-.0005
.240/.238
.030/.040 WIDE .010/.020 DEEP
● A .0002 TIR
—D—
32
.010/.030 X 45°±5° CHAMFER
.532/.530
.156/.160
.030/.040 X 45°±5° CHAMFER BOTH ENDS
● A .005 TIR
● A .0005 TIR
4.562 DIA
.968 DIA
.8747/.8745 DIA
.500/.501 DIA
1.196 DIA REF
3.8124/3.8122 DIA
4.4998/4.4996 DIA
⊥ C .0001
—A—
SEE DETAIL E
Ⓒ
● A .005 TIR
● A .0002 TIR
—B—
.156/.160
.020 RAD MAX
.562/.563
∥ C .0002
.642/.641
32
∥ C .0002
—C—

SECTION A-A

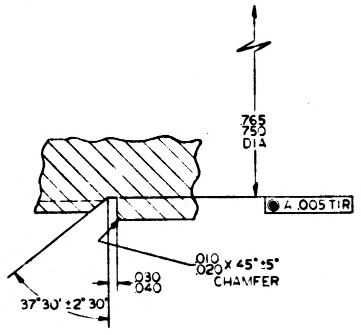


.312/.317 DIA MILLED SLOT
6 PLACES EQUALLY SPACED ON 4.375 DIA BSC
⊕ D .005 DIA
No 4 (112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 PLACES EQUALLY SPACED ON 4.312 DIA BSC
⊕ D .005 DIA
.125/.130 DIA THRU
CSK 85°±5° TO .180/.200 DIA
3 HOLES EQUALLY SPACED ON 1.020 DIA BSC
⊕ A .005 DIA
A
.500 TYP
.250 TYP
No 2 (086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100/.130 DIA
2 HOLES SPACED AS SHOWN ON .750 DIA BSC
⊕ A .004 DIA
Ⓐ
45°0' 2 PLACES
SLOT F
D
Ⓒ
R
DATUM PLANE G
SEE NOTE 7
D
6°0' TYP
18°0' TYP
B
B
F
C
C
30°0' TYP
42°0' TYP
2.000 RAD
Ⓐ
.040/.060 R TYP
SEE NOTE 5
A
F



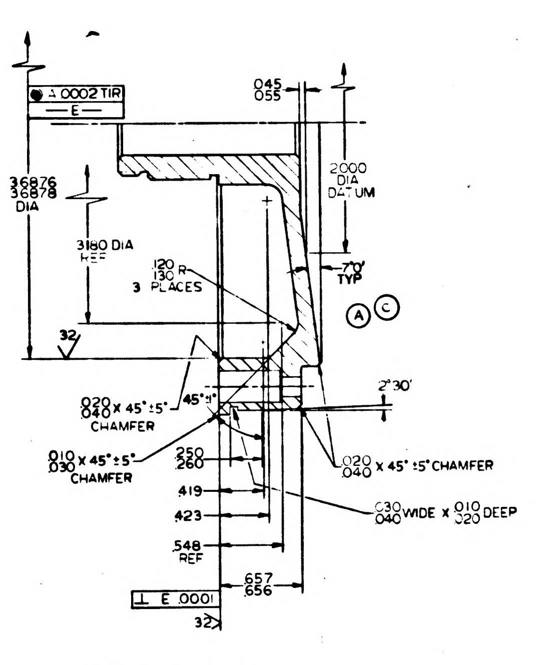
.234/.238 DIA THRU
.312 DIA CBORE AS SHOWN ON 1.450 RAD.
60°±1° CSK TO .265/.270 DIA—FARSIDE—
.134/.138 DIA THRU
.187 DIA CBORE TO DIM. SHOWN
60°±1° CSK TO .162/.165 DIA—FARSIDE—
8 HOLES AS SHOWN
Ⓐ
45° REF
1.030 R
7°±1° TYP
.095/.090
.085/.080
7° REF

SECTION B-B
SCALE: 2/1



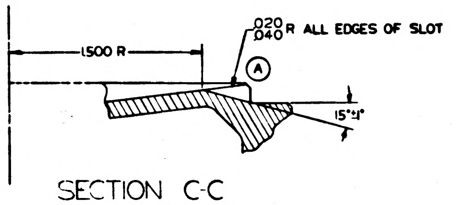
.765/.750 DIA
● A .005 TIR
.010/.020 X 45°±5° CHAMFER
.030/.040
37°30' ±2°30'

DETAIL E
SCALE: 4/1



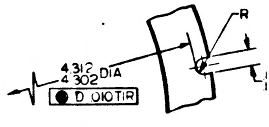
● A .0002 TIR
—E—
.045/.055
2.000 DIA DATUM
3.6876/3.6878 DIA
3.180 DIA REF
.120/.130 R 3 PLACES
7°0' TYP
Ⓐ Ⓒ
32
2°30'
.020/.040 X 45°±5° CHAMFER
45°±1°
.010/.030 X 45°±5° CHAMFER
.250/.260
.419
.423
.548 REF
.657/.656
.020/.040 X 45°±5° CHAMFER
.030/.040 WIDE X .010/.020 DEEP
⊥ E .0001
32

SECTION F-F
SCALE: 2/1



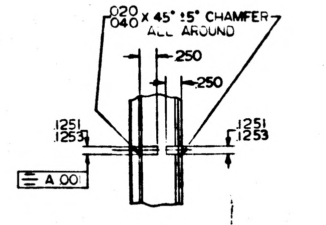
1.500 R
.020/.040 R ALL EDGES OF SLOT
Ⓐ
15°±1°

SECTION C-C
SCALE: 2/1
2 PLACES



R
4.312/4.302 DIA
● D .010 TIR
.125/.130 THRU

DETAIL G
4 PLACES EQUALLY SPACED WITHIN ±.005
SCALE 2/1



.020/.040 X 45°±5° CHAMFER ALL AROUND
.250
.250
.1251/.1253
.1251/.1253
≡ A .001

VIEW D-D
SCALE 1/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005/.015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201	
1000010	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM—BRUSH SPEC S-200 ALT: SPEC MIL-B-21531

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

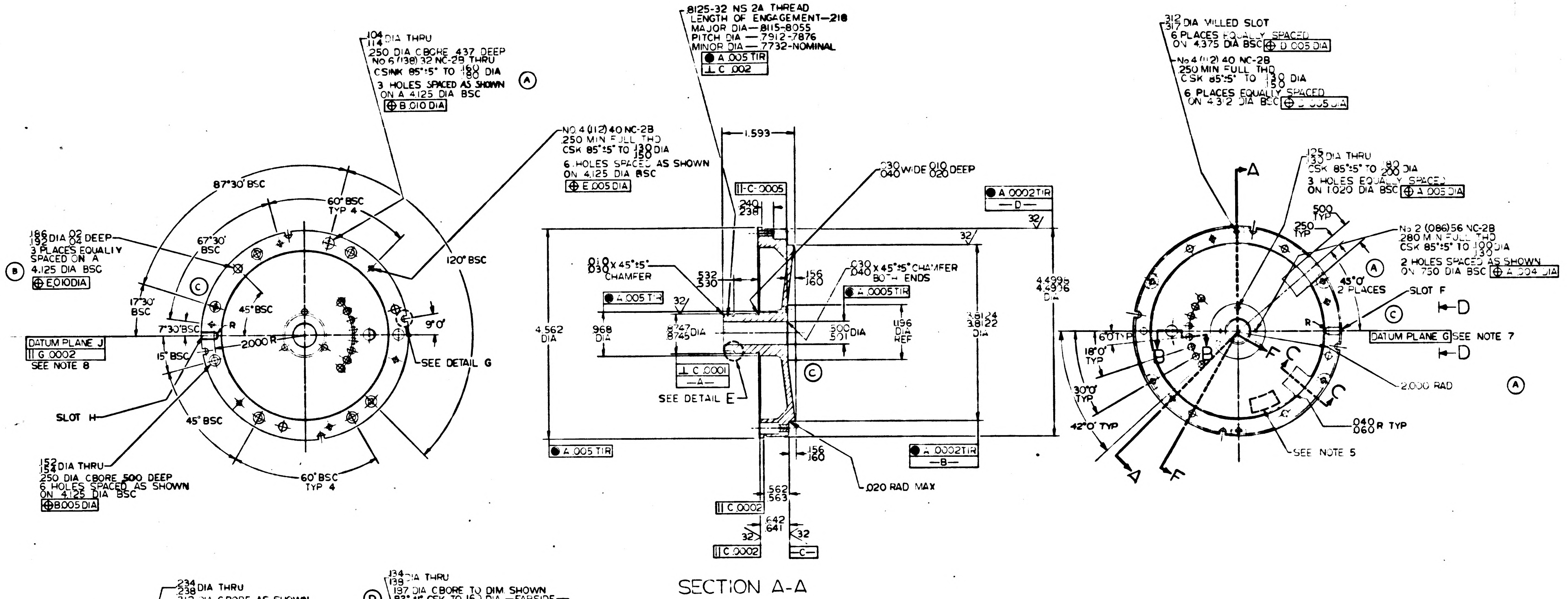
		DATE
APPROVED	A J Boyce	9-13-62
CHECKED		
DRAWN	MORSE	7-10-62
APPROVED FOR MSC		9-13-62
BY DIRECTION		
		9/13/62

SHAFT, STUB
ONE SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.
1/1		

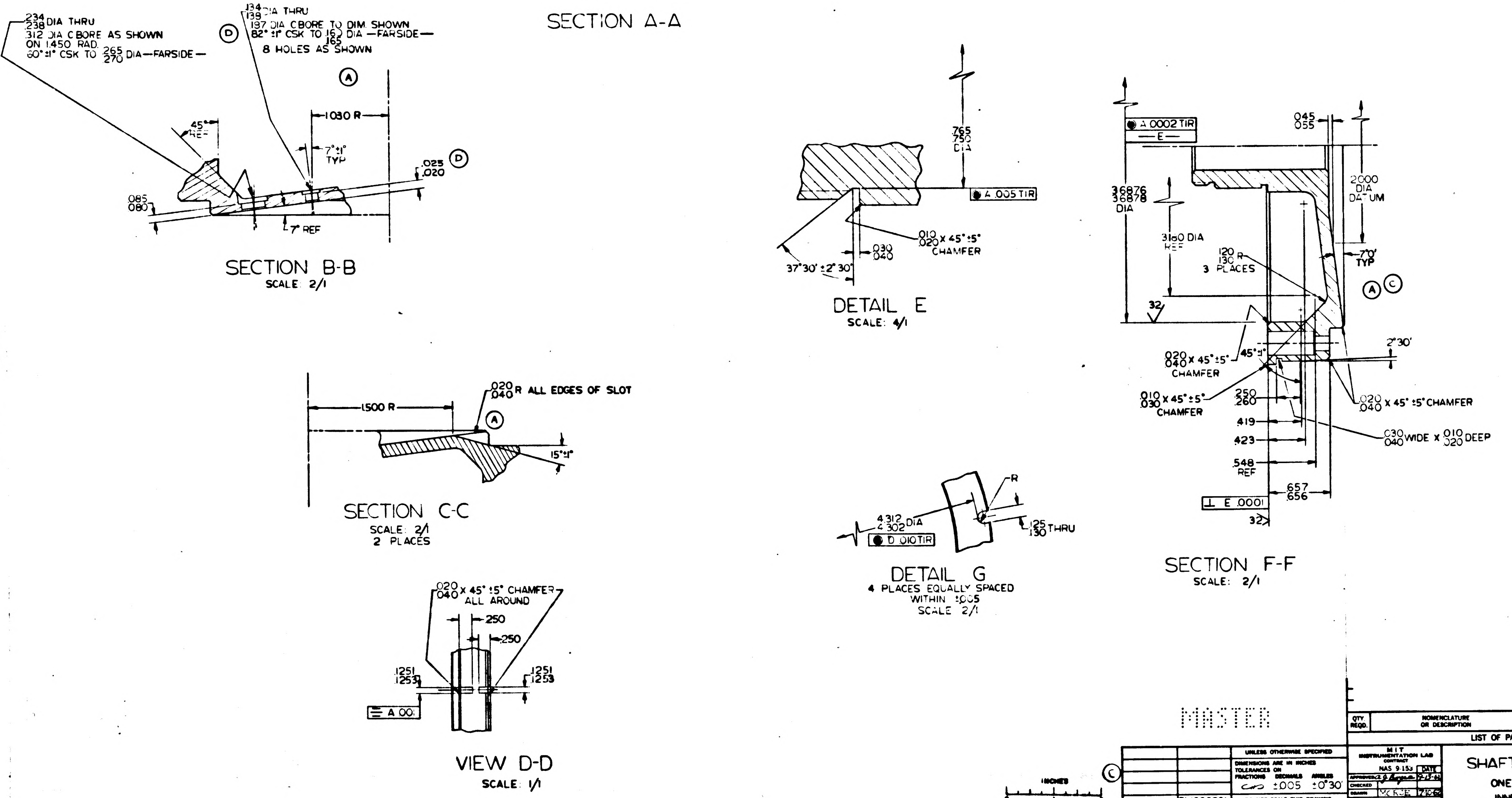
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000057
SHEET 1 OF 1 SHEET

REVISIONS TDRR 00C26				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00044	10-5-62	
	B	TDRR 00212	1-8-63	
	C	TDRR 00590	10-3-63	
	D	TDRR 01044	4-30-63	



.104/.114 DIA THRU
.250 DIA CBORE .437 DEEP
NO 6 (.138) 32 NC-2B THRU
CSINK 85°±5° TO .160/.180 DIA
3 HOLES SPACED AS SHOWN ON A 4.125 DIA BSC
⊕ B .010 DIA
87°30' BSC
60° BSC TYP 4
120° BSC
67°30' BSC
.186/.192 DIA .02 DEEP
3 PLACES EQUALLY SPACED ON A 4.125 DIA BSC
⊕ E .010 DIA
17°30' BSC
7°30' BSC
45° BSC
2.000 R
9°0'
DATUM PLANE J
G .0002
SEE NOTE 8
15° BSC
SEE DETAIL G
SLOT H
45° BSC
.152/.154 DIA THRU
.250 DIA CBORE .500 DEEP
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ B .005 DIA
60° BSC TYP 4
NO 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .180/.190 DIA
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ E .005 DIA
.8125-32 NS 2A THREAD
LENGTH OF ENGAGEMENT—.218
MAJOR DIA—.8115-.8055
PITCH DIA—.7912-.7876
MINOR DIA—.7732-NOMINAL
A .005 TIR
⊥ C .002
1.593
C .0005
.240/.238
.030/.040 WIDE .010/.020 DEEP
A .0002 TIR
D
.010/.030 X 45°±5° CHAMFER
.532/.530
.156/.160
.030/.040 X 45°±5° CHAMFER BOTH ENDS
A .0005 TIR
A .005 TIR
4.562 DIA
.968 DIA
.747/.745 DIA
.500/.501 DIA
1.196 DIA REF
3.8124/3.8122 DIA
4.499/4.498 DIA
⊥ C .0001
A
SEE DETAIL E
A .005 TIR
A .0002 TIR
B
.156/.160
.020 RAD MAX
.562/.563
C .0002
.642/.641
C .0002
C
.312/.317 DIA MILLED SLOT
6 PLACES EQUALLY SPACED ON 4.375 DIA BSC
⊕ D .005 DIA
No 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 PLACES EQUALLY SPACED ON 4.312 DIA BSC
.125/.130 DIA THRU
CSK 85°±5° TO .180/.200 DIA
3 HOLES EQUALLY SPACED ON 1.020 DIA BSC
⊕ A .005 DIA
.500 TYP
.250 TYP
No 2 (.086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100/.130 DIA
2 HOLES SPACED AS SHOWN ON .750 DIA BSC
⊕ A .004 DIA
45°0' 2 PLACES
SLOT F
DATUM PLANE G SEE NOTE 7
6°0' TYP
18°0' TYP
30°0' TYP
42°0' TYP
2.000 RAD
.040/.060 R TYP
SEE NOTE 5
A
F
C
D

SECTION A-A



.234/.238 DIA THRU
.312 DIA CBORE AS SHOWN ON 1.450 RAD
60°±1° CSK TO .265/.270 DIA—FARSIDE—
.134/.139 DIA THRU
.197 DIA CBORE TO DIM SHOWN
82°±1° CSK TO .160/.165 DIA—FARSIDE—
8 HOLES AS SHOWN
45° REF
1.030 R
7°±1° TYP
.025/.020
.085/.080
7° REF
.765/.750 DIA
A .005 TIR
.010/.020 X 45°±5° CHAMFER
.030/.040
37°30'±2°30'
A .0002 TIR
E
.045/.055
3.6876/3.6878 DIA
2.000 DIA DATUM
3.160 DIA REF
.120/.130 R 3 PLACES
7°0' TYP
2°30'
45°±1°
.020/.040 X 45°±5° CHAMFER
.010/.030 X 45°±5° CHAMFER
.250/.260
.419
.423
.548 REF
.020/.040 X 45°±5° CHAMFER
.030/.040 WIDE X .010/.020 DEEP
.657/.656
⊥ E .0001
.020/.040 R ALL EDGES OF SLOT
1.500 R
15°±1°
4.312/4.302 DIA
D .0010 TIR
R
.125/.130 THRU
.020/.040 X 45°±5° CHAMFER ALL AROUND
.250
.250
.1251/.1255
.1251/.1253
A .00

SECTION B-B
SCALE 2/1

DETAIL E
SCALE 4/1

SECTION F-F
SCALE 2/1

SECTION C-C
SCALE 2/1
2 PLACES

DETAIL G
4 PLACES EQUALLY SPACED WITHIN ±.005
SCALE 2/1

VIEW D-D
SCALE 1/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005/.015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000010	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
±.005 ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
BERYLLIUM—
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED A. J. Boyce 9-13-62
CHECKED
DRAWN MORSE 7-10-62
APPROVED FOR MSC
9-13-62
BY DIRECTION
MIT 9/13/62

SHAFT, STUB
ONE SPEED
INNER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

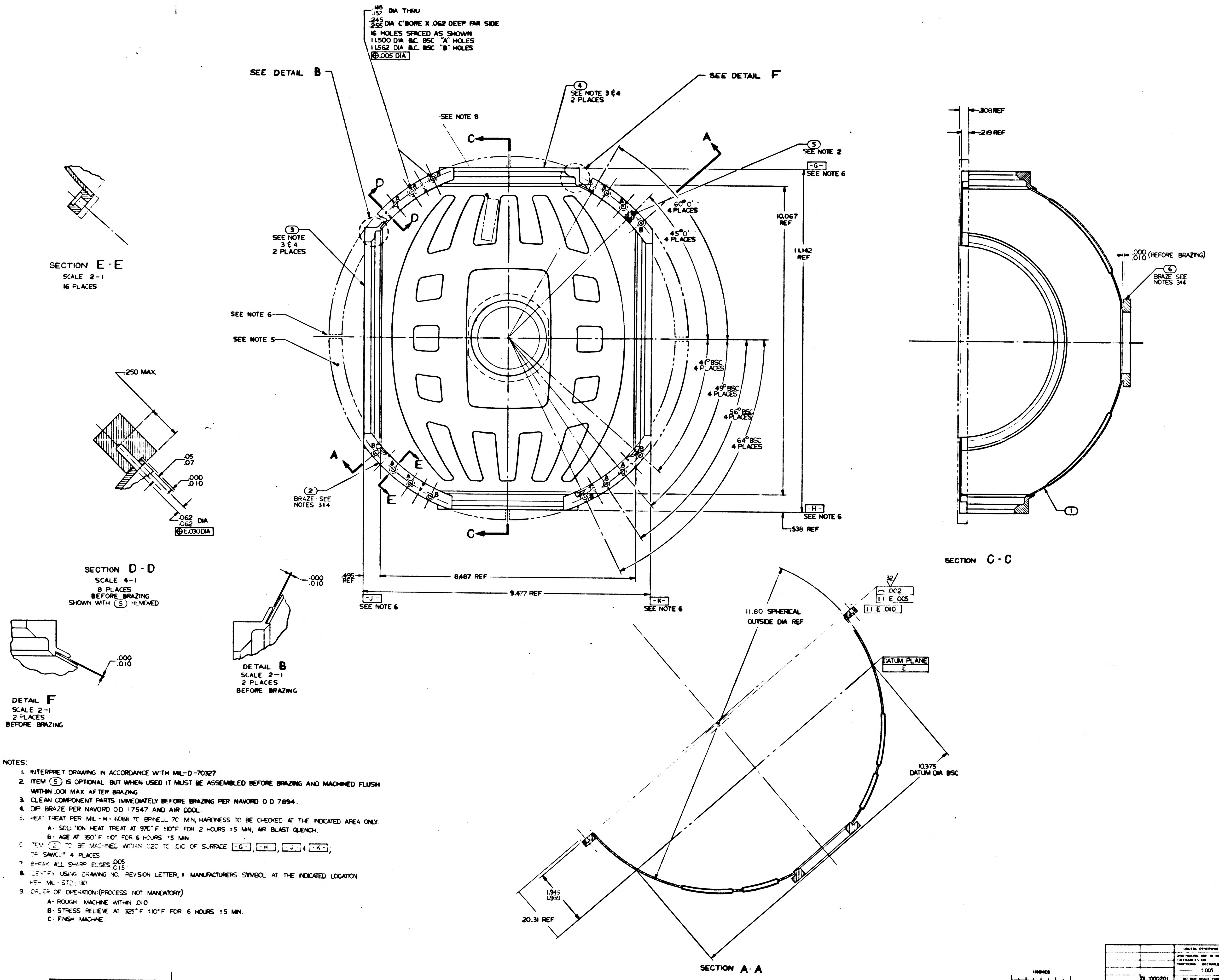
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000057
SHEET 1 OF 1 SHEET

INCHES
PHOTOGRAPHIC SCALE ONLY

1000057

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 001 + B	12-11-62	WK

REVISIONS TDRR



.148 / .152 DIA THRU
.245 / .255 DIA C'BORE X .062 DEEP FAR SIDE
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
SEE DETAIL B
SEE DETAIL F
SEE NOTE 8
④ SEE NOTE 3 & 4 2 PLACES
⑤ SEE NOTE 2
-G- SEE NOTE 6
60° 0' 4 PLACES
45° 0' 4 PLACES
10.067 REF
11.142 REF
③ SEE NOTE 3 & 4 2 PLACES
SECTION E-E
SCALE 2-1
16 PLACES
SEE NOTE 6
SEE NOTE 5
.250 MAX.
.05 / .07
.000 / .010
.062 / .062 DIA
⊕ E .030 DIA
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
② BRAZE - SEE NOTES 3 & 4
-H- SEE NOTE 6
.538 REF
.495 REF
8.487 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH ⑤ REMOVED
.000 / .010
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.308 REF
.219 REF
.000 / .010 (BEFORE BRAZING)
⑥ BRAZE SEE NOTES 3 & 4
①
SECTION C-C
11.80 SPHERICAL OUTSIDE DIA REF
32
⌒ .002 / 11 E .005
11 E .010
DATUM PLANE E
10.375 DATUM DIA BSC
1.945 / 1.939
20.31 REF
SECTION A-A
A
C
D
E

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑤ IS OPTIONAL BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OF SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES .005 / .015
8. IDENTIFY USING DRAWING NO, REVISION LETTER, & MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
9. ORDER OF OPERATION:(PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.

DISREGARD ROLLBOND PATTERN

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	FLANGE BLOWER OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG.	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000103	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T. INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 9-13-62
DRAWN R. CONTANT 6-19-62
APPROVED FOR MSC W. G. 9-13-62
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY
MOVABLE OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

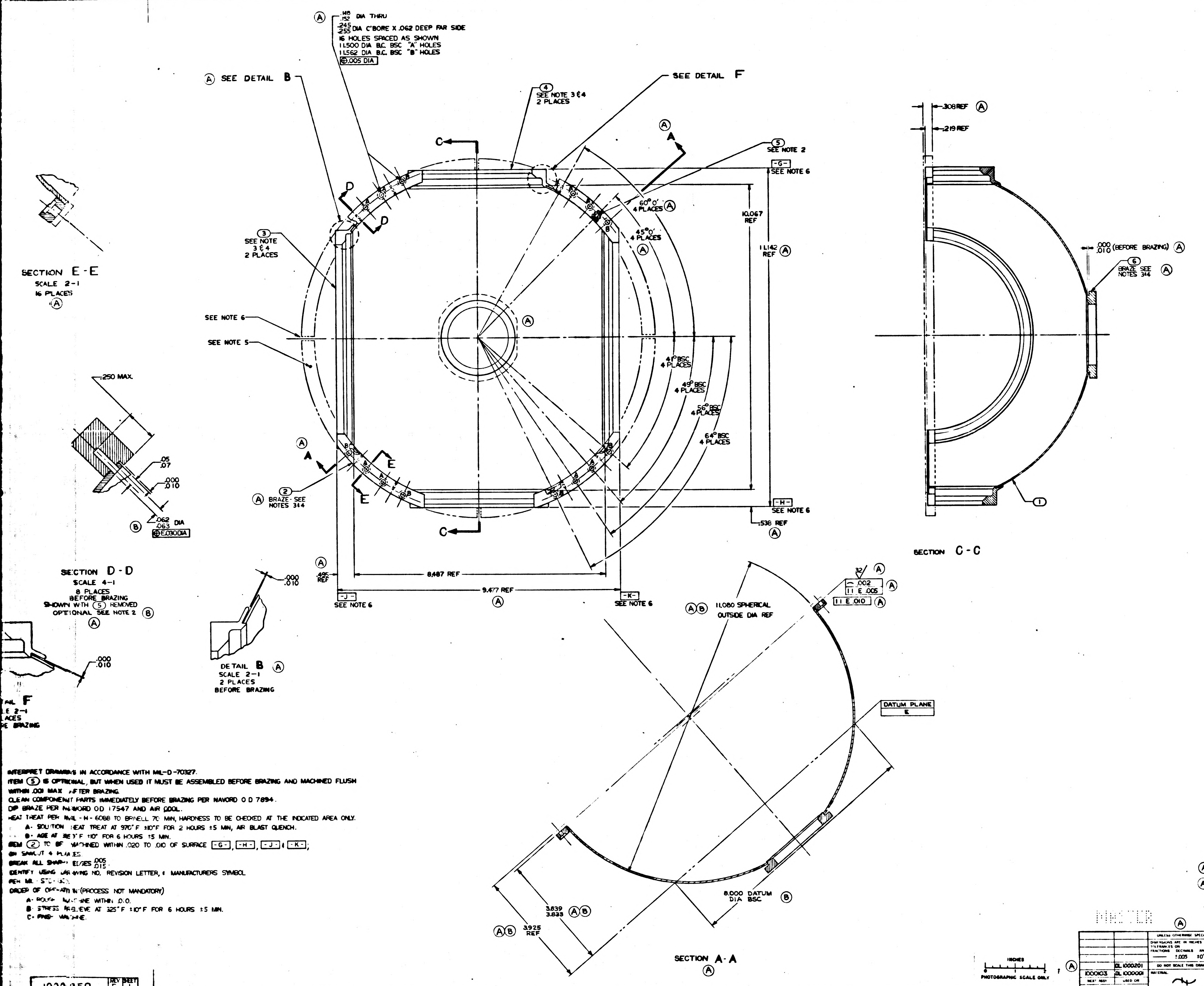
M.I.T. INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000059
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000059	REV A	SHEET 1

1000059 A

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDRR 00085			
A	TDRR 00148	12-11-62		WR
B	TDRR 00427	1-6-63		WR



.148 .152 DIA THRU
.245 .255 DIA C'BORE X .062 DEEP FAR SIDE
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
SEE DETAIL B
SEE DETAIL F
SEE NOTE 3 & 4 2 PLACES
SEE NOTE 2
-G- SEE NOTE 6
60° 0' 4 PLACES
45° 0' 4 PLACES
10.067 REF
11.142 REF
SEE NOTE 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
BRAZE - SEE NOTES 3 & 4
-H- SEE NOTE 6
.538 REF
.495 REF
8.487 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
SECTION E-E SCALE 2-1 16 PLACES
.250 MAX
.05 .07
.000 .010
.062 .063 DIA
⊕ E .030 DIA
SECTION D-D SCALE 4-1 8 PLACES BEFORE BRAZING SHOWN WITH (5) REMOVED OPTIONAL SEE NOTE 2
.000 .010
DETAIL B SCALE 2-1 2 PLACES BEFORE BRAZING
DETAIL F SCALE 2-1 PLACES BEFORE BRAZING
.308 REF
.219 REF
.000 .010 (BEFORE BRAZING)
BRAZE SEE NOTES 3 & 4
SECTION C-C
11.080 SPHERICAL OUTSIDE DIA REF
.002
E .005
E .010
DATUM PLANE E
8.000 DATUM DIA BSC
3.839 3.833
3.925 REF
SECTION A-A

INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

ITEM (5) IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.

CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7894.

DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.

HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
- A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
- B- AGE AT [illegible]°F ±10° FOR 6 HOURS ±5 MIN.

ITEM (2) TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-;

ON SAME CUT 4 PLACES.

BREAK ALL SHARP EDGES $\frac{.005}{.015}$.

IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.

ORDER OF OPERATION (PROCESS NOT MANDATORY)
- A- ROUGH MACHINE WITHIN .010.
- B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
- C- FINISH MACHINE.

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	FLANGE, BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

1000103	DL 1000001
	DL 1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 9-13-62
DRAWN R. CONTANT 6-19-62
APPROVED FOR MSC W J Rhine 9-13-62

HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

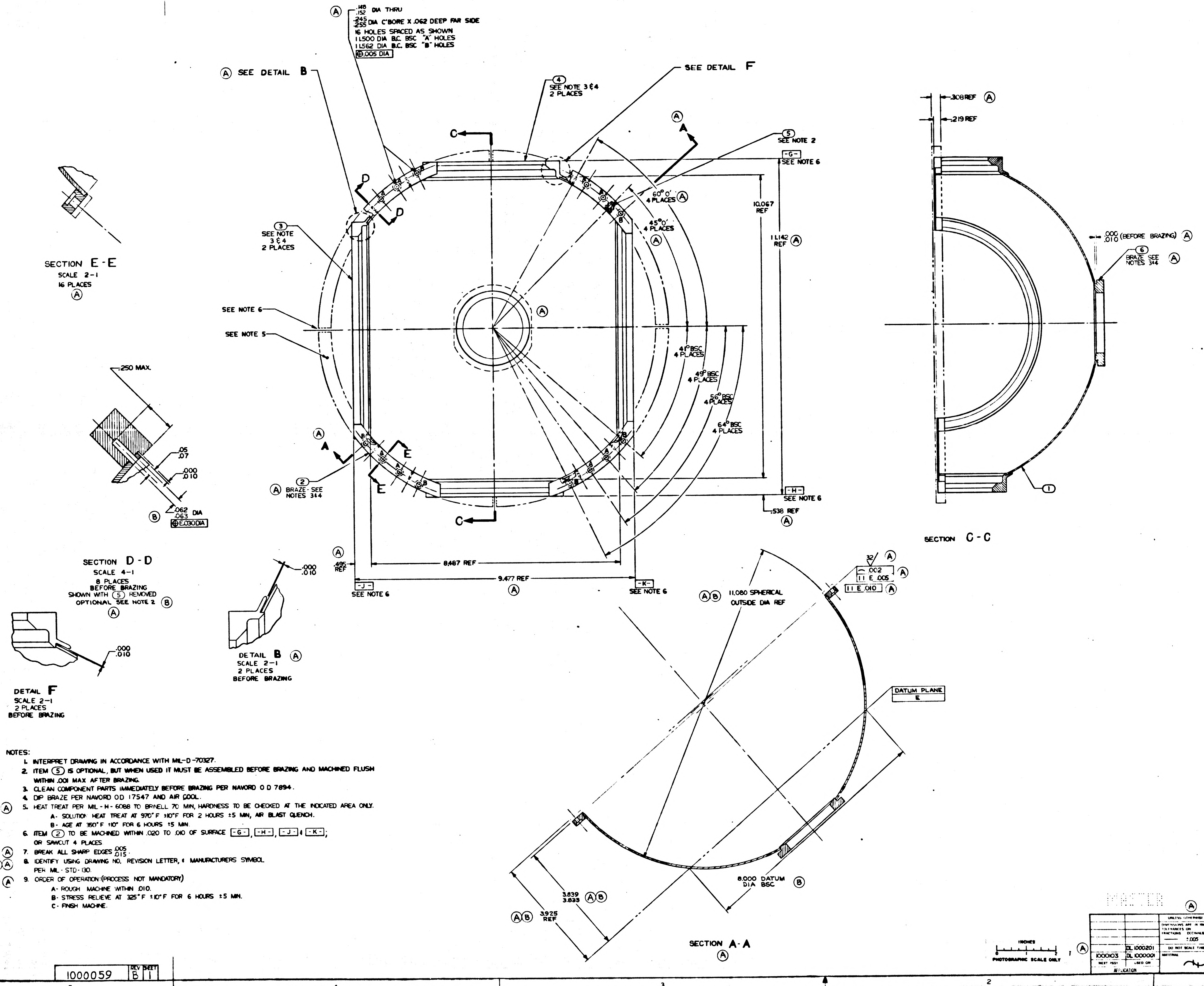
SCALE 1-1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000059
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000059 REV B SHEET 1

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00148	11-62	
B	TDRR 03427	1-6-63	



.148 .152 DIA THRU
.245 .255 DIA C'BORE X .062 DEEP FAR SIDE
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕.005 DIA
SEE DETAIL B
SEE DETAIL F
SEE NOTE 3 & 4 2 PLACES
SEE NOTE 2
-G- SEE NOTE 6
60° 0' 4 PLACES
45° 0' 4 PLACES
10.067 REF
11.142 REF
SEE NOTE 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
BRAZE-SEE NOTES 3 & 4
-H- SEE NOTE 6
.538 REF
.495 REF
8.487 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
SECTION E-E
SCALE 2-1
16 PLACES
.250 MAX.
.05 .07
.000 .010
.062 .063 DIA
⊕E.030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
.000 .010
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.308 REF
.219 REF
.000 .010 (BEFORE BRAZING)
BRAZE SEE NOTES 3 & 4
SECTION C-C
11.080 SPHERICAL OUTSIDE DIA REF
32
.002
E .005
E .010
DATUM PLANE E
8.000 DATUM DIA BSC
3.839 3.833
3.925 REF
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
5. Ⓐ HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OR SAWCUT 4 PLACES.
7. Ⓐ BREAK ALL SHARP EDGES $^{.005}_{.015}$.
8. Ⓑ Ⓐ IDENTIFY USING DRAWING NO, REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.
9. Ⓐ ORDER OF OPERATION: (PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010.
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	ITEM NO
1	FLANGE LOWER OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STL.B	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG.	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000103	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL —

M.I.T.
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 9-13-62
DRAWN R. CONTANT 6-1962
APPROVED MSC W J Rhine 9-13-62

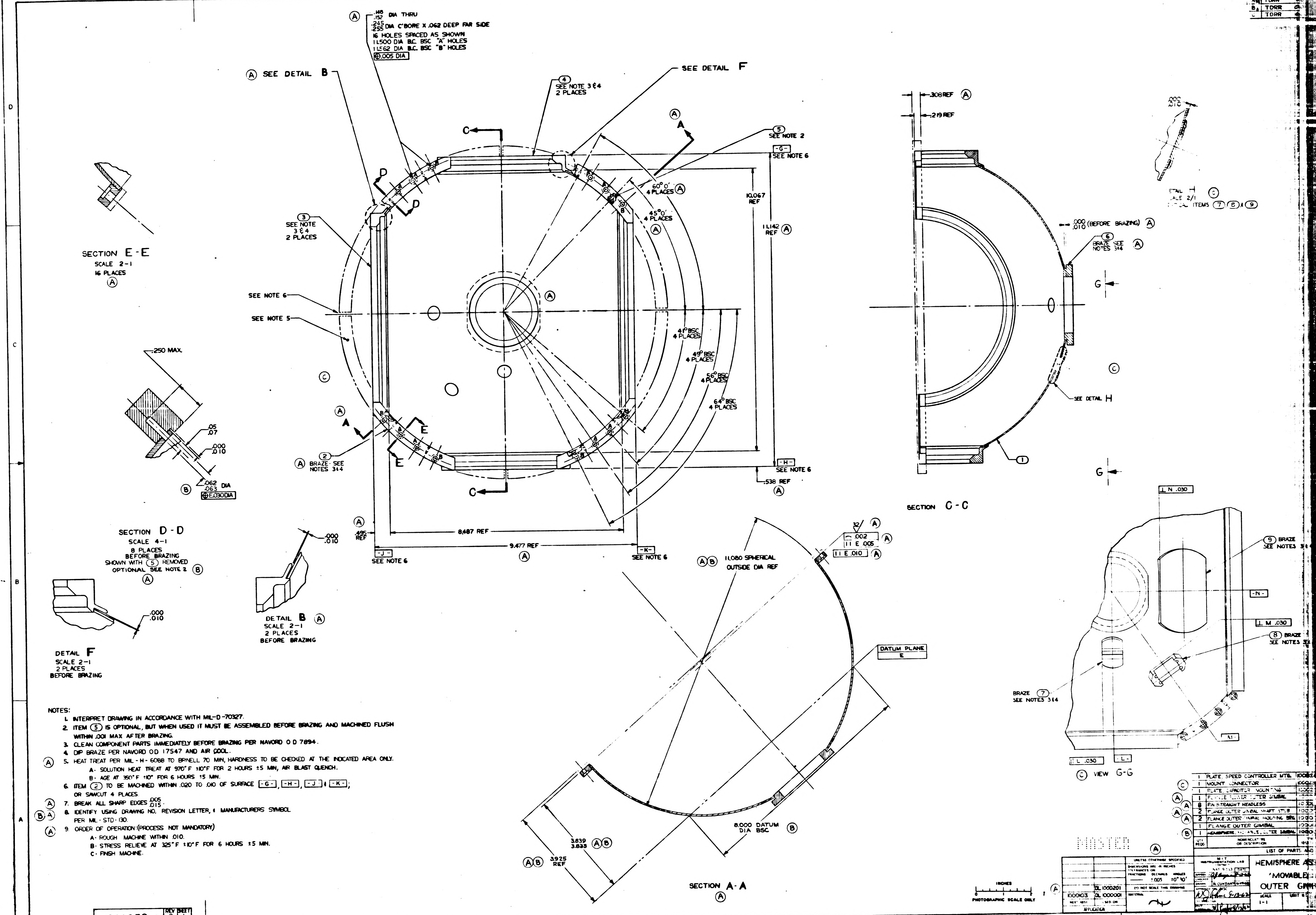
HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

M.I.T.
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000059

INCHES
PHOTOGRAPHIC SCALE ONLY

1000059 REV B SHEET 1



.148 .152 DIA THRU
.245 .255 DIA C'BORE X .062 DEEP FAR SIDE
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
.005 DIA
SEE DETAIL B
SEE DETAIL F
4 SEE NOTE 3 & 4 2 PLACES
5 SEE NOTE 2
-G- SEE NOTE 6
60° 0' 4 PLACES
45° 0' 4 PLACES
10.067 REF
11.142 REF
3 SEE NOTE 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
2 BRAZE SEE NOTES 3 & 4
-H- SEE NOTE 6
.538 REF
.495 REF
8.487 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
SECTION E-E SCALE 2-1 16 PLACES
.250 MAX.
.05 .07
.000 .010
.062 .063 DIA
E .030 DIA
SECTION D-D SCALE 4-1 8 PLACES BEFORE BRAZING SHOWN WITH 5 REMOVED OPTIONAL SEE NOTE 2
.000 .010
DETAIL B SCALE 2-1 2 PLACES BEFORE BRAZING
DETAIL F SCALE 2-1 2 PLACES BEFORE BRAZING
.308 REF
.219 REF
.000 .010 (BEFORE BRAZING)
6 BRAZE SEE NOTES 3 & 4
SEE DETAIL H
1
SECTION C-C
DETAIL H SCALE 2/1 TYPICAL ITEMS 7, 8 & 9
32
.002
E .005
E .010
11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
8.000 DATUM DIA BSC
3.839 3.833
3.925 REF
SECTION A-A
N .030
9 BRAZE SEE NOTES 3 & 4
-N-
M .030
8 BRAZE SEE NOTES 3 & 4
BRAZE 7 SEE NOTES 3 & 4
-M-
L .030
-L-
VIEW G-G
MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
5. Ⓐ HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OR SAWCUT 4 PLACES.
7. Ⓐ BREAK ALL SHARP EDGES $^{.005}_{.015}$.
8. Ⓑ Ⓐ IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.
9. Ⓐ ORDER OF OPERATION: (PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010.
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.

	QTY REQD	NOMENCLATURE OR DESCRIPTION	
	1	PLATE, SPEED CONTROLLER MTG.	10002
Ⓒ	1	MOUNT CONNECTOR	10002
	1	PLATE, CAPACITOR MOUNTING	10002
Ⓐ	1	FLANGE LOWER OUTER GIMBAL	[illegible]
Ⓐ	8	PIN STRAIGHT HEADLESS	1000
Ⓐ	2	FLANGE OUTER GIMBAL SHAFT STUB	1000
Ⓐ	2	FLANGE OUTER GIMBAL HOUSING BRG	1000
	1	FLANGE OUTER GIMBAL	1000
Ⓑ	1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000

LIST OF PARTS AND

	DL 1000201
1000103	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R. CONTANT
APPROVED FOR MSC W.J. Rhine 9-13-62
MIT 9/13/62

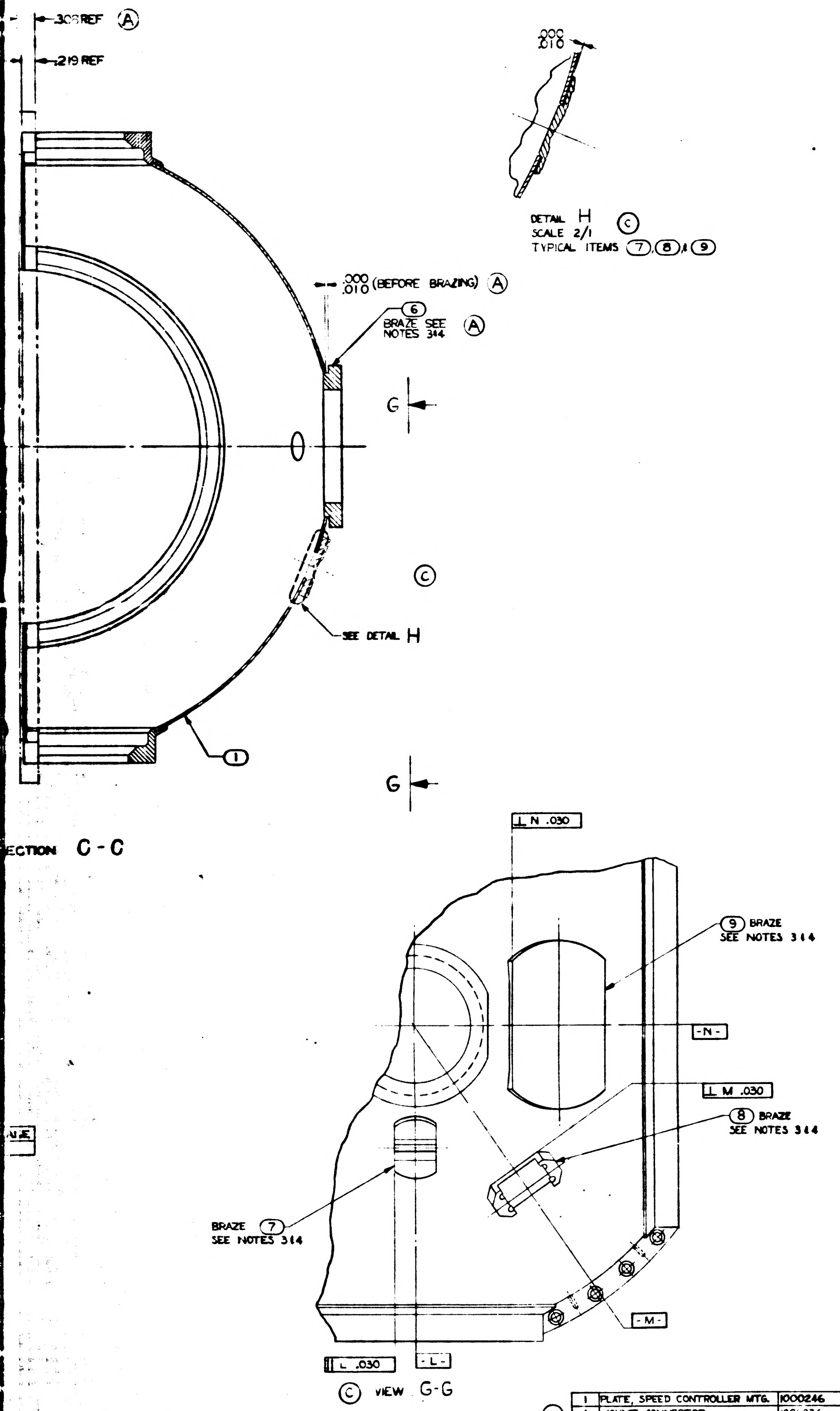
HEMISPHERE AS
'MOVABLE
OUTER GIM

SCALE 1-1
UNIT WT

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000059 REV C SHEET 1

REVISIONS		TDRR 00023		
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00148	12-11-62		WK
B	TDRR 00427	1-6-63		WK
C	TDRR 00613	3-7-63		JK



.308 REF (A)
.219 REF
.000 .010 (BEFORE BRAZING) (A)
(6) BRAZE SEE NOTES 3&4 (A)
G
G
(C)
SEE DETAIL H
(1)
ECTION C-C
.000 .010
DETAIL H (C)
SCALE 2/1
TYPICAL ITEMS (7) (8) & (9)
⊥ N .030
(9) BRAZE SEE NOTES 3&4
-N-
⊥ M .030
(8) BRAZE SEE NOTES 3&4
BRAZE (7) SEE NOTES 3&4
-M-
⊥ L .030
-L-
(C) VIEW G-G

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	1	PLATE, SPEED CONTROLLER MTG.	1000246			9
(C)	1	MOUNT CONNECTOR	1000236			8
	1	PLATE, CAPACITOR MOUNTING	1000237			7
(A)	1	FLANGE BLOWER OUTER GIMBAL	1000058			6
(A)	8	PIN STRAIGHT HEADLESS	1000054-1			5
(A)	2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
(A)	2	FLANGE, OUTER GIMBAL HOUSING BRG.	1000046			3
	1	FLANGE OUTER GIMBAL	1000048			2
(B)	1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

MASTER

(A)

	DL 1000201
1000103	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
CHECKED
DRAWN R. CONTANT 6-19-62
APPROVED FOR MSC W J Rhine 9-13-62

HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

SCALE	UNIT WT	CODE IDENT
1-1		

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000059
SHEET 1 OF 1

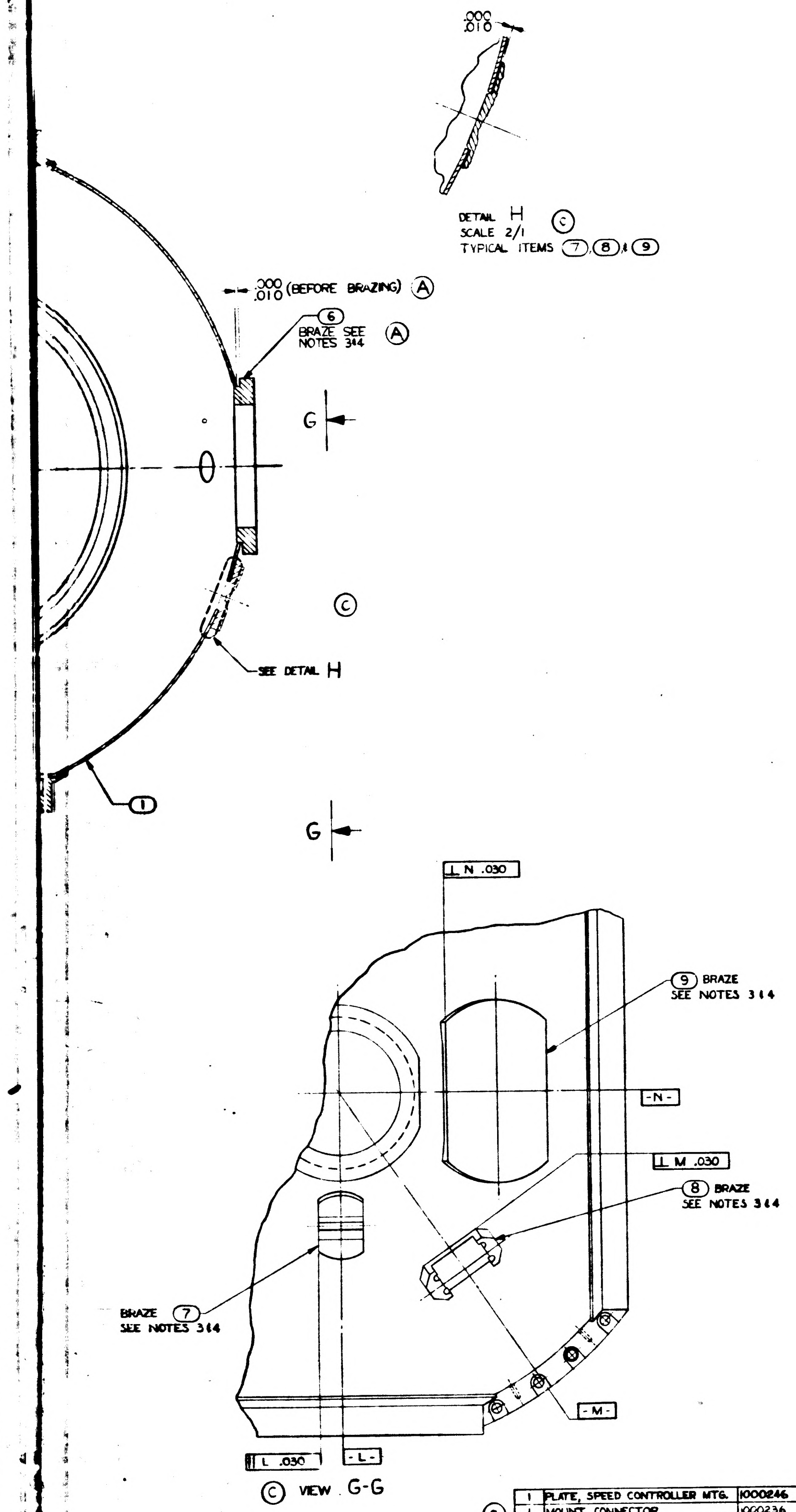
1000059 C

1000059

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDRR 00025			
A	TDRR 00148	2-11-62	ajb	WK
B	TDRR 00427	1-6-63	ajb	WK
C	TDRR 00613	3-7-63	ajb	WK
D	TDRR 01046	4-30-63	ajb	WK


.000
.010
DETAIL H Ⓒ
SCALE 2/1
TYPICAL ITEMS ⑦ ⑧ & ⑨
.000
.010 (BEFORE BRAZING) Ⓐ
⑥
BRAZE SEE NOTES 3&4 Ⓐ
G
G
Ⓒ
SEE DETAIL H
①
⊥ N .030
⑨ BRAZE SEE NOTES 3&4
-N-
⊥ M .030
⑧ BRAZE SEE NOTES 3&4
BRAZE ⑦ SEE NOTES 3&4
-M-
⊥ L .030
-L-
Ⓒ VIEW G-G

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	PLATE, SPEED CONTROLLER MTG.	1000246			9
1	MOUNT, CONNECTOR	1000236			8
1	PLATE, CAPACITOR MOUNTING	1000237			7
1	FLANGE BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG.	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

MASTER Ⓐ

	DE 1000201
1000103	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN R. CONTANT 6-19-62
APPROVED FOR MSC 9-13-62
BY DIRECTION

HEMISPHERE ASSEMBLY 'MOVABLE OUTER GIMBAL

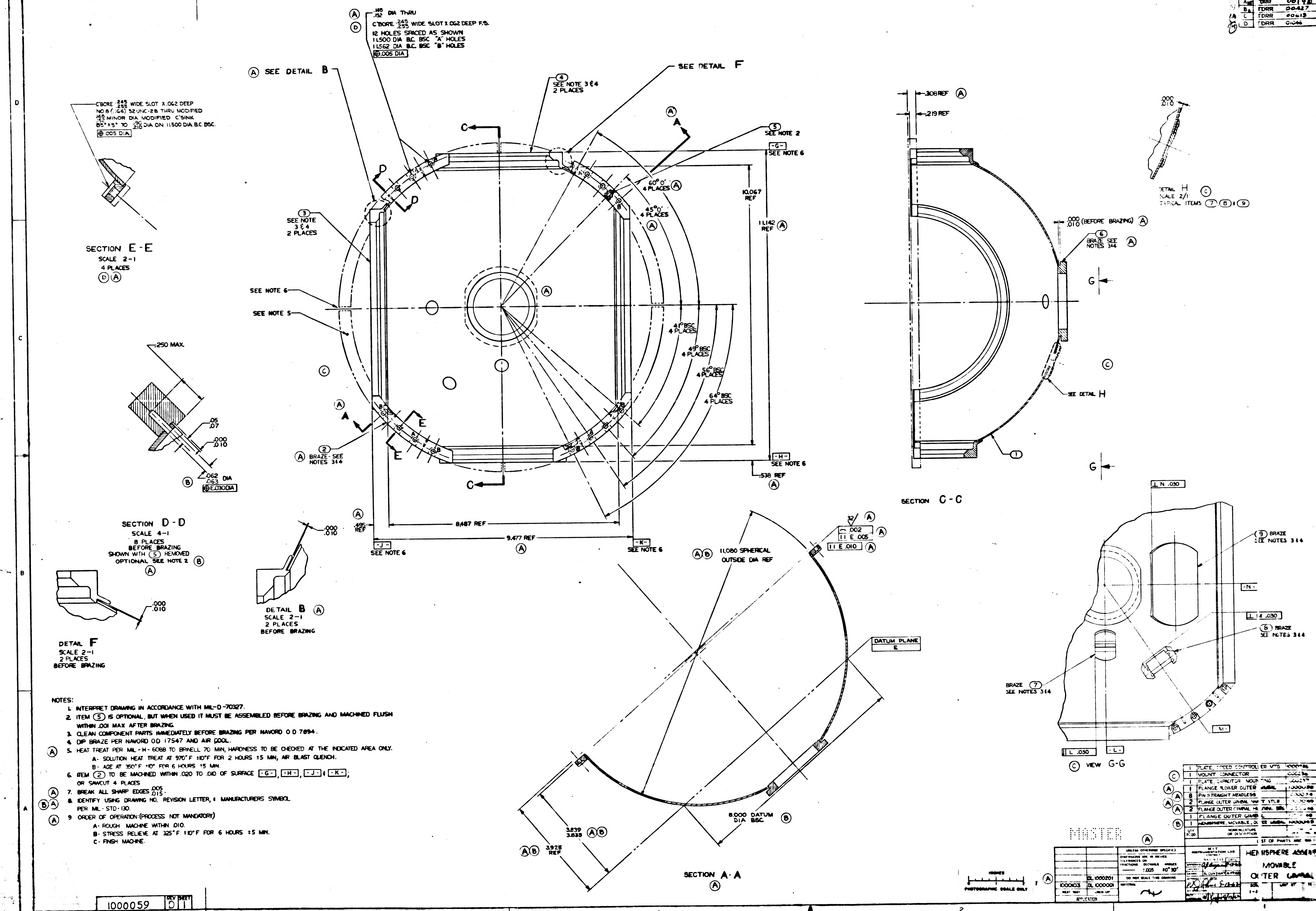
SCALE 1-1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000059
SHEET 1 OF 1

1000059 D

1000039

INCHES
PHOTOGRAPHIC SCALE ONLY



(A) .148/.152 DIA THRU
(D) C'BORE .245/.255 WIDE SLOT X .062 DEEP F.S.
12 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
(A) SEE DETAIL B
SEE DETAIL F
(4) SEE NOTE 3 & 4 2 PLACES
(5) SEE NOTE 2
-G- SEE NOTE 6
60° 0' 4 PLACES (A)
45° 0' 4 PLACES (A)
10.067 REF
11.142 REF (A)
(3) SEE NOTE 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
(2) BRAZE - SEE NOTES 3 & 4 (A)
-H- SEE NOTE 6
.538 REF (A)
.495 REF (A)
8.487 REF
9.477 REF (A)
-J- SEE NOTE 6
-K- SEE NOTE 6
C'BORE .245/.255 WIDE SLOT X .062 DEEP
NO 8 (.164) 32 UNC-2B THRU MODIFIED
.148/.152 MINOR DIA MODIFIED C'SINK
85° ± 5° TO .192/.210 DIA ON 11.500 DIA B.C. BSC.
⊕ .005 DIA
SECTION E-E
SCALE 2-1
4 PLACES
(D) (A)
.250 MAX.
.05/.07
.000/.010
.062/.063 DIA
(B) ⊕ E .030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH (5) REMOVED
OPTIONAL SEE NOTE 2 (B)
(A)
.000/.010
DETAIL B (A)
SCALE 2-1
2 PLACES
BEFORE BRAZING
.000/.010
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.308 REF (A)
.219 REF
.000/.010 (BEFORE BRAZING) (A)
(6) BRAZE SEE NOTES 3 & 4 (A)
G
(C)
SEE DETAIL H
(1)
SECTION C-C
.000/.010
DETAIL H (C)
SCALE 2/1
TYPICAL ITEMS (7) (8) & (9)
32 (A)
⌒ .002
∥ E .005 (A)
∥ E .010 (A)
(A) (B) 11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
8.000 DATUM DIA BSC (B)
3.839/3.833 (A) (B)
(A) (B) 3.925 REF
SECTION A-A (A)
⊥ N .030
(9) BRAZE SEE NOTES 3 & 4
-N-
⊥ M .030
(8) BRAZE SEE NOTES 3 & 4
BRAZE (7) SEE NOTES 3 & 4
-M-
∥ L .030
-L-
(C) VIEW G-G
MASTER
INCHES
PHOTOGRAPHIC SCALE ONLY

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM (5) IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
5. (A) HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM (2) TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OR SAWCUT 4 PLACES
7. (A) BREAK ALL SHARP EDGES $\frac{.005}{.015}$.
8. (B)(A) IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.
9. (A) ORDER OF OPERATION: (PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010.
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.

SYM		
A	TDRR	00148
B	TDRR	00427
C	TDRR	00613
D	TDRR	01046

	QTY REQD	NOMENCLATURE OR DESCRIPTION	
	1	PLATE, SPEED CONTROLLER MTG	[illegible]
(C)	1	MOUNT CONNECTOR	[illegible]
	1	PLATE, CAPACITOR MOUNTING	[illegible]
(A)	1	FLANGE LOWER OUTER GIMBAL	[illegible]
(A)	8	PIN STRAIGHT HEADLESS	[illegible]
(A)	2	FLANGE OUTER GIMBAL SHAFT STUB	[illegible]
(A)	2	FLANGE OUTER GIMBAL HOUSING BRG	[illegible]
	1	FLANGE OUTER GIMBAL	[illegible]
(B)	1	HEMISPHERE, MOVABLE, OUTER GIMBAL	[illegible]

LIST OF PARTS

NEXT ASSY	USED ON
	DL 1000201
1000103	DL 1000001

APPLICATION

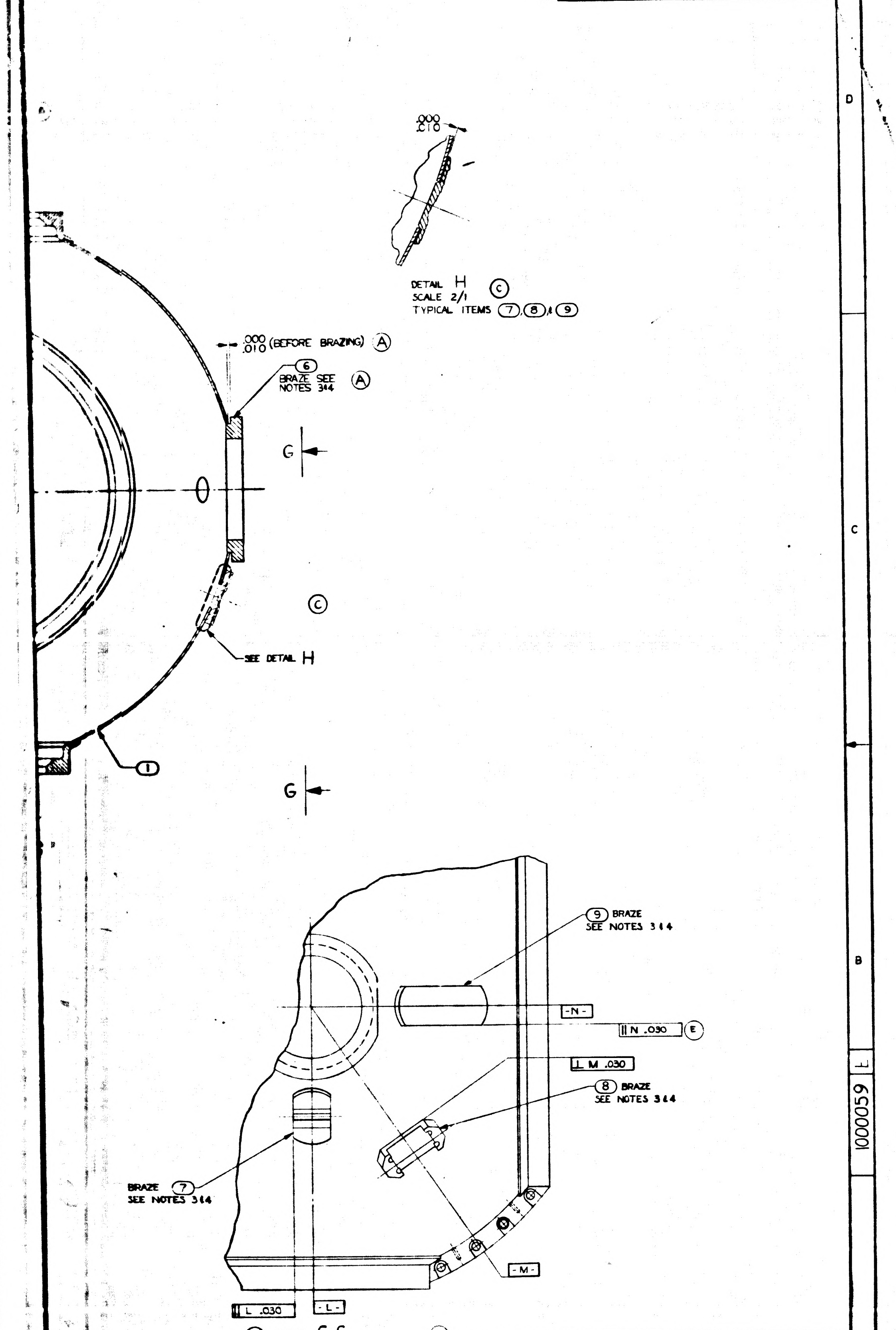
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R. CONTANT 6-19-62
APPROVED FOR MSC
W J Rhine 9-13-62
BY DIRECTION
SCALE 1-1

HEMISPHERE ASSE
MOVABLE
OUTER GIMBAL

1000059 REV D SHEET 1

REVISIONS		TDRR 00025	
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00148	2-11-62	WR
B	TDRR 00427	1-6-63	WK
C	TDRR 00613	3-7-63	WK
D	TDRR 01046	4-30-63	WK
E	TDRR 01232	5-21-63	WK



D
.000
.010
DETAIL H
SCALE 2/1
TYPICAL ITEMS 7, 8, & 9
C
.000
.010 (BEFORE BRAZING) A
6
BRAZE SEE NOTES 3 & 4
A
G
C
SEE DETAIL H
1
G
C
9 BRAZE
SEE NOTES 3 & 4
-N-
∥ N .030
E
⊥ M .030
8 BRAZE
SEE NOTES 3 & 4
BRAZE 7
SEE NOTES 3 & 4
-M-
B
1000059 E
⊥ L .030
-L-

C VIEW G-G

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	PLATE, MTG, 28 V REG	1000238			9
1	MOUNT, CONNECTOR	1000236			8
1	PLATE, CAPACITOR MOUNTING	1000237			7
1	FLANGE BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG.	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

MASTER

A

	DL 1000201
1000103	DL 000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R. CONTANT
APPROVED FOR MSC W. J. Rhine 8-13-62
BY DELEGATION

HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

SCALE 1-1
UNIT WT.
CODE IDENT

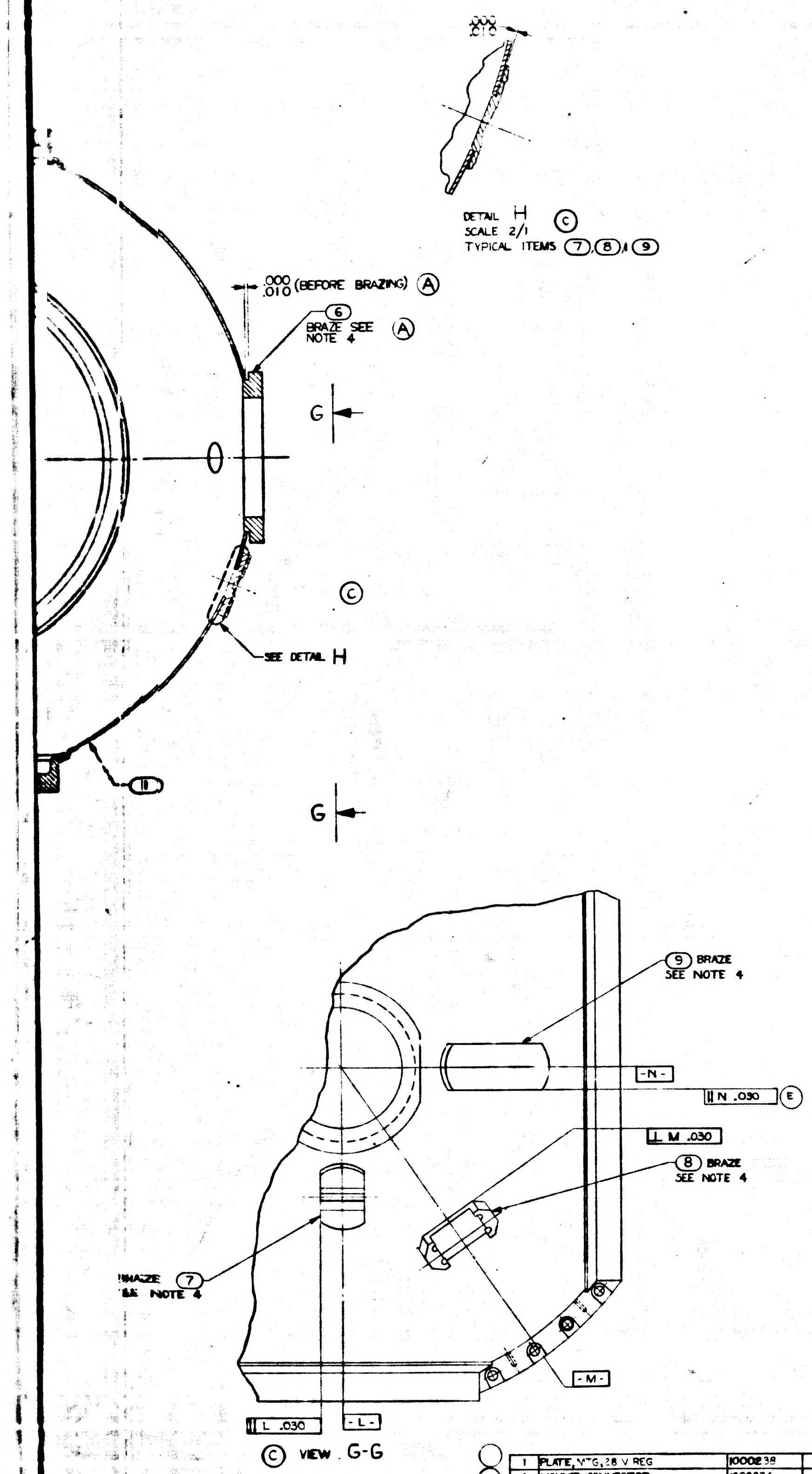
MIT INSTRUMENTATION LABORATORY
Cambridge, Mass
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000059
SHEET 1 OF 1

1000059

2K

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00025				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00148	2-11-62	ajb	WR
B	TDRR 00427	1-6-63	ajb	WR
C	TDRR 00613	3-7-63	ajb	WR
D	TDRR 01046	4-30-63	ajb	WR
E	TDRR 01232	5-21-63	ajb	WR
F	TDRR 01443	6-5-63	ajb	RHB



DETAIL H
SCALE 2/1 Ⓒ
TYPICAL ITEMS ⑦,⑧,⑨
.000 .010 (BEFORE BRAZING) Ⓐ
⑥ BRAZE SEE NOTE 4 Ⓐ
G
Ⓒ
SEE DETAIL H
⑪
G
⑨ BRAZE SEE NOTE 4
-N-
N .030 Ⓔ
M .030
⑧ BRAZE SEE NOTE 4
BRAZE ⑦ SEE NOTE 4
-M-
L .030
-L-
Ⓒ VIEW G-G

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	PLATE, MTG, 28 V REG	1000238			9
1	MOUNT, CONNECTOR	1000236			8
1	PLATE, CAPACITOR MOUNTING	1000237			7
1	FLANGE, BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG.	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

MASTER Ⓐ

	SL 1000201
1000103	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL ~

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R. CONTANT 6-1-62
APPROVED FOR MSC W.J. Rhines 8-13-62
BY DIRECTION

HEMISPHERE ASSEMBLY
'MOVABLE
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000059
SHEET 1 OF 1

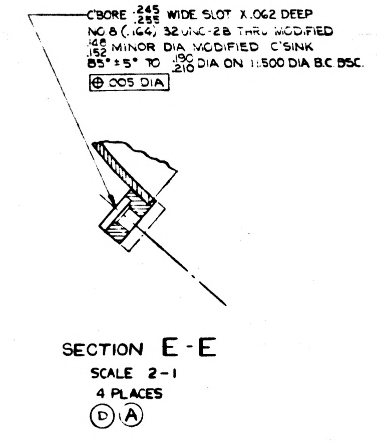
1000059 F

1000001

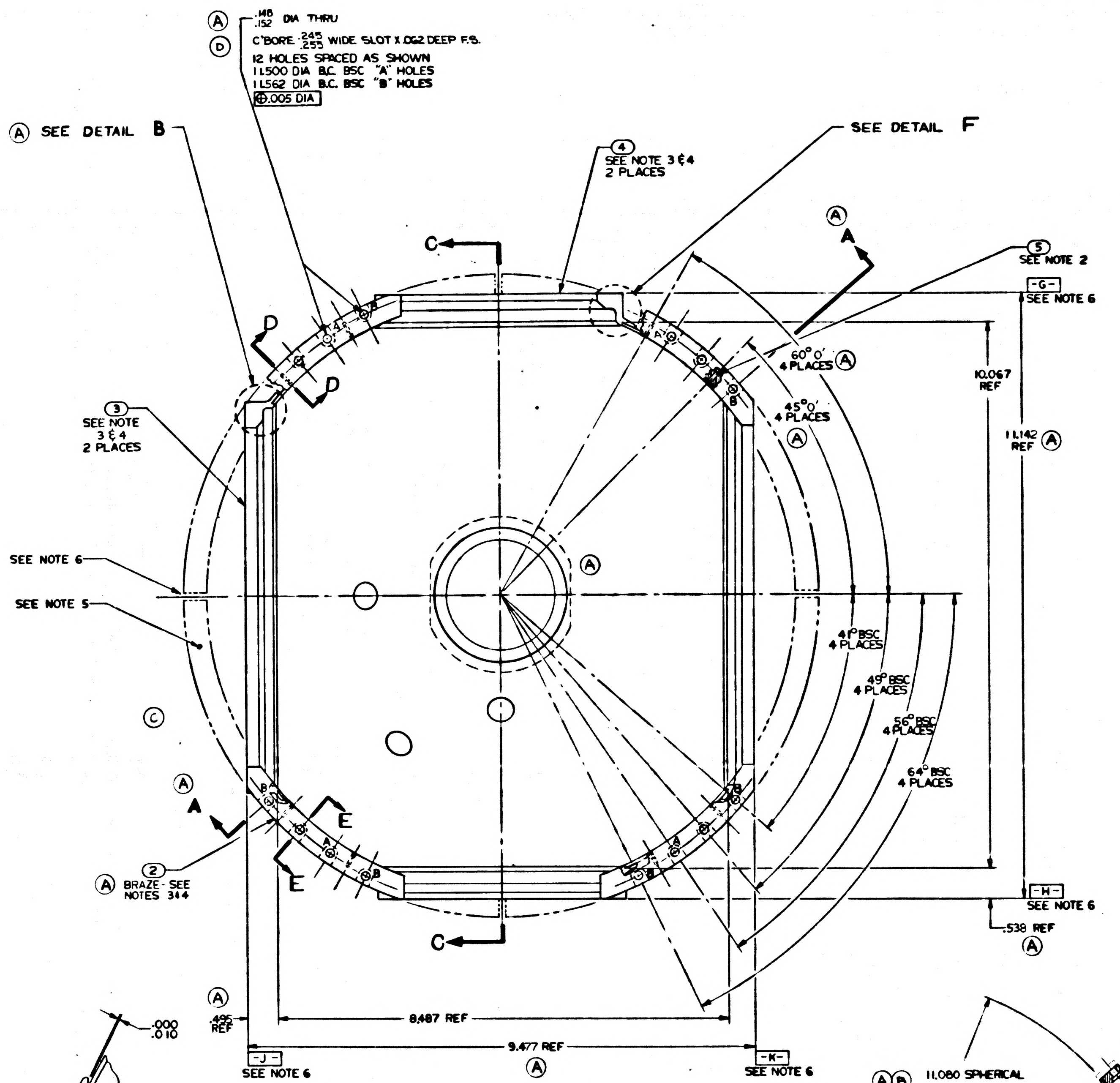
2H

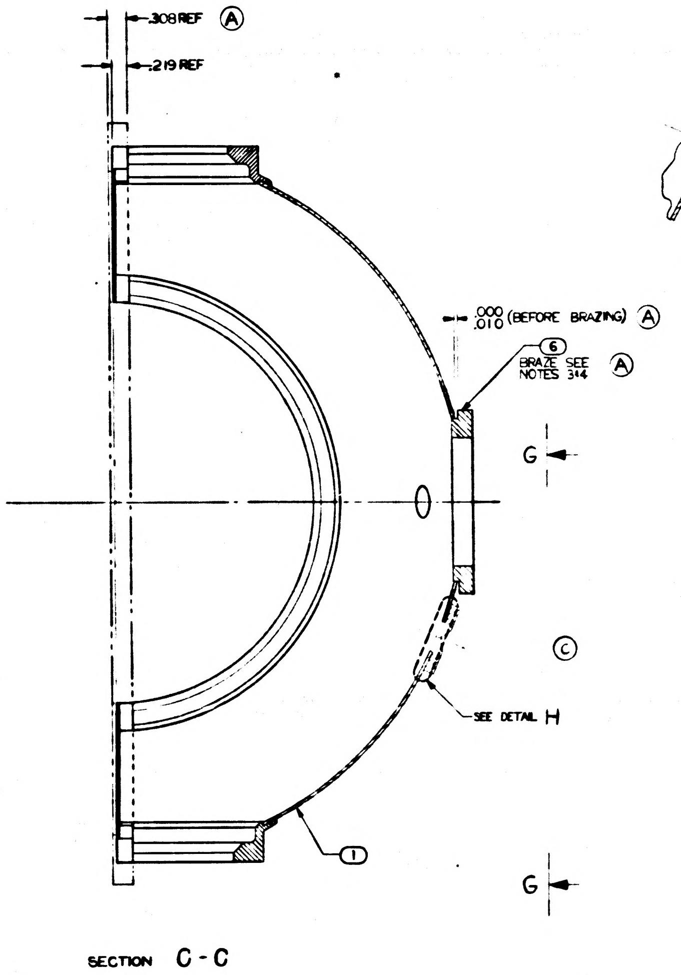
INCHES
PHOTOGRAPHIC SCALE ONLY

SYM		REVISIONS DESCRIPTION
A	TDRR	00148
B	TDRR	00427
C	TDRR	00613
D	TDRR	01046
E	TDRR	01232

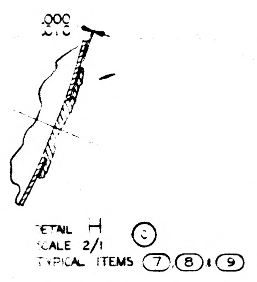

C'BORE .245/.255 WIDE SLOT X .062 DEEP
NO 8 (.164) 32 UNC-2B THRU MODIFIED
.148/.152 MINOR DIA MODIFIED C'SINK
85° ± 5° TO .190/.210 DIA ON 11.500 DIA B.C BSC.
⊕ .005 DIA

SECTION E-E
SCALE 2-1
4 PLACES
Ⓓ Ⓐ

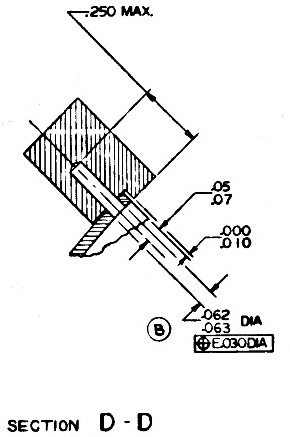

Ⓐ .148/.152 DIA THRU
Ⓓ C'BORE .245/.255 WIDE SLOT X .062 DEEP F.S.
12 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
Ⓐ SEE DETAIL B
SEE DETAIL F
④ SEE NOTE 3 & 4 2 PLACES
⑤ SEE NOTE 2
-G- SEE NOTE 6
60° 0' 4 PLACES Ⓐ
45° 0' 4 PLACES Ⓐ
10.067 REF
11.142 REF Ⓐ
③ SEE NOTE 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
② BRAZE - SEE NOTES 3 & 4 Ⓐ
-H- SEE NOTE 6
.538 REF Ⓐ
.495 REF Ⓐ
8.487 REF
9.477 REF Ⓐ
-J- SEE NOTE 6
-K- SEE NOTE 6
C C D D E E A A
Ⓒ Ⓐ


.308 REF Ⓐ
.219 REF
.000/.010 (BEFORE BRAZING) Ⓐ
⑥ BRAZE SEE NOTES 3 & 4 Ⓐ
G G
Ⓒ
SEE DETAIL H
①

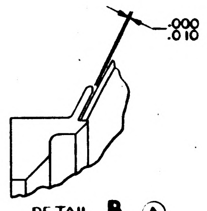
SECTION C-C



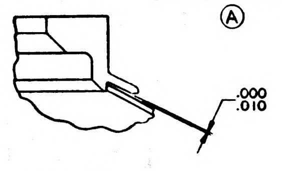
DETAIL H Ⓒ
SCALE 2/1
TYPICAL ITEMS ⑦ ⑧ & ⑨


.250 MAX.
.05/.07
.000/.010
.062/.063 DIA
Ⓑ ⊕ E .030 DIA

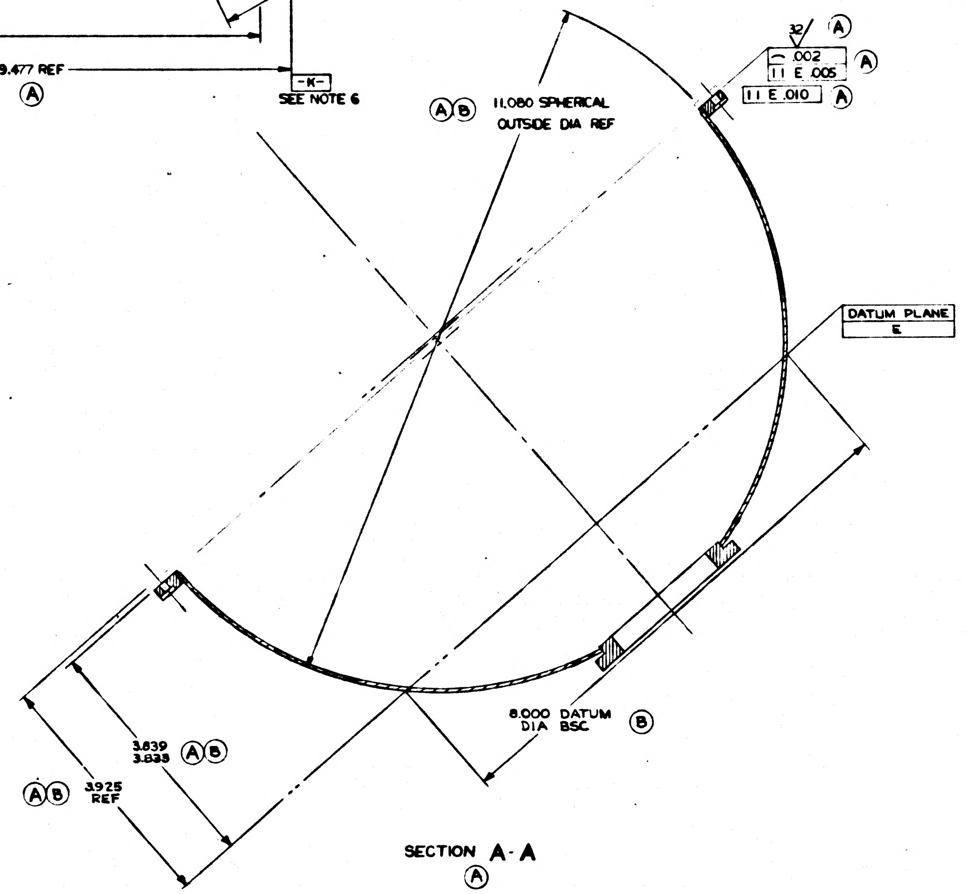
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH ⑤ REMOVED
OPTIONAL SEE NOTE 2 Ⓑ
Ⓐ



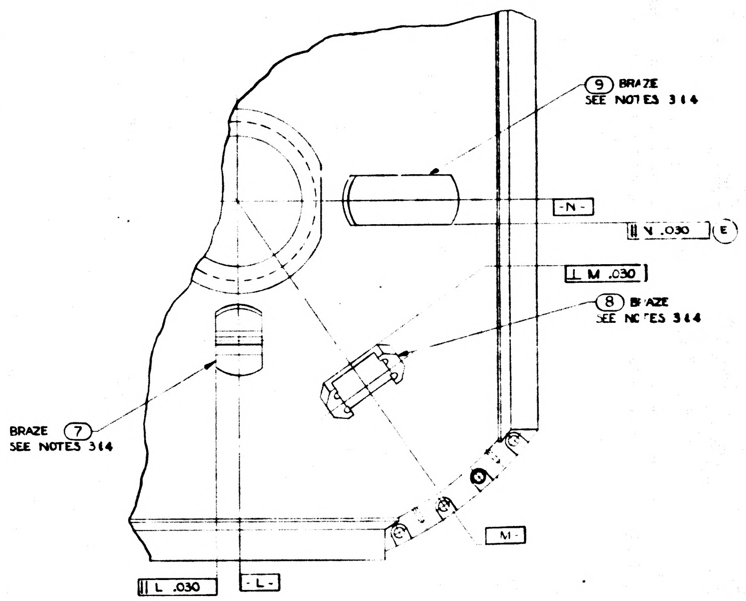
DETAIL B Ⓐ
SCALE 2-1
2 PLACES
BEFORE BRAZING



DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING


32/ Ⓐ
⌓ .002 Ⓐ
∥ E .005
∥ E .010 Ⓐ
Ⓐ Ⓑ 11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
8.000 DATUM DIA BSC Ⓑ
3.839/3.833 Ⓐ Ⓑ
Ⓐ Ⓑ 3.925 REF

SECTION A-A
Ⓐ


⑨ BRAZE SEE NOTES 3 & 4
-N-
∥ N .030 Ⓔ
⊥ M .030
⑧ BRAZE SEE NOTES 3 & 4
BRAZE ⑦ SEE NOTES 3 & 4
-M-
∥ L .030
-L-

Ⓒ VIEW G-G

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7894.
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
5. Ⓐ HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970° F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350° F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OR SAWCUT 4 PLACES.
7. Ⓐ BREAK ALL SHARP EDGES $^{.005}_{.015}$.
8. Ⓑ Ⓐ IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.
9. Ⓐ ORDER OF OPERATION:(PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010.
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO
	1	PLATE, [illegible]	10002[illegible]
Ⓒ	1	MOUNT CONNECTOR	[illegible]00236
	1	PLATE, CAPACITOR MOUNTING	[illegible]00237
Ⓐ	1	FLANGE BLOWER OUTER GIMBAL	1000098
Ⓐ	8	PIN STRAIGHT HEADLESS	1000054-1
Ⓐ	2	FLANGE OUTER GIMBAL SHAFT STUB	1000045
Ⓐ	2	FLANGE OUTER GIMBAL HOUSING [illegible]	1000046
	1	FLANGE OUTER GIMBAL	1000048
Ⓑ	1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000049

LIST OF PARTS AND MATERIALS

Ⓐ

NEXT ASSY	USED ON
	DL 1000201
1000103	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	[illegible]	9-13-62
CHECKED		
DRAWN	R. CONTANT	6-19-62

APPROVED FOR MSC
W J [illegible] 9-13-62
BY DIRECTION
[illegible] 9/13/62

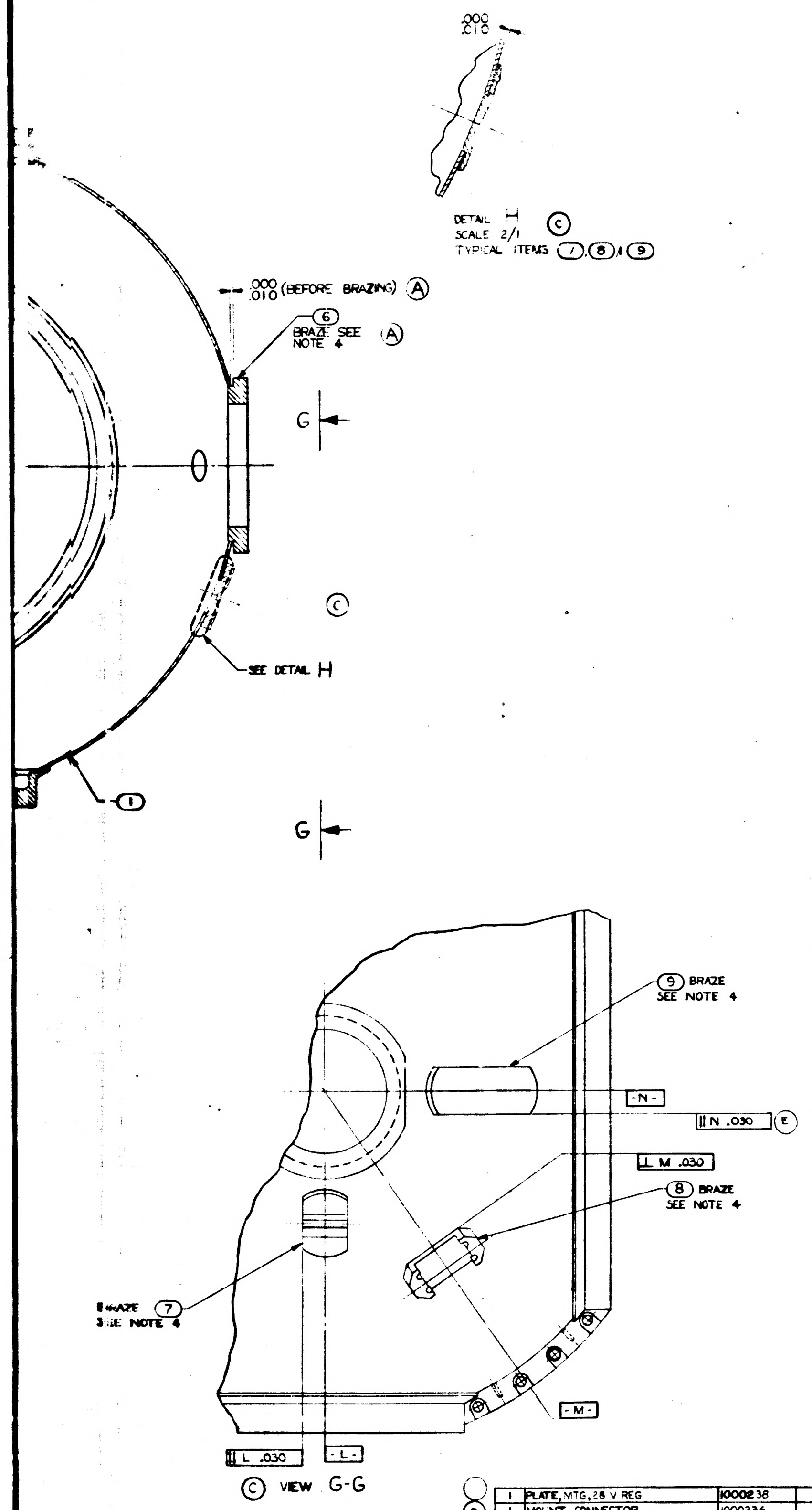
HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

SCALE 1-1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000059 REV E SHEET 1

REVISIONS	TDRR 00023		
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00148	12-11-62	WR
B	TDRR 00427	1-6-63	WR
C	TDRR 00613	3-7-63	WR
D	TDRR 01046	4-30-63	WR
E	TDRR 01232	5-21-63	WR
F	TDRR 01443	6-5-63	RRB


.000
.010
DETAIL H (C)
SCALE 2/1
TYPICAL ITEMS 7, 8 & 9
.000
.010 (BEFORE BRAZING) (A)
6
BRAZE SEE NOTE 4 (A)
G
(C)
SEE DETAIL H
1
G
9 BRAZE SEE NOTE 4
-N-
∥ N .030 (E)
⊥ M .030
8 BRAZE SEE NOTE 4
BRAZE 7 SEE NOTE 4
-M-
∥ L .030
-L-
(C) VIEW G-G

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	PLATE, MTG, 28 V REG	1000238			9
1	MOUNT, CONNECTOR	1000236			8
1	PLATE, CAPACITOR MOUNTING	1000237			7
1	FLANGE BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG.	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL 1000201
1000103	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 12-13-62
DRAWN R. CONTANT 6-19-62
APPROVED FOR MSC 12-13-62

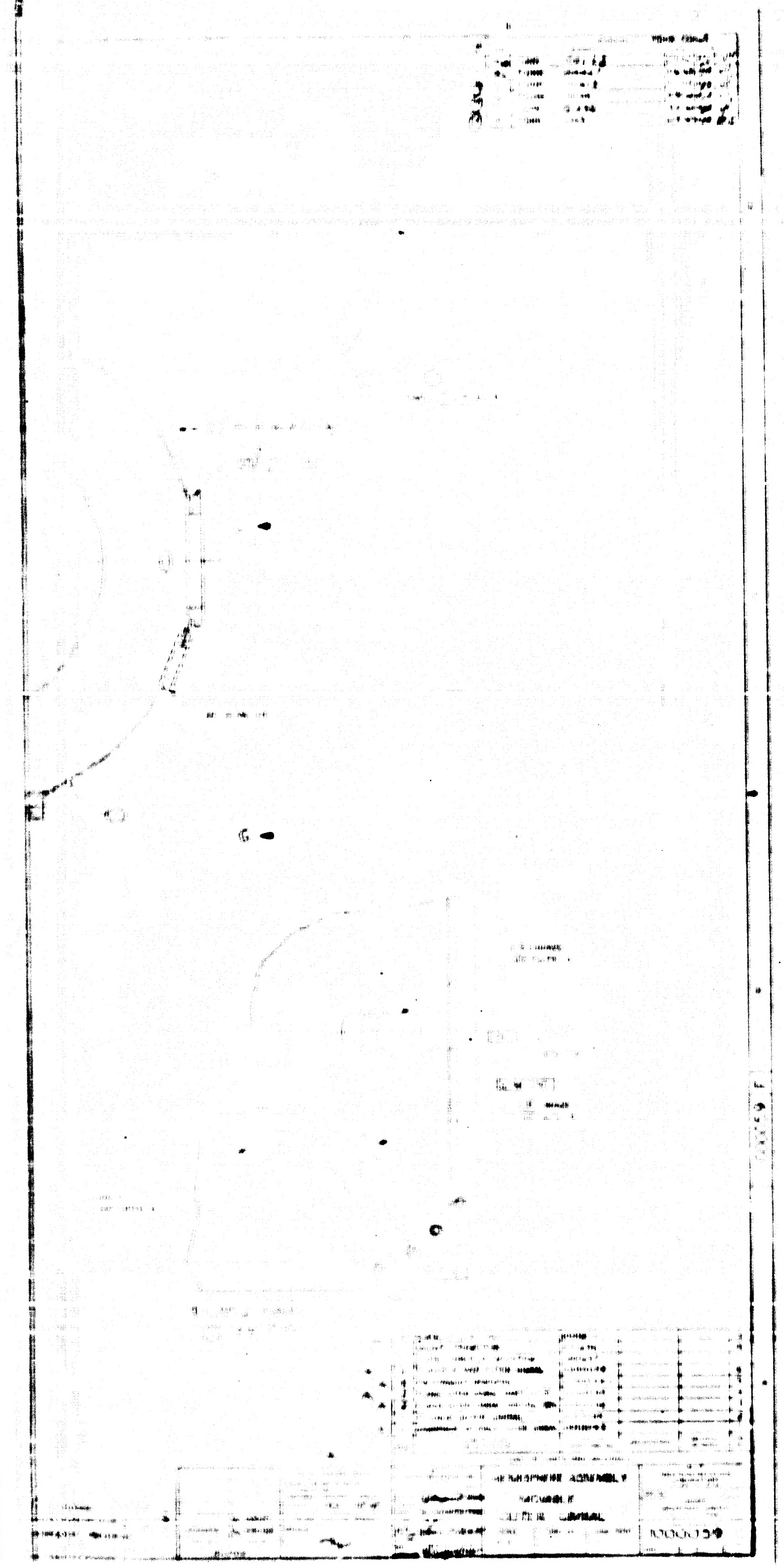
HEMISPHERE ASSEMBLY MOVABLE OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT.

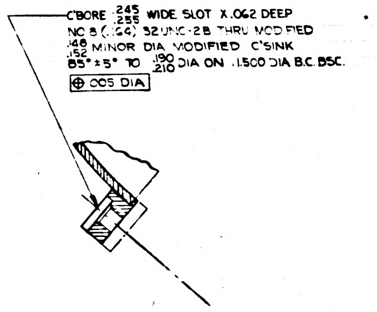
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000059
SHEET 1 OF 1

1000059 F

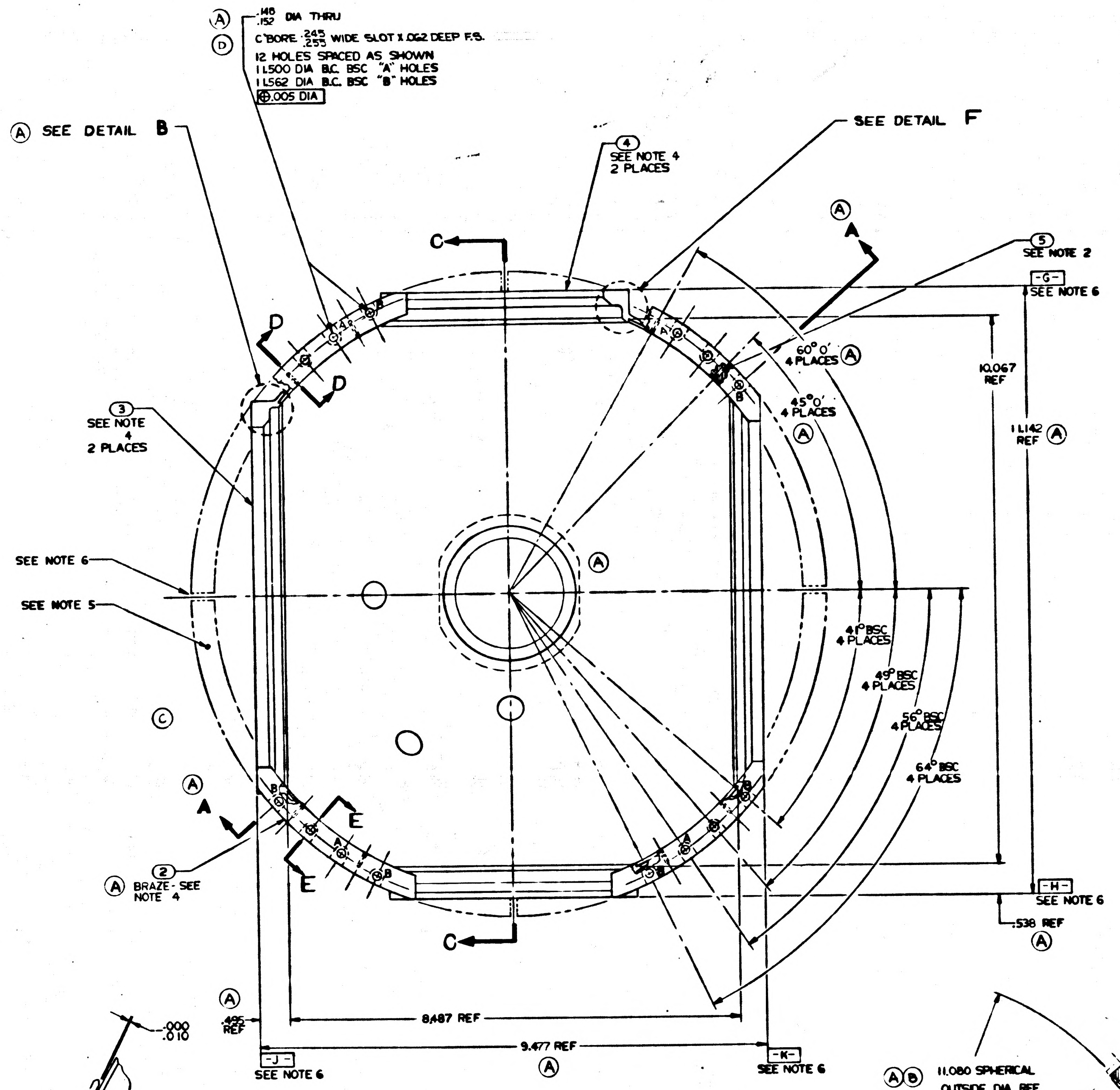
1000039

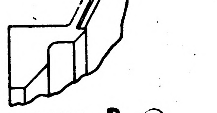

HEMISPHERE ASSEMBLY

SYM		REVISIONS DESCRIPTION
A	TDRR	00148
B	TDRR	00427
C	TDRR	00613
D	TDRR	01046
E	TDRR	01232
F	TDRR	01443

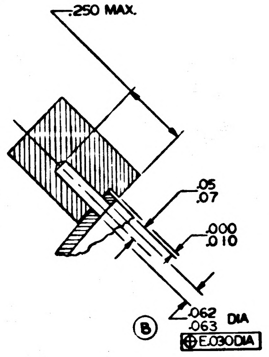

C'BORE .245/.255 WIDE SLOT X .062 DEEP
NO 8 (.164) 32UNC-2B THRU MODIFIED .148/.152 MINOR DIA MODIFIED C'SINK 85° ±5° TO .190/.210 DIA ON 11.500 DIA B.C. BSC
⊕ .005 DIA

SECTION E-E
SCALE 2-1
4 PLACES
Ⓓ Ⓐ

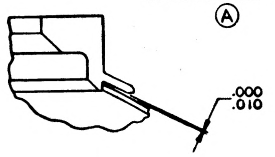

Ⓐ .148/.152 DIA THRU
Ⓓ C'BORE .245/.255 WIDE SLOT X .062 DEEP F.S.
12 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
Ⓐ SEE DETAIL B
SEE DETAIL F
④ SEE NOTE 4 2 PLACES
⑤ SEE NOTE 2
-G- SEE NOTE 6
③ SEE NOTE 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
Ⓒ
Ⓐ
C
D
E
A
60° 0' 4 PLACES Ⓐ
45° 0' 4 PLACES Ⓐ
10.067 REF
11.142 REF Ⓐ
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
② Ⓐ BRAZE - SEE NOTE 4
-H- SEE NOTE 6
.538 REF Ⓐ
Ⓐ .495 REF
8.487 REF
9.477 REF Ⓐ
-J- SEE NOTE 6
-K- SEE NOTE 6



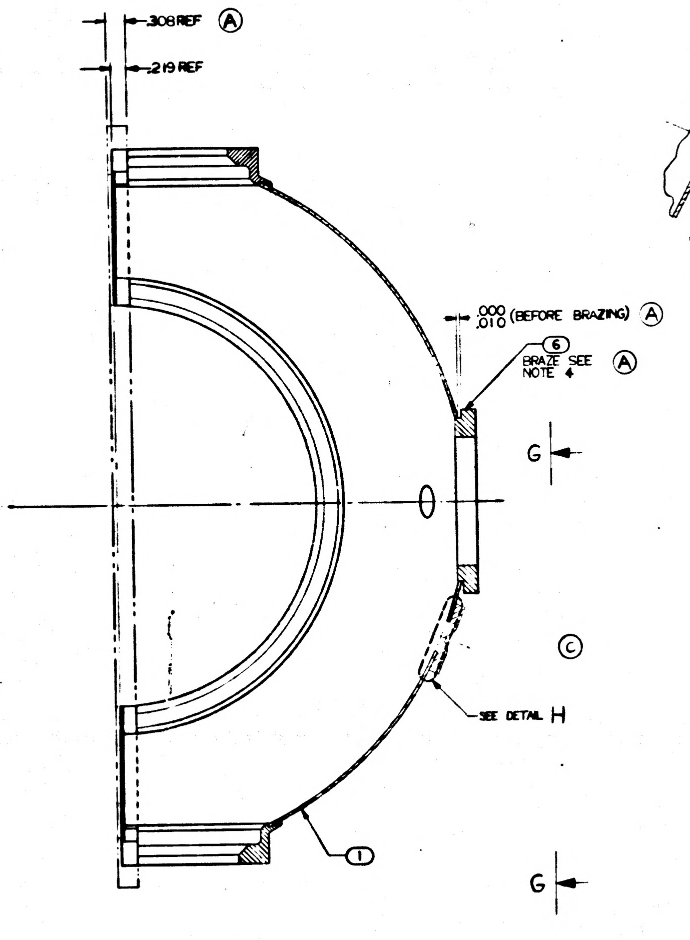
DETAIL B Ⓐ
SCALE 2-1
2 PLACES
BEFORE BRAZING


.250 MAX.
.05/.07
.000/.010
.062/.063 DIA
Ⓑ ⊕ E .030 DIA

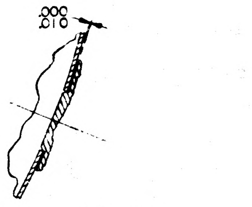
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH ⑤ REMOVED
OPTIONAL SEE NOTE 2 Ⓑ
Ⓐ



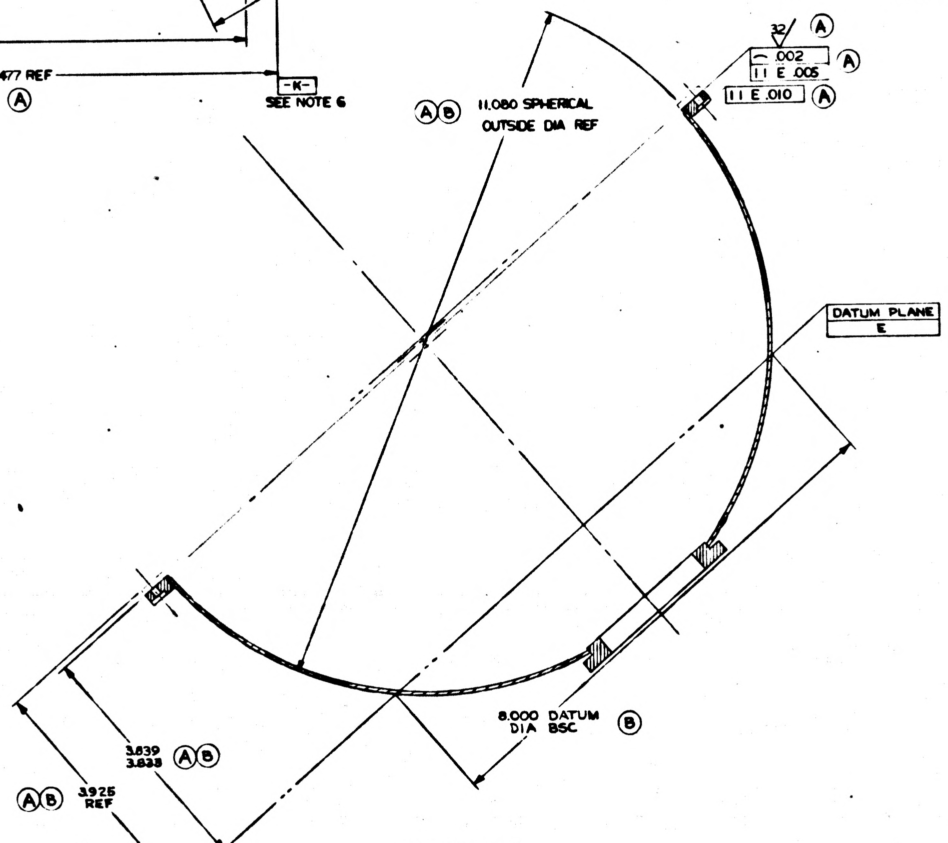
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING


.308 REF Ⓐ
.219 REF
.000/.010 (BEFORE BRAZING) Ⓐ
⑥ BRAZE SEE NOTE 4 Ⓐ
G
G
Ⓒ
SEE DETAIL H
①

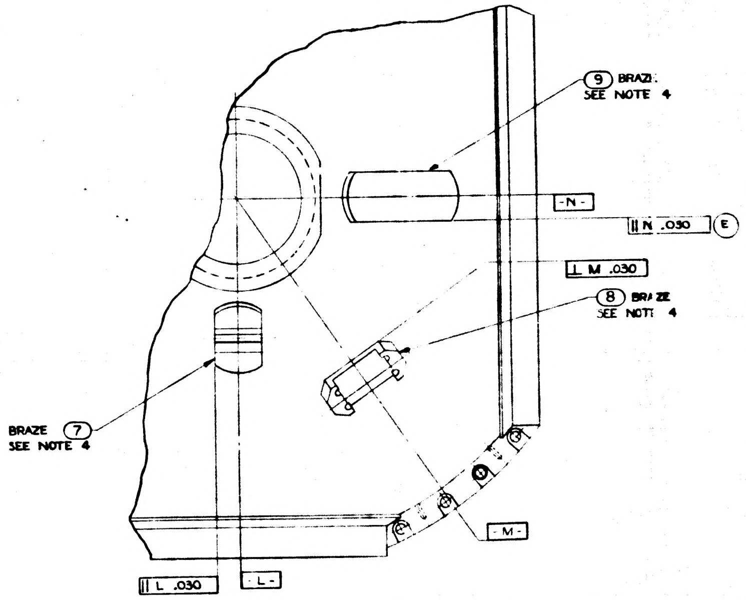
SECTION C-C



DETAIL H Ⓒ
SCALE 2/1
TYPICAL ITEMS ⑦ ⑧ ⑨


32 Ⓐ
⌒ .002 Ⓐ
// E .005
// E .010 Ⓐ
Ⓐ Ⓑ 11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
8.000 DATUM DIA BSC Ⓑ
3.839/3.833 Ⓐ Ⓑ
Ⓐ Ⓑ 3.925 REF

SECTION A-A
Ⓐ


⑨ BRAZE SEE NOTE 4
-N-
// N .030 Ⓔ
⊥ M .030
⑧ BRAZE SEE NOTE 4
BRAZE ⑦ SEE NOTE 4
-M-
// L .030
-L-

Ⓒ VIEW G-G

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. ~~CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O.D. 7884.~~ Ⓕ
4. Ⓕ DIP BRAZE PER ND 1002073
5. Ⓐ HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OR SAWCUT 4 PLACES.
7. Ⓐ BREAK ALL SHARP EDGES .005/.015.
8. Ⓑ Ⓐ IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.
9. Ⓐ ORDER OF OPERATION: (PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010.
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.

MASTER Ⓐ

	QTY RQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO
	1	PLATE, [illegible]	10002[illegible]
Ⓒ	1	MOUNT CONNECTOR	1000236
	1	PLATE CAPACITOR MOUNTING	1000237
Ⓐ	1	FLANGE BLOWER OUTER GIMBAL	1000098
Ⓐ	8	PIN STRAIGHT HEADLESS	1000054-1
Ⓐ	2	FLANGE, OUTER GIMBAL SHAFT STUB	1000045
Ⓐ	2	FLANGE, OUTER GIMBAL HOUSING BRG	1000046
	1	FLANGE OUTER GIMBAL	1000048
Ⓑ	1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000103	DL 1000001

APPLICATION Ⓐ

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

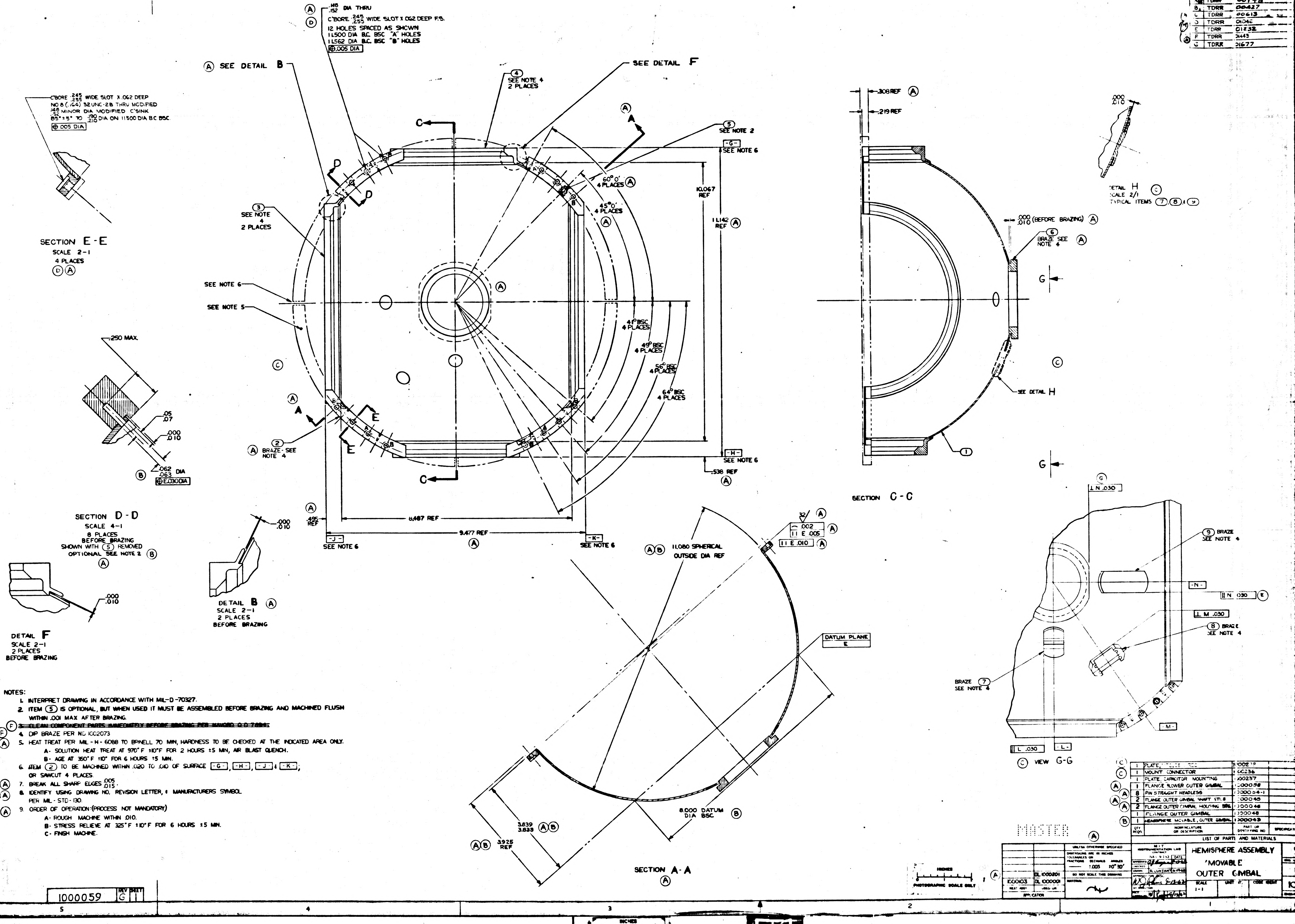
MIT
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED DATE 9-13-62
CHECKED
DRAWN R. CONTANT 6-19-62
APPROVED FOR MSC W. J. Rhine 9-13-62
BY DIRECTION
MIT 9/13/62

HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

INCHES
PHOTOGRAPHIC SCALE ONLY

1000059 REV F SHEET 1



.148 .152 DIA THRU
C'BORE .245 .255 WIDE SLOT X .062 DEEP F.S.
12 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
SEE DETAIL B
SEE DETAIL F
4 SEE NOTE 4 2 PLACES
5 SEE NOTE 2
-G- SEE NOTE 6
C'BORE .245 .255 WIDE SLOT X .062 DEEP
NO 8 (.164) 32 UNC-2B THRU MODIFIED
.148 MINOR DIA MODIFIED C'SINK
.152 85°±5° TO .190 .210 DIA ON 11.500 DIA B.C. BSC
⊕ .005 DIA
SECTION E-E
SCALE 2-1
4 PLACES
60°0' 4 PLACES
45°0' 4 PLACES
10.067 REF
11.142 REF
3 SEE NOTE 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
.250 MAX.
.05 .07
.000 .010
.062 .063 DIA
⊕ E .030 DIA
2 BRAZE - SEE NOTE 4
-H- SEE NOTE 6
.538 REF
.495 REF
8.487 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.308 REF
.219 REF
.000 .010 (BEFORE BRAZING)
6 BRAZE SEE NOTE 4
SEE DETAIL H
1
SECTION C-C
DETAIL H
SCALE 2/1
TYPICAL ITEMS 7, 8, 9
11.080 SPHERICAL OUTSIDE DIA REF
.002
E .005
E .010
DATUM PLANE E
8.000 DATUM DIA BSC
3.839 3.833
3.925 REF
SECTION A-A
N .030
9 BRAZE SEE NOTE 4
-N-
N .030
M .030
8 BRAZE SEE NOTE 4
BRAZE 7 SEE NOTE 4
-M-
L .030
-L-
VIEW G-G
MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
~~3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O.D. 7894.~~
4. DIP BRAZE PER ND 1002073
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OR SAWCUT 4 PLACES.
7. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
8. IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.
9. ORDER OF OPERATION: (PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010.
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.

REVISIONS

SYM		DESCRIPTION
A	TDRR	00148
B	TDRR	00427
C	TDRR	00613
D	TDRR	01046
E	TDRR	01232
F	TDRR	01443
G	TDRR	01677

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION
1	PLATE, [illegible]	100239	
1	MOUNT CONNECTOR	100236	
1	PLATE, CAPACITOR MOUNTING	100237	
1	FLANGE LOWER OUTER GIMBAL	1000058	
8	PIN STRAIGHT HEADLESS	1000054-1	
2	FLANGE OUTER GIMBAL SHAFT STUB	1000045	
2	FLANGE OUTER GIMBAL HOUSING BRG	1000046	
1	FLANGE OUTER GIMBAL	1000048	
1	HEMISPHERE MOVABLE, OUTER GIMBAL	1000043	

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000103	DL 1000001
	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DRAWN R. LUNTANT 6-19-62
APPROVED FOR MSC W.J. Rhine 9-13-62

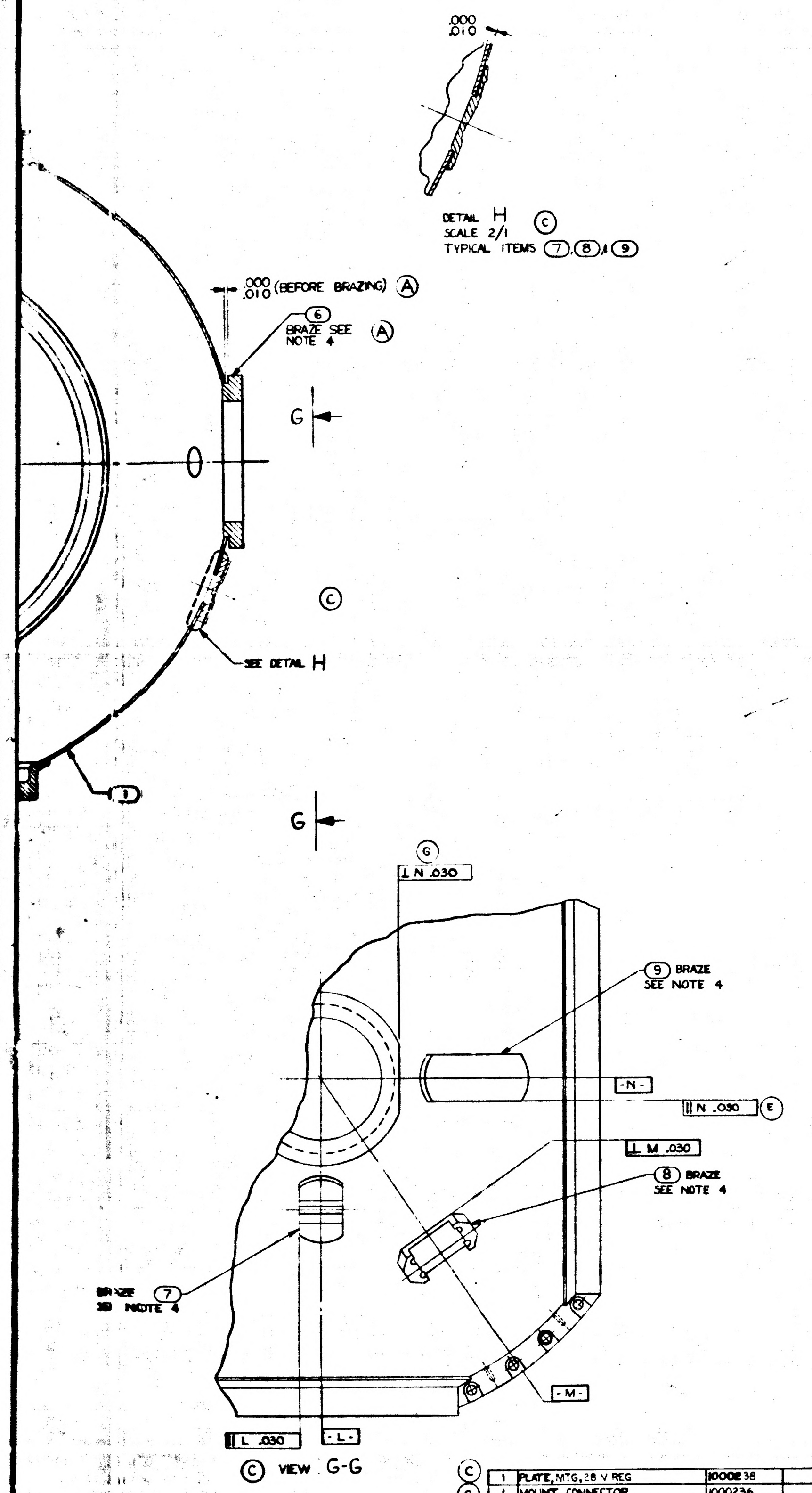
HEMISPHERE ASSEMBLY
'MOVABLE
OUTER GIMBAL

SCALE 1-1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000059 REV G SHEET 1

SYM	DESCRIPTION		DATE	APPROVAL	
	REVISIONS	TDRR 00023			
A	TDRR	00148	2-11-62		WK
B	TDRR	00427	1-6-63		WK
C	TDRR	00613	3-7-63		WK
D	TDRR	01046	4-30-63		WK
E	TDRR	01232	5-21-63		WK
F	TDRR	01443	6-5-63		
G	TDRR	01677	6-19-63		WK


.000
.010
DETAIL H Ⓒ
SCALE 2/1
TYPICAL ITEMS ⑦,⑧,&⑨
.000
.010 (BEFORE BRAZING) Ⓐ
⑥
BRAZE SEE NOTE 4 Ⓐ
G
Ⓒ
SEE DETAIL H
①
G
Ⓖ
⊥ N .030
⑨ BRAZE SEE NOTE 4
-N-
∥ N .030 Ⓔ
⊥ M .030
⑧ BRAZE SEE NOTE 4
BRAZE ⑦ SEE NOTE 4
-M-
∥ L .030
-L-
Ⓒ VIEW G-G

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	PLATE, MTG, 28 V REG	1000238			9
1	MOUNT, CONNECTOR	1000236			8
1	PLATE, CAPACITOR MOUNTING	1000237			7
1	FLANGE BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

MASTER

	DL 1000801
1000103	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R. CONTANT
APPROVED MSC
BY DIRECTION

HEMISPHERE ASSEMBLY 'MOVABLE OUTER GIMBAL

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000059
SCALE 1-1
UNIT WT
CODE IDENT
SHEET 1 OF 1

1000059 G

1000059

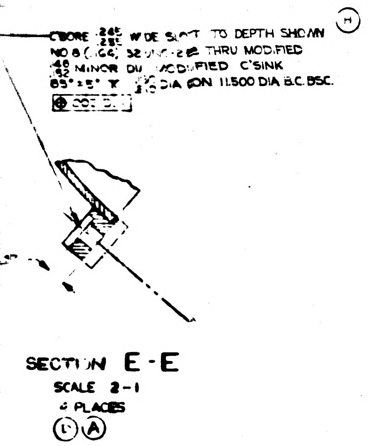
D
C
B
A

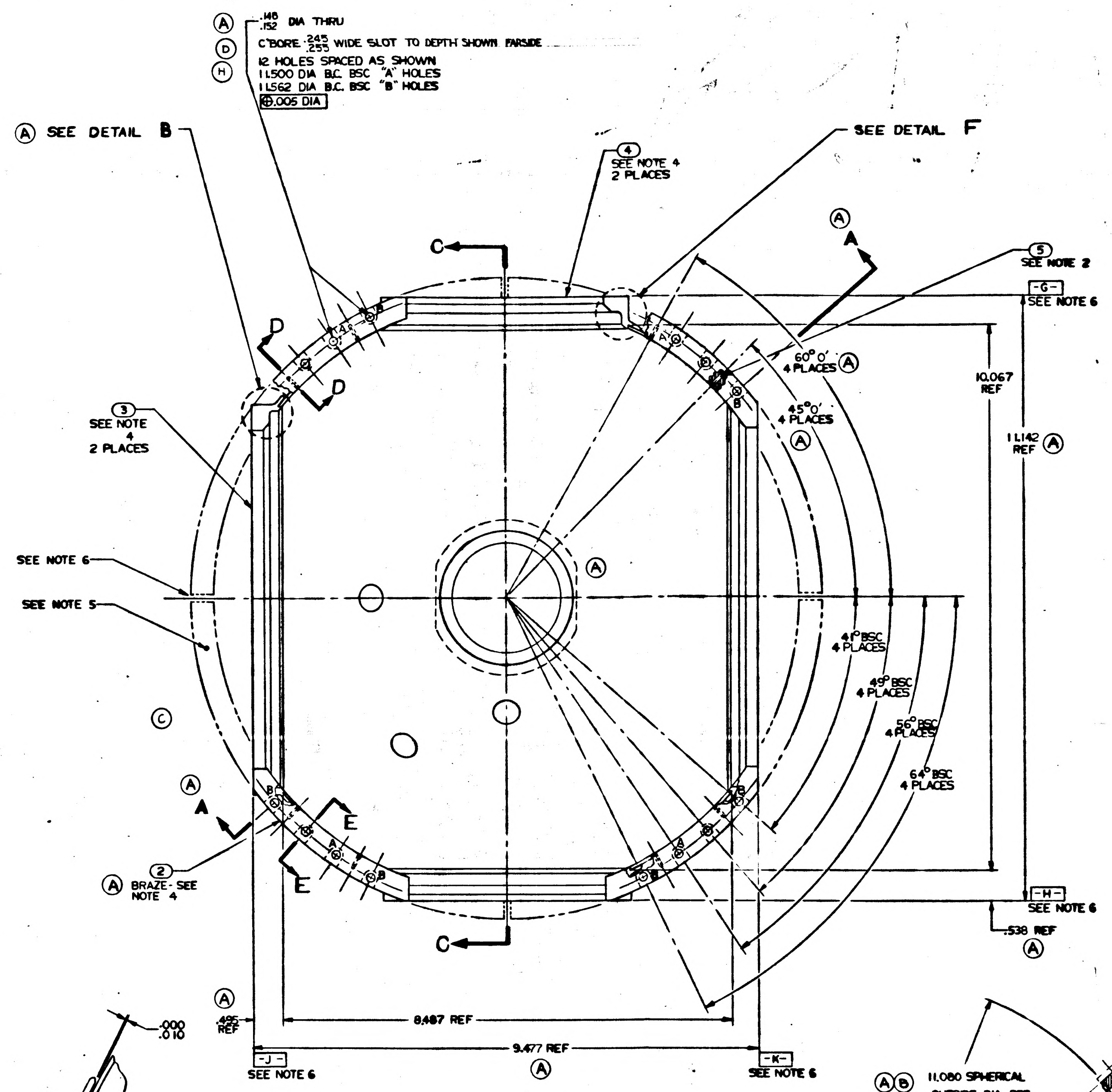
INCHES
PHOTOGRAPHIC SCALE ONLY

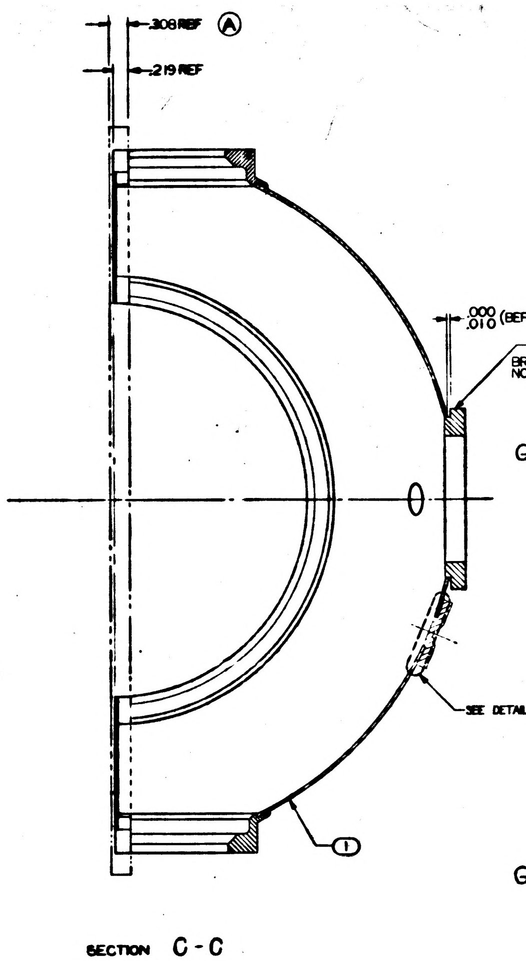
F2

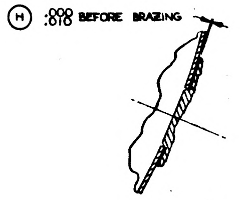
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00148	2-11-62	ajb	WK
B	TDRR 00427	1-6-63	ajb	WK.
C	TDRR 00613	3-7-63	ajb	WK
D	TDRR 01046	4-30-63	ajb	WK
E	TDRR 01232	5-21-63	ajb	WK
F	TDRR 01443	6-5-63	ajb	RRB
G	TDRR 01677	6-19-63	ajb	WK.
H	TDRR 04567	12-2-63		WK.

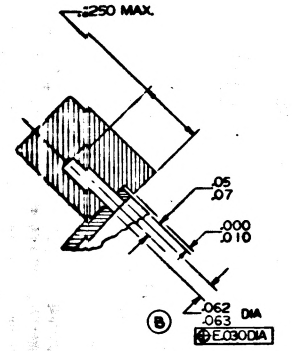
REVISIONS TDRR 0002

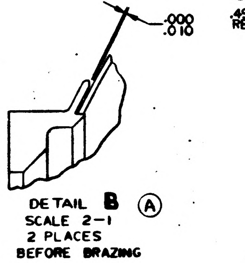

C'BORE .245 .255 WIDE SLOT TO DEPTH SHOWN
NO 6 (.164) SEMS THRU MODIFIED
.48 MINOR DIA MODIFIED C'SINK
85° DIA ON 11.500 DIA B.C. BSC.
SECTION E-E
SCALE 2-1
4 PLACES

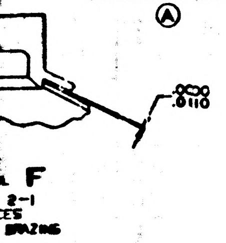

.148 .152 DIA THRU
C'BORE .245 .255 WIDE SLOT TO DEPTH SHOWN FARSIDE
12 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
.005 DIA
SEE DETAIL B
SEE DETAIL F
SEE NOTE 4 2 PLACES
SEE NOTE 2
SEE NOTE 6
SEE NOTE 5
SEE NOTE 4 2 PLACES
60°0' 4 PLACES
45°0' 4 PLACES
10.067 REF
11.142 REF
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
BRAZE - SEE NOTE 4
.538 REF
8.487 REF
9.477 REF
.495 REF
.000 .010
C
D
A
E

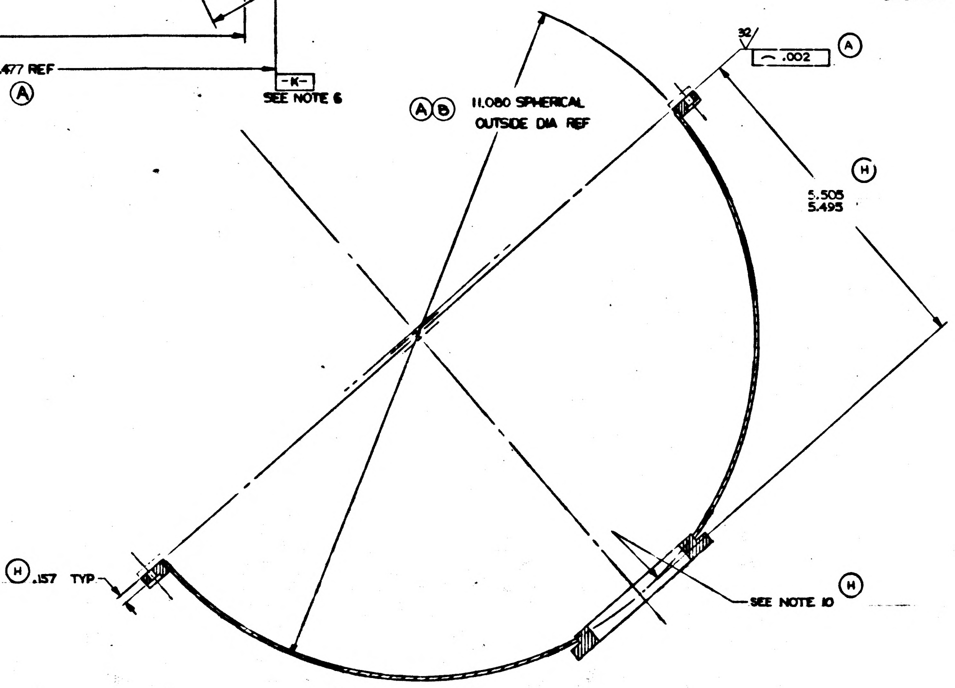

.308 REF
.219 REF
.000 .010 (BEFORE BRAZING)
BRAZE SEE NOTE 4
SEE DETAIL H
G
SECTION C-C

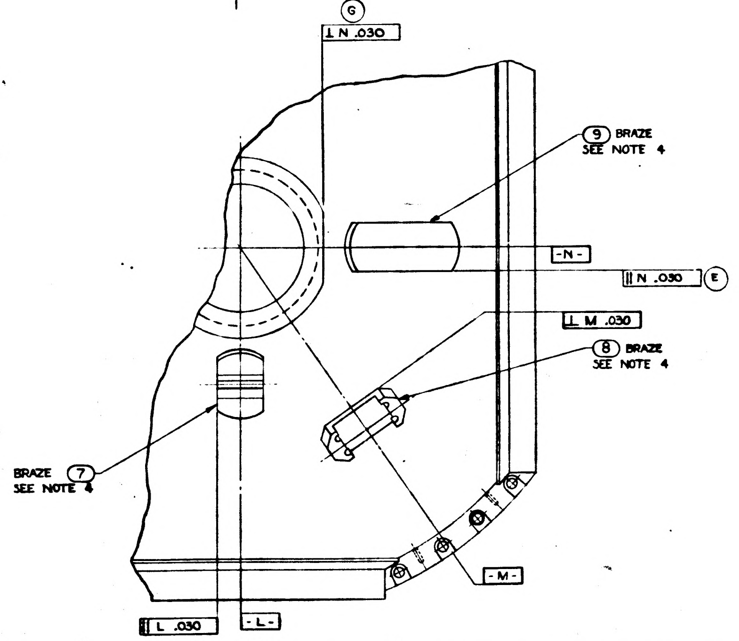

.000 .010 BEFORE BRAZING
DETAIL H
SCALE 2/1
TYPICAL ITEMS 7, 8 & 9


.250 MAX.
.05 .07
.000 .010
.062 .063 DIA
.030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2


.000 .010
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING


.0100 .0110
F
2-1
ES
BRAZING


11.080 SPHERICAL OUTSIDE DIA REF
.002
5.505 5.495
.157 TYP
SEE NOTE 10
SECTION A-A


N .030
BRAZE SEE NOTE 4
-N-
N .030
M .030
BRAZE SEE NOTE 4
BRAZE SEE NOTE 4
-M-
L .030
-L-
VIEW G-G

NTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

TEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.

~~CLEAN COMPONENTS [illegible] BEFORE BRAZING PER [illegible]~~

BRAZE PER ML [illegible] (EXCEPT AIRBLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING

HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.

SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.

B. AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.

[illegible] TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-;

[illegible] 4 PLACES

BREAK ALL SHARP EDGES .005 .015.

IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL

[illegible]

[illegible] (PROCESS NOT MANDATORY)

A. ROUGH MACHINE WITHIN .010.

B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.

C. FINISH MACHINE

[illegible] SPHERICAL [illegible] OF 5.480/5.520 MUST BE MAINTAINED AFTER BRAZING AND HEAT TREAT

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	PLATE, MTG, 28 V REG	1000238			9
1	MOUNT, CONNECTOR	1000236			8
1	PLATE, CAPACITOR MOUNTING	1000237			7
1	FLANGE, BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL HOUSING BRG	1000046			3
1	FLANGE OUTER GIMBAL	1000048			2
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL 1000201
1000103	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN B. CONSTANTINE
APPROVED FOR MSC
W J Rhine 9-13-62
BY DIRECTION

HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

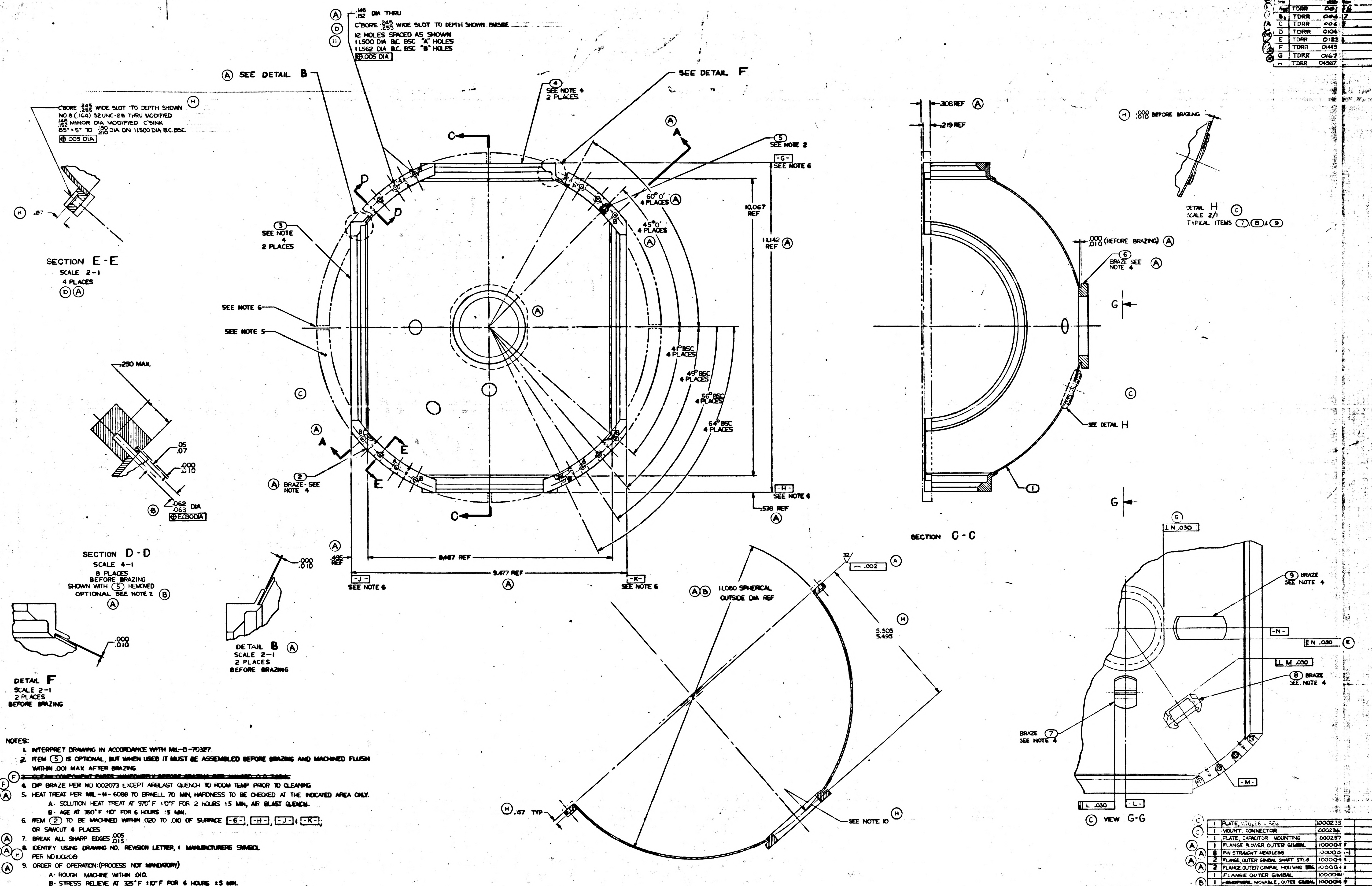
SCALE 1-1
UNIT WT.
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000059
SHEET 1 OF 1

1000059 H

1000059 REV H SHEET 1

SYM	DESCRIPTION
A	TDRR 001
B	TDRR 0046
C	TDRR 006
D	TDRR 0104
E	TDRR 0123
F	TDRR 01443
G	TDRR 0167
H	TDRR 04567



.148/.152 DIA THRU
C'BORE .245/.255 WIDE SLOT TO DEPTH SHOWN INSIDE
12 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
SEE DETAIL B
SEE DETAIL F
4 SEE NOTE 4 2 PLACES
5 SEE NOTE 2
-G- SEE NOTE 6
60° 0' 4 PLACES
45° 0' 4 PLACES
10.067 REF
11.142 REF
3 SEE NOTE 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
2 BRAZE-SEE NOTE 4
-H- SEE NOTE 6
.538 REF
8.487 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
C'BORE .245/.255 WIDE SLOT TO DEPTH SHOWN
NO.8 (.164) 32UNC-2B THRU MODIFIED
.148/.152 MINOR DIA MODIFIED C'SINK
85°±5° TO .190/.210 DIA ON 11.500 DIA B.C. BSC
⊕ .005 DIA
.157
SECTION E-E
SCALE 2-1
4 PLACES
.250 MAX.
.05/.07
.000/.010
.062/.063 DIA
⊕ E.030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
.000/.010
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.495 REF
.000/.010
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
.208 REF
.219 REF
.000/.010 (BEFORE BRAZING)
6 BRAZE SEE NOTE 4
SEE DETAIL H
1
SECTION C-C
.000/.010 BEFORE BRAZING
DETAIL H
SCALE 2/1
TYPICAL ITEMS 7, 8, 9
11.080 SPHERICAL OUTSIDE DIA REF
⌒ .002
32
5.505/5.495
.157 TYP
SEE NOTE 10
SECTION A-A
⊥ N .030
9 BRAZE SEE NOTE 4
-N-
∥ N .030
⊥ M .030
8 BRAZE SEE NOTE 4
7 BRAZE SEE NOTE 4
-M-
⊥ L .030
-L-
VIEW G-G

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM (5) IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. ~~CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O.D. 7094~~
4. DIP BRAZE PER ND 1002073 EXCEPT AIRBLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY.
   - A- SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MIN, AIR BLAST QUENCH.
   - B- AGE AT 350°F ±10° FOR 6 HOURS ±5 MIN.
6. ITEM (2) TO BE MACHINED WITHIN .020 TO .010 OF SURFACE -G-, -H-, -J- & -K-; OR SAWCUT 4 PLACES.
7. BREAK ALL SHARP EDGES .005/.015.
8. IDENTIFY USING DRAWING NO. REVISION LETTER, & MANUFACTURERS SYMBOL PER ND 1002019
9. ORDER OF OPERATION: (PROCESS NOT MANDATORY)
   - A- ROUGH MACHINE WITHIN .010.
   - B- STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MIN.
   - C- FINISH MACHINE.
10. INSIDE SPHERICAL RADIUS OF 5.480/5.520 MUST BE MAINTAINED AFTER BRAZING AND HEAT TREAT

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART & IDENTIFYING NO.	SPECIFICATION
1	PLATE, MTG, 28 V REG	1000233	
1	MOUNT, CONNECTOR	1000236	
1	PLATE, CAPACITOR MOUNTING	1000237	
1	FLANGE BLOWER, OUTER GIMBAL	1000057	
8	PIN STRAIGHT HEADLESS	1000058-1	
2	FLANGE, OUTER GIMBAL SHAFT STUB	1000045	
2	FLANGE, OUTER GIMBAL HOUSING BRG	1000043	
1	FLANGE OUTER GIMBAL	1000042	
1	HEMISPHERE, MOVABLE, OUTER GIMBAL	1000041	

LIST OF PARTS AND MATERIALS

MASTER

	DL 1000201
1000103	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN R. CONTANT
APPROVED FOR
W. G. 9-13-62
BY DIRECTION

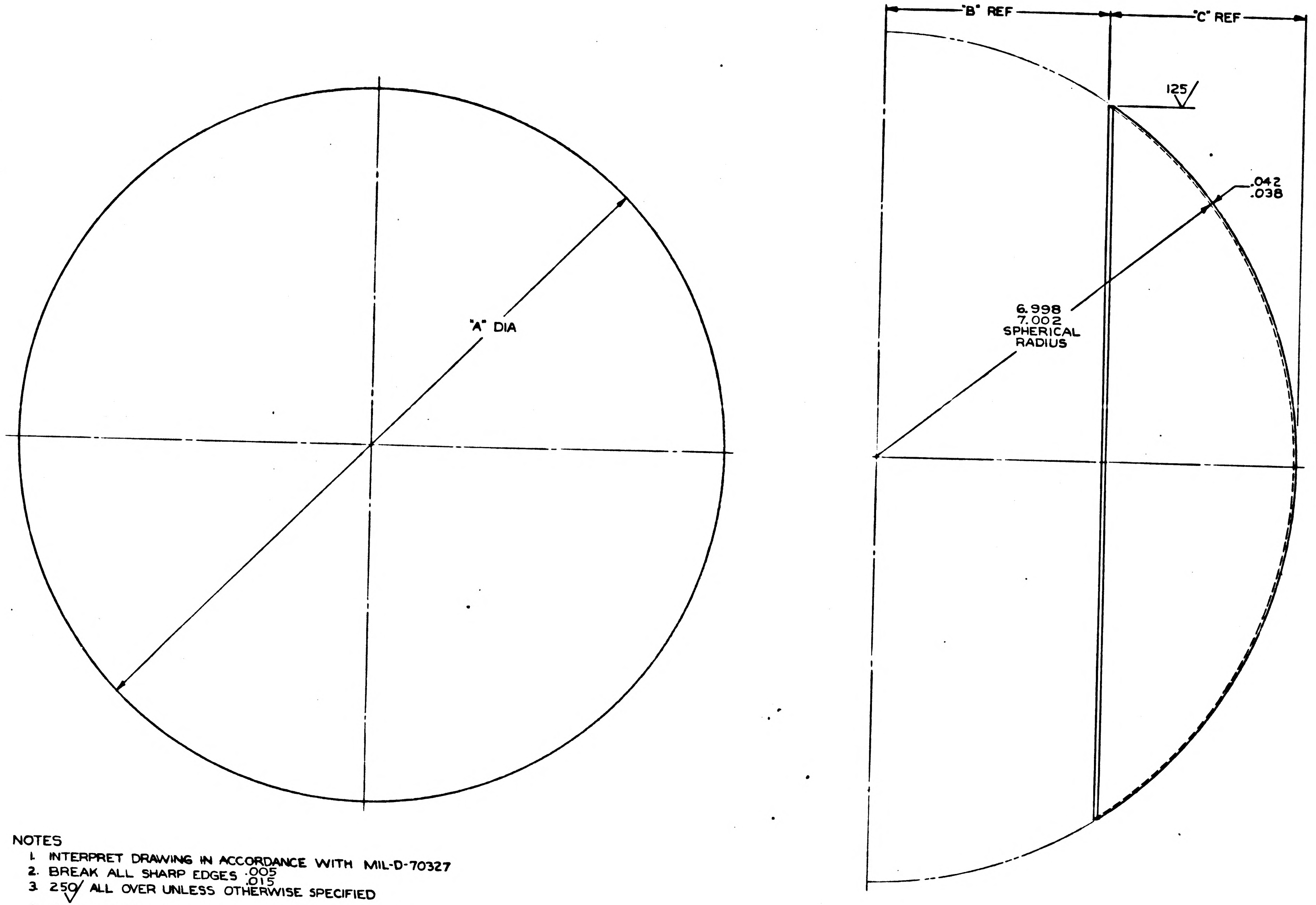
HEMISPHERE ASSEMBLY
MOVABLE
OUTER GIMBAL

SCALE 1-1
UNIT WT.

1000059 REV H SHEET 1

PART NO.	"A"	"B"	"C"	USED WITH (REF.)
1000060-1	11.818 11.828	3.750	3.290	1000061
1000060-2	11.495 11.505	3.990	3.050	1000064

ZONE	SYM	REVISIONS TDRR 00105 DESCRIPTION	DATE	APPROVAL



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 250 ALL OVER UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING PART NO., REVISION LETTER, APPLICABLE DASH NO. AND MANUFACTURERS SYMBOL PER MIL-STD-130.
5. STRESS RELIEVE AT 325°F ±10° FOR 6 HOURS ±10MIN.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000139	
1000081	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY SH6061 TEMP O; ALT SPEC QQ-A-327 TEMP O

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		11/21/62
CHECKED		
DRAWN	G QUINN	6/22/62

APPROVED FOR MSC
BY DIRECTION MIT APPROVAL
W Kupfer 21 Nov '62

HEMISPHERE CASE COVER

SCALE 1/1
UNIT WT.
CODE IDENT.

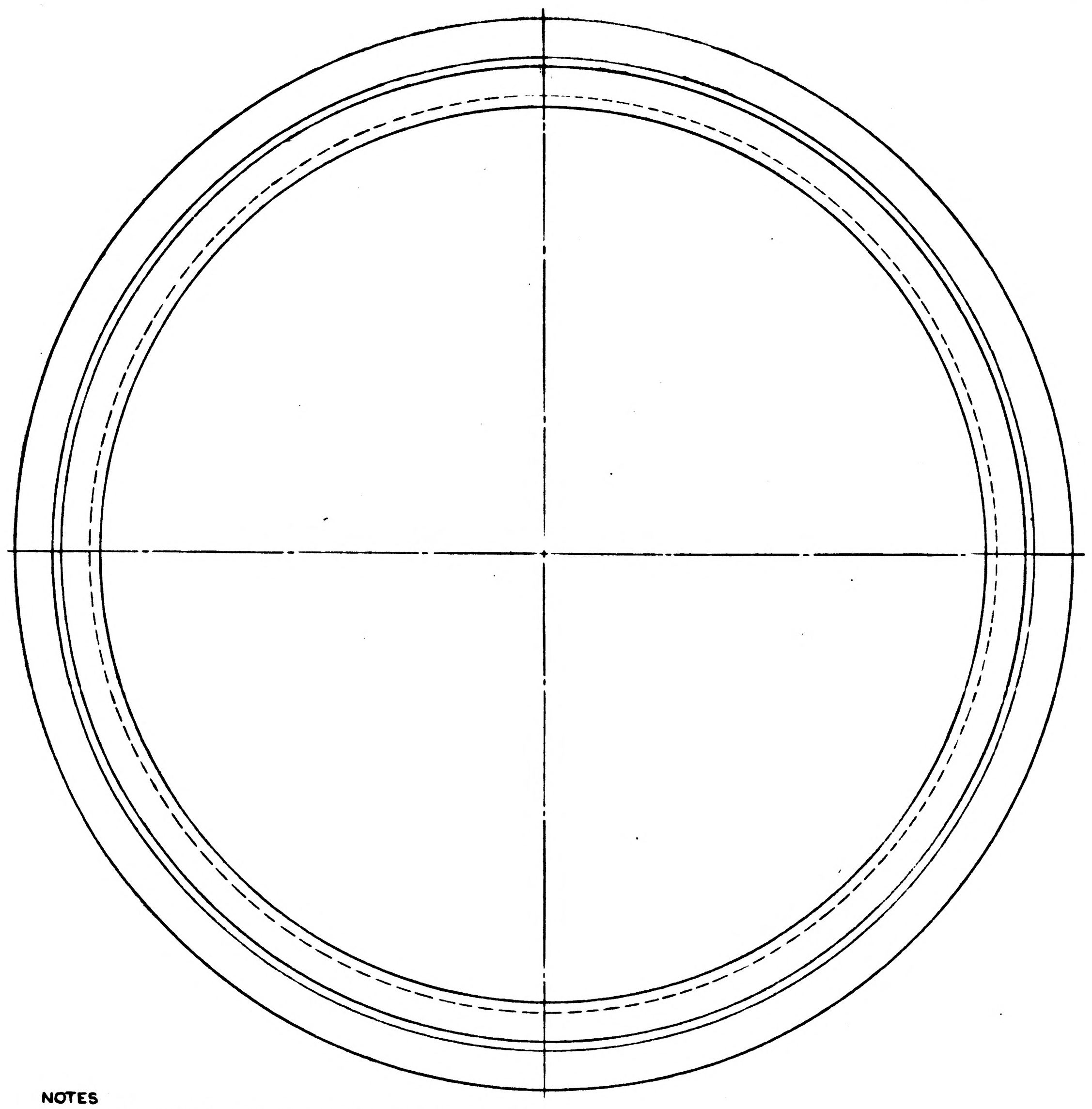
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

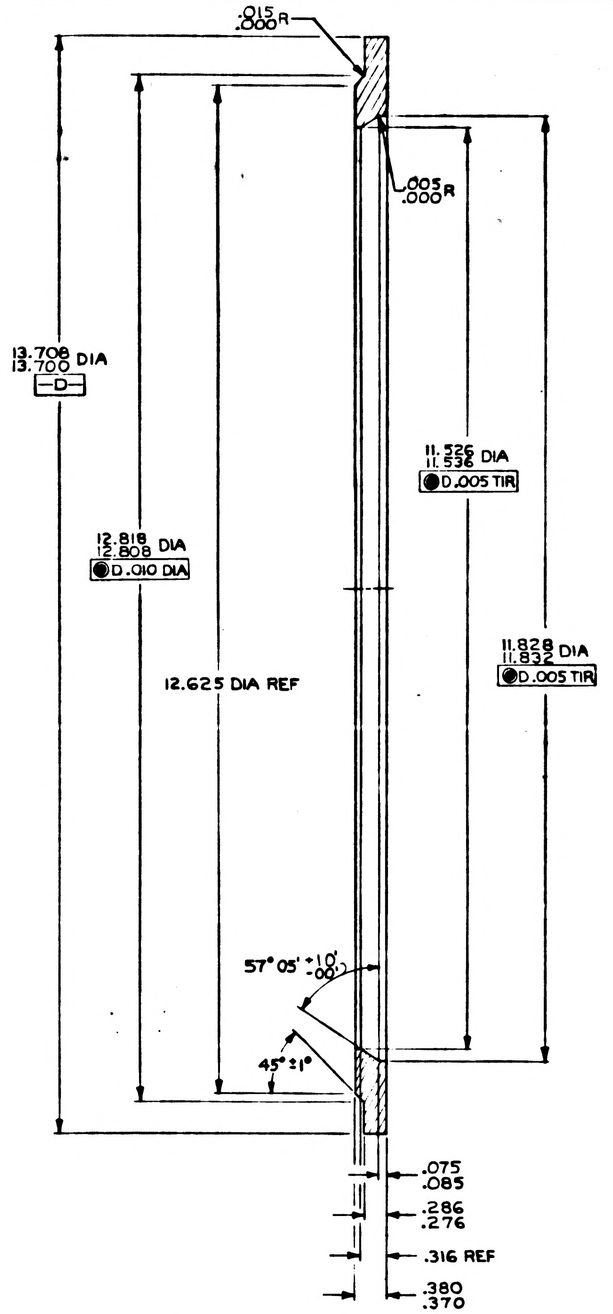
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000060
SHEET 1 OF 1 SHEET

1000060

REVISIONS TDRR 00086				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

(M)




.015 .000 R
.005 .000 R
13.708 13.700 DIA
-D-
12.818 12.808 DIA
● D .010 DIA
12.625 DIA REF
11.526 11.536 DIA
● D .005 TIR
11.828 11.832 DIA
● D .005 TIR
57° 05' +10' -00'
45° ±1°
.075 .085
.286 .276
.316 REF
.380 .370

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON MANDATORY)
   - A ROUGH MACHINE
   - B STRESS RELIEVE AT 325°F ±10° FOR 6 HOURS ±10 MIN
   - C FINISH MACHINE
5. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000139	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327 TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	G QUINN	6/22/62
APPROVED FOR MSC	W J Rhine	11 Dec
BY DIRECTION MIT APPROVAL	W J Kupfer	8 Nov 62

FLANGE
CASE COVER MOVABLE

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

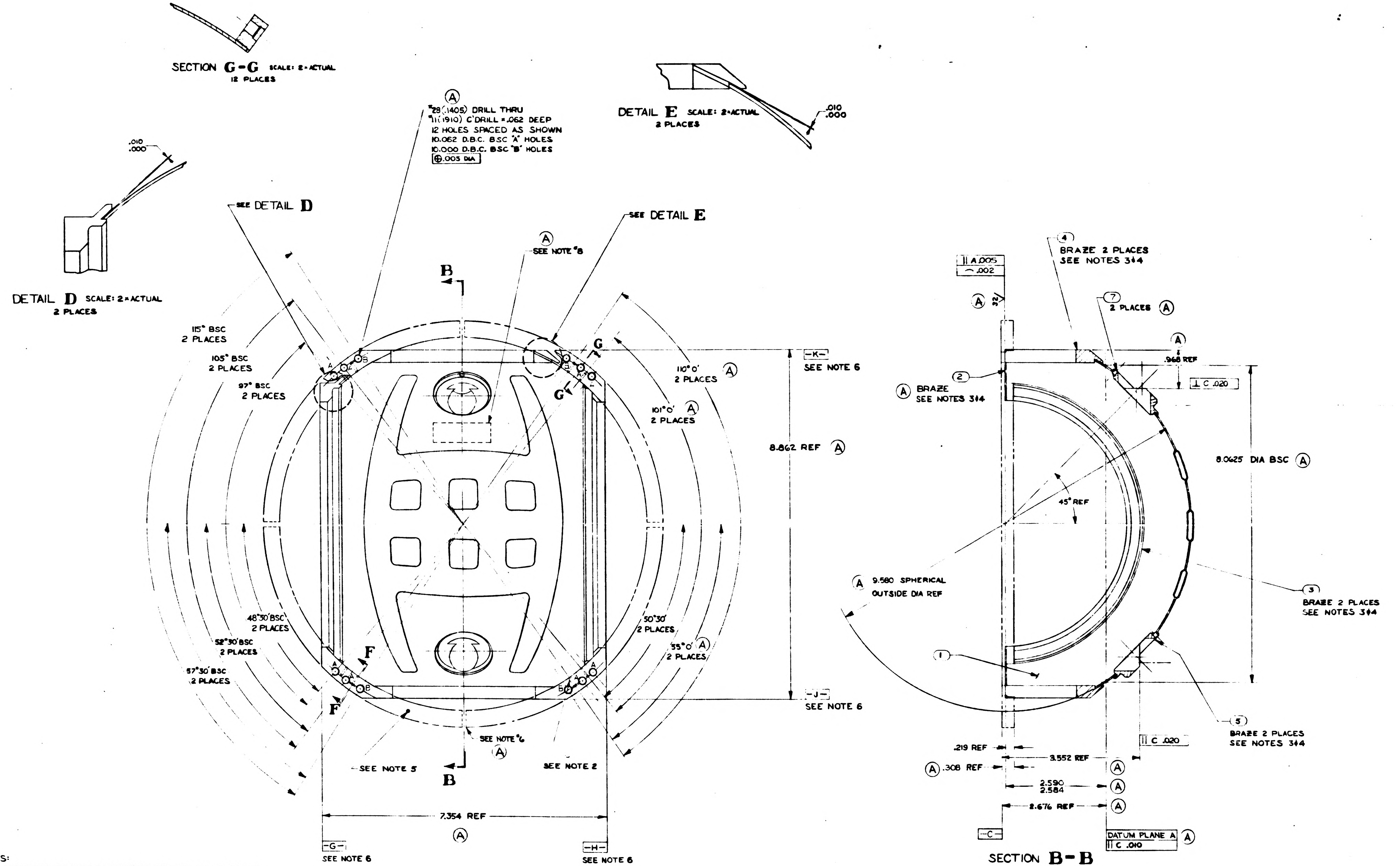
NASA DRAWING NO.
1000061

SHEET 1 OF 1 SHEET

1000061

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00115	11-29-62	

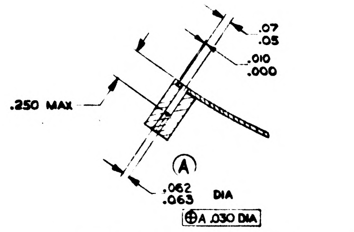
REVISIONS TDRR C0028



SECTION G-G SCALE: 2×ACTUAL
12 PLACES
DETAIL D SCALE: 2×ACTUAL
2 PLACES
.010
.000
DETAIL E SCALE: 2×ACTUAL
2 PLACES
.010
.000
Ⓐ
#29(.1405) DRILL THRU
#11(.1910) C'DRILL × .062 DEEP
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
⊕ .003 DIA
SEE DETAIL D
SEE DETAIL E
Ⓐ SEE NOTE 8
B
B
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
110° 0' 2 PLACES Ⓐ
101° 0' 2 PLACES Ⓐ
G
G
8.862 REF Ⓐ
-K- SEE NOTE 6
-J- SEE NOTE 6
48°30' BSC 2 PLACES
52°30' BSC 2 PLACES
57°30' BSC 2 PLACES
50°30' 2 PLACES
55°0' 2 PLACES Ⓐ
F
F
SEE NOTE 6 Ⓐ
SEE NOTE 5
SEE NOTE 2
7.354 REF Ⓐ
-G- SEE NOTE 6
-H- SEE NOTE 6
A .005
.002
Ⓐ 32
④ BRAZE 2 PLACES SEE NOTES 3 & 4
⑦ 2 PLACES Ⓐ
Ⓐ .968 REF
⊥ C .020
② Ⓐ BRAZE SEE NOTES 3 & 4
8.0625 DIA BSC Ⓐ
45° REF
Ⓐ 9.580 SPHERICAL OUTSIDE DIA REF
③ BRAZE 2 PLACES SEE NOTES 3 & 4
①
⑤ BRAZE 2 PLACES SEE NOTES 3 & 4
C .020
.219 REF
Ⓐ .308 REF
3.552 REF Ⓐ
2.590
2.584 Ⓐ
2.676 REF Ⓐ
-C-
DATUM PLANE A Ⓐ
C .010
SECTION B-B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑥ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING & MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATLY BEFORE BRAZING PER NAVORD OD 7894
4. DIP BRAZE PER NAVORD OD 17547 & AIR COOL
5. Ⓐ HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② MAY BE MACHINED WITHIN .020 - .010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES
7. BREAK SHARP EDGES .005 - .015
8. Ⓐ IDENTIFY USING THE DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
9. Ⓐ ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   C. FINISH MACHINE



.07
.05
.010
.000
.250 MAX
Ⓐ
.062
.063 DIA
⊕ A .030 DIA

SECTION F-F SCALE: 2×ACTUAL
8 PLACES – SHOWN WITH ⑥ REMOVED

DISREGARD ROLLBOND PATTERN

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	PIN, LOCATING, ADA MOUNT	1000069			[illegible]
8	PIN, STRAIGHT, HEADLESS	[illegible]			[illegible]
2	Ⓐ MOUNT, ADA	1000062			[illegible]
2	Ⓐ FLG, STUB SHAFT, MID GIMBAL	100005			[illegible]
2	Ⓐ FLG, BEARING HOUSING, MID GMBL	1000050			[illegible]
1	FLANGE, MIDDLE GIMBAL	1000049			[illegible]
1	HEMISPHERE, FIXED, MID GMBL	1000041			[illegible]

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000074	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D.M.W.
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

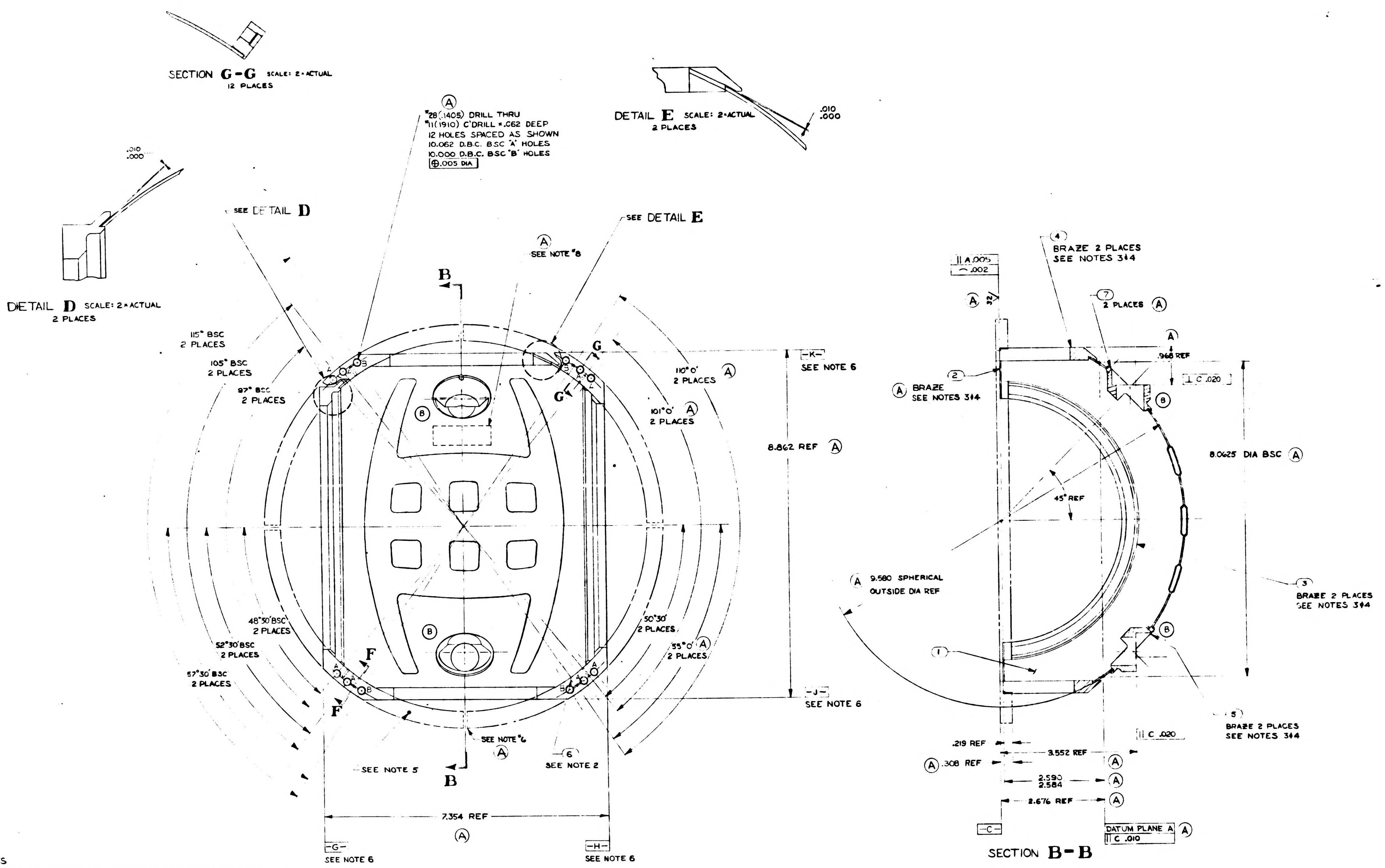
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000063
SHEET 1 OF 1

1000063	REV A	SHT 1

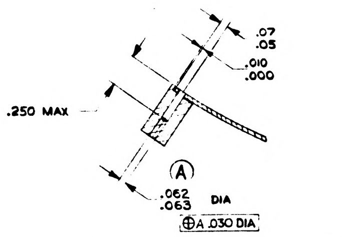
1000063 A

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00115	11-29-62	GJB	WR
B	TDRR 00231	1-9-62	GJB	JM

REVISIONS TDRR 00025



SECTION G-G SCALE: 2× ACTUAL
12 PLACES
#28 (.1405) DRILL THRU
#11 (.1910) C'DRILL × .062 DEEP
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC 'A' HOLES
10.000 D.B.C. BSC 'B' HOLES
⊕ .005 DIA
DETAIL E SCALE: 2× ACTUAL
2 PLACES
.010
.000
SEE DETAIL D
SEE DETAIL E
SEE NOTE 8
DETAIL D SCALE: 2× ACTUAL
2 PLACES
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
110° 0' 2 PLACES
101° 0' 2 PLACES
8.862 REF
-K- SEE NOTE 6
48°30' BSC 2 PLACES
52°30' BSC 2 PLACES
57°30' BSC 2 PLACES
50°30' 2 PLACES
55° 0' 2 PLACES
-J- SEE NOTE 6
SEE NOTE 6
SEE NOTE 5
SEE NOTE 2
7.354 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
B
F
G
BRAZE 2 PLACES SEE NOTES 3 & 4
2 PLACES
.968 REF
BRAZE SEE NOTES 3 & 4
8.0625 DIA BSC
45° REF
9.580 SPHERICAL OUTSIDE DIA REF
BRAZE 2 PLACES SEE NOTES 3 & 4
BRAZE 2 PLACES SEE NOTES 3 & 4
.219 REF
.308 REF
3.552 REF
2.590
2.584
2.676 REF
-C-
DATUM PLANE A
SECTION B-B



.07
.05
.010
.000
.250 MAX
.062
.063 DIA
⊕ A .030 DIA

SECTION F-F SCALE: 2× ACTUAL
8 PLACES – SHOWN WITH ⑥ REMOVED

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑥ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING & MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATLY BEFORE BRAZING PER NAVORD OD 7894
4. DIP BRAZE PER NAVORD OD 17547 & AIR COOL
Ⓐ 5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN. HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   a. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   b. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② MAY BE MACHINED WITHIN .020 – .010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES
7. BREAK SHARP EDGES .005 – .015
Ⓐ 8. IDENTIFY USING THE DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
Ⓐ 9. ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   a. ROUGH MACHINE WITHIN .010
   b. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   c. FINISH MACHINE

DISREGARD ROLLBOND PATTERN

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	PIN, LOCATING, ADA MOUNT	1000069			7
8	PIN, STRAIGHT, HEADLESS	1000054-[illegible]			6
2	MOUNT, ADA	10000[illegible]			5
2	FLG, STUB SHAFT, MID GIMBAL	100005			4
2	FLG. BEARING HOUSING MID GMBL	1000050			3
1	FLANGE, MIDDLE GIMBAL	000049			2
1	HEMISPHERE, FIXED MID GMBL	1000041			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000074	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT
APPROVED GJ Bagnall 2-27-62
CHECKED
DRAWN D.M.WHITE 6-22-62
APPROVED W J Rhine 6-13-62
MIT APPROVAL W Ragan 9/13/62

HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

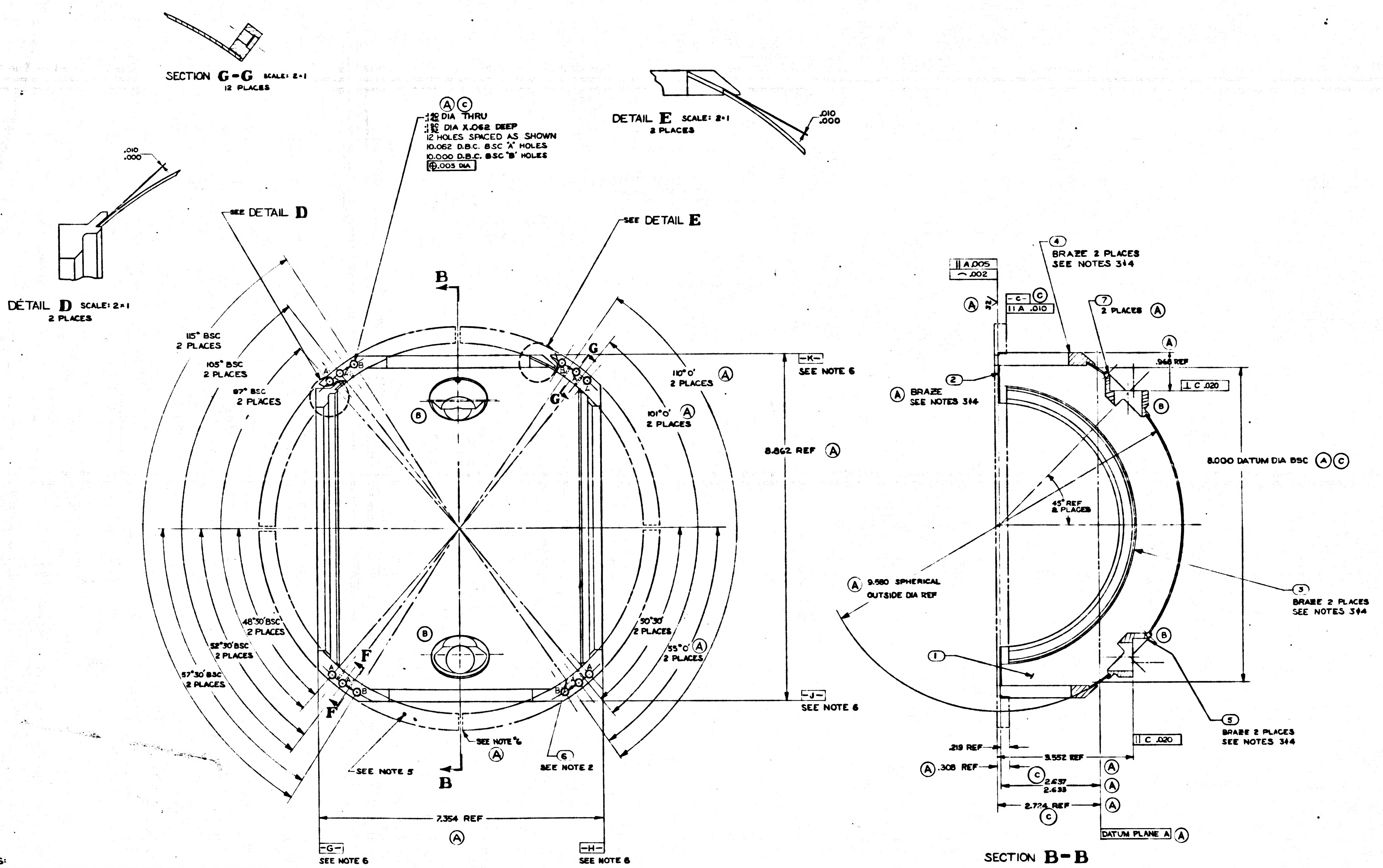
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000063
SHEET 1 OF 1

1000063 b

1000063 REV B SHT 1

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00115	1-29-[illegible]	[illegible]
B	TDRR 00231	1-9-62	[illegible]
C	TDRR C0367	2-7-63	[illegible]


SECTION G-G SCALE: 2=1
12 PLACES
.010
.000
DETAIL D SCALE: 2=1
2 PLACES
SEE DETAIL D
Ⓐ Ⓒ
.140 .142 DIA THRU
.190 .192 DIA X.062 DEEP
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
⊕.005 DIA
DETAIL E SCALE: 2=1
2 PLACES
.010
.000
SEE DETAIL E
B
115° BSC
2 PLACES
105° BSC
2 PLACES
97° BSC
2 PLACES
110° 0'
2 PLACES Ⓐ
101° 0' Ⓐ
2 PLACES
G
-K-
SEE NOTE 6
8.862 REF Ⓐ
Ⓑ
48°30' BSC
2 PLACES
52°30' BSC
2 PLACES
57°30' BSC
2 PLACES
50°30'
2 PLACES
55°0' Ⓐ
2 PLACES
F
-J-
SEE NOTE 6
SEE NOTE 6
Ⓐ
SEE NOTE 5
6
SEE NOTE 2
7.354 REF
Ⓐ
-G-
SEE NOTE 6
-H-
SEE NOTE 6
|| A .005
⌒ .002
Ⓐ 32
-C- Ⓒ
|| A .010
4
BRAZE 2 PLACES
SEE NOTES 3 & 4
7
2 PLACES Ⓐ
Ⓐ
.968 REF
⊥ C .020
2
Ⓐ BRAZE
SEE NOTES 3 & 4
8.000 DATUM DIA BSC Ⓐ Ⓒ
45° REF
2 PLACES
Ⓐ 9.580 SPHERICAL
OUTSIDE DIA REF
3
BRAZE 2 PLACES
SEE NOTES 3 & 4
1
5
BRAZE 2 PLACES
SEE NOTES 3 & 4
|| C .020
.219 REF
Ⓐ .308 REF
3.552 REF
Ⓒ
2.637
2.633
2.724 REF
DATUM PLANE A Ⓐ
SECTION B-B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑥ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING & MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
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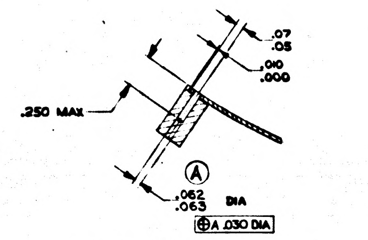
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   - C. FINISH MACHINE


.07
.05
.010
.000
.250 MAX
Ⓐ
.062
.063 DIA
⊕A .030 DIA

SECTION F-F SCALE: 2=1
8 PLACES — SHOWN WITH ⑥ REMOVED
OPTIONAL SEE NOTE 2 Ⓒ

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	ITEM NO.
2	PIN, LOCATING, ADA MOUNT	1000069			7
8	PIN, STRAIGHT, HEADLESS	1000054-1			6
2	MOUNT, ADA	1000067			5
2	FLG. STUB SHAFT, MID GIMBAL	100005			4
2	FLG. BEARING HOUSING, MID GMBL	1000050			3
1	FLANGE, MIDDLE GIMBAL	1000048			2
1	HEMISPHERE, FIXED MID GMBL	1000041			1

LIST OF PARTS AND MATERIALS

MASTER

	DL1000201
1000074	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
BY DIRECTION
MIT 2/15/62

HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000063
SHEET 1 OF 1

1000063 REV C SHT 1

REVISIONS		TDRR 00025	
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00115	11-29-62	WK
B	TDRR 00231	1-9-62	
C	TDRR 00367	2-7-63	WK
D	TDRR 01237	5-21-63	WK

D

C

TUM DA BSIC Ⓐ Ⓒ

35

BRAZE 2 PLACES
SEE NOTES 3&4

2 PLACES
OTES 3&4

B

1000063 D

2	PIN, LOCATING, ADA MOUNT	1000069			7
8	PIN, STRAIGHT, HEADLESS	1000054-1			6
2	MOUNT, ADA	1000167			5
2	FLG, STUB SHAFT, MID GIMBAL	1000051			4
2	FLG. BEARING HOUSING, MID GMBL	1000050			3
1	FLANGE, MIDDLE GIMBAL	1000049			2
1	HEMISPHERE, FIXED MID GMBL	1000041			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

A

Ⓒ MASTER

	DL 1000201
1000074	DL 1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0°30′

DO NOT SCALE THIS DRAWING

MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D.M.WHITE
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS

DWG NO

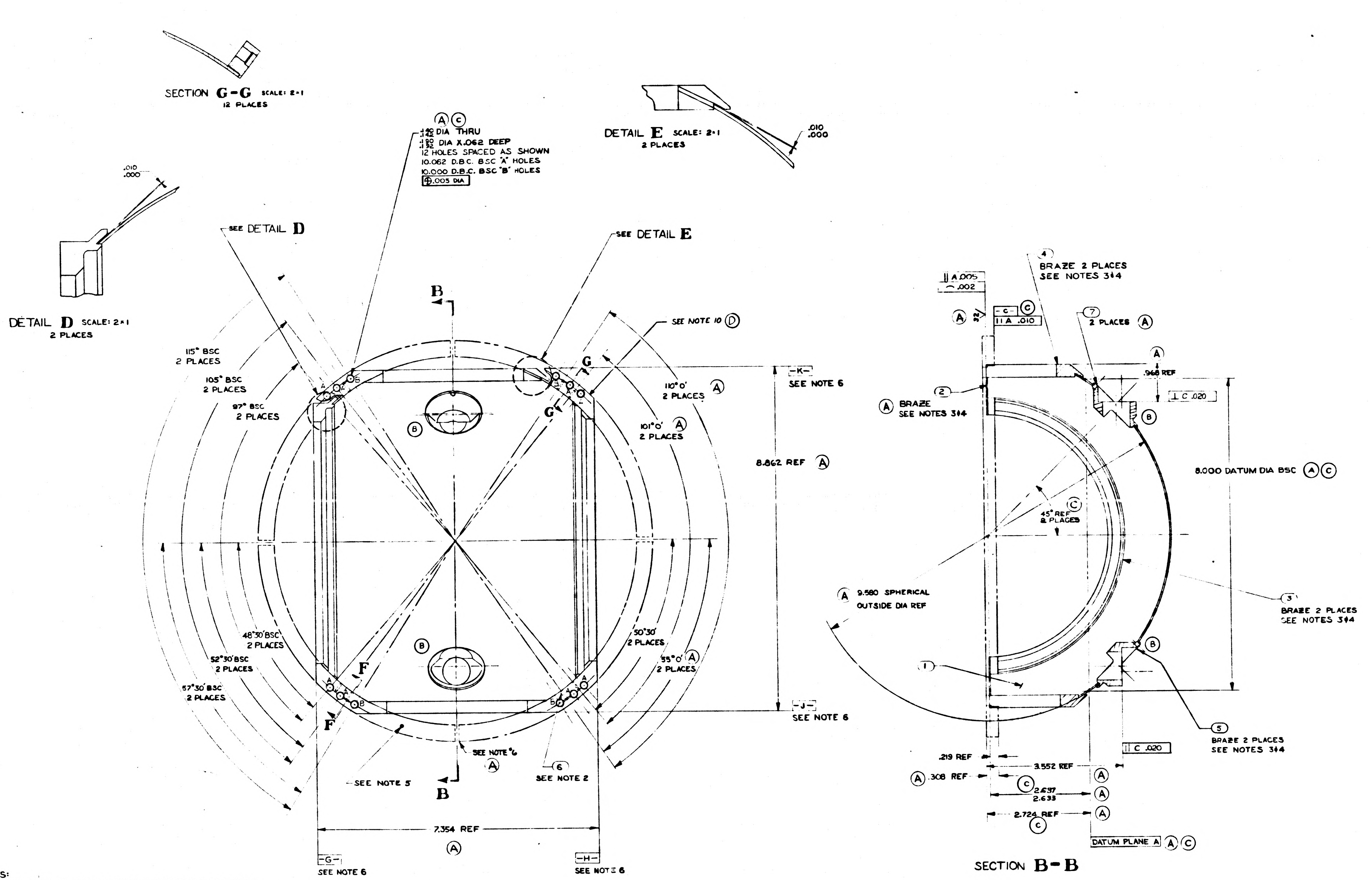
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO
1000063

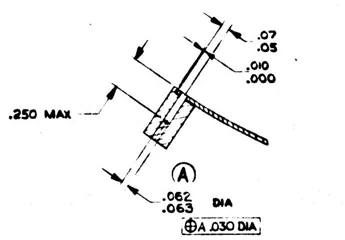
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION
A	TDRR 00115
B	TDRR 00231
C	TDRR C0367
D	TDRR 01237


SECTION G-G SCALE: 2:1
12 PLACES
DETAIL D SCALE: 2:1
2 PLACES
DETAIL E SCALE: 2:1
2 PLACES
.010
.000
(A)(C)
.142 DIA THRU
.190 DIA X .062 DEEP
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
.003 DIA
SEE DETAIL D
SEE DETAIL E
SEE NOTE 10 (D)
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
110°0' 2 PLACES
101°0' 2 PLACES
8.862 REF
-K- SEE NOTE 6
-J- SEE NOTE 6
48°30' BSC 2 PLACES
52°30' BSC 2 PLACES
57°30' BSC 2 PLACES
50°30' 2 PLACES
55°0' 2 PLACES
SEE NOTE 6
SEE NOTE 5
(6) SEE NOTE 2
7.354 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
B
F
G
BRAZE 2 PLACES SEE NOTES 3 & 4
BRAZE SEE NOTES 3 & 4
2 PLACES
.968 REF
C .020
8.000 DATUM DIA BSC
45° REF 8 PLACES
9.580 SPHERICAL OUTSIDE DIA REF
BRAZE 2 PLACES SEE NOTES 3 & 4
.219 REF
.308 REF
3.552 REF
2.637
2.633
2.724 REF
DATUM PLANE A
A .005
.002
A .010
C .020

SECTION B-B


.07
.05
.010
.000
.250 MAX
.062
.063 DIA
.030 DIA

SECTION F-F SCALE: 2:1
8 PLACES - SHOWN WITH (6) REMOVED
OPTIONAL SEE NOTE 2 (C)

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM (6) OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING & MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. CLEAN COMPONENT PARTS IMMEDIATLY BEFORE BRAZING PER NAVORD OD 7894
4. DIP BRAZE PER NAVORD OD 17547 & AIR COOL
5. (A) HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   - A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   - B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM (2) MAY BE MACHINED WITHIN .020 - .010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES
7. BREAK SHARP EDGES .005 - .015
8. (C)(A) IDENTIFY USING THE DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
9. (A) ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   - C. FINISH MACHINE
10. (D) *OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM (2). USE OF ITEM (6) IS OPTIONAL BUT IF USED MUST BE LOCATED IN CENTER OF HOLES MARKED A & B. PADS MUST NOT COME INTO CONTACT WITH ITEMS (1), (3), & (4)*

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION
2	PIN, LOCATING, ADA MOUNT	1001069	
8	PIN, STRAIGHT, HEADLESS	[illegible]	
2	MOUNT, ADA	1000067	
2	FLG. STUB SHAFT, MID GIMBAL	1000005	
2	FLG. BEARING HOUSING MID GMBL	1000050	
1	FLANGE, MIDDLE GIMBAL	1001049	
1	HEMISPHERE, FIXED MID GMBL	1000041	

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL1000201
1000074	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED
CHECKED
DRAWN D.M.WHITE 6-22-62
APPROVED FOR MSC
MIT APPROVAL W. Kupfer 9/13/62

HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

	REV	SHT
1000063	D	1

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDRR 00025			
A	TDRR 00115	11-29-62		WK
B	TDRR 00231	1-9-62		
C	TDRR C0367	2-7-63		WK
D	TDRR 01237	5-21-63		WK
E	TDRR 01443	6-5-63		RKB

D

DIA BSC (A)(C)

C

(3)
BRAZE 2 PLACES
SEE NOTE 4

ACES
4

B

1000063 E

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	PIN, LOCATING, ADA MOUNT	1000069			7
8	PIN, STRAIGHT, HEADLESS	1000054-1			6
2	MOUNT, ADA	1000167			5
2	FLG, STUB SHAFT, MID GIMBAL	1000051			4
2	FLG, BEARING HOUSING, MID GMBL	1000050			3
1	FLANGE, MIDDLE GIMBAL	1000049			2
1	HEMISPHERE, FIXED MID GMBL	1000041			1

(B) (A) (A) (A) (A)

LIST OF PARTS AND MATERIALS

A

(C) MASTER

NEXT ASSY	USED ON
	DL1000801
1000076	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
——— ——— ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
—

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
BY DIRECTION
MIT

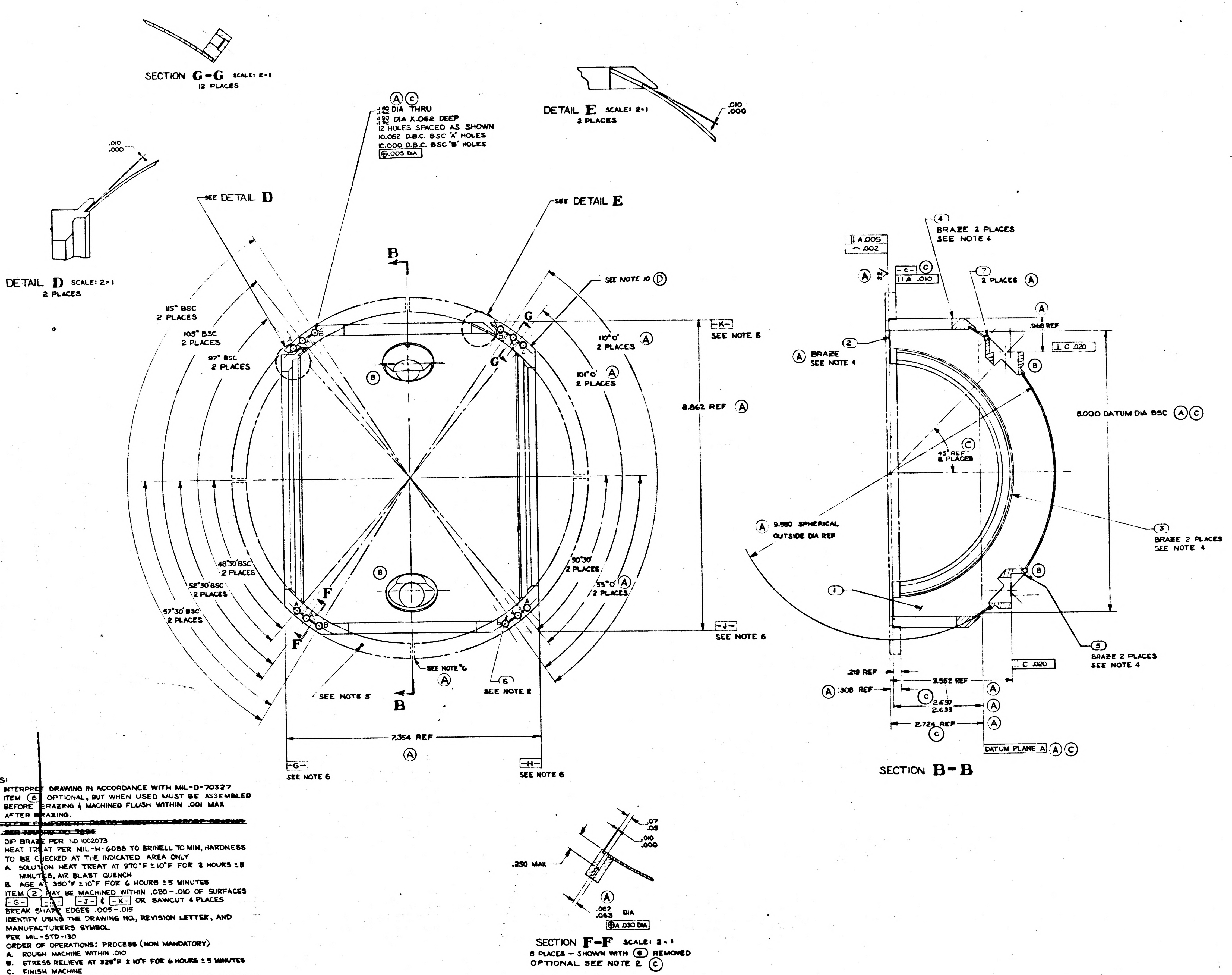
HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000063
SHEET OF

1000063

SYM	DESCRIP		DATE
A	TDRR 00115		1-29
B	TDRR 00231		1-9-6
C	TDRR 00367		2-
D	TDRR 01237		5-
E	TDRR 01443		5-5-


SECTION G-G SCALE: 2:1
12 PLACES
DETAIL D SCALE: 2:1
2 PLACES
.010
.000
DETAIL E SCALE: 2:1
2 PLACES
.010
.000
DIA THRU
DIA X .062 DEEP
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC 'A' HOLES
10.000 D.B.C. BSC 'B' HOLES
.003 DIA
SEE DETAIL D
SEE DETAIL E
SEE NOTE 10 (D)
B
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
110°0' 2 PLACES (A)
101°0' 2 PLACES (A)
G
-K-
SEE NOTE 6
8.862 REF (A)
48°30' BSC 2 PLACES
52°30' BSC 2 PLACES
57°30' BSC 2 PLACES
50°30' 2 PLACES
55°0' 2 PLACES (A)
F
-J-
SEE NOTE 6
SEE NOTE 6 (A)
SEE NOTE 5
6
SEE NOTE 2
7.354 REF (A)
-G- SEE NOTE 6
-H- SEE NOTE 6
∥ A .005
⌒ .002
-C- ∥ A .010
4 BRAZE 2 PLACES SEE NOTE 4
7 2 PLACES (A)
.968 REF
⊥ C .020
2 (A) BRAZE SEE NOTE 4
8.000 DATUM DIA BSC (A)(C)
45° REF 8 PLACES
(A) 9.580 SPHERICAL OUTSIDE DIA REF
3 BRAZE 2 PLACES SEE NOTE 4
1
5 BRAZE 2 PLACES SEE NOTE 4
⊥ C .020
.219 REF
(A) .308 REF
3.552 REF
2.637
2.633
2.724 REF
DATUM PLANE A (A)(C)
SECTION B-B
.07
.05
.010
.000
.250 MAX
.062
.063 DIA
⊕ A .030 DIA
SECTION F-F SCALE: 2:1
8 PLACES – SHOWN WITH 6 REMOVED
OPTIONAL SEE NOTE 2 (C)

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑥ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING & MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.

(E) ~~3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7896~~

(E) 4. DIP BRAZE PER ND 1002073

(A) 5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES

6. ITEM ② MAY BE MACHINED WITHIN .020 – .010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES
7. BREAK SHARP EDGES .005 – .015

(C)(A) 8. IDENTIFY USING THE DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130

(A) 9. ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   C. FINISH MACHINE

(D) 10. *OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM ②. USE OF ITEM ⑥ IS OPTIONAL BUT IF USED MUST BE LOCATED IN CENTER OF HOLES MARKED A & B. PADS MUST NOT COME INTO CONTACT WITH ITEMS (1), (3), & (4)*

1000063	REV	SHT
	E	1

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION
2	PIN, LOCATING, ADA MOUNT	1000069	
8	PIN, STRAIGHT, HEADLESS	[illegible]	
2	MOUNT, ADA	1000067	
2	FLG, STUB SHAFT, MID GIMBAL	1000045	
2	FLG, BEARING HOUSING MID GMBL	1000050	
1	FLANGE, MIDDLE GIMBAL	1000048	
1	HEMISPHERE, FIXED MID GMBL	1000041	

LIST OF PARTS AND MATERIALS

(C) MASTER

NEXT ASSY	USED ON
	DL 1000201
1000074	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ± 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL —

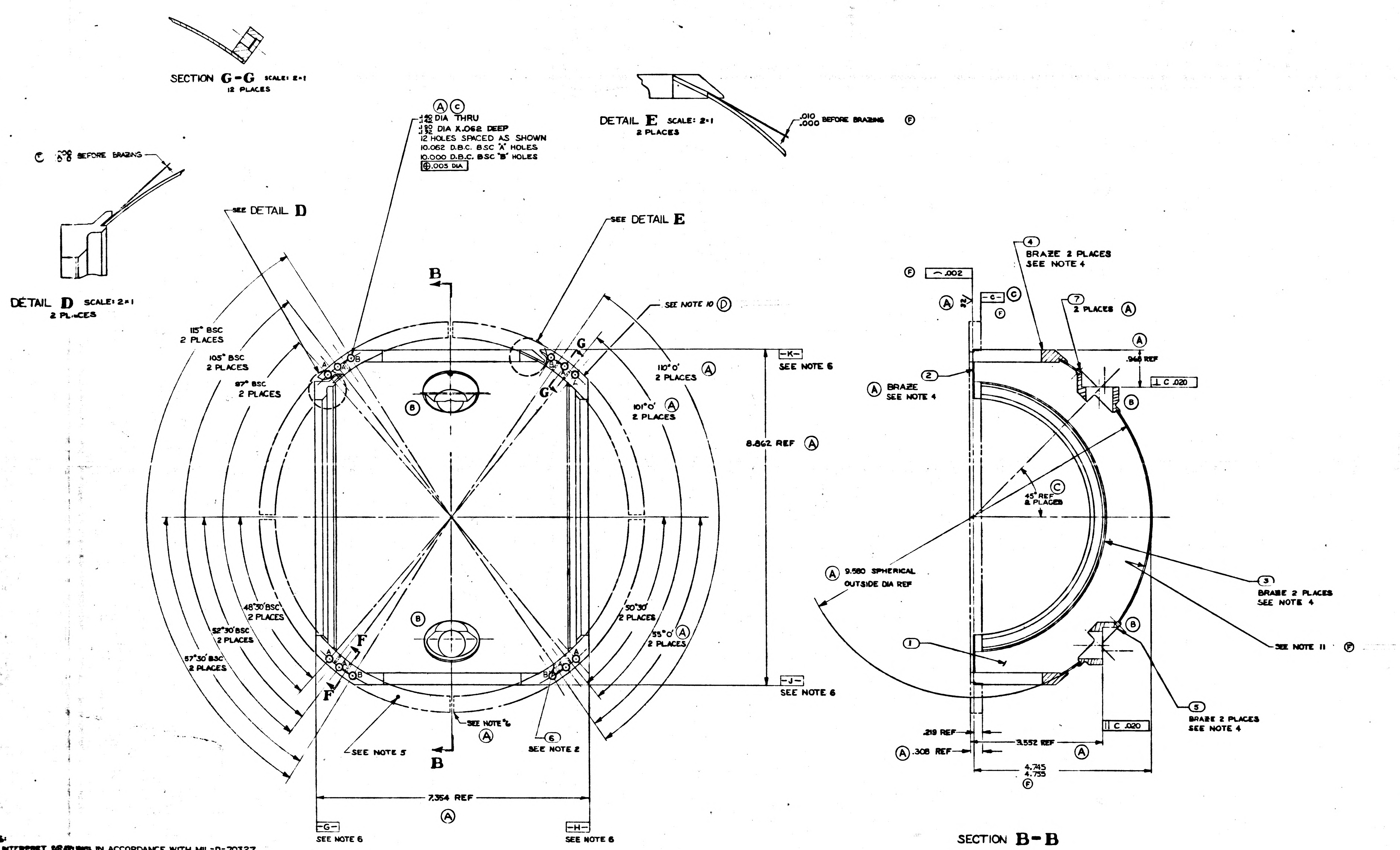
MIT
INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D.M.WHITE 6-2
APPROVED FOR MSC
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT
DWG NO.
SPACECR
HOUSTO
NASA
1000
SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED	
A	TDRR 00115	11-29-62		
B	TDRR 00231	1-9-62		
C	TDRR 00367	2-7-63		
D	TDRR 01237	5-21-63		
E	TDRR 0443	6-5-63		PKB
F	TDRR 04563	2-9-63		


SECTION G-G SCALE: 2:1
12 PLACES
.006 / .0 BEFORE BRAZING
DETAIL D SCALE: 2:1
2 PLACES
SEE DETAIL D
.140 / .142 DIA THRU
.190 / .192 DIA X .062 DEEP
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
.005 DIA
DETAIL E SCALE: 2:1
2 PLACES
.010 / .000 BEFORE BRAZING
SEE DETAIL E
SEE NOTE 10
115° BSC 2 PLACES
105° BSC 2 PLACES
97° BSC 2 PLACES
110° 0' 2 PLACES
101° 0' 2 PLACES
B
G
8.862 REF
-K- SEE NOTE 6
-J- SEE NOTE 6
48°30' BSC 2 PLACES
52°30' BSC 2 PLACES
57°30' BSC 2 PLACES
50°30' 2 PLACES
55° 0' 2 PLACES
F
SEE NOTE 6
SEE NOTE 5
6 SEE NOTE 2
7.354 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
.002
-C-
4 BRAZE 2 PLACES SEE NOTE 4
7 2 PLACES
.968 REF
⊥ C .020
2
BRAZE SEE NOTE 4
45° REF 2 PLACES
9.580 SPHERICAL OUTSIDE DIA REF
3 BRAZE 2 PLACES SEE NOTE 4
SEE NOTE 11
1
5 BRAZE 2 PLACES SEE NOTE 4
∥ C .020
.219 REF
.308 REF
3.552 REF
4.745 / 4.755

SECTION **B-B**

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑥ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING & MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING

~~[illegible]~~

DIP BRAZE PER D 1002073 EXCEPT AIRBLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING.

HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
- A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
- B. AGE AT 36[illegible] ± 10°F FOR 6 HOURS ± 5 MINUTES

ITEM ② MAY BE MACHINED WITHIN .020 - .010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES

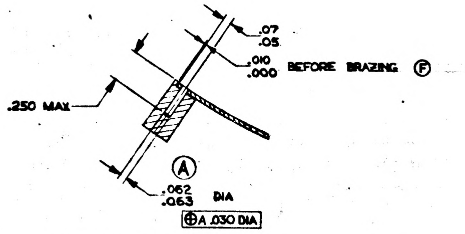
BREAK SHARP EDGES .005 - .015

MARK USING [illegible] DRAWING NO., REVISION LETTER, AND MANUFACTURER'S SYMBOL PER [illegible]

GROUP OF OPERATIONS: PROCESS (NON MANDATORY)
- A. [illegible] MACHINE WITHIN .010
- B. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
- C. FINISH MACHINE

[illegible] OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM ②. USE OF ITEM ⑥ IS [illegible] BUT IF USED, MUST BE LOCATED IN CENTER OF HOLES MARKED "A" & "B". PADS MUST NOT COME INTO [illegible] WITH ITEMS ③ OR ④. ALTERNATE: MACHINING PADS MAY BE MADE AS AN INTEGRAL [illegible]

[illegible] SPHERICAL RADIUS OF 4.730/4.770 MUST BE MAINTAINED AFTER BRAZING & HEAT TREAT.


.07 / .05
.010 / .000 BEFORE BRAZING
.250 MAX
.062 / .063 DIA
A .030 DIA

SECTION **F-F** SCALE: 2:1
8 PLACES - SHOWN WITH ⑥ REMOVED
OPTIONAL SEE NOTE 2 Ⓒ

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	PIN, LOCATING, ADA MOUNT	1000069			7
8	PIN, STRAIGHT, HEADLESS	1000054-1			6
2	MOUNT, ADA	1000167			5
2	FLG, STUB SHAFT, MID GIMBAL	1000051			4
2	FLG, BEARING HOUSING, MID GMBL	1000050			3
1	FLANGE, MIDDLE GIMBAL	1000049			2
1	HEMISPHERE, FIXED MID GMBL	1000041			1

LIST OF PARTS AND MATERIALS

	DL1000201
1000096	DL 1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D.M. W[illegible]
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

SCALE	UNIT WT.	CODE IDENT
1/1		

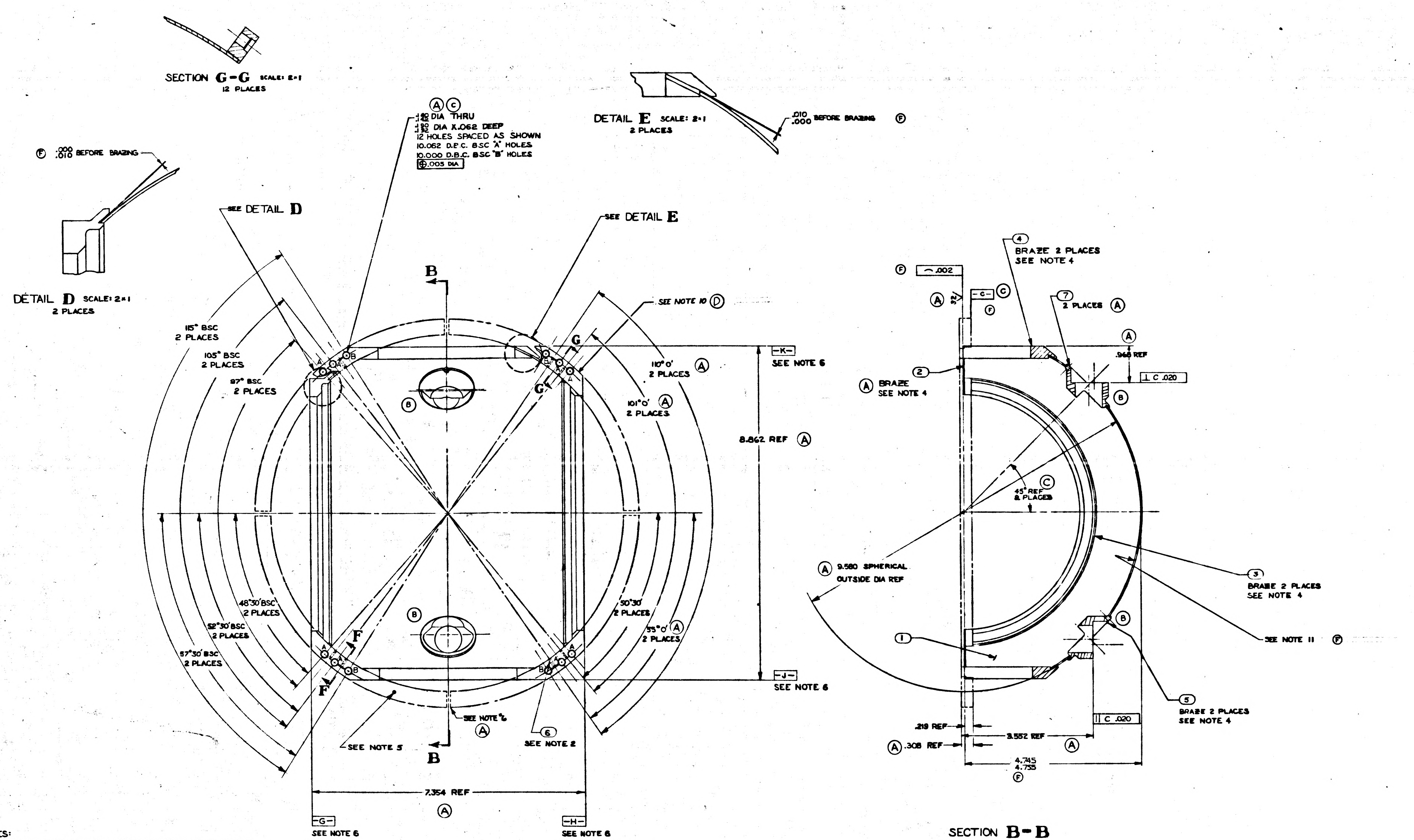
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000063
SHEET 1 OF 1

1000063 F

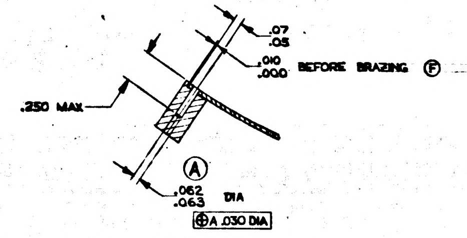
1000063	REV	SHT
	F	1

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE
A	TDRR 00115	[illegible]
B	TDRR 00231	1-9-62
C	TDRR 00367	2-7-63
D	TDRR 01237	5-21-63
E	TDRR 0443	[illegible]
F	TDRR 04563	2-5-63



SECTION G-G SCALE: 2=1
12 PLACES
Ⓐ Ⓒ
1/32 DIA THRU
1/8 DIA X .062 DEEP
12 HOLES SPACED AS SHOWN
10.062 D.B.C. BSC "A" HOLES
10.000 D.B.C. BSC "B" HOLES
.003 DIA
DETAIL E SCALE: 2=1
2 PLACES
.010 .000 BEFORE BRAZING Ⓕ
Ⓕ .000 .010 BEFORE BRAZING
SEE DETAIL D
SEE DETAIL E
DETAIL D SCALE: 2=1
2 PLACES
B
115° BSC
2 PLACES
105° BSC
2 PLACES
97° BSC
2 PLACES
SEE NOTE 10 Ⓓ
G
110° 0'
2 PLACES Ⓐ
101° 0'
2 PLACES Ⓐ
-K-
SEE NOTE 6
8.862 REF Ⓐ
Ⓑ
48°30' BSC
2 PLACES
52°30' BSC
2 PLACES
57°30' BSC
2 PLACES
50°30'
2 PLACES
55°0' Ⓐ
2 PLACES
F
-J-
SEE NOTE 6
SEE NOTE 6 Ⓐ
SEE NOTE 5
⑥ SEE NOTE 2
7.354 REF
Ⓐ
-G-
SEE NOTE 6
-H-
SEE NOTE 6
Ⓕ ⌒ .002
Ⓐ 32
-C- Ⓒ
Ⓕ
④
BRAZE 2 PLACES
SEE NOTE 4
⑦ 2 PLACES Ⓐ
Ⓐ
.960 REF
⊥ C .020
② Ⓐ BRAZE
SEE NOTE 4
Ⓒ 45° REF 8 PLACES
Ⓐ 9.580 SPHERICAL OUTSIDE DIA REF
③
BRAZE 2 PLACES
SEE NOTE 4
①
SEE NOTE 11 Ⓕ
⑤
BRAZE 2 PLACES
SEE NOTE 4
⊥ C .020
.219 REF
Ⓐ .308 REF
3.552 REF Ⓐ
4.745 4.755 Ⓕ
SECTION B-B



.07 .05
.010 .000 BEFORE BRAZING Ⓕ
.250 MAX
Ⓐ
.062 .063 DIA
⊕ A .030 DIA

SECTION F-F SCALE: 2=1
8 PLACES - SHOWN WITH ⑥ REMOVED
OPTIONAL SEE NOTE 2 Ⓒ

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑥ OPTIONAL, BUT WHEN USED MUST BE ASSEMBLED BEFORE BRAZING & MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING.
3. Ⓔ ~~CLEAN COMPONENT PARTS [illegible] BEFORE BRAZING PER [illegible]~~
4. Ⓔ Ⓕ DIP BRAZE PER ND 1002073 EXCEPT AIRBLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING.
5. Ⓐ HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   - A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   - B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② MAY BE MACHINED WITHIN .020 - .010 OF SURFACES -G- -H- -J- & -K- OR SAWCUT 4 PLACES
7. BREAK SHARP EDGES .005 - .015
8. Ⓒ Ⓐ Ⓕ IDENTIFY USING THE DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND 1002019.
9. Ⓐ ORDER OF OPERATIONS: PROCESS (NON MANDATORY)
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   - C. FINISH MACHINE
10. Ⓓ Ⓕ OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM ②. USE OF ITEM ⑥ IS OPTIONAL, BUT IF USED, MUST BE LOCATED IN CENTER OF HOLES MARKED "A" & "B". PADS MUST NOT COME INTO CONTACT WITH ITEMS ① ③ OR ④. ALTERNATE: MACHINING PADS MAY BE MADE AS AN INTEGRAL PART OF ITEM ②.
11. Ⓕ INSIDE SPHERICAL RADIUS OF 4.730/4.770 MUST BE MAINTAINED AFTER BRAZING & HEAT TREAT.

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.
2	PIN, LOCATING, ADA MOUNT	1000069
8	PIN, STRAIGHT, HEADLESS	1000054-1
2	MOUNT, ADA	1000167
2	FLG, STUB SHAFT, MID GIMBAL	1000051
2	FLG, BEARING HOUSING, MID GMBL	1000050
1	FLANGE, MIDDLE GIMBAL	1000049
1	HEMISPHERE, FIXED MID GMBL	1000041

LIST OF PARTS AND MATERIAL

Ⓕ MASTER Ⓒ

	DL 1000201
1000076	DL 1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D.M.WHITE
APPROVED FOR MSC
BY DIRECTION
MIT

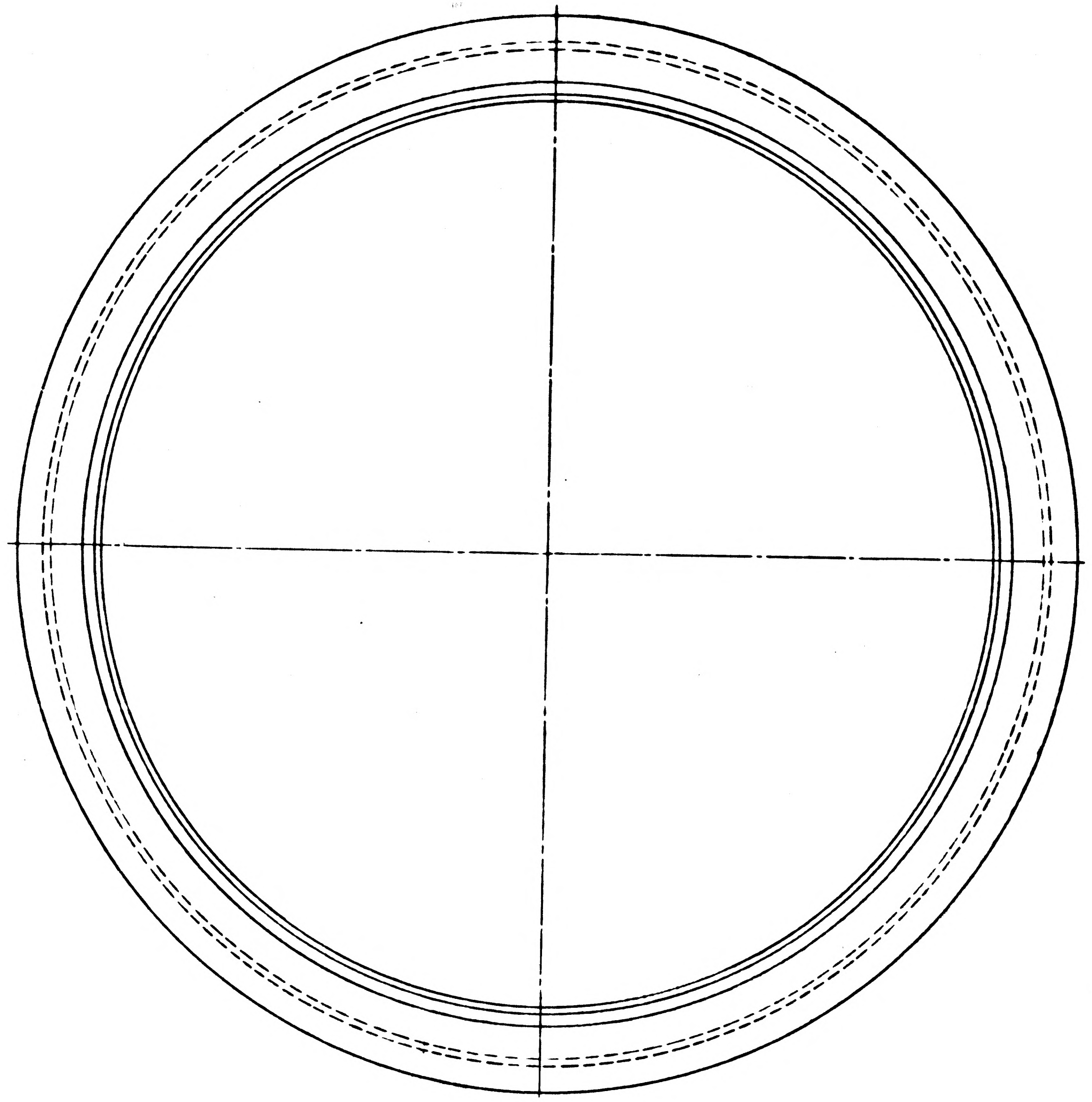
HEMISPHERE ASSEMBLY
FIXED
MIDDLE GIMBAL

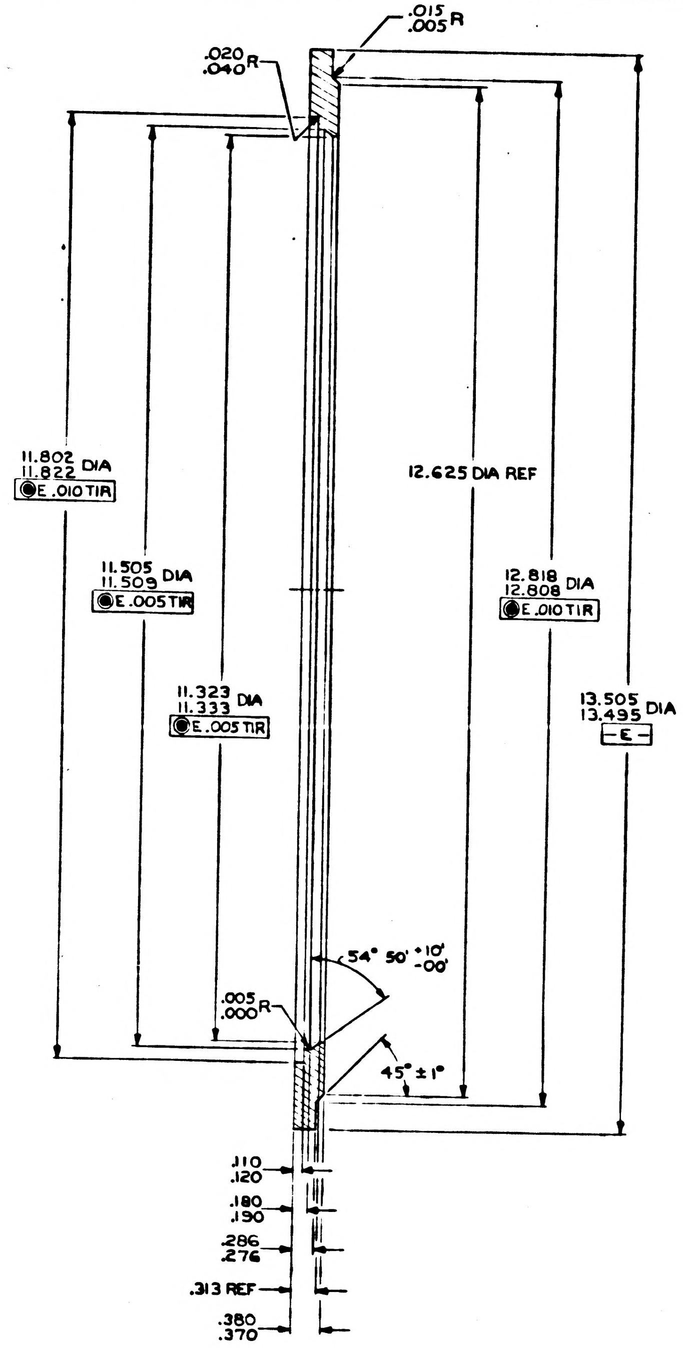
SCALE 1/1
UNIT WT.
CODE IDENT

1000063 REV F SHT 1

ZONE	SYM	DESCRIPTION REVISIONS TDRR 00086	DATE	APPROVAL

A




.015
.005 R
.020
.040 R
11.802
11.822 DIA
E .010 TIR
11.505
11.509 DIA
E .005 TIR
11.323
11.333 DIA
E .005 TIR
12.625 DIA REF
12.818
12.808 DIA
E .010 TIR
13.505
13.495 DIA
-E-
54° 50' +10' -00'
.005
.000 R
45° ± 1°
.110
.120
.180
.190
.286
.276
.313 REF
.380
.370

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63/ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON MANDATORY)
   - A ROUGH MACHINE
   - B STRESS RELIEVE AT 325 °F ±10° FOR 6 HOURS ±10 MIN
   - C FINISH MACHINE
5. IDENTIFY USING PART NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000081	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL-6061
TEMP T6 ALT SPEC
QQ-A-327 TEMP T6

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED C J Bayer DATE 11/9/62
CHECKED
DRAWN G. QUINN 6/25/62
APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W Kupfer 8 Nov 1962

FLANGE
CASE COVER FIXED

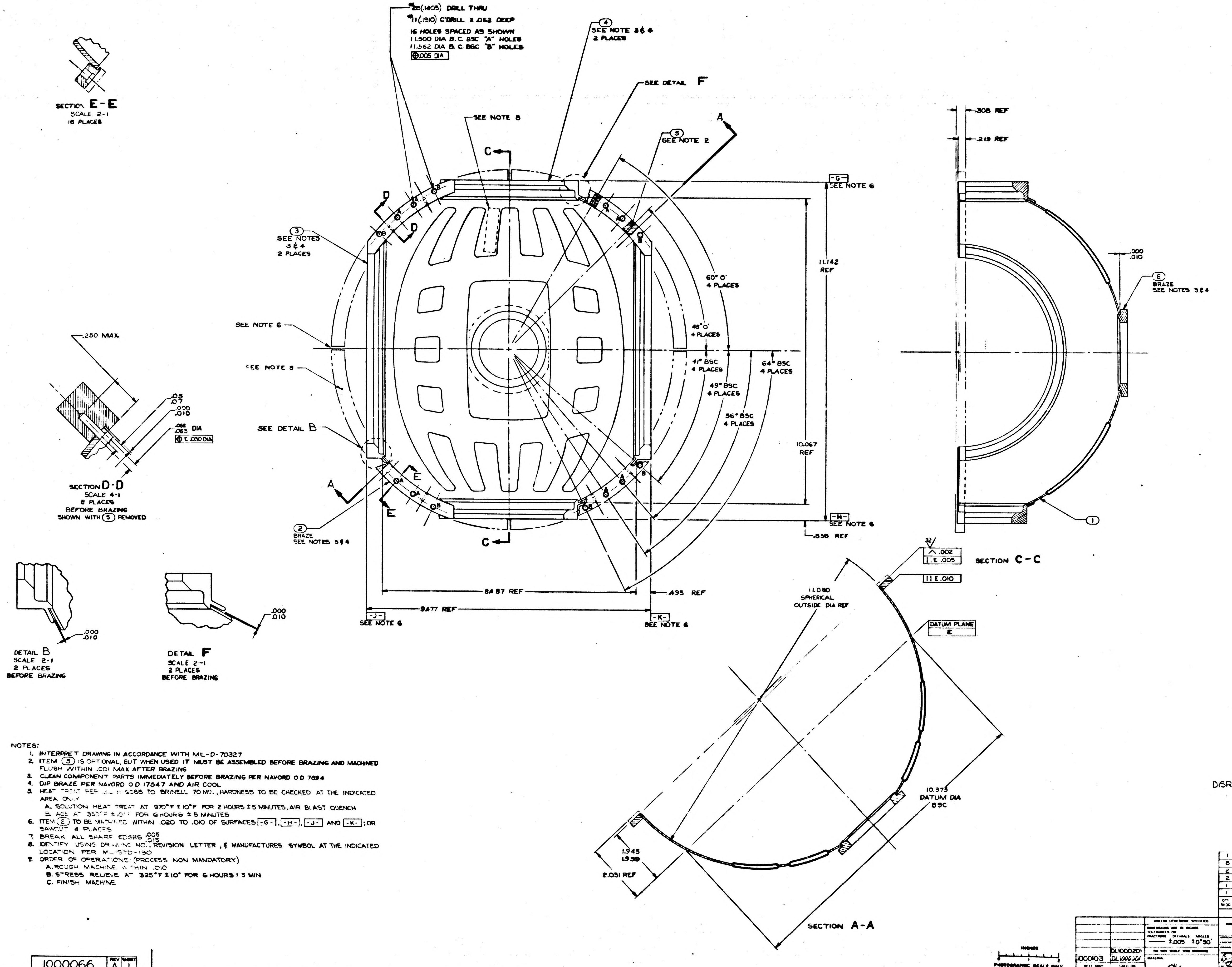
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000064
SHEET 1 OF 1 SHEET

1000064

SYM	DESCRIPTION	DATE	APPROVAL
A	TDR 00147	27 NOV 62	

REVISIONS TDR 00625



#28 (.1405) DRILL THRU
#11 (.1910) C'DRILL X .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
④ SEE NOTE 3 & 4 2 PLACES
SEE DETAIL F
SEE NOTE 8
⑤ SEE NOTE 2
C
A
D
E
-G- SEE NOTE 6
③ SEE NOTES 3 & 4 2 PLACES
11.142 REF
60° 0' 4 PLACES
45° 0' 4 PLACES
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
SEE NOTE 6
SEE NOTE 5
SEE DETAIL B
10.067 REF
② BRAZE SEE NOTES 3 & 4
-H- SEE NOTE 6
.538 REF
8.487 REF
.495 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
.308 REF
.219 REF
.000 .010
⑥ BRAZE SEE NOTES 3 & 4
①
SECTION C-C
SECTION E-E SCALE 2-1 16 PLACES
.250 MAX
.05 .07
.000 .010
.062 .063 DIA
⊕ E .030 DIA
SECTION D-D SCALE 4-1 8 PLACES BEFORE BRAZING SHOWN WITH ⑤ REMOVED
.000 .010
DETAIL B SCALE 2-1 2 PLACES BEFORE BRAZING
DETAIL F SCALE 2-1 2 PLACES BEFORE BRAZING
32
.002
E .005
E .010
11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
10.375 DATUM DIA BSC
1.945 1.939
2.031 REF
SECTION A-A

DISREGARD ROLLBOND PATTERN

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7694
4. DIP BRAZE PER NAVORD O D 17547 AND AIR COOL
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN., HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES $^{.005}_{.015}$
8. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURES SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
9. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
   C. FINISH MACHINE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	FLANGE BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-			5
2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046			3
1	FLG OUTER GIMBAL	1000048			2
1	HEMISPHERE OUTER GIMBAL	1000043			1

LIST OF PARTS AND MATERIALS

1000103	DL1000201 DL1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL —

M I T INSTRUMENTATION LAB CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN R CONTINO 6-27-62
MSC
6-13-62
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

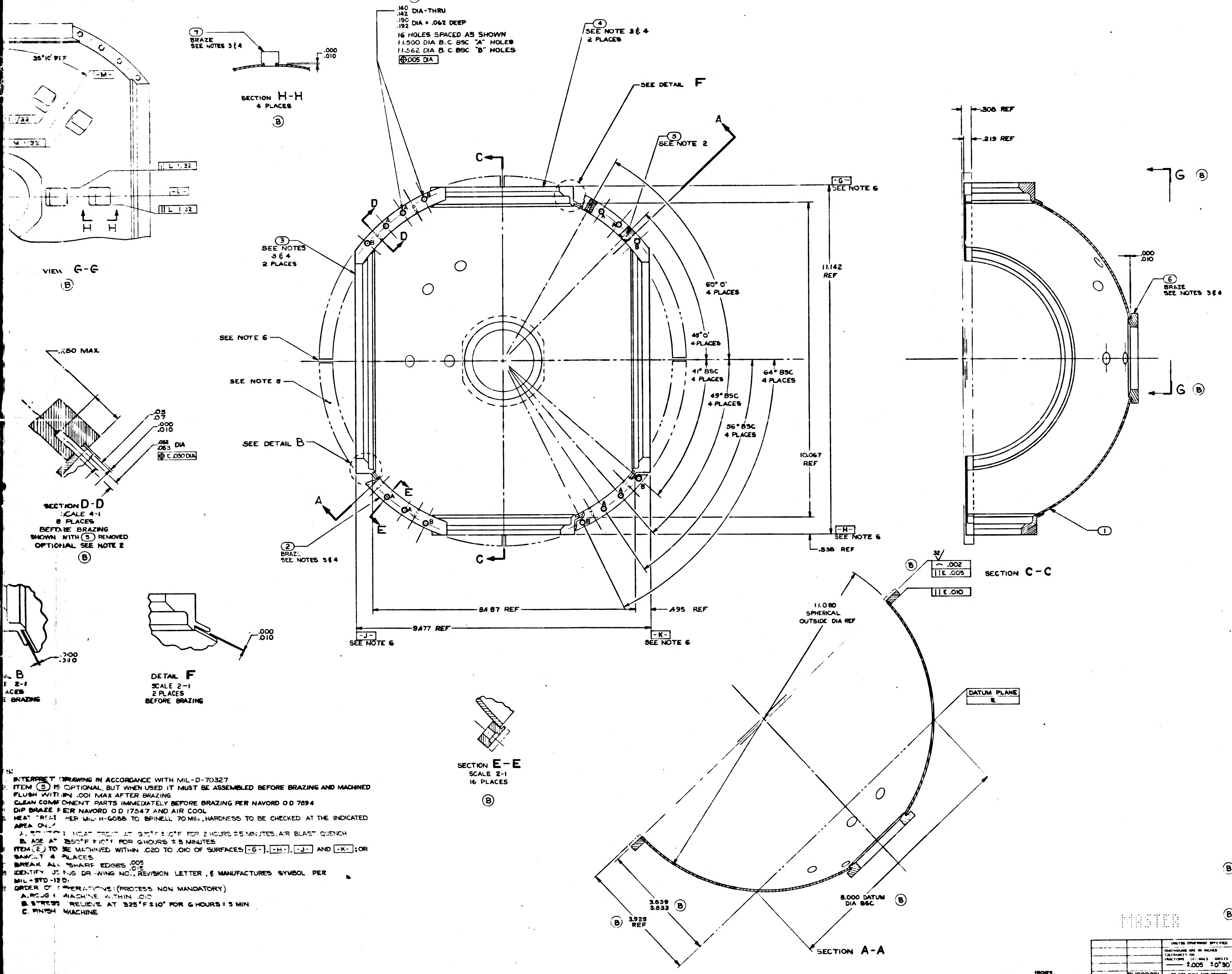
M I T INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000066
SHEET 1 OF 1

PHOTOGRAPHIC SCALE ONLY
INCHES

1000066 REV A SHEET 1

SYM	DESCRIPTION	DATE	APPROVAL
A	TDR 00147	27 Nov 62	WK
B	TDRR 00428	1-7-63	WK

REVISIONS TDR 00025



VIEW G-G
SECTION H-H
4 PLACES
7 BRAZE SEE NOTES 3 & 4
.000 .010
.140 .142 DIA-THRU
.190 .192 DIA × .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
4 SEE NOTE 3 & 4 2 PLACES
SEE DETAIL F
5 SEE NOTE 2
3 SEE NOTES 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 8
SEE DETAIL B
2 BRAZE SEE NOTES 3 & 4
60° 0' 4 PLACES
45° 0' 4 PLACES
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
-G- SEE NOTE 6
-H- SEE NOTE 6
-J- SEE NOTE 6
-K- SEE NOTE 6
11.142 REF
10.067 REF
.538 REF
8.487 REF
9.477 REF
.495 REF
.308 REF
.219 REF
6 BRAZE SEE NOTES 3 & 4
1
SECTION C-C
.002 ∥ E .005
∥ E .010
11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
3.839 3.833
3.925 REF
8.000 DATUM DIA BSC
SECTION A-A
.250 MAX
.05 .07
.062 .063 DIA
⊕ E .030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
DETAIL B
SCALE 2-1
BEFORE BRAZING
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
SECTION E-E
SCALE 2-1
16 PLACES

INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

ITEM (5) IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING

CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7694

DIP BRAZE PER NAVORD O D 17547 AND AIR COOL

HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
- A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
- B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES

ITEM (2) TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES

BREAK ALL SHARP EDGES .005 .015

IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURES SYMBOL PER MIL-STD-130

ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
- A. ROUGH MACHINE WITHIN .010
- B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
- C. FINISH MACHINE

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND №
4	MOUNTING PAD	1000227			7
1	FLANGE, BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046			3
1	FLG OUTER GIMBAL	1000048			2
1	HEMISPHERE, FIXED, OUTER GIMBAL	1000230			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
100C103	DL1000201 DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

INCHES
PHOTOGRAPHIC SCALE ONLY

M I T INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R CONTINI
APPROVED NASA 9-13-62
BY DIRECTION
MIT APPROVAL 9/13/62

HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

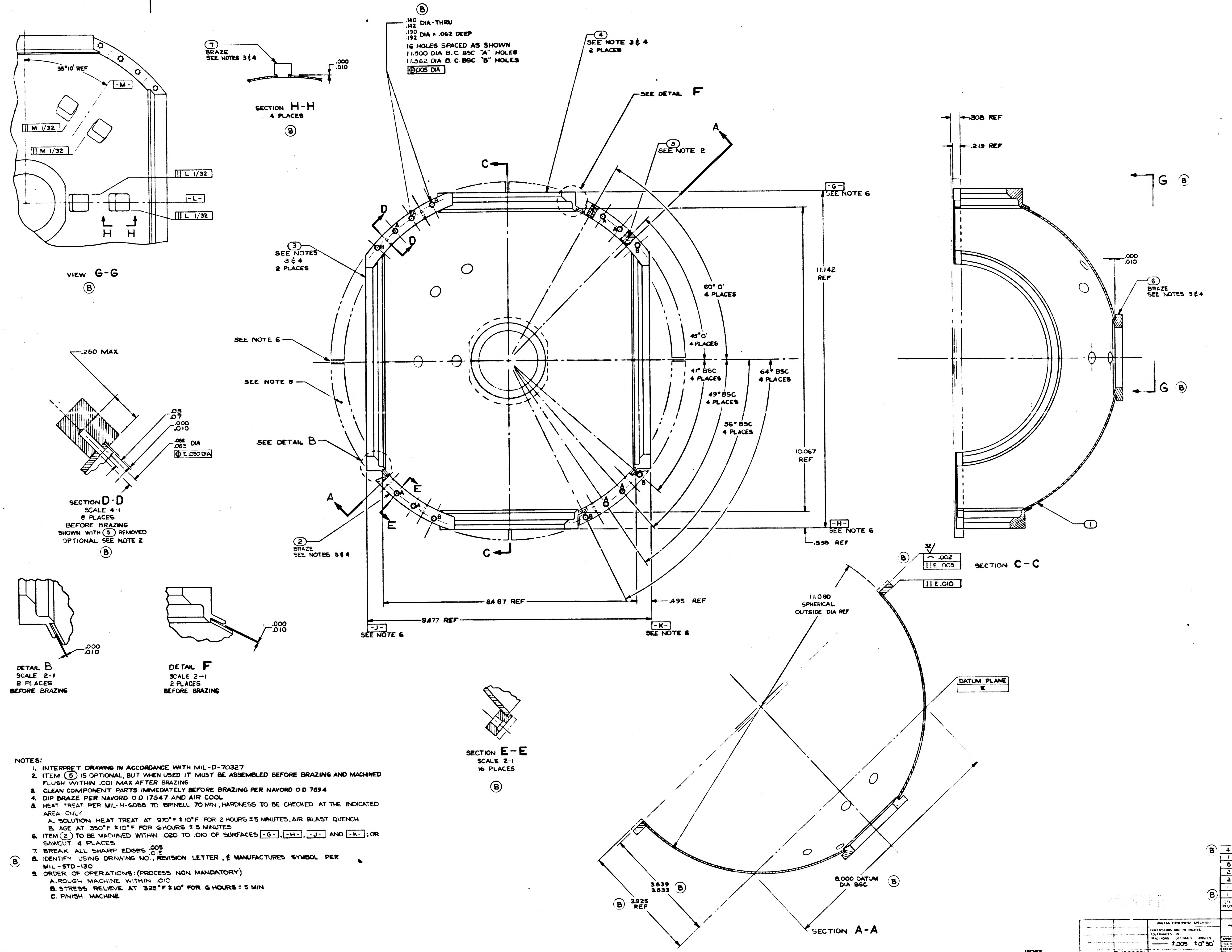
M I T INSTRUMENTATION LABORATORY
Cambridge Mass
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000066
SHEET 1 OF 1

1000066 REV B SHEET 1

1000066 B

SYM	DESCRIPTION	DATE	APP
A	TDR 00147	27 NOV 62	
B	TDRR 00428	1-7-63	

REVISIONS B 00025



VIEW G-G
35°10' REF
-M-
M 1/32
M 1/32
L 1/32
-L-
L 1/32
H H
7
BRAZE
SEE NOTES 3 & 4
.000
.010
SECTION H-H
4 PLACES
.140
.142 DIA-THRU
.190
.192 DIA x .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
.005 DIA
4
SEE NOTE 3 & 4
2 PLACES
SEE DETAIL F
5
SEE NOTE 2
A
C
D
D
3
SEE NOTES 3 & 4
2 PLACES
SEE NOTE 6
SEE NOTE 5
SEE DETAIL B
60° 0'
4 PLACES
45° 0'
4 PLACES
41° BSC
4 PLACES
49° BSC
4 PLACES
64° BSC
4 PLACES
56° BSC
4 PLACES
-G-
SEE NOTE 6
11.142
REF
10.067
REF
-H-
SEE NOTE 6
.538 REF
A
E
E
2
BRAZE
SEE NOTES 3 & 4
C
8.487 REF
.495 REF
9.477 REF
-J-
SEE NOTE 6
-K-
SEE NOTE 6
.250 MAX
.05
.07
.000
.010
.062
.063 DIA
E .030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
.000
.010
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.000
.010
SECTION E-E
SCALE 2-1
16 PLACES
.308 REF
.219 REF
G
G
.000
.010
6
BRAZE
SEE NOTES 3 & 4
1
SECTION C-C
32
.002
E .005
E .010
11.080
SPHERICAL
OUTSIDE DIA REF
DATUM PLANE
E
3.839
3.833
3.925
REF
8.000 DATUM
DIA BSC
SECTION A-A
B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM (5) IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7694
4. DIP BRAZE PER NAVORD O D 17547 AND AIR COOL
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   - A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   - B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM (2) TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES $^{.005}_{.015}$
8. Ⓑ IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURES SYMBOL PER MIL-STD-130
9. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
   - C. FINISH MACHINE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES
4	MOUNTING PAD	1000227		
1	FLANGE BLOWER, OUTER GIMBAL	1000058		
8	PIN, STRAIGHT HEADLESS	1000054		
2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045		
2	FLANGE, OUTER GIMBAL HOUSING BEARING	1000046		
1	FLG OUTER GIMBAL	1000048		
1	HEMISPHERE, FIXED, OUTER GIMBAL	1000230		

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000103	DL1000201 DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

M.I.T.
INSTRUMENTATION LAB
CONTRACT
APPROVED
CHECKED
DRAWN R CONTANT 8-27-62
4-17-62
MIT 9/13/62

HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

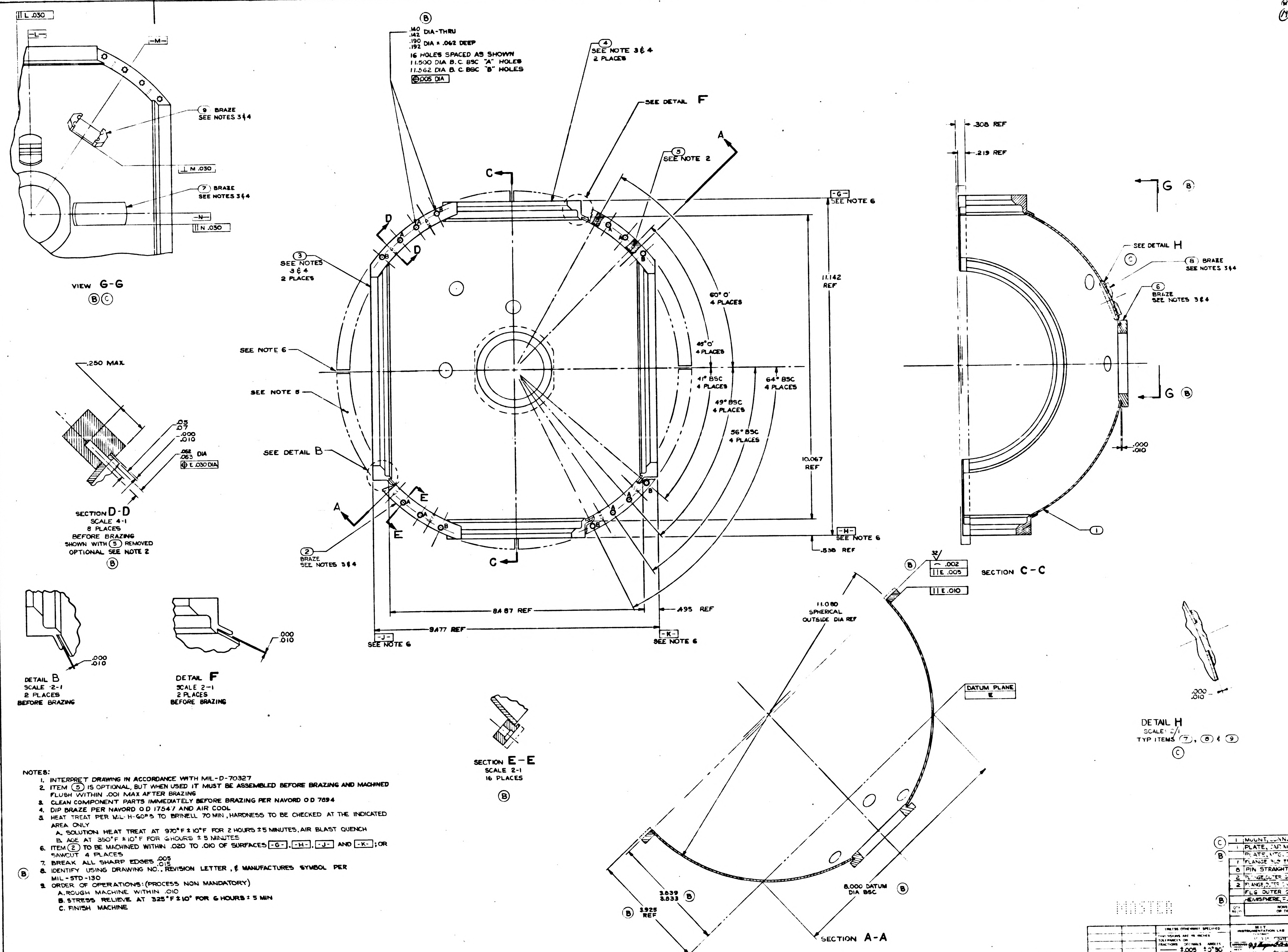
M.I.T.
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING

1000066
SHEET 1 OF

1000066	REV B	SHEET 1

SYM	DESCRIPTION
A	TDR 00147
B	TDRR 00428
C	TDRR 00614



VIEW G-G
B C
L .030
-L-
-M-
M .030
-N-
N .030
9 BRAZE SEE NOTES 3 & 4
7 BRAZE SEE NOTES 3 & 4
B
.140 .142 DIA-THRU
.190 .192 DIA x .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.362 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
4 SEE NOTE 3 & 4 2 PLACES
SEE DETAIL F
5 SEE NOTE 2
3 SEE NOTES 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
SEE DETAIL B
2 BRAZE SEE NOTES 3 & 4
60° 0' 4 PLACES
45° 0' 4 PLACES
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
11.142 REF
10.067 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
.538 REF
8.487 REF
9.477 REF
.495 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
A
C
D
E
.250 MAX
.05 .07
.000 .010
.062 .063 DIA
⊕ E .030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
B
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
.000 .010
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.000 .010
SECTION E-E
SCALE 2-1
16 PLACES
B
.308 REF
.219 REF
G B
SEE DETAIL H
C
8 BRAZE SEE NOTES 3 & 4
6 BRAZE SEE NOTES 3 & 4
.000 .010
1
SECTION C-C
B
32
⌒ .002
∥ E .005
∥ E .010
11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
8.000 DATUM DIA BSC
B
3.839 3.833
B
3.925 REF
SECTION A-A
DETAIL H
SCALE 2/1
TYP ITEMS 7, 8 & 9
C
.000 .010
MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD O D 7694
4. DIP BRAZE PER NAVORD O D 17547 AND AIR COOL
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   - A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   - B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES $^{.005}_{.015}$
8. Ⓑ IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURES SYMBOL PER MIL-STD-130
9. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
   - C. FINISH MACHINE

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO
Ⓒ	1	MOUNT, CONN, OUTER GMBL	1000236
	1	PLATE, CAP MTG, OUTER GMBL	1000237
Ⓑ		PLATE, MTG, 25 V REG	1000238
	1	FLANGE BLOWER, OUTER GIMBAL	1000058
	8	PIN STRAIGHT HEADLESS	1000054-1
	2	FLANGE, OUTER GIMBAL SHAFT STUB	1000045
	2	FLANGE, OUTER GIMBAL HOUSING BEARING	1000046
		FLG OUTER GIMBAL	1000048
Ⓑ		HEMISPHERE, FIXED, OUTER GIMBAL	1000230

LIST OF PARTS AND MATERIAL

NEXT ASSY	USED ON
1000103	DL1000201 DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
DATE
APPROVED
DRAWN R CONTINETTI
4-13-62
9/13/62

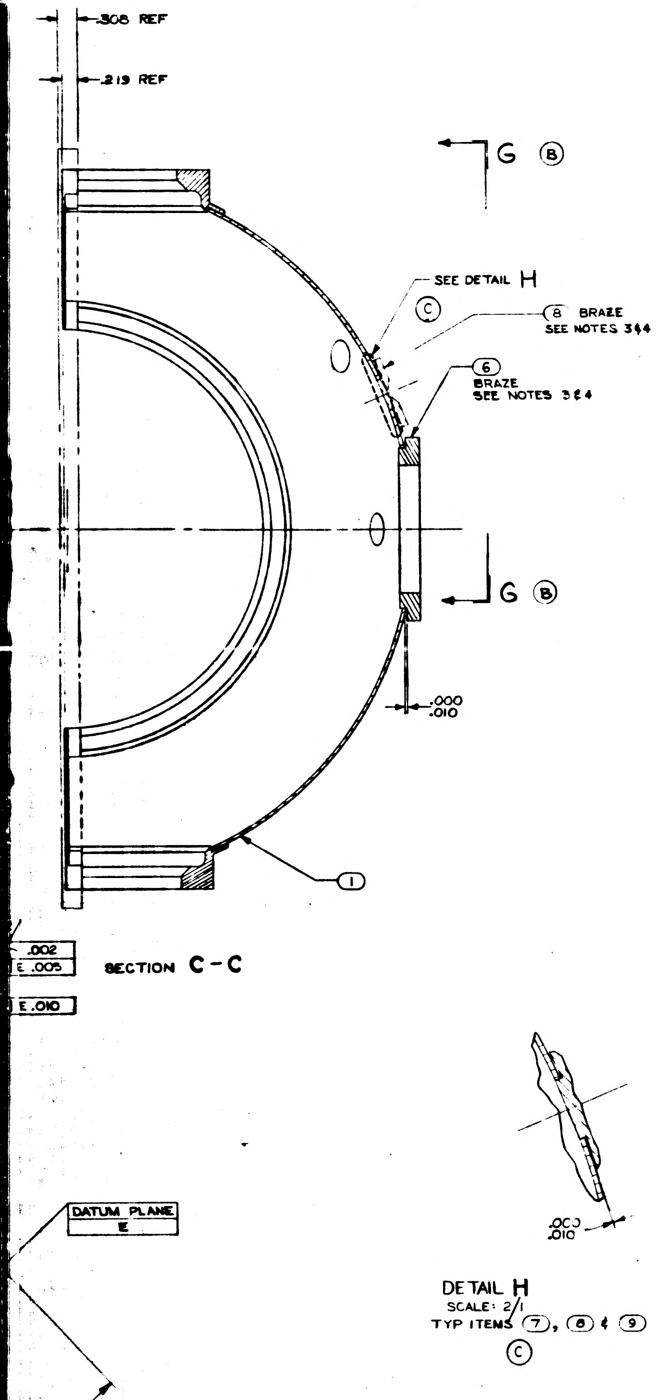
HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	REV	SHEET
1000066	C	1

SYM	DESCRIPTION	DATE	APPROVAL	
REVISION:	TDR 00025			
A	TDR 00147	27 Nov 62	AGB	WK
B18	TDRR 00428	1-7-63	AJB	WK
C	TDRR 00614	3-7-63	AJB	WK



.308 REF
.219 REF
G (B)
SEE DETAIL H
(C)
(8) BRAZE
SEE NOTES 3&4
(6) BRAZE
SEE NOTES 3&4
G (B)
.000
.010
(1)
.002
.005
.010
SECTION C-C
DATUM PLANE
E
.000
.010
DETAIL H
SCALE: 2/1
TYP ITEMS (7), (8) & (9)
(C)

MASTER

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(C)	1	MOUNT, CONN., OUTER GMBL	1000236			9
	1	PLATE, CAP. MTG., OUTER GMBL	1000237			8
(B)	1	PLATE, MTG., 28 V REG	1000 238			7
	1	FLANGE, BLOWER, OUTER GIMBAL	1000 058			6
	8	PIN STRAIGHT HEADLESS	1000054-1			5
	2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045			4
	2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046			3
	1	FLG OUTER GIMBAL	1000048			2
(B)	1	HEMISPHERE, FIXED, OUTER GIMBAL	1000230			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000103	DL1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Bergman
DRAWN R. ONTHANK
By Phil 9-13-62
MIT W. Kupfer 9/13/62

HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

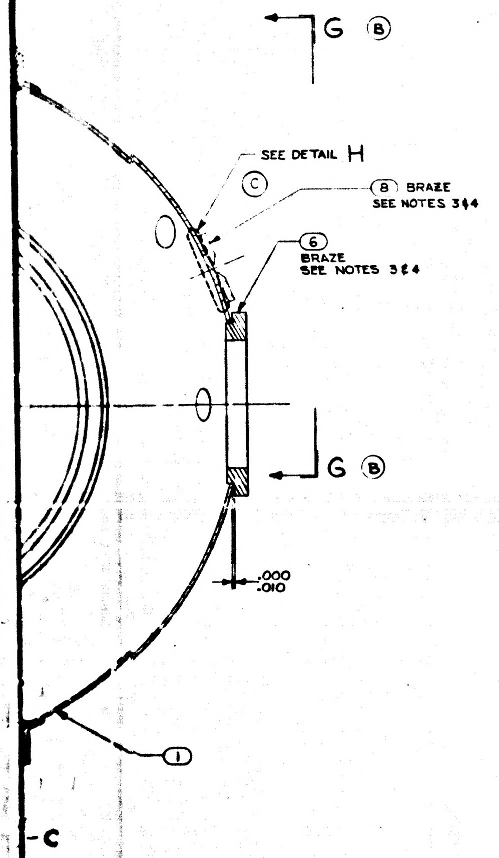
SCALE 1-1
UNIT WT.
CODE IDENT

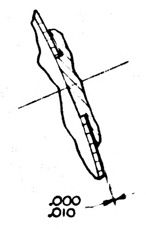
MIT INSTRUMENTATION LABORATORY
Cambridge, Mass
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000066
SHEET 1 OF 1

1000066 C

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDR 00025			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDR 00147	27 Nov 62	WK
B	TDRR 00428	1-7-63	WK
C	TDRR 00614	3-7-63	WK
D	TDRR 01233	5-20-63	WK





DETAIL H
SCALE: 2/1
TYP ITEMS (7), (8) & (9)
(C)

D

1000066

MASTER

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(C)	1	MOUNT, CONN, OUTER GIMBAL	1000236			9
	1	PLATE, CAP. MTG, OUTER GMBL	1000237			8
(D)(B)	1	PLATE, SPEED CONTROLLER MTG	1000 246			7
	1	FLANGE, BLOWER, OUTER GIMBAL	1000058			6
	8	PIN STRAIGHT HEADLESS	1000054-1			5
	2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045			4
	2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046			3
	1	FLG OUTER GIMBAL	1000048			2
(B)	1	HEMISPHERE, FIXED, OUTER GIMBAL	1000230			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000103	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN R CONTINUITY
APPROVED MSC
9-13-62
BY DIRECTION
9/13/62

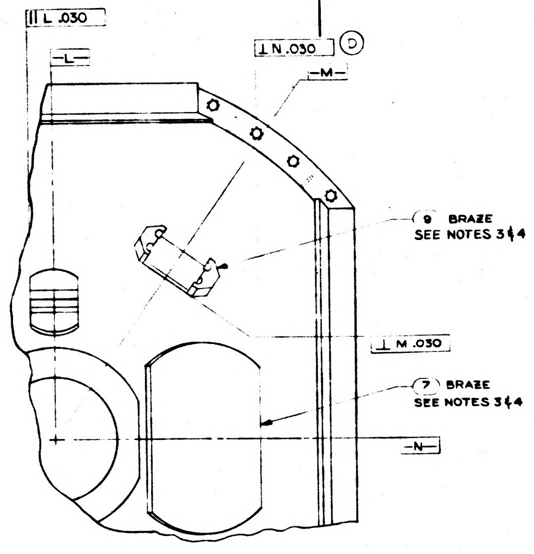
HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

SCALE 1-1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
Cambridge, Mass.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000066
SHEET 1 OF 1

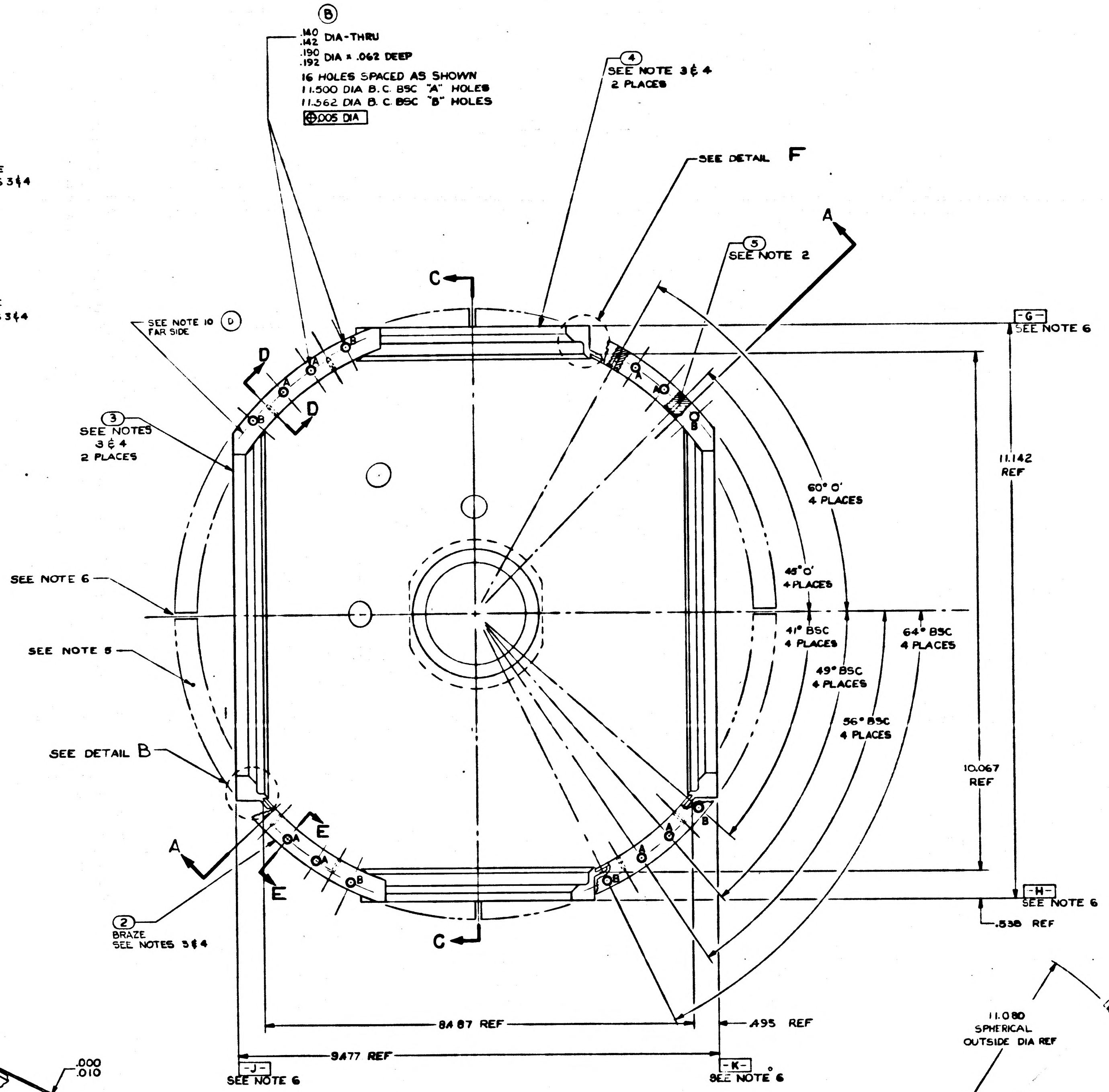
INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION
A	TDR 00147
B	TDRR 00421
C	TDRR 00614
D	TDRR 01233

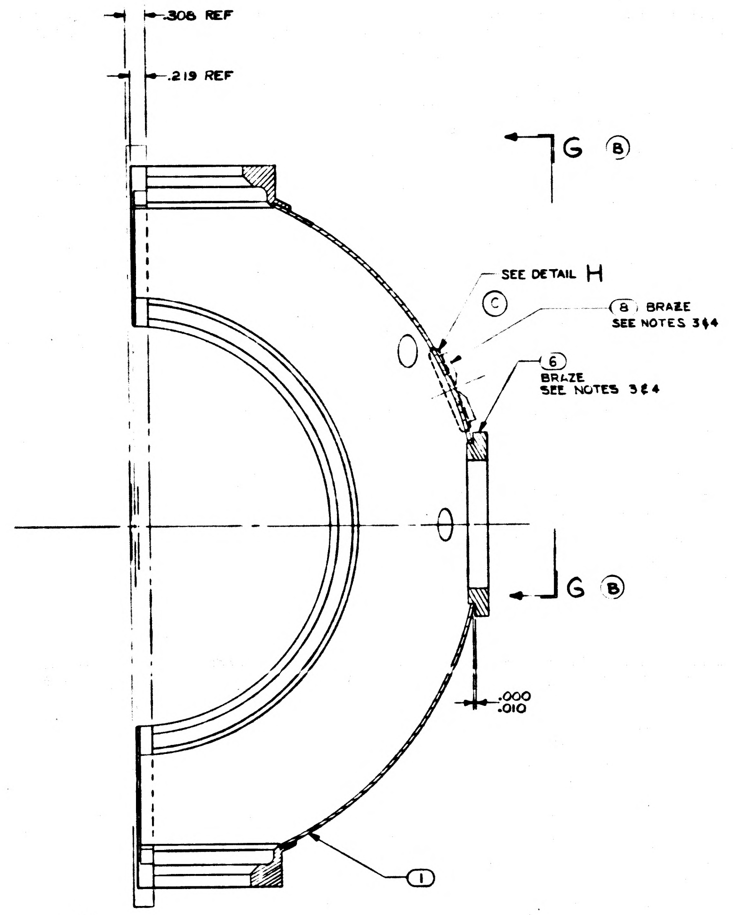


⊥ L .030
-L-
⊥ N .030 (D)
-M-
(9) BRAZE SEE NOTES 3 & 4
⊥ M .030
(7) BRAZE SEE NOTES 3 & 4
-N-

VIEW G-G (B)(C)

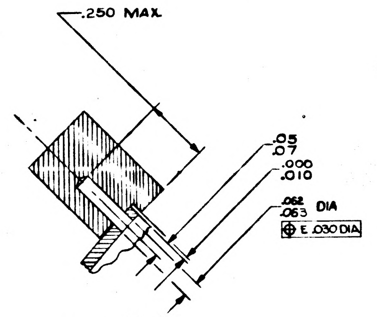


(B)
.140 .142 DIA-THRU
.190 .192 DIA × .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C BSC "A" HOLES
11.562 DIA B.C BSC "B" HOLES
⊕ .005 DIA
(4) SEE NOTE 3 & 4 2 PLACES
SEE DETAIL F
(5) SEE NOTE 2
A
C
SEE NOTE 10 (D) FAR SIDE
D
D
(3) SEE NOTES 3 & 4 2 PLACES
SEE NOTE 6
SEE NOTE 6
SEE DETAIL B
A
E
E
(2) BRAZE SEE NOTES 3 & 4
C
60° 0' 4 PLACES
45° 0' 4 PLACES
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
-G- SEE NOTE 6
11.142 REF
10.067 REF
-H- SEE NOTE 6
.538 REF
8.487 REF
9.477 REF
.495 REF
-J- SEE NOTE 6
-K- SEE NOTE 6



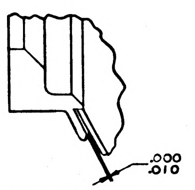
.308 REF
.219 REF
G (B)
SEE DETAIL H
(C)
(8) BRAZE SEE NOTES 3 & 4
(6) BRAZE SEE NOTES 3 & 4
G (B)
.000 .010
(1)

SECTION C-C

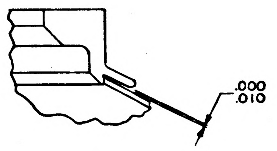


.250 MAX
.05 .07
.000 .010
.066 .063 DIA
⊕ E .030 DIA

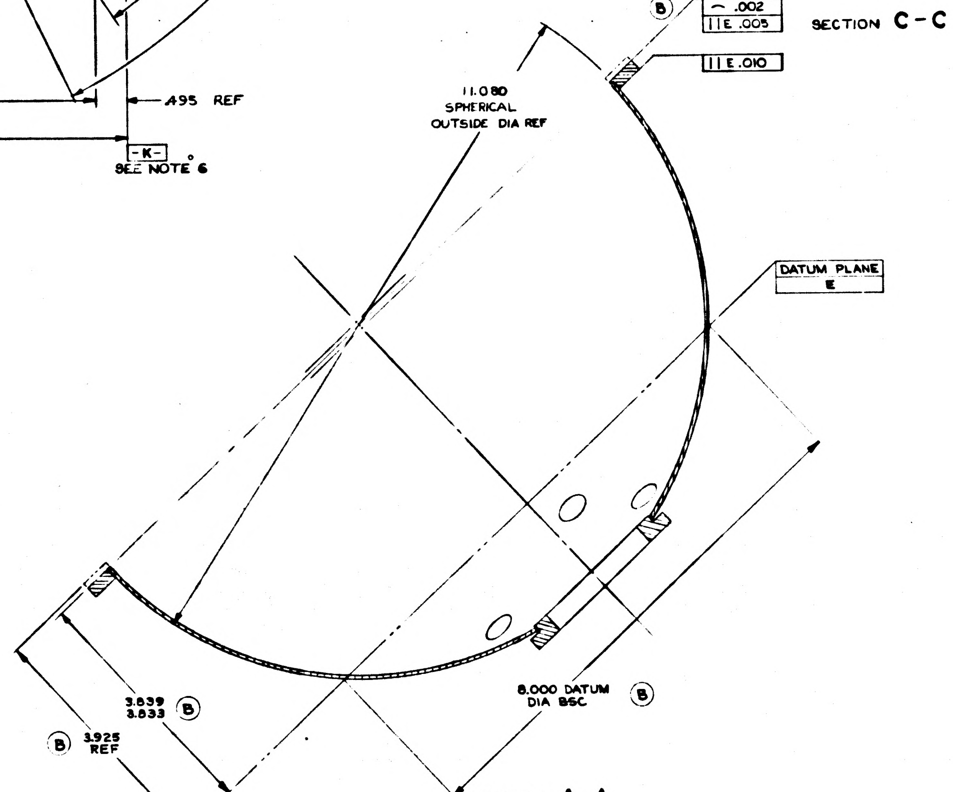
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH (5) REMOVED
OPTIONAL SEE NOTE 2
(B)



DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING

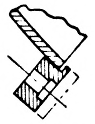


DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING

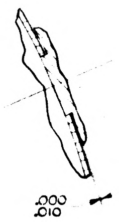


(B)
32
⌒ .002
∥ E .005
∥ E .010
11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
8.000 DATUM DIA BSC (B)
3.839 3.833 (B)
(B) 3.925 REF

SECTION A-A



SECTION E-E
SCALE 2-1
16 PLACES
(B)



DETAIL H
SCALE 4/1
TYP ITEMS (7), (8) & (9)
(C)

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM (5) IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7694
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM (2) TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES $^{.005}_{.015}$
8. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURES SYMBOL PER MIL-STD-130 (B)
9. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
   C. FINISH MACHINE
10. OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM (2). USE OF ITEM (5) IS OPTIONAL, BUT IF USED, MUST BE LOCATED IN CENTER OF HOLES MARKED A & B PADS MUST NOT COME IN CONTACT WITH ITEMS (1) (3) & (4) (D)

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION
1	MOUNT, CONN, OUTER GIMBAL	1000[illegible]	
1	PLATE, CAP MTG, OUTER GMBL	1000237	
1	PLATE, FEED CONTROLLER MTG	1000[illegible]	
1	FLANGE BLOWER, OUTER GIMBAL	1000[illegible]58	
8	PIN STRAIGHT HEADLESS	1000[illegible]54-	
2	FLANGE, OUTER GIMBAL SHAFT STUB	1000[illegible]45	
2	FLANGE, OUTER GIMBAL HOUSING BEARING	1000[illegible]46	
1	FLG OUTER GIMBAL	1000[illegible]48	
1	HEMISPHERE, FIXED, OUTER GIMBAL	1000230	

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

1000103 NEXT ASSY
DL1000201 DL1000101 USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
APPROVED
CHECKED
DRAWN R CONTI 6-27-62
9-13-62
9/13/62

HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

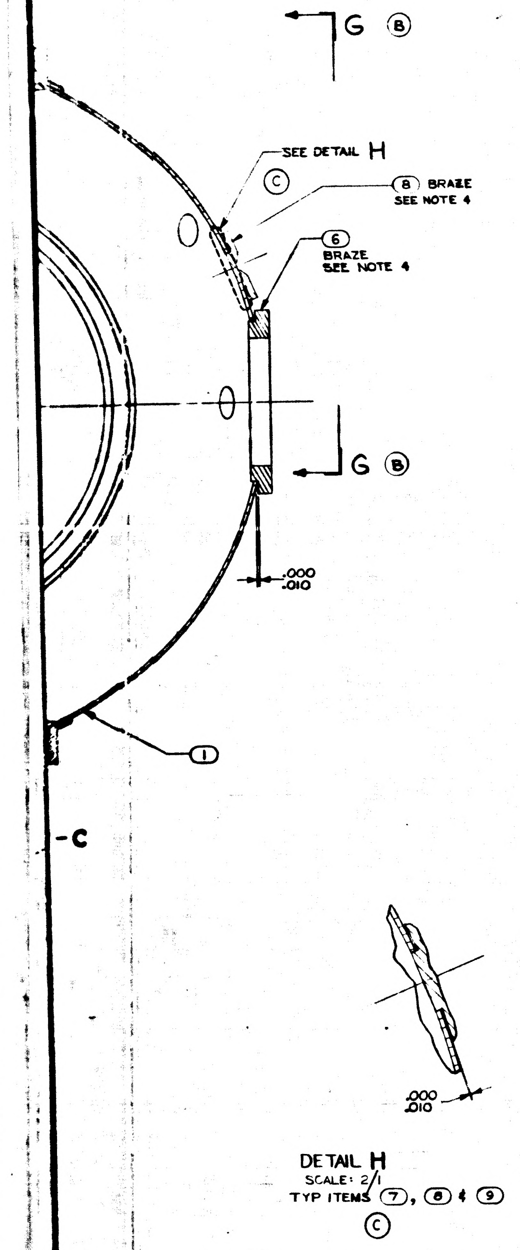
SCALE 1-1
UNIT WT
CODE IDENT

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

1000066 REV D SHEET 1

REVISIONS		TDR 00025	
SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ A	TDR 00147	27 NOV 62	2JB WK
Ⓜ B	TDRR 00428	1-7-63	2JB WK
C	TDRR 00614	3-7-63	2JB WK
Ⓜ D	TDRR 01233	5-20-63	2JB WK
Ⓜ E	TDRR 01443	6-5-63	2JB RJB



DETAIL H
SCALE: 2/1
TYP ITEMS ⑦, ⑧ & ⑨
Ⓒ

D

C

B

A

1000066 E

1000066

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	Ⓒ MOUNT, CONN, OUTER GIMBAL	1000236			9
1	PLATE, CAP. MTG, OUTER GMBL	1000237			8
1	Ⓓ Ⓑ PLATE, SPEED CONTROLLER MTG	1000 246			7
1	FLANGE, BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046			3
1	FLG OUTER GIMBAL	1000048			2
1	Ⓑ HEMISPHERE, FIXED, OUTER GIMBAL	1000230			1

LIST OF PARTS AND MATERIALS

MASTER

	DL1000201
1000103	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN R. CONTINI
APPROVED MSC 9-13-62
BY DIRECTION

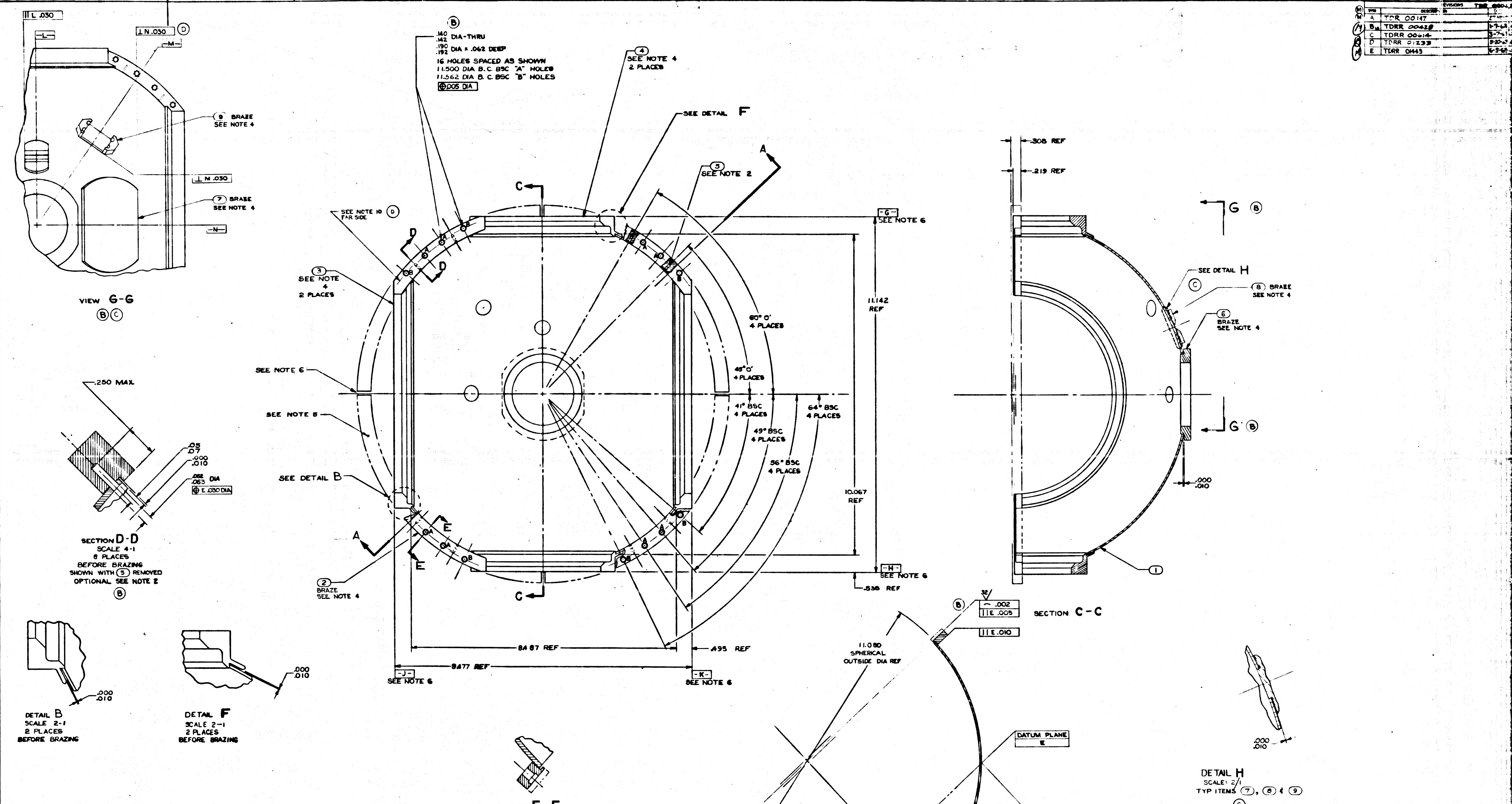
HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

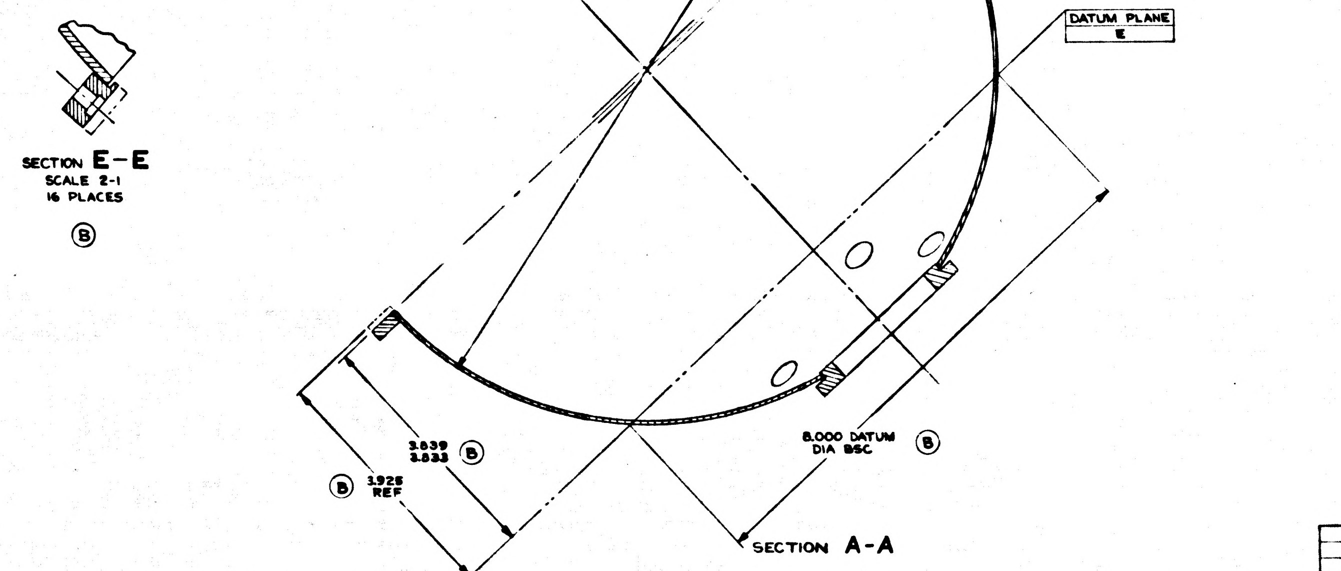
SCALE 1-1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000066
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE
A	TDR 00147	
B	TDRR 00428	1-7-63
C	TDRR 00614	3-7-63
D	TDRR 01233	5-20-63
E	TDRR 01443	6-5-63


5
4
3
2
1
D
C
B
A
⊥ L .030
⊥ N .030 Ⓓ
-L-
-M-
-N-
⊥ M .030
⑨ BRAZE SEE NOTE 4
⑦ BRAZE SEE NOTE 4
VIEW G-G
Ⓑ Ⓒ
Ⓑ
.140 .142 DIA-THRU
.190 .192 DIA x .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
④ SEE NOTE 4 2 PLACES
SEE DETAIL F
⑤ SEE NOTE 2
A
C
D
SEE NOTE 10 FAR SIDE Ⓓ
③ SEE NOTE 4 2 PLACES
-G- SEE NOTE 6
11.142 REF
60° 0' 4 PLACES
45° 0' 4 PLACES
41° BSC 4 PLACES
49° BSC 4 PLACES
64° BSC 4 PLACES
56° BSC 4 PLACES
SEE NOTE 6
SEE NOTE 5
SEE DETAIL B
10.067 REF
E
② BRAZE SEE NOTE 4
-H- SEE NOTE 6
.538 REF
8.487 REF
.495 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6
.250 MAX
.05 .07
.000 .010
.062 .063 DIA
⊕ E .030 DIA
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH ⑤ REMOVED
OPTIONAL SEE NOTE 2
Ⓑ
.308 REF
.219 REF
G Ⓑ
SEE DETAIL H
Ⓒ
⑧ BRAZE SEE NOTE 4
⑥ BRAZE SEE NOTE 4
.000 .010
①
SECTION C-C
.000 .010
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
.000 .010
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
Ⓑ
32
⌒ .002
⫽ E .005
⫽ E .010
11.080 SPHERICAL OUTSIDE DIA REF
.000 .010
DETAIL H
SCALE: 2/1
TYP ITEMS ⑦, ⑧ & ⑨
Ⓒ


SECTION E-E
SCALE 2-1
16 PLACES
Ⓑ
DATUM PLANE E
3.839 3.833 Ⓑ
Ⓑ 3.928 REF
8.000 DATUM DIA BSC Ⓑ
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. Ⓔ ~~[illegible]~~
4. Ⓔ DIP BRAZE PER ND 1002073
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   - A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   - B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES $^{.005}_{.015}$
8. Ⓑ IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURES SYMBOL PER MIL-STD-130
9. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
   - C. FINISH MACHINE
10. OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM ②. USE OF ITEM ⑤ IS OPTIONAL, BUT IF USED, MUST BE LOCATED IN CENTER OF HOLES MARKED A&B PADS MUST NOT COME IN CONTACT WITH ITEMS ① ③ & ④ Ⓓ

MASTER

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.
Ⓒ	1	MOUNT, CONN, OUTER GIMBAL	1000236
	1	PLATE, CAP. MTG, OUTER GMBL	1000237
Ⓓ Ⓑ	1	PLATE, SPEED CONTROLLER MTG	1000246
	1	FLANGE, BLOWER, OUTER GIMBAL	1000058
	8	PIN STRAIGHT HEADLESS	1000054-
	2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000049
	2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046
	1	FLG OUTER GIMBAL	1000048
Ⓑ	1	HEMISPHERE, FIXED, OUTER GIMBAL	1000238

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000103	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R CONTINO 6-27-62
MSC Phi 9-13-62

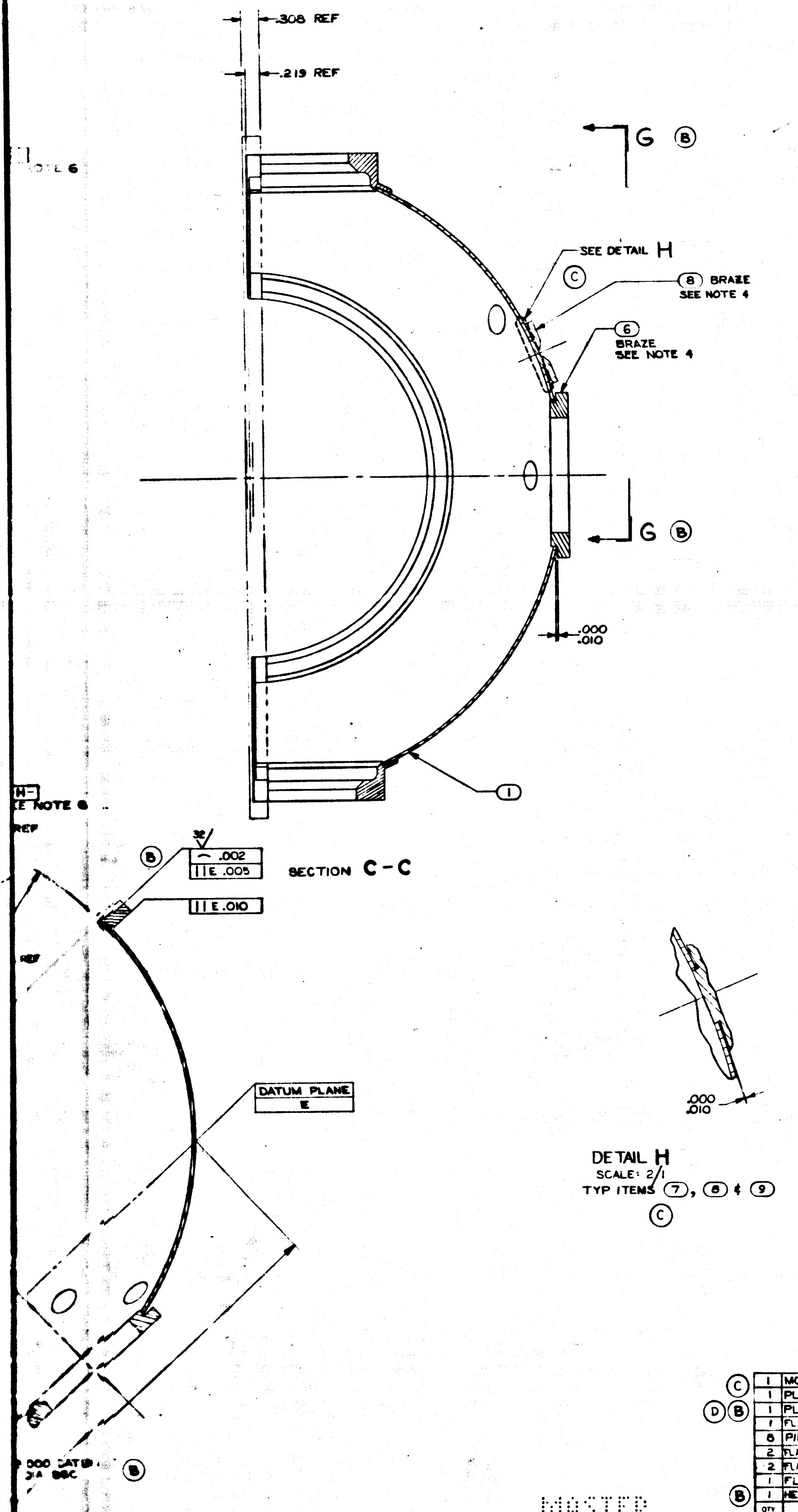
HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

SCALE 1-1
UNIT WT.

INCHES
PHOTOGRAPHIC SCALE ONLY

1000066 REV E SHEET 1

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDR 0002F			
A	TLR 00147	27 NOV62		WK
B	TDRR 00428	1-7-63		WK
C	TDRR 00614	3-7-63		WK
D	TDRR 01233	5-20-63		WK
E	TDRR 01443	6-5-63		
F	TDRR 01678	6-13-63		WK



.308 REF
.219 REF
G Ⓑ
SEE DETAIL H
Ⓒ
⑧ BRAZE SEE NOTE 4
⑥ BRAZE SEE NOTE 4
G Ⓑ
.000 .010
①
Ⓑ
.002
E .005
E .010
SECTION C-C
REF
DATUM PLANE E
.000 .010
DETAIL H
SCALE: 2/1
TYP ITEMS ⑦, ⑧ & ⑨
Ⓒ
Ⓑ
A-A

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	MOUNT, CONN, OUTER GIMBAL	1000236			9
1	PLATE, CAP. MTG, OUTER GMBL	1000237			8
1	PLATE, SPEED CONTROLLER MTG	1000 246			7
1	FLANGE, BLOWER, OUTER GIMBAL	1000 058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046			3
1	FLG OUTER GIMBAL	1000048			2
1	HEMISPHERE, FIXED, OUTER GIMBAL	1000230			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000103	DL 1100001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN R CONTRINO 2-7-62
APPROVED MSC 9-13-62

HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

SCALE 1-1
UNIT WT
CODE IDENT

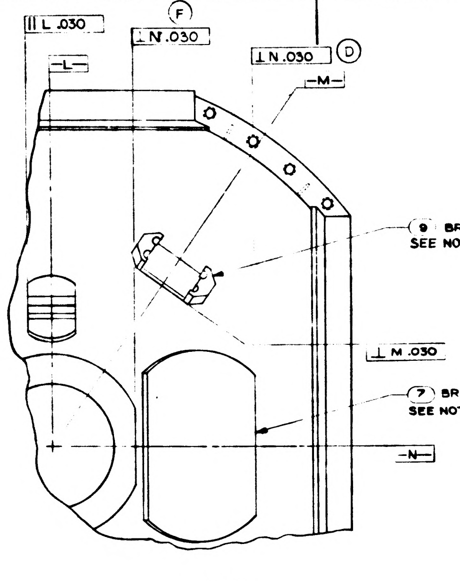
MIT INSTRUMENTATION LABORATORY Cambridge, Mass.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000066
SHEET 1 OF 1

1000066

1000066

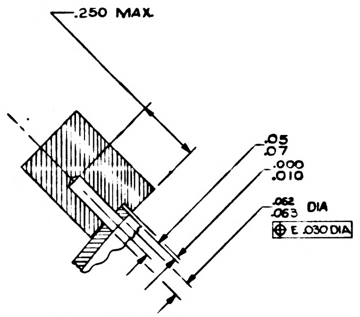
INCHES
PHOTOGRAPHIC SCALE ONLY

F2



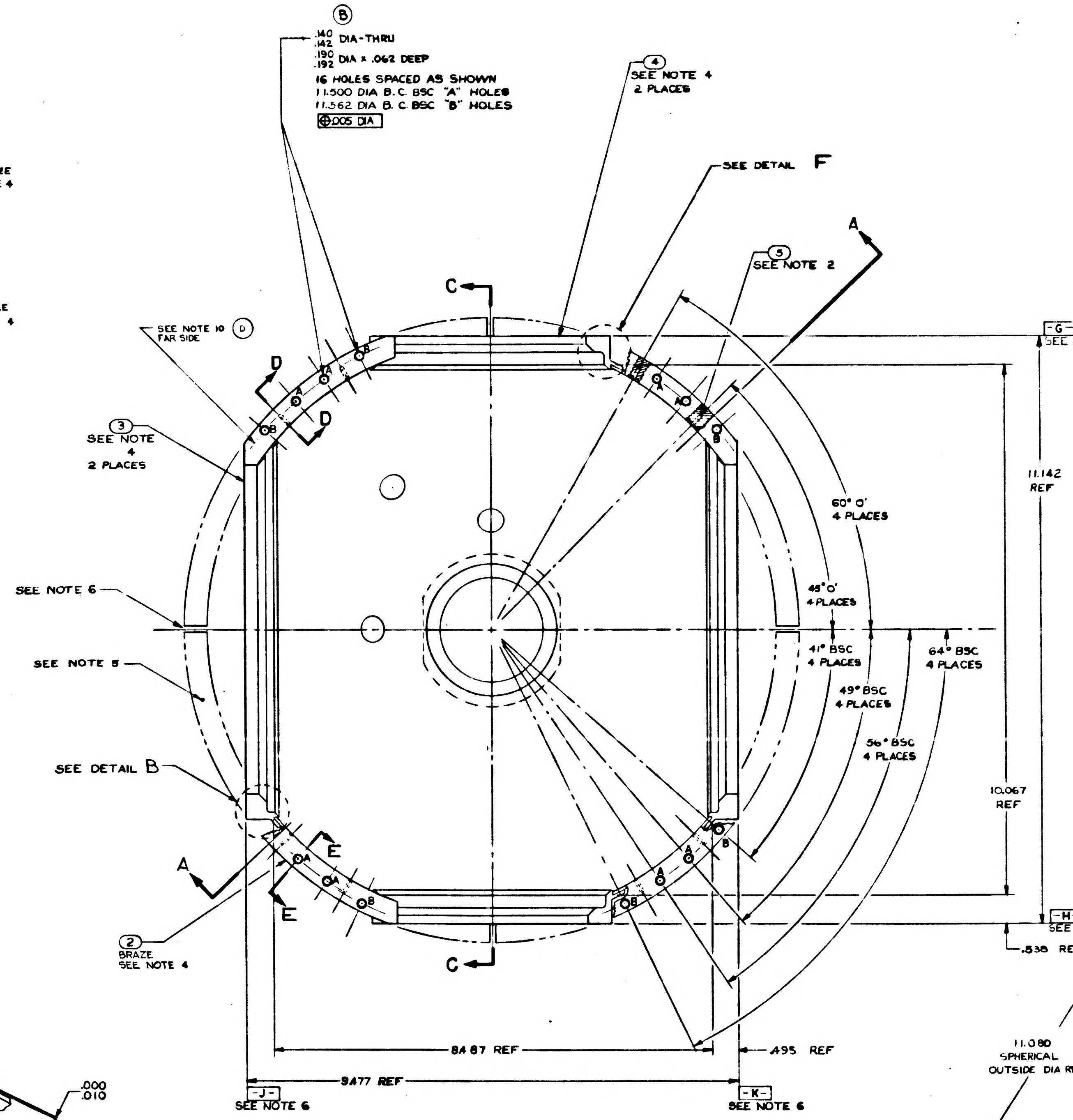
∥ L .030
-L-
⊥ N .030
Ⓕ
⊥ N .030 Ⓓ
-M-
⑨ BRAZE SEE NOTE 4
⊥ M .030
⑦ BRAZE SEE NOTE 4
-N-

VIEW G-G
Ⓑ Ⓒ

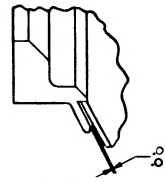


.250 MAX
.05 .07
.000 .010
.062 .063 DIA
⊕ E .030 DIA

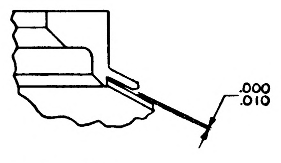
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH ⑤ REMOVED
OPTIONAL SEE NOTE 2
Ⓑ



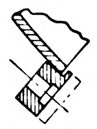
Ⓑ
.140 .142 DIA-THRU
.190 .192 DIA x .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
④ SEE NOTE 4 2 PLACES
SEE DETAIL F
A
⑤ SEE NOTE 2
C
SEE NOTE 10 FAR SIDE Ⓓ
D
D
③ SEE NOTE 4 2 PLACES
-G- SEE NOTE 6
11.142 REF
60° 0' 4 PLACES
SEE NOTE 6
45° 0' 4 PLACES
SEE NOTE 5
41° BSC 4 PLACES
49° BSC 4 PLACES
64° BSC 4 PLACES
56° BSC 4 PLACES
10.067 REF
SEE DETAIL B
A
E
E
② BRAZE SEE NOTE 4
-H- SEE NOTE 6
.538 REF
C
84.87 REF
.495 REF
9.477 REF
-J- SEE NOTE 6
-K- SEE NOTE 6



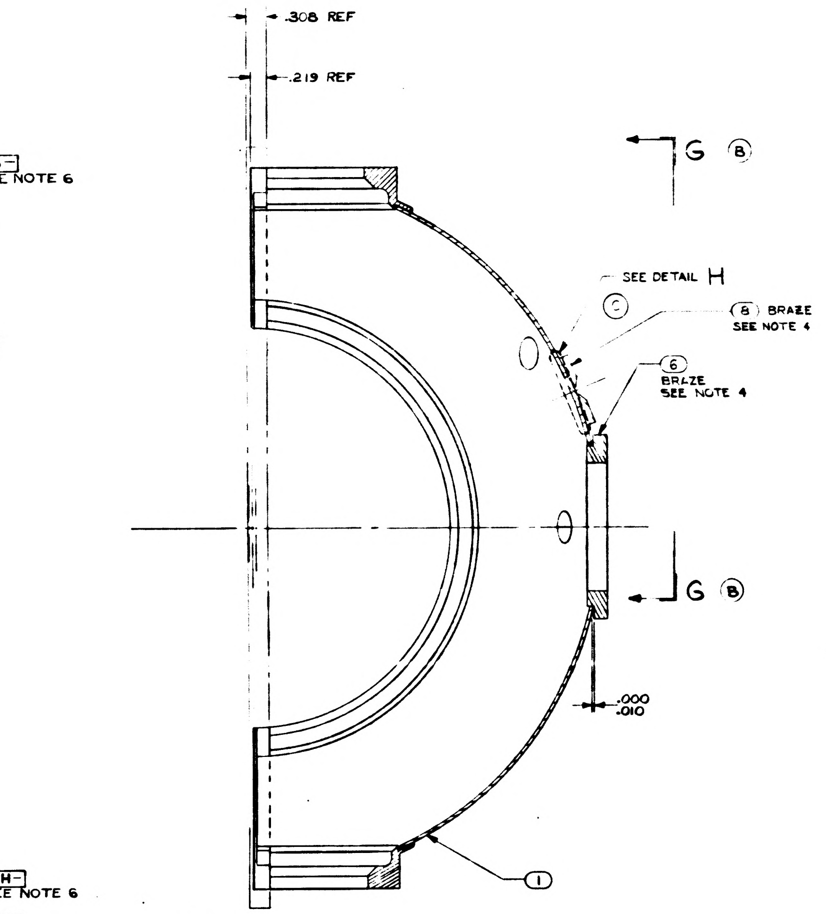
DETAIL B
SCALE 2-1
PLACES
BEFORE BRAZING



DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING

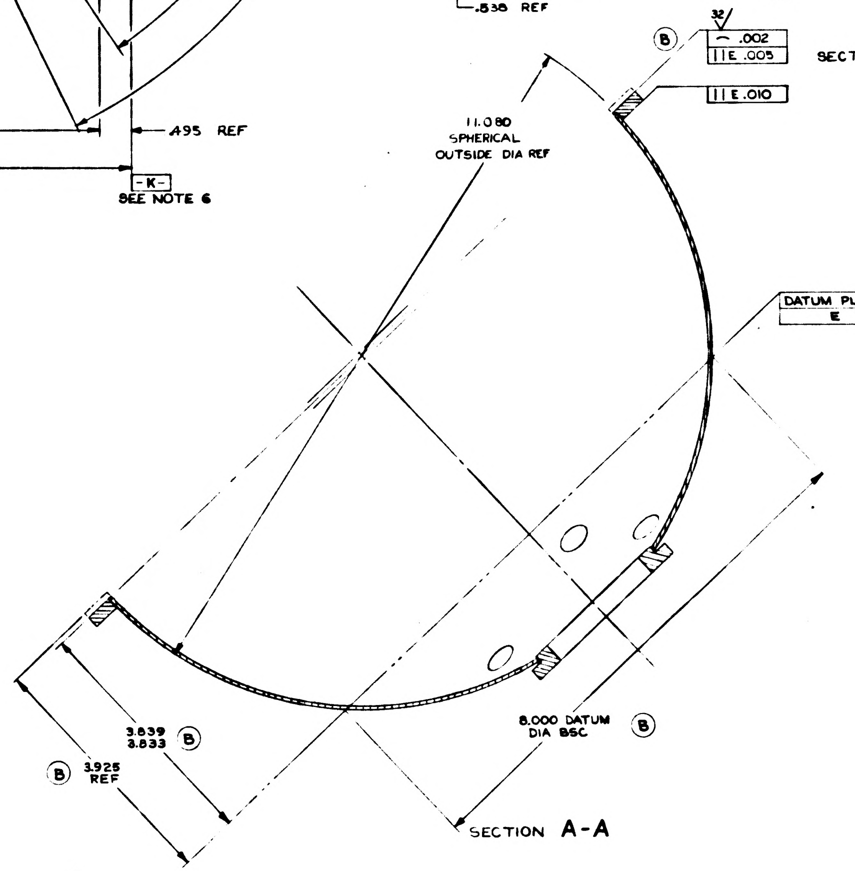


SECTION E-E
SCALE 2-1
16 PLACES
Ⓑ



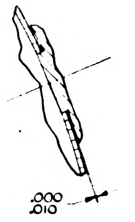
.308 REF
.219 REF
G Ⓑ
SEE DETAIL H
Ⓒ
⑧ BRAZE SEE NOTE 4
⑥ BRAZE SEE NOTE 4
G Ⓑ
.000 .010
①

SECTION C-C



Ⓑ
32
⌒ .002
∥ E .005
∥ E .010
11.080 SPHERICAL OUTSIDE DIA REF
DATUM PLANE E
3.839 3.833 Ⓑ
Ⓑ 3.925 REF
8.000 DATUM DIA BSC Ⓑ

SECTION A-A



DETAIL H
SCALE 2/1
TYP ITEMS ⑦, ⑧ & ⑨
Ⓒ

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. ~~CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7884~~ Ⓔ Ⓔ
4. DIP BRAZE PER ND 1002073
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR ? HOURS ±5 MINUTES, AIR BLAST QUENCH
   B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES $^{.005}_{.015}$
8. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURES SYMBOL PER MIL-STD-130 Ⓑ
9. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   A. ROUGH MACHINE WITHIN .010
   B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
   C. FINISH MACHINE
10. OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM ②. USE OF ITEM ⑤ IS OPTIONAL, BUT IF USED, MUST BE LOCATED IN CENTER OF HOLES MARKED A & B PADS MUST NOT COME IN CONTACT WITH ITEMS ①, ③ & ④ Ⓓ

1	MOUNT, CONN. Ⓒ
1	PLATE, CAP. M
1	PLATE, SPEED Ⓓ Ⓑ
1	FLANGE, BLOWER
8	PIN STRAIGHT
2	FLANGE, OUTER G
2	FLANGE, OUTER G
	FLG OUTER G
	HEMISPHERE, FL Ⓑ
QTY REQD	NOML OR DE

MASTER

NEXT ASSY	USED ON
000103	DL1000201
	DL1000201
APPLICATION	

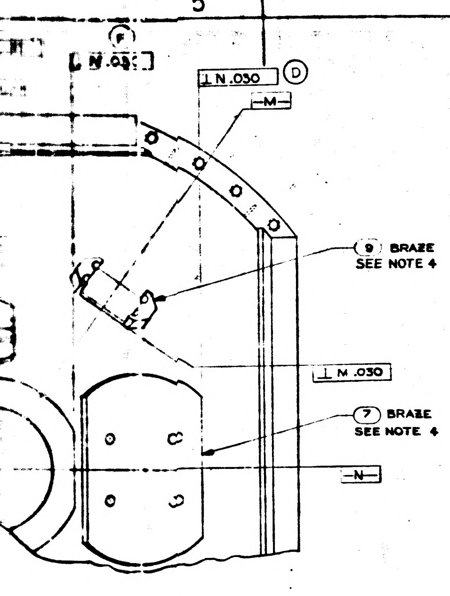
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED
CHECKED
DRAWN R CONTINO
APPROVED MSC
BY DIRECTION
MIT

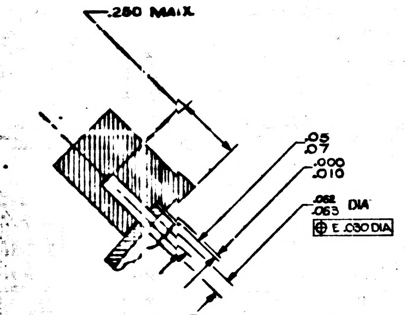
INCHES
PHOTOGRAPHIC SCALE ONLY

	REV	SHEET
1000066	F	1

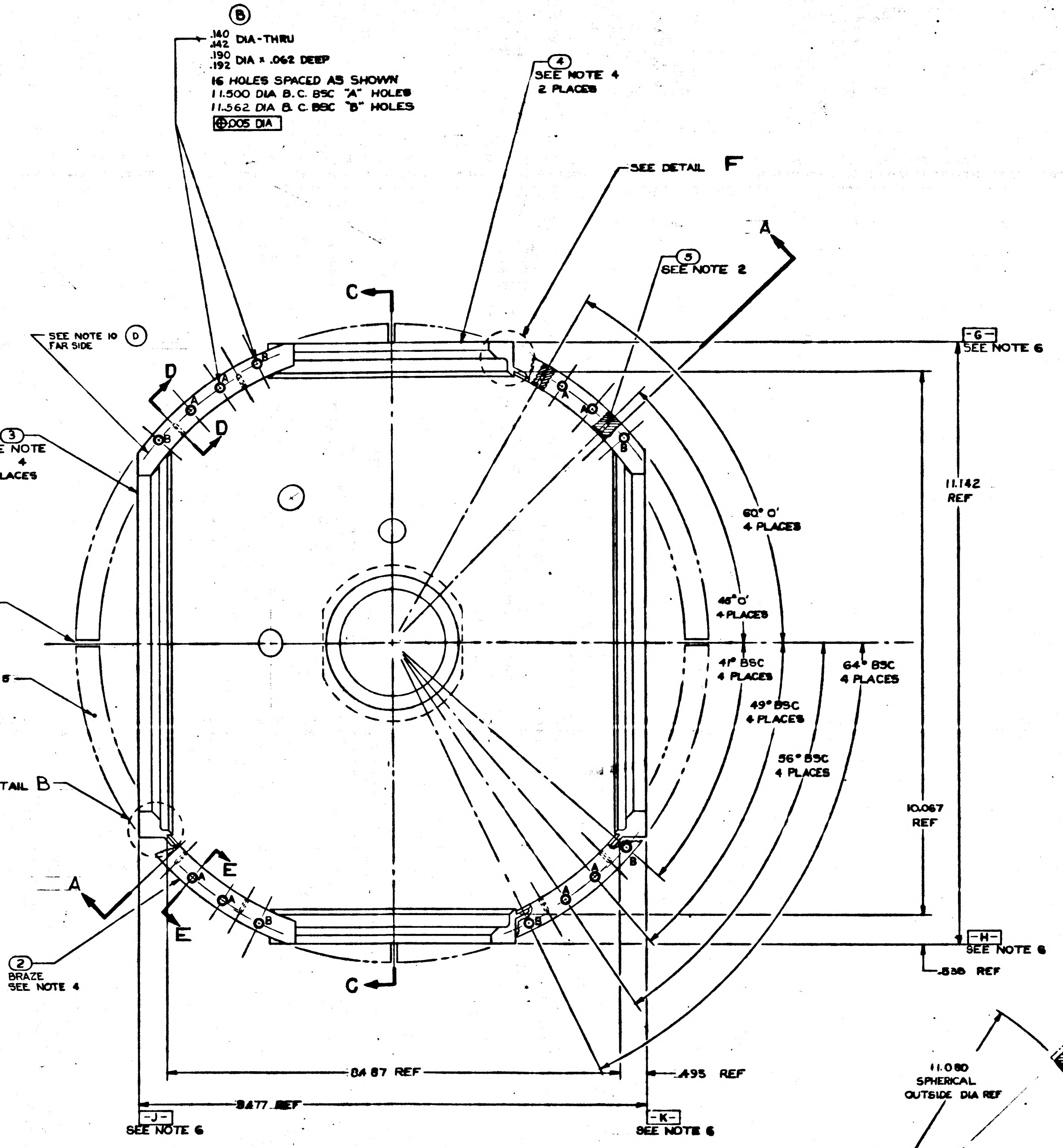
SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDR 00025			
A	TDR 00147	27 NOV 62		WK
B	TDRR 00428	1-7-63		WK
C	TDRR 00614	3-7-63		WK
D	TDRR 01233	5-20-63		WK
E	TDRR 01443	6-5-63		
F	TDRR 01678	6-19-63		WK
G	TDRR 04565	12-5-63		WK

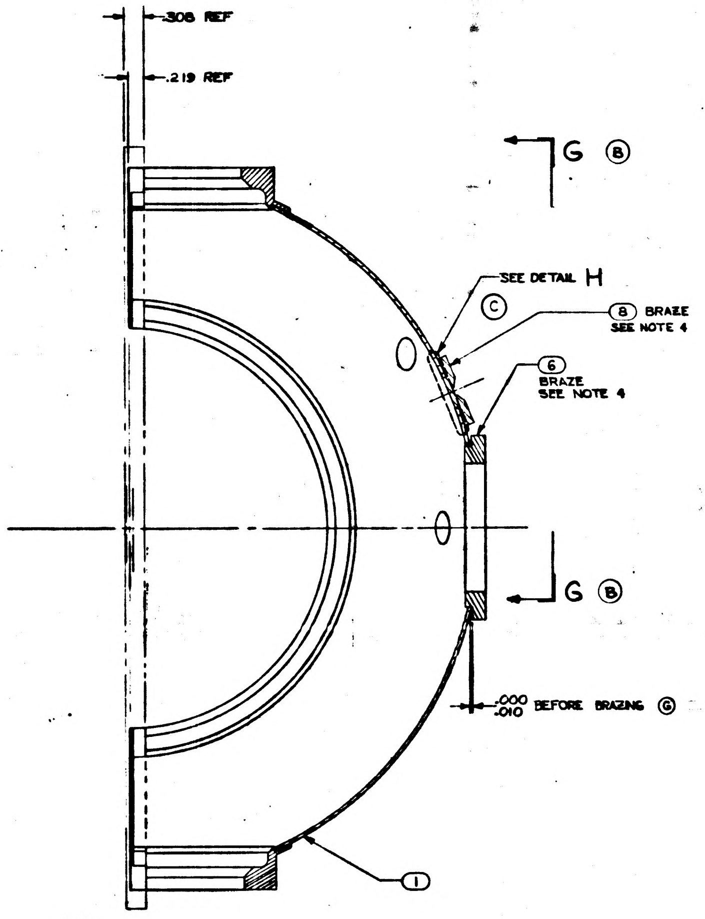

F
N .03
⊥ N .030 D
-M-
9 BRAZE
SEE NOTE 4
⊥ N .030
7 BRAZE
SEE NOTE 4
-N-

VIEW G-G
B C G

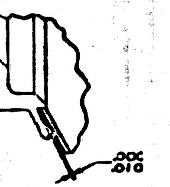

.280 MAX.
.05
.07
.000
.010
.062
.063 DIA
⊕ E .030 DIA

SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
B

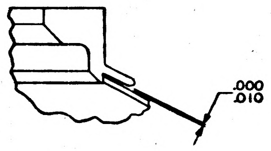

B
.140
.142 DIA-THRU
.190
.192 DIA x .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
⊕ .005 DIA
4
SEE NOTE 4
2 PLACES
SEE DETAIL F
5
SEE NOTE 2
A
C
SEE NOTE 10
FAR SIDE
D
D
D
3
SEE NOTE 4
2 PLACES
-G-
SEE NOTE 6
11.142
REF
60° 0'
4 PLACES
46° 0'
4 PLACES
41° BSC
4 PLACES
64° BSC
4 PLACES
49° BSC
4 PLACES
56° BSC
4 PLACES
SEE NOTE 6
SEE NOTE 5
SEE DETAIL B
10.067
REF
A
E
E
C
2
BRAZE
SEE NOTE 4
-H-
SEE NOTE 6
.536 REF
8487 REF
.495 REF
8477 REF
-J-
SEE NOTE 6
-K-
SEE NOTE 6


.308 REF
.219 REF
G B
SEE DETAIL H
C
8 BRAZE
SEE NOTE 4
6
BRAZE
SEE NOTE 4
G B
.000
.010 BEFORE BRAZING G
1

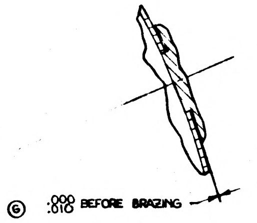
SECTION C-C



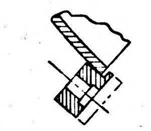
IL B
E 2-1
LACED
E BRAZING



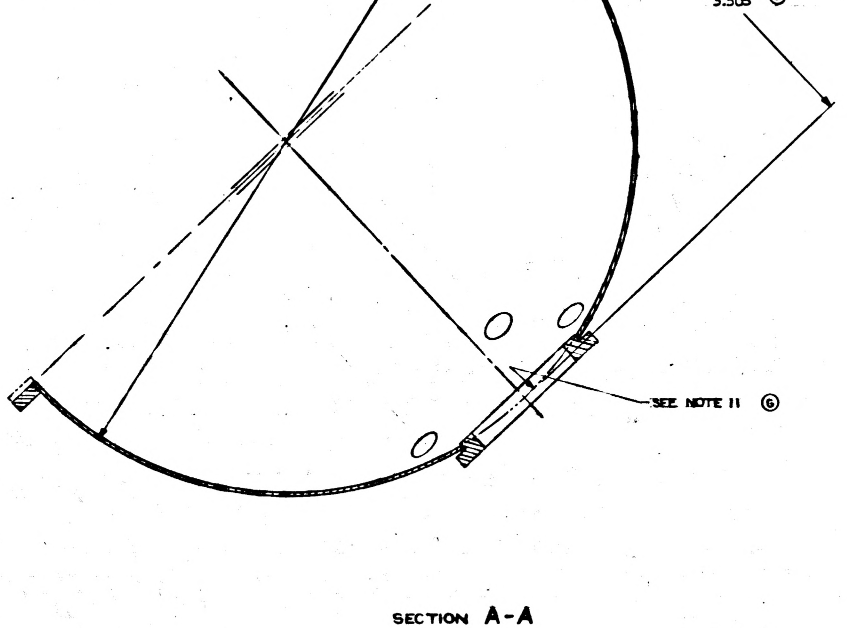
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING


G .000
.010 BEFORE BRAZING

DETAIL H
SCALE: 2/1
TYP ITEMS 7, 8 & 9
C



SECTION E-E
SCALE 2-1
16 PLACES
B


B
32
⌒ .002
11.080
SPHERICAL
OUTSIDE DIA REF
5.495
5.505 G
SEE NOTE 11 G

SECTION A-A

ES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 ITEM (5) IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING

~~[illegible]~~

DIP BRAZE PER [illegible] 1002073 EXCEPT AIRBLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING

HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY

- A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
- B. AGE AT 3[illegible]°F ± 10°F FOR 6 HOURS ± 5 MINUTES

ITEM (2) TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR UNDERCUT 4 PLACES.

BREAK ALL SHARP EDGES .005/.015

IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER [illegible] C02C9

ORDER OF OPERATIONS: (PROCESS NON MANDATORY)

- A. ROUGH MACHINE WITHIN .010
- B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
- C. FINISH MACHINE

OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM (2). USE OF [illegible] IS OPTIONAL, BUT IF USED, MUST BE LOCATED IN CENTER OF HOLES MARKED A & B [illegible] MUST NOT COME IN CONTACT WITH ITEMS (1) (3) & (4). ALTERNATE: MACHINING [illegible] BE MADE AS AN INTEGRAL PART OF ITEM (6). D

[illegible] SPHERICAL RADIUS OF 5.480/5.520 MUST BE MAINTAINED AFTER BRAZING AND HEAT TREAT.

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	MOUNT, CONN, OUTER GIMBAL	1000236			9
1	PLATE, CAP. MTG, OUTER GMBL	1000237			8
1	PLATE, SPEED CONTROLLER MTG	1000246			7
1	FLANGE, BLOWER, OUTER GIMBAL	1000058			6
8	PIN STRAIGHT HEADLESS	1000054-1			5
2	FLANGE, OUTER GIMBAL, SHAFT, STUB	1000045			4
2	FLANGE, OUTER GIMBAL, HOUSING BEARING	1000046			3
1	FLG OUTER GIMBAL	1000048			2
1	HEMISPHERE, FIXED, OUTER GIMBAL	1000230			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000103	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN R CONTANT 6-27-62
APPROVED MSC 9-13-62
BY DIRECTION
MIT 9/13/62

HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL

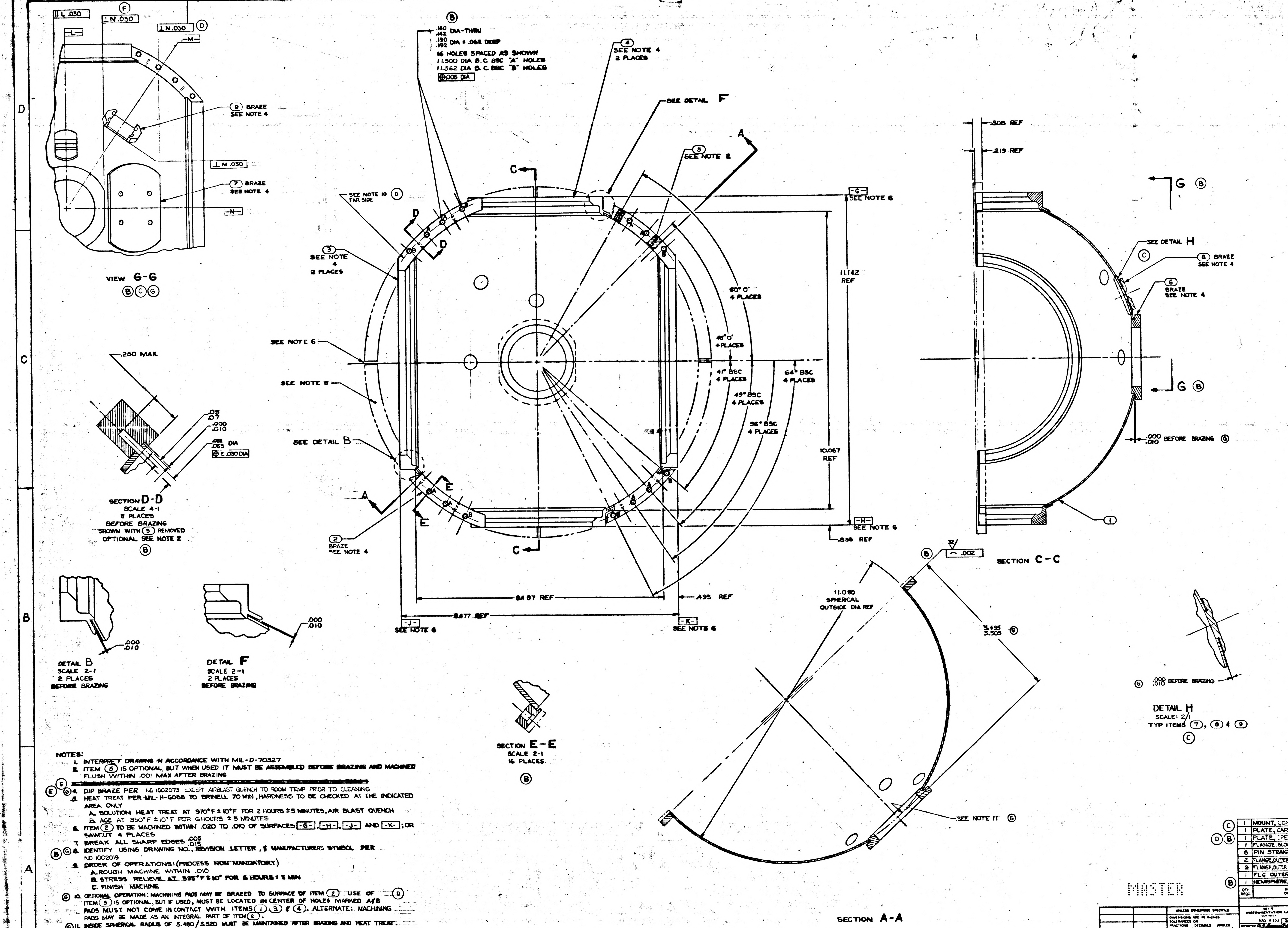
SCALE 1-1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000066
SHEET 1 OF 1

1000066 G

100066 REV G SHEET 1

PHOTOGRAPHIC SCALE ONLY


VIEW G-G
B C G
SECTION D-D
SCALE 4-1
8 PLACES
BEFORE BRAZING
SHOWN WITH 5 REMOVED
OPTIONAL SEE NOTE 2
B
.250 MAX
.082 .083 DIA
E .030 DIA
DETAIL B
SCALE 2-1
2 PLACES
BEFORE BRAZING
DETAIL F
SCALE 2-1
2 PLACES
BEFORE BRAZING
.000 .010
B
.140 .142 DIA-THRU
.190 .192 DIA x .062 DEEP
16 HOLES SPACED AS SHOWN
11.500 DIA B.C. BSC "A" HOLES
11.562 DIA B.C. BSC "B" HOLES
.005 DIA
4 SEE NOTE 4 2 PLACES
SEE DETAIL F
5 SEE NOTE 2
SEE NOTE 10 FAR SIDE D
3 SEE NOTE 4 2 PLACES
SEE NOTE 6
SEE NOTE 5
SEE DETAIL B
2 BRAZE SEE NOTE 4
60° 0' 4 PLACES
45° 0' 4 PLACES
41° BSC 4 PLACES
49° BSC 4 PLACES
56° BSC 4 PLACES
64° BSC 4 PLACES
11.142 REF
10.067 REF
-G- SEE NOTE 6
-H- SEE NOTE 6
-J- SEE NOTE 6
-K- SEE NOTE 6
.538 REF
8.487 REF
8.477 REF
.495 REF
SECTION E-E
SCALE 2-1
16 PLACES
B
.308 REF
.219 REF
G B
SEE DETAIL H
C
8 BRAZE SEE NOTE 4
6 BRAZE SEE NOTE 4
.000 .010 BEFORE BRAZING G
1
SECTION C-C
B
.002
11.080 SPHERICAL OUTSIDE DIA REF
5.495 5.505 G
SEE NOTE 11 G
SECTION A-A
G .000 .010 BEFORE BRAZING
DETAIL H
SCALE: 2/1
TYP ITEMS 7, 8 & 9
C
9 BRAZE SEE NOTE 4
7 BRAZE SEE NOTE 4
L .030
⊥ N .030
⊥ M .030
F
D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEM ⑤ IS OPTIONAL, BUT WHEN USED IT MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. ~~[illegible]~~ E
4. E G DIP BRAZE PER ND 1002073 EXCEPT AIRBLAST QUENCH TO ROOM TEMP PRIOR TO CLEANING
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN, HARDNESS TO BE CHECKED AT THE INDICATED AREA ONLY
   - A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES, AIR BLAST QUENCH
   - B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. ITEM ② TO BE MACHINED WITHIN .020 TO .010 OF SURFACES -G-, -H-, -J- AND -K-; OR SAWCUT 4 PLACES
7. BREAK ALL SHARP EDGES .005 .015
8. B G IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND 1002019
9. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE WITHIN .010
   - B. STRESS RELIEVE AT 325°F ± 10° FOR 6 HOURS ± 5 MIN
   - C. FINISH MACHINE
10. G OPTIONAL OPERATION: MACHINING PADS MAY BE BRAZED TO SURFACE OF ITEM ②. USE OF ITEM ⑤ IS OPTIONAL, BUT IF USED, MUST BE LOCATED IN CENTER OF HOLES MARKED A&B PADS MUST NOT COME IN CONTACT WITH ITEMS ① ③ & ④. ALTERNATE: MACHINING PADS MAY BE MADE AS AN INTEGRAL PART OF ITEM ⑥. D
11. G INSIDE SPHERICAL RADIUS OF 5.480/5.520 MUST BE MAINTAINED AFTER BRAZING AND HEAT TREAT.

SYM	DESCRIPTION	DATE
A	TDR 00147	27 NOV
B	TDRR 00428	1-7-63
C	TDRR 00_4	
D	TDRR 01233	9-10-63
E	TDRR 01443	6-3-63
F	TDRR 01678	6-13-63
G	TDRR 04565	12-5-63

MASTER

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION
C	1	MOUNT, CONN, OUTER GIMBAL	1000236	
	1	PLATE, CAP MTG, OUTER GMBL	1000237	
D B	1	PLATE, SPEED CONTROLLER MTG	1000216	
	1	FLANGE, BLOWER, OUTER GIMBAL	1000C5	
	8	PIN STRAIGHT HEADLESS	100005	
	2	FLANGE, OUTER GIMBAL, SHAFT, STUB	100004	
	2	FLANGE, OUTER GIMBAL, HOUSING BEARING	100004	
	1	FLG OUTER GIMBAL	100004	
B	1	HEMISPHERE, FIXED, OUTER GIMBAL	100023	

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000103	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN R. CONTINO
MSC
6-13-63

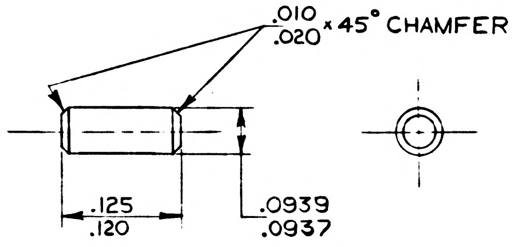
HEMISPHERE ASSEMBLY
FIXED
OUTER GIMBAL
SCALE 1-1
UNIT WT.

10000

1000066 REV G SHEET 1

1000069 B

REVISIONS TDRR 00025			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL CHANGES	9-11-62	agB WK
B	TDRR 00257	1-15-63	agB JMM



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70237
2. 63/ ALL OVER
3. Ⓑ IDENTIFY USING DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130.

MASTER Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY Ⓑ

NEXT ASSY	USED ON
	DL 1000201
1000063	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ±5°
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY ROD 1100, TEMP H14 ALT SPEC QQ-A-411D TEMP O

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	Q.J. Boyce	9-13-62
CHECKED		
DRAWN	D.M.WHITE	7-2-62

APPROVED FOR MSC
9-13-62
BY DIRECTION
MIT APPROVAL 9/13/62

PIN, LOCATING,
ADA MOUNT

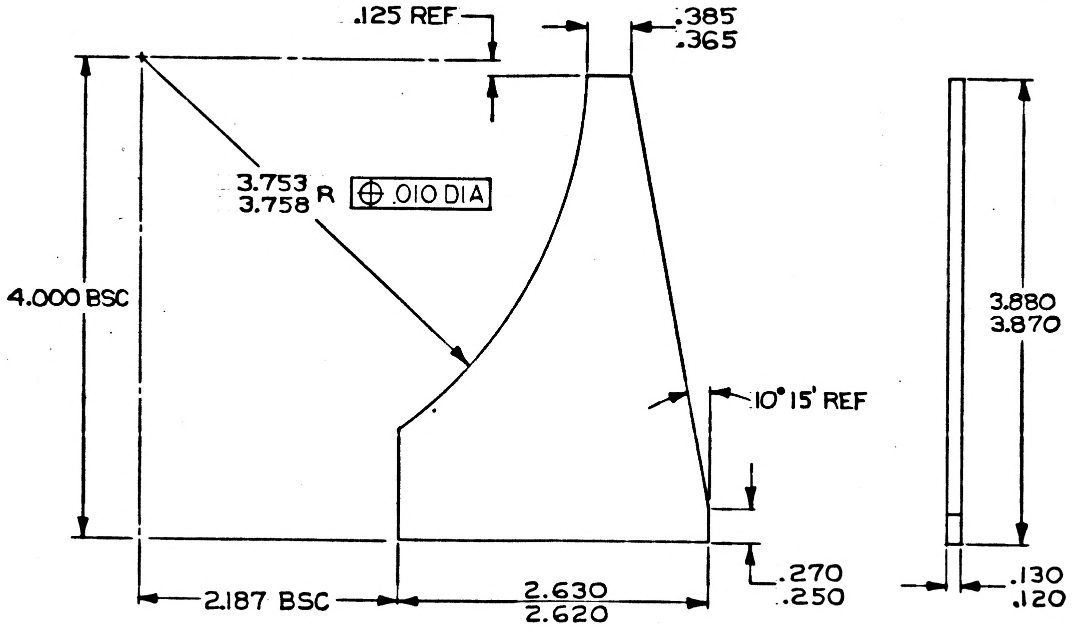
SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000069
SHEET 1 OF 1

1000072

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 00077



NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES $^{.005}_{.015}$
3 250$\surd$ ALL OVER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000083	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327B TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/31/62
CHECKED		
DRAWN	G. QUINN	7/3/62

APPROVED FOR MSC
W J Rhine 10-31-62
BY DIRECTION
MIT APPROVAL 10/31/62

GUSSET PLATE
CASE

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000072
SHEET 1 OF 1 SHEET

1000074

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00109	19Nov62		

REVISIONS TDRR 00065

Ⓜ

PART NO.	DESCRIPTION	REQD.
1000063	Hemisphere Assy, Fixed Middle Gimbal	1
1000055	Hemisphere Assy, Movable Middle Gimbal	1
1000110-7	Screw, Cap, Socket Head, Hexagon	12
1000088-2	Pin Locating	4
MS 16555-625	Dowel Pin	4
1000115-3	Insert, threaded Self Locking	36

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10/17/62
BY DIRECTION MIT Approval
10/17/62

MIDDLE GIMBAL HOUSING
ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000074

SHEET OF

1000074

REVISIONS TDRR 00065			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDR 00109	19 Nov 62	AJB
B	REPLACED WITH CHANGE BY REV C TDRR 00159	11 DEC 62	AJB

PART NO.	DESCRIPTION	REQD.
1000063	Hemisphere Assy, Fixed Middle Gimbal	1
1000055	Hemisphere Assy, Movable Middle Gimbal	1
1000110-7	Screw, Cap, Socket Head, Hexagon	12
1000088-2	Pin Locating	4
MS 16555-625	Dowel Pin	4
1000115-3	Insert, threaded Self Locking	36

REPLACED WITH CHANGE BY REV C

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

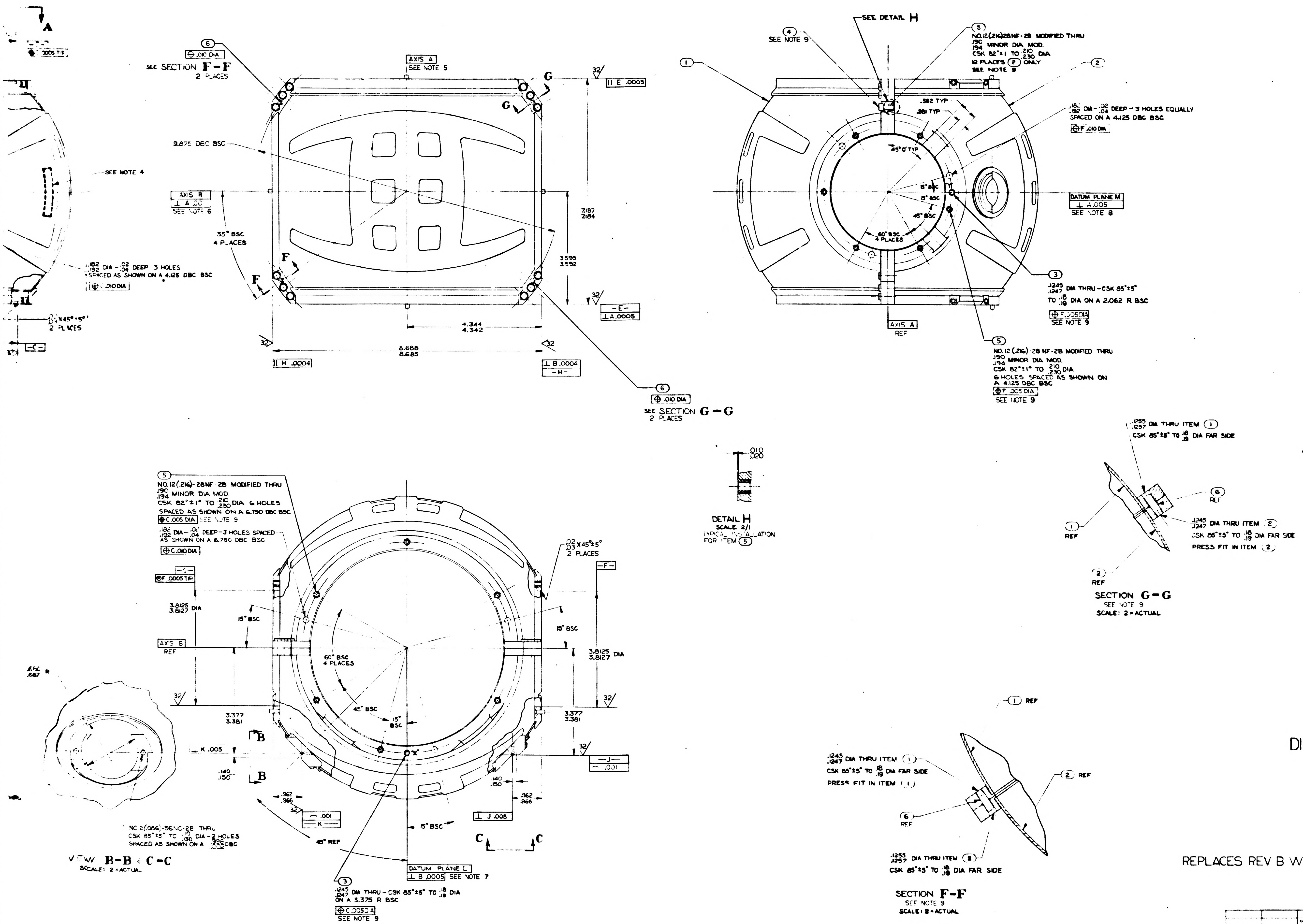
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A J Boyce DATE 10/17/62
CHECKED
DRAWN
APPROVED FOR MSC
10/17/62
BY DIRECTION MIT Approval
10/17/62

MIDDLE GIMBAL HOUSING
ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000074
SHEET OF

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV B WITH CHANGE IDRR 00159	11 Dec 62	WK



SEE SECTION F-F 2 PLACES
⊕ .010 DIA
AXIS A
SEE NOTE 5
G
G
11 E .0005
9.875 DBC BSC
SEE NOTE 4
AXIS B
⊥ A .00
SEE NOTE 6
35° BSC 4 PLACES
2.187 2.184
3.593 3.592
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ .010 DIA
F
F
.03 X45°±5° 2 PLACES
-C-
4.344 4.342
8.688 8.685
11 H .0004
⊥ B .0004
-H-
-E-
⊥ A .0005
⑥
⊕ .010 DIA
SEE SECTION G-G 2 PLACES
SEE DETAIL H
④ SEE NOTE 9
⑤ NO.12(.216)28NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD. CSK 82°±1 TO .210 .230 DIA 12 PLACES ② ONLY SEE NOTE 9
①
②
.562 TYP
.281 TYP
45° 0' TYP
.182 .192 DIA - .02 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 4.125 DBC BSC
⊕ F .010 DIA
15° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
DATUM PLANE M
⊥ A .005
SEE NOTE 8
③ .1245 .1247 DIA THRU - CSK 85°±5° TO .18 .19 DIA ON A 2.062 R BSC
⊕ F .005 DIA
SEE NOTE 9
AXIS A REF
⑤ NO.12 (.216)-28 NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD. CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ F .005 DIA
SEE NOTE 9
.010 .020
DETAIL H SCALE 2/1 TYPICAL INSTALLATION FOR ITEM ⑤
.1255 .1257 DIA THRU ITEM ① CSK 85°±5° TO .18 .19 DIA FAR SIDE
⑥ REF
① REF
.1245 .1247 DIA THRU ITEM ② CSK 85°±5° TO .18 .19 DIA FAR SIDE PRESS FIT IN ITEM ②
② REF
SECTION G-G
SEE NOTE 9
SCALE: 2 x ACTUAL
⑤ NO.12 (.216)-28NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD. CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .005 DIA SEE NOTE 9
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .010 DIA
.02 .03 X45°±5° 2 PLACES
-G-
⊕ F .0005 TIR
-F-
3.8125 3.8127 DIA
15° BSC
15° BSC
AXIS B REF
60° BSC 4 PLACES
3.8125 3.8127 DIA
45° BSC
15° BSC
3.377 3.381
3.377 3.381
⊥ K .005
B
B
.140 .150
.140 .150
-J-
⊥ .001
.962 .966
.962 .966
⊥ .001
-K-
15° BSC
45° REF
⊥ J .005
C
C
DATUM PLANE L
⊥ B .0005 SEE NOTE 7
③ .1245 .1247 DIA THRU - CSK 85°±5° TO .18 .19 DIA ON A 3.375 R BSC
⊕ C .0052 A
SEE NOTE 9
.656 .687 R
NO.2(.086)-56NC-2B THRU CSK 85°±5° TO .10 .130 DIA - 2 HOLES SPACED AS SHOWN ON A .828 .832 DBC
VIEW B-B & C-C
SCALE: 2 x ACTUAL
.1245 .1247 DIA THRU ITEM ① CSK 85°±5° TO .18 .19 DIA FAR SIDE PRESS FIT IN ITEM ①
① REF
② REF
⑥ REF
.1255 .1257 DIA THRU ITEM ② CSK 85°±5° TO .18 .19 DIA FAR SIDE
SECTION F-F
SEE NOTE 9
SCALE: 2 x ACTUAL

DISREGARD ROLLBOND PATTERN

REPLACES REV B WITH CHANGE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000068-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M.I.T. INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED G J Bergen 12 Feb 62
CHECKED
DRAWN D M WHITE 3-27-61
APPROVED FOR MSC W G Rhine 12-12-62
M.I.T. APPROVAL W G Hopper 12/12/62

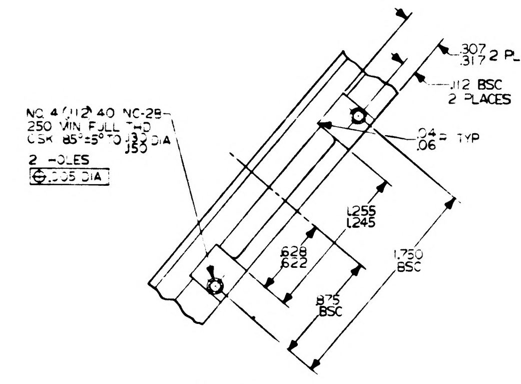
HOUSING ASSEMBLY
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

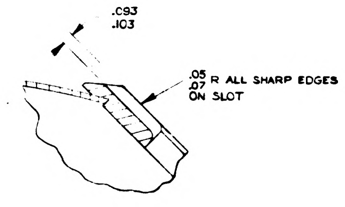
M.I.T. INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000074
SHEET 1 OF

1000074 REV C SHEET 1

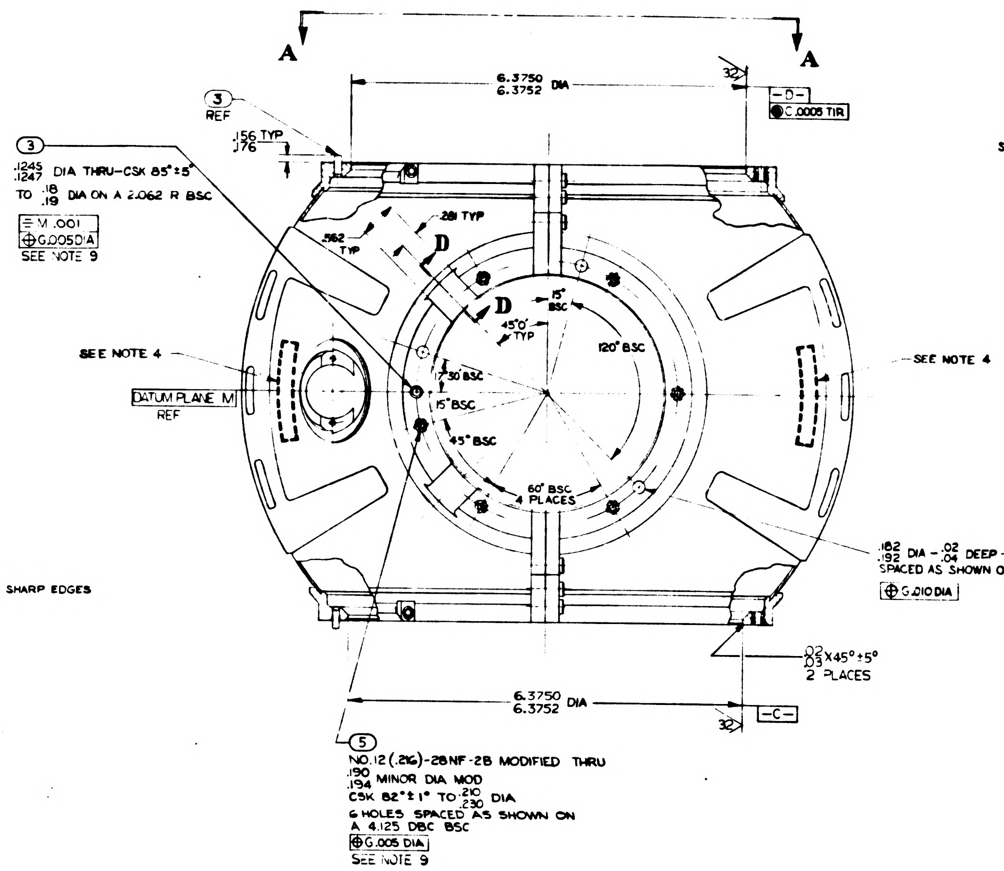
12483

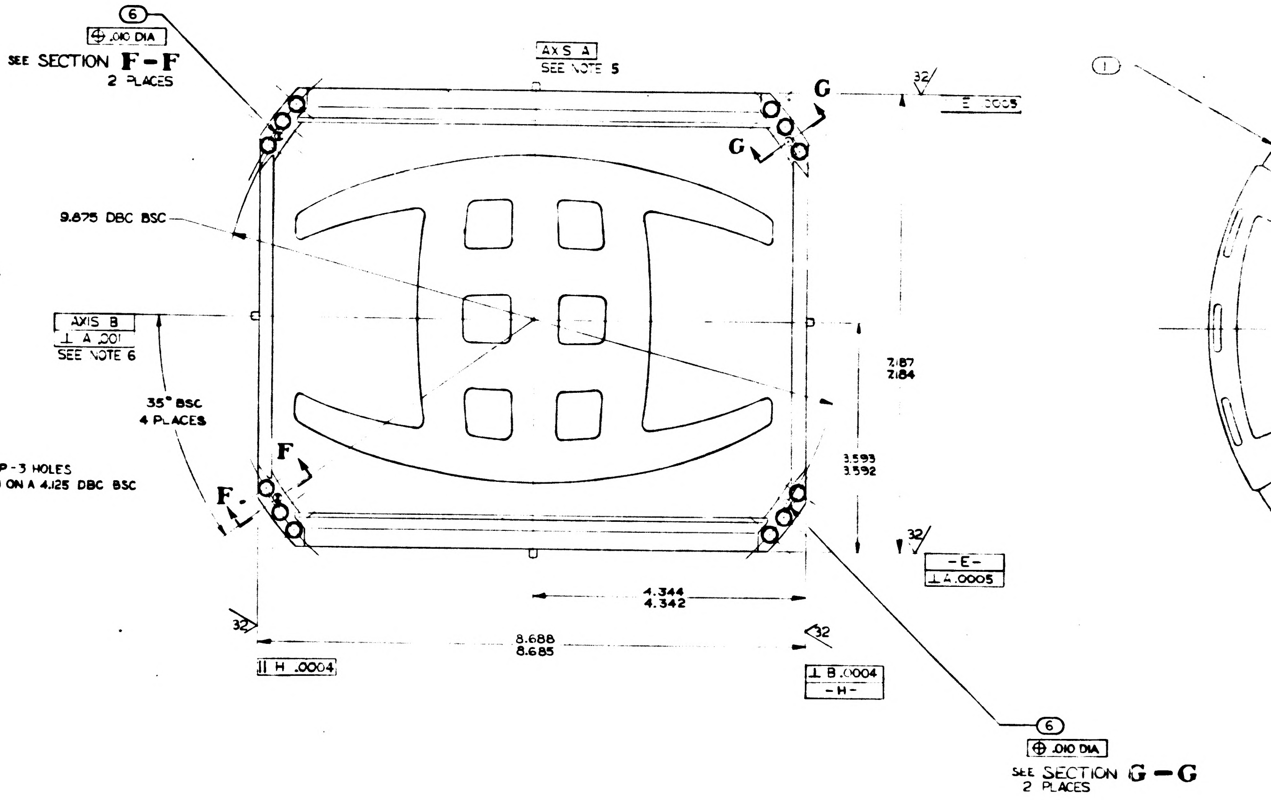

.307
.317 2 PLACES
.312 BSC
2 PLACES
NO. 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .133/.153 DIA
2 HOLES
⊕ .005 DIA
.24±
.06 TYP
1.255
1.245
.626
.622
1.750
BSC
.875
BSC

VIEW J-J
TYP 4 PLACES
SCALE: 2 X ACTUAL


.093
.103
.05
.07 R ALL SHARP EDGES
ON SLOT

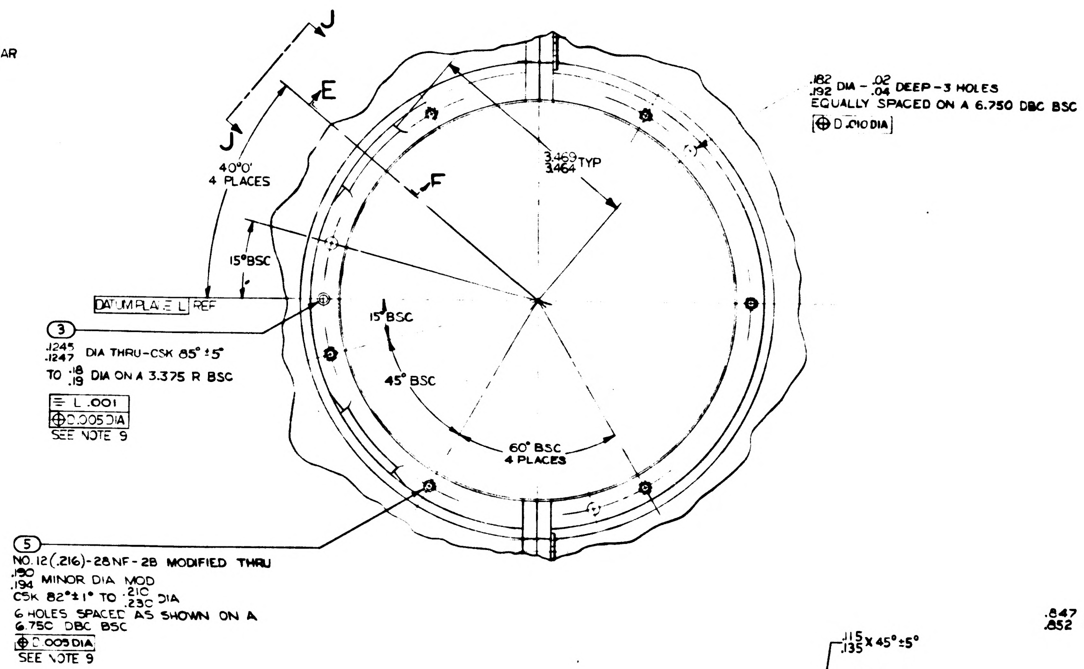
SECTION D-D
TYP - 4 PLACES
SCALE: 2 × ACTUAL


A
A
6.3750
6.3752 DIA
32
-D-
⊙ C .0005 TIR
3
REF
.156 TYP
.176
3
.1245
.1247 DIA THRU-CSK 85°±5°
TO .18
.19 DIA ON A 2.062 R BSC
⊥ M .001
⊕ G .005 DIA
SEE NOTE 9
.562
TYP
.281 TYP
D
D
15°
BSC
45°0'
TYP
120° BSC
SEE NOTE 4
SEE NOTE 4
DATUM PLANE M
REF
17°30' BSC
15° BSC
45° BSC
60° BSC
4 PLACES
.182
.192 DIA - .02
.04 DEEP - 3 HOLES
SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .010 DIA
.02
.03 X 45° ± 5°
2 PLACES
6.3750
6.3752 DIA
32
-C-
5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190
.194 MINOR DIA MOD
CSK 82° ± 1° TO .210
.230 DIA
6 HOLES SPACED AS SHOWN ON
A 4.125 DBC BSC
⊕ G .005 DIA
SEE NOTE 9

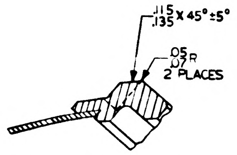

6
⊕ .010 DIA
SEE SECTION F-F
2 PLACES
AXIS A
SEE NOTE 5
G
G
32
-E- .0005
9.875 DBC BSC
AXIS B
⊥ A .001
SEE NOTE 6
7.87
7.84
35° BSC
4 PLACES
F
F
3.593
3.592
32
-E-
⊥ A .0005
4.344
4.342
32
8.688
8.685
32
⊥ H .0004
⊥ B .0004
-H-
6
⊕ .010 DIA
SEE SECTION G-G
2 PLACES

NOTES

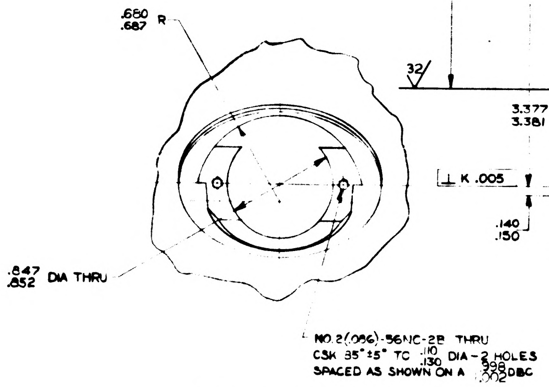
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO. REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ② AND MATCHING SERIAL NO. ON ① AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7. A PLANE CONTAINING AXIS A AND CENTER OF ITEM ③ MARKED "X" ESTABLISHES DATUM PLANE L
8. A PLANE CONTAINING AXIS B AND CENTER OF ITEM ③ MARKED "Y" ESTABLISHES DATUM PLANE M
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
   - B. DRILL, REAM & CSINK FOR ITEM ⑥
   - C. INSTALL ITEM ⑥
   - D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
   - E. STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MINUTES
   - F. FINISH MACHINE
   - G. REMOVE ITEM ⑥ AND ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
   - H. INSTALL ITEMS ③, ④, ⑤ & ⑥


J
E
J
F
40°0'
4 PLACES
3.460
3.464 TYP
.182
.192 DIA - .02
.04 DEEP - 3 HOLES
EQUALLY SPACED ON A 6.750 DBC BSC
⊕ D .010 DIA
15° BSC
DATUM PLANE L REF
3
.1245
.1247 DIA THRU-CSK 85°±5°
TO .18
.19 DIA ON A 3.375 R BSC
⊥ L .001
⊕ D .005 DIA
SEE NOTE 9
15° BSC
45° BSC
60° BSC
4 PLACES
5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190
.194 MINOR DIA MOD
CSK 82° ± 1° TO .210
.230 DIA
6 HOLES SPACED AS SHOWN ON A
6.750 DBC BSC
⊕ D .005 DIA
SEE NOTE 9

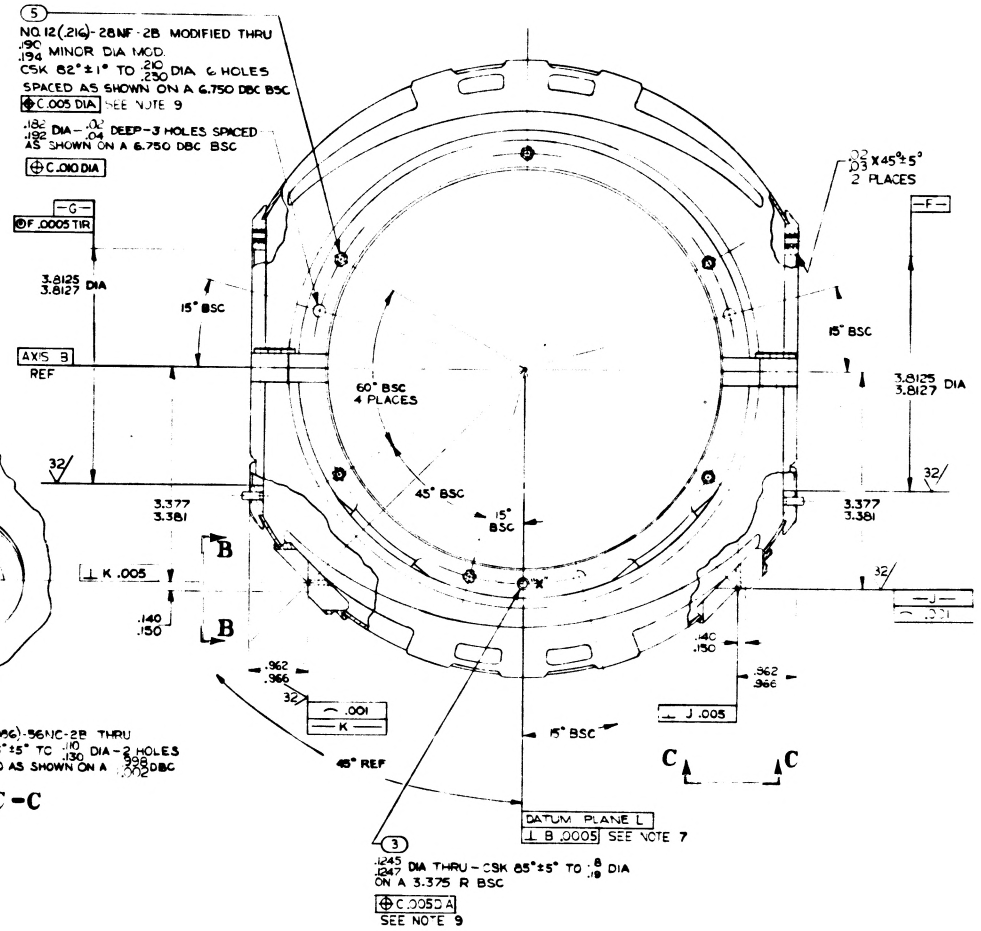
VIEW A-A

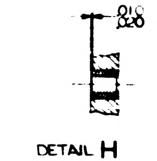

.115
.135 X 45° ± 5°
.05
.07 R
2 PLACES

SECTION E-E
TYP - 4 PLACES
SCALE: 2X ACTUAL


.650
.687 R
.847
.852 DIA THRU
NO. 2 (.086)-56NC-2B THRU
CSK 85° ± 5° TO .110
.130 DIA - 2 HOLES
SPACED AS SHOWN ON A .938 DBC

VIEW B-B & C-C
SCALE: 2 - ACTUAL


5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190
.194 MINOR DIA MOD
CSK 82° ± 1° TO .210
.230 DIA 6 HOLES
SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .005 DIA SEE NOTE 9
.182
.192 DIA - .02
.04 DEEP - 3 HOLES SPACED
AS SHOWN ON A 6.750 DBC BSC
⊕ C .010 DIA
-G-
⊙ F .0005 TIR
3.8125
3.8127 DIA
15° BSC
AXIS B
REF
.02
.03 X 45° ± 5°
2 PLACES
-F-
15° BSC
60° BSC
4 PLACES
3.8125
3.8127 DIA
32
32
3.377
3.381
45° BSC
15° BSC
3.377
3.381
⊥ K .005
B
B
.140
.150
32
-J-
⊥ .001
.140
.150
.962
.966
32
⌒ .001
-K-
.962
.966
⊥ J .005
15° BSC
45° REF
C
C
DATUM PLANE L
⊥ B .0005 SEE NOTE 7
3
.1245
.1247 DIA THRU - CSK 85° ± 5° TO .18
.19 DIA
ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 9

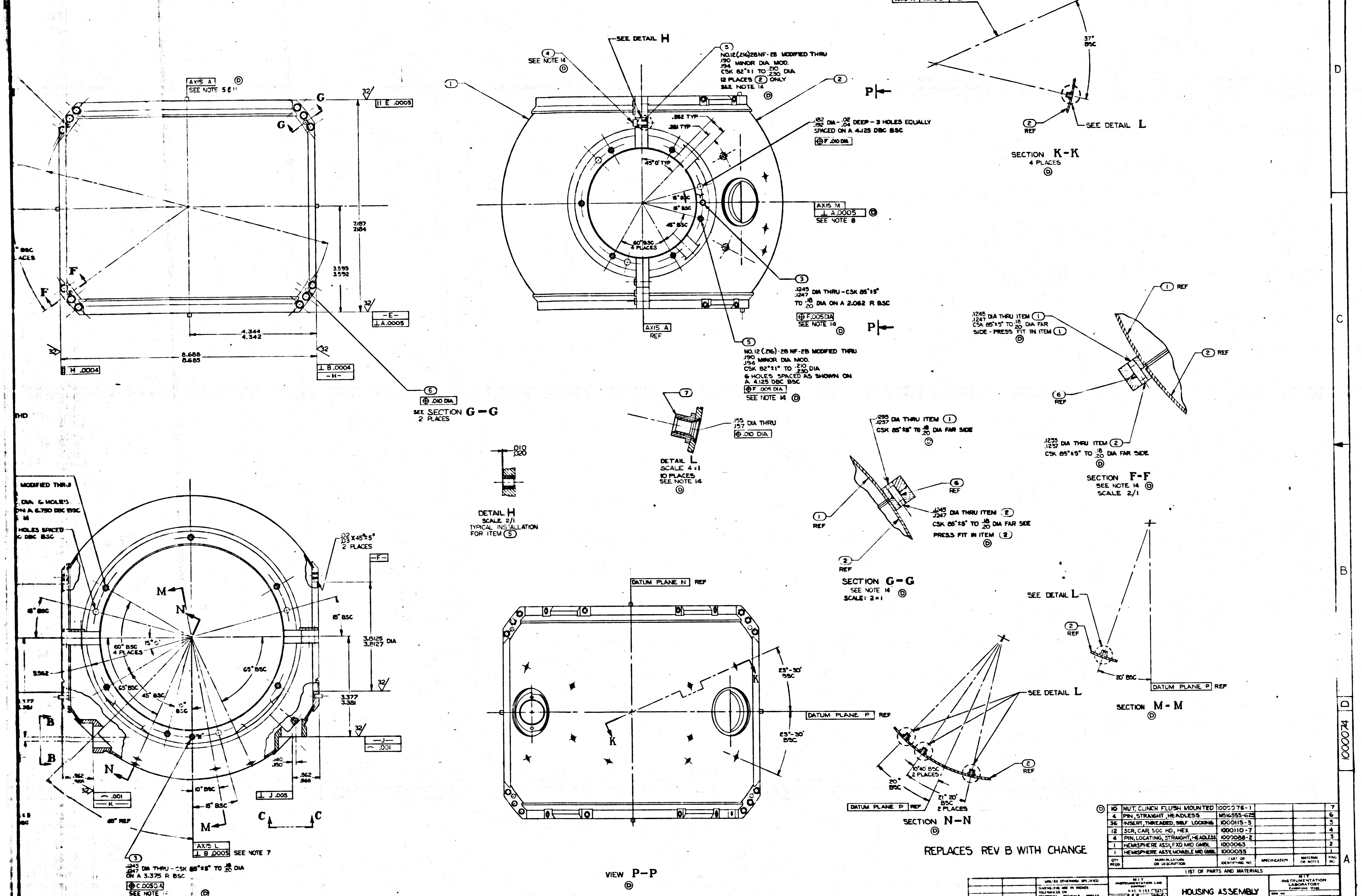


DETAIL H
SCALE 2/1
TYPICAL ALL AT
FOR ITEM ⑤

1000074 REV C SHEET 1

11/83

REV	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE TDRR 00159	11 Dec 62		WK
D	TDRR 00360	4-24-63		WK



AXIS A
SEE NOTE 5 & 11
G
F
11 E .0005
7.187
7.184
3.593
3.592
4.344
4.342
8.688
8.685
H .0004
⊥ B .0004
-H-
-E-
⊥ A .0005
SEE DETAIL H
SEE NOTE 14
NO.12(.216)28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1 TO .210 .230 DIA
12 PLACES ② ONLY
SEE NOTE 14
.562 TYP
.281 TYP
.182 .192 DIA - .02 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 4.125 DBC BSC
⊕ F .010 DIA
45° 0' TYP
15° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
AXIS M
⊥ A .0005
SEE NOTE 8
P
.1245 .1247 DIA THRU - CSK 85°±5°
TO .18 .20 DIA ON A 2.062 R BSC
⊕ F .005 DIA
SEE NOTE 14
AXIS A REF
NO.12(.216)-28 NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ F .005 DIA
SEE NOTE 14
⊕ .010 DIA
SEE SECTION G-G 2 PLACES
AXIS A | AXIS B | REF
37° BSC
SEE DETAIL L
REF
SECTION K-K
4 PLACES
.1245 .1247 DIA THRU ITEM ①
CSK 85°±5° TO .18 .20 DIA FAR SIDE - PRESS FIT IN ITEM ①
① REF
② REF
⑥ REF
.1255 .1257 DIA THRU ITEM ②
CSK 85°±5° TO .18 .20 DIA FAR SIDE
SECTION F-F
SEE NOTE 14
SCALE 2/1
.155 .157 DIA THRU
⊕ .010 DIA
DETAIL L
SCALE 4×1
10 PLACES
SEE NOTE 14
.010 .020
DETAIL H
SCALE 2/1
TYPICAL INSTALLATION FOR ITEM ⑤
.1255 .1257 DIA THRU ITEM ①
CSK 85°±5° TO .18 .20 DIA FAR SIDE
.1245 .1247 DIA THRU ITEM ②
CSK 85°±5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
SECTION G-G
SEE NOTE 14
SCALE: 2×1
SEE DETAIL L
20° BSC
DATUM PLANE P REF
SECTION M-M
MODIFIED THRU
DIA & HOLES
ON A 6.750 DBC BSC
HOLES SPACED
DBC BSC
.02 .03 X45°±5°
2 PLACES
-F-
15° BSC
60° BSC 4 PLACES
15° 0'
65° BSC
45° BSC
3.8125 3.8127 DIA
3.377 3.381
-J-
⌒ .001
.140 .150
.962 .966
⊥ J .005
10° BSC
15° BSC
⌒ .001
-K-
45° REF
AXIS L
⊥ B .0005
SEE NOTE 7
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA
ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14
B
N
M
C
DATUM PLANE N REF
DATUM PLANE P REF
23°-30' BSC
K
VIEW P-P
SEE DETAIL L
10°40' BSC 2 PLACES
21°20' BSC 2 PLACES
20° BSC
DATUM PLANE P REF
SECTION N-N
MASTER
4
3
2
1
D
C
B
A

REPLACES REV B WITH CHANGE

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
10	NUT, CLINCH FLUSH MOUNTED	1000076-1			7
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN D M WHITE
APPROVED FOR MSC
M.I.T.

HOUSING ASSEMBLY
MIDDLE GIMBAL

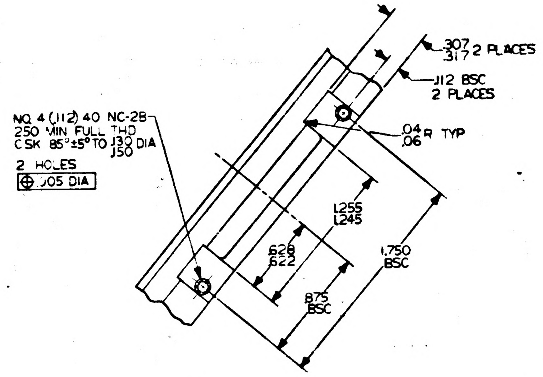
SCALE 1/1
UNIT WT.
CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO

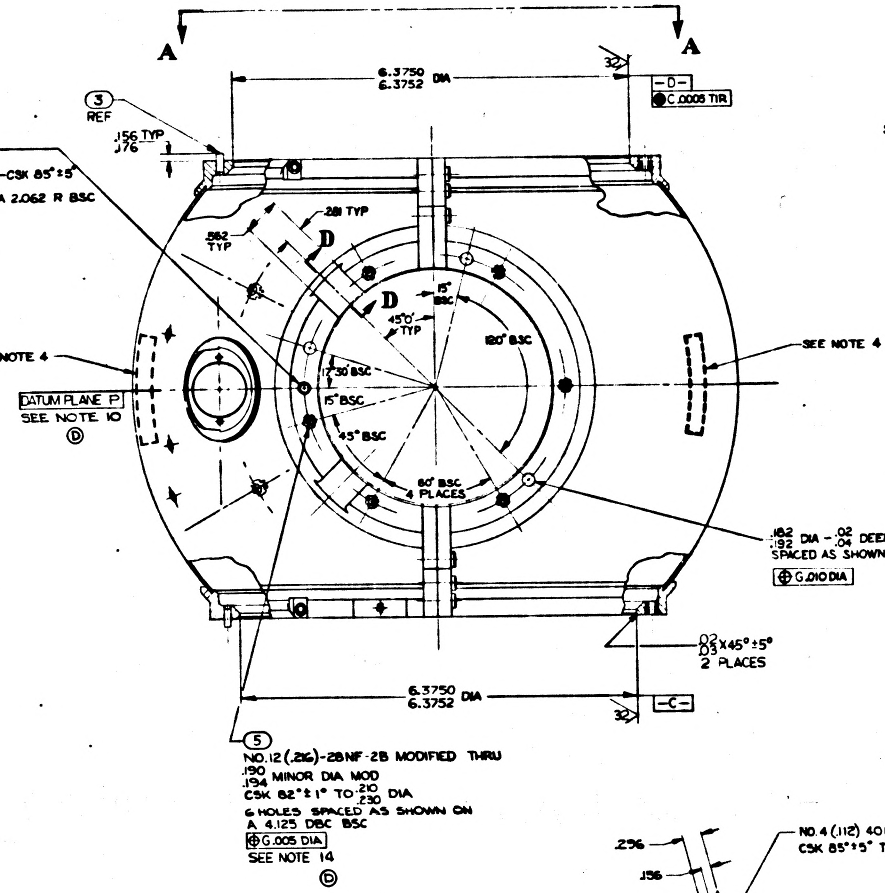
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000074
SHEET 1 OF 1

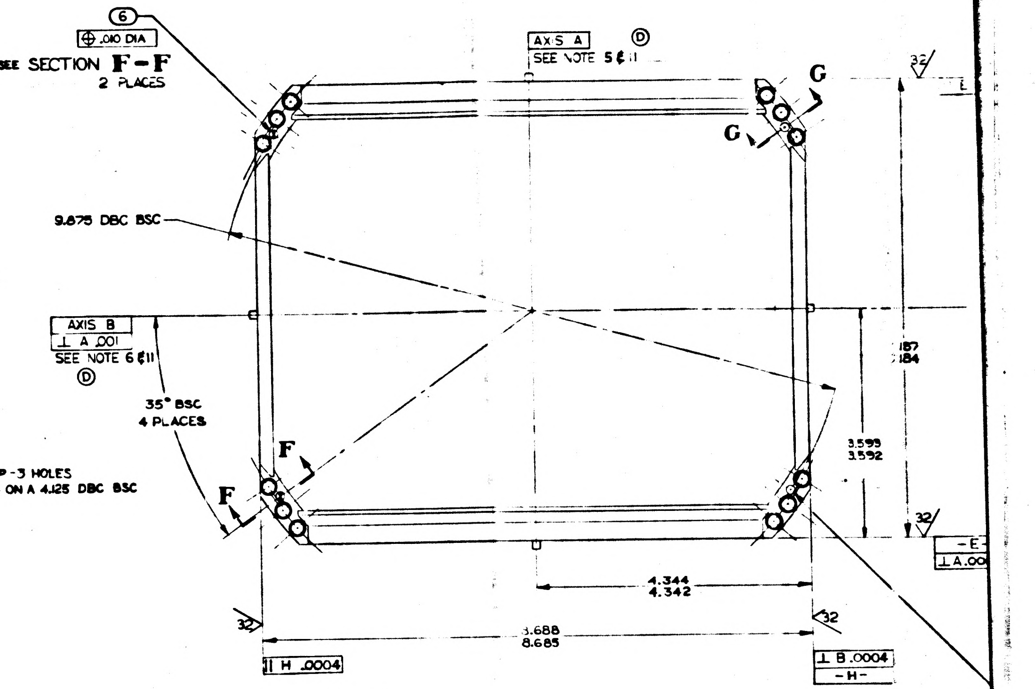
1000074

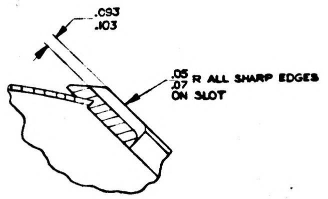
INCHES
PHOTOGRAPHIC SCALE ONLY


.307 .317 2 PLACES
.112 BSC 2 PLACES
NO. 4 (.112) 40 NC-2B .250 MIN FULL THD CSK 85°±5° TO .130 .150 DIA
2 HOLES
⊕ .005 DIA
.04 .06 R TYP
1.255 1.245
.628 .622
.875 BSC
1.750 BSC

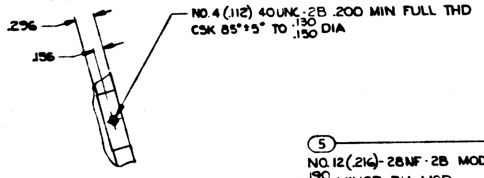
VIEW J-J
TYP-4 PLACES
SCALE: 2×1


A
A
6.3750 6.3752 DIA
32
-D-
◎ C .0005 TIR
③ REF
.156 TYP .176
③
Ⓓ .1245 .1247 DIA THRU-CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
⊥ P .001
⊕ G .005 DIA
SEE NOTE 14
.281 TYP
.562 TYP
D
D
15° BSC
45°0' TYP
120° BSC
17°30' BSC
15° BSC
45° BSC
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
Ⓓ
SEE NOTE 4
60° BSC 4 PLACES
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .010 DIA
.02 .03 X45°±5° 2 PLACES
6.3750 6.3752 DIA
32
-C-
⑤
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .005 DIA
SEE NOTE 14
Ⓓ


⑥
⊕ .010 DIA
AXIS A
SEE NOTE 5 & 11
Ⓓ
SEE SECTION F-F 2 PLACES
G
G
32
9.875 DBC BSC
AXIS B
⊥ A .001
SEE NOTE 6 & 11
Ⓓ
35° BSC 4 PLACES
F
F
.187 .184
3.595 3.592
32
-E-
⊥ A .00
4.344 4.342
32
3.688 3.685
⊥ H .0004
⊥ B .0004
-H-

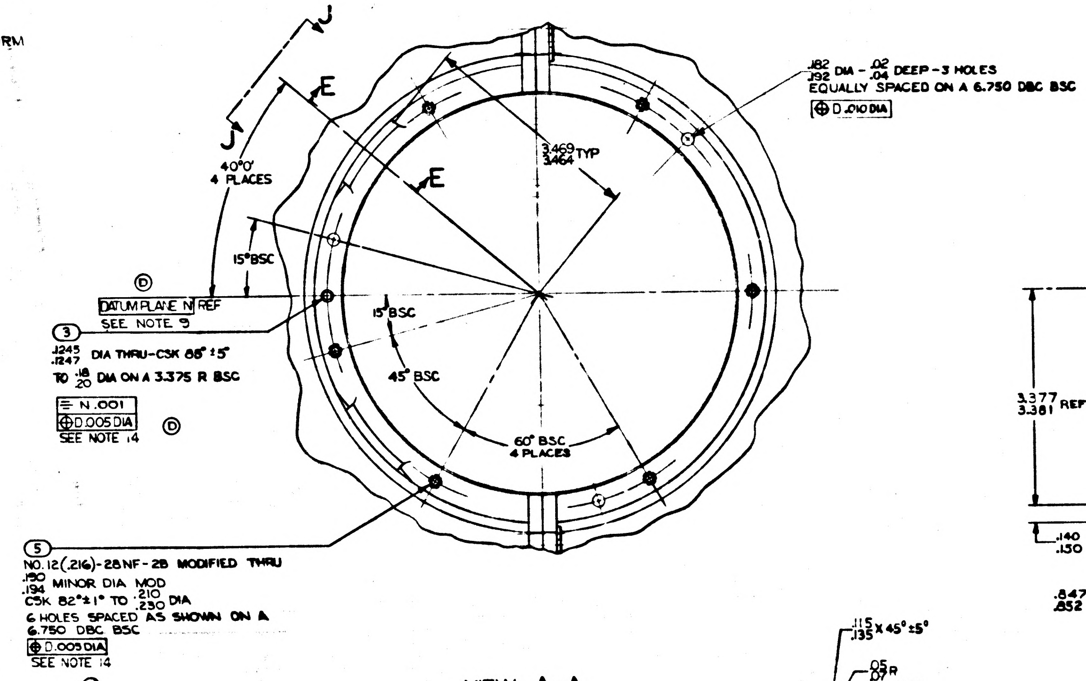

.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT

SECTION D-D
TYP-4 PLACES
SCALE: 2=1

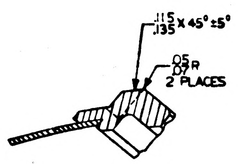

.296
.156
NO. 4 (.112) 40 UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130 .150 DIA

Ⓓ VIEW Q-Q

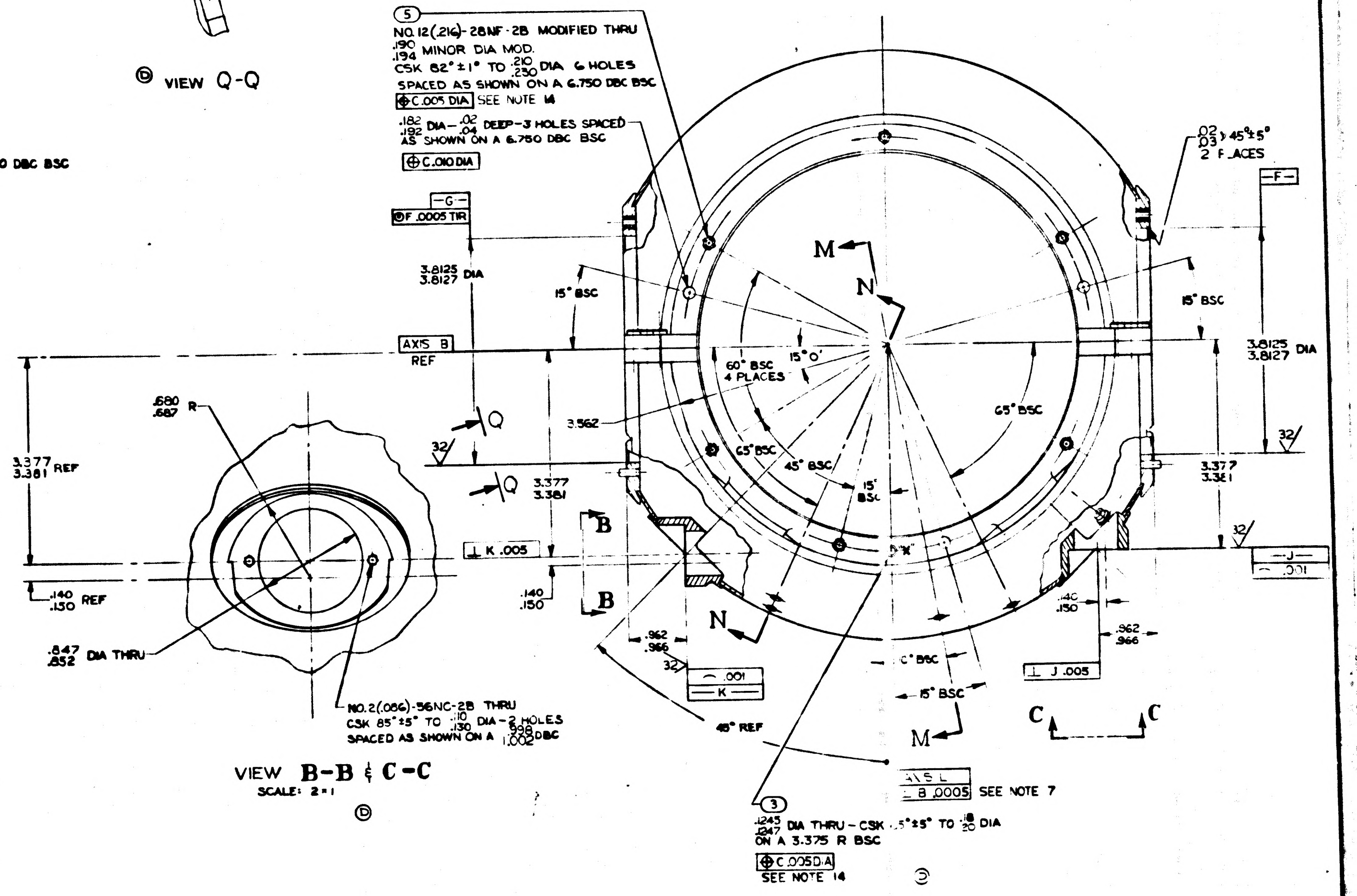
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO. REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ② AND MATCHING SERIAL NO. ON ① AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
Ⓓ 7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM ③ MARKED "X" ESTABLISHES AXIS M
Ⓓ 8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM ③ MARKED "Y" ESTABLISHES AXIS M
Ⓓ 9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
Ⓓ 10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
Ⓓ 11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
Ⓓ 12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
Ⓓ 13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ± 1°F
Ⓓ 14. ORDER OF OPERATIONS (NON-MANDATORY)
- A. ASSEMBLE ITEMS ① & ② USING NO.6 SCREWS & NUTS
- B. DRILL, REAM & C'SINK FOR ITEM ⑥
- C. INSTALL ITEM ⑥
- D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
- E. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
- F. FINISH MACHINE
- G. REMOVE ITEM ⑥ AND ANODIC COAT PER NOTE 12
- H. INSTALL ITEMS ③④⑤⑥ & ⑦


J
E
J
E
40°0' 4 PLACES
3.469 3.464 TYP
15° BSC
Ⓓ
DATUM PLANE N REF
SEE NOTE 9
③
.1245 .1247 DIA THRU-CSK 88°±5° TO .18 .20 DIA ON A 3.375 R BSC
⊥ N .001
⊕ D .005 DIA
SEE NOTE 14
Ⓓ
15° BSC
45° BSC
60° BSC 4 PLACES
.182 .192 DIA - .02 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 6.750 DBC BSC
⊕ D .010 DIA
⑤
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ D .005 DIA
SEE NOTE 14
Ⓓ

VIEW A-A


.115 .135 X 45°±5°
.05 .07 R 2 PLACES

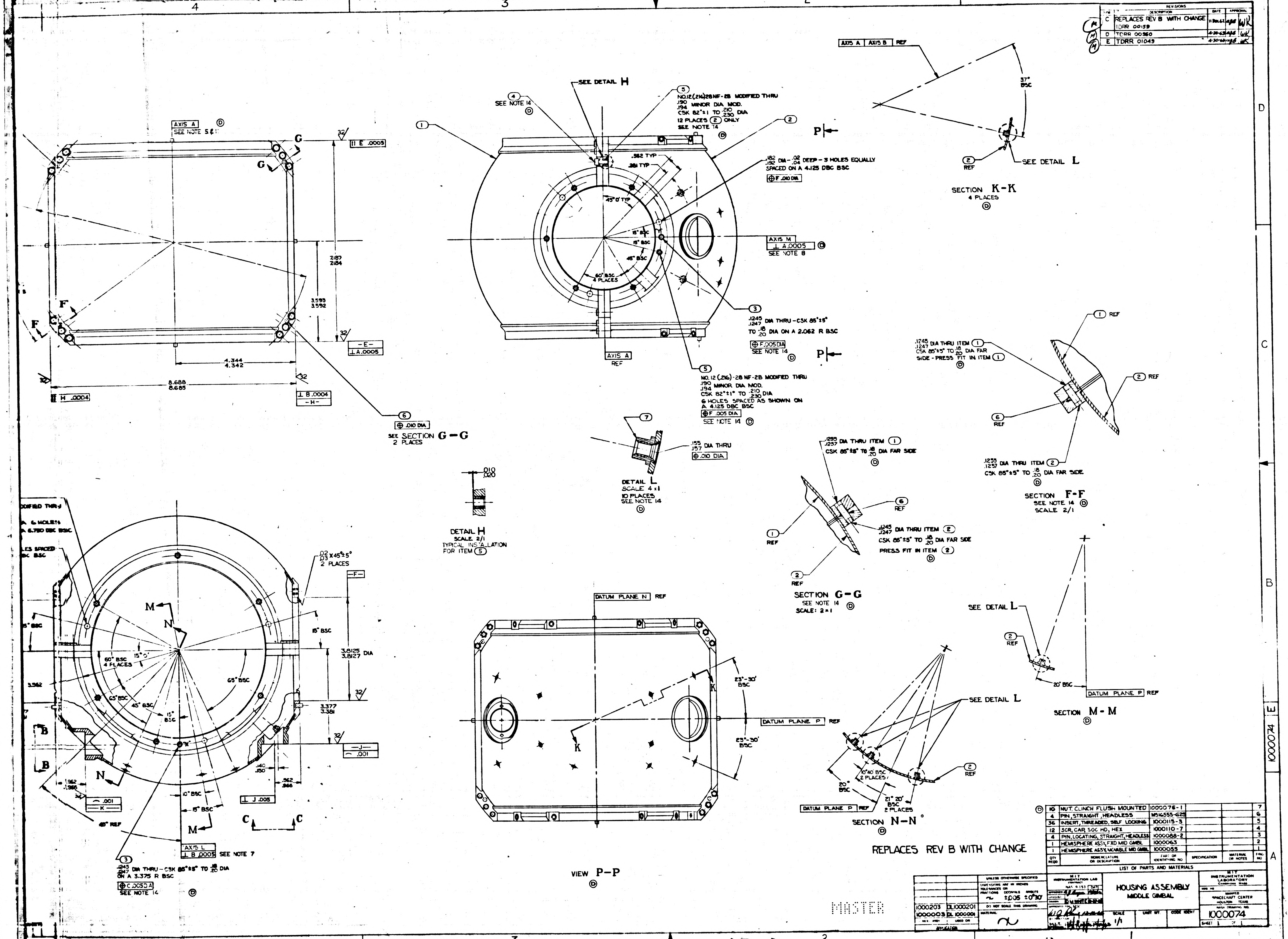
SECTION E-E
TYP-4 PLACES
SCALE: 2×1


⑤
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1° TO .210 .250 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .005 DIA SEE NOTE 14
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .010 DIA
-G-
◎ F .0005 TIR
3.8125 3.8127 DIA
AXIS B REF
Q
32
Q
3.562
3.377 3.381 REF
.680 .687 R
3.377 3.381
⊥ K .005
B
B
.140 .150 REF
.140 .150
.847 .852 DIA THRU
NO.2 (.086)-56NC-2B THRU CSK 85°±5° TO .110 .130 DIA - 2 HOLES SPACED AS SHOWN ON A .998 1.002 DBC
M
N
15° BSC
15°0'
60° BSC 4 PLACES
65° BSC
65° BSC
45° BSC
15° BSC
N
.962 .966
32
⌒ .001
-K-
45° REF
15° BSC
M
.02 .03 X 45°±5° 2 PLACES
-F-
15° BSC
3.8125 3.8127 DIA
32
3.377 3.321
32
-J-
⌒ .001
.140 .150
.962 .966
⊥ J .005
C
C
AXIS L
⊥ B .0005 SEE NOTE 7
③
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14
Ⓓ

VIEW B-B & C-C
SCALE: 2=1
Ⓓ

1000074 REV D SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY


AXIS A
SEE NOTE 5 & 11
11 E .0005
G
G
2.187
2.184
3.593
3.592
F
F
−E−
⊥ A .0005
4.344
4.342
8.688
8.685
H .0004
⊥ B .0004
−H−
6
⊕ .010 DIA
SEE SECTION G−G
2 PLACES
SEE DETAIL H
4
SEE NOTE 14
1
5
NO.12(.216)28NF-2B MODIFIED THRU
.190
.194 MINOR DIA MOD.
CSK 82°±1 TO .210 .230 DIA
12 PLACES 2 ONLY
SEE NOTE 14
2
P
.562 TYP
.281 TYP
45° 0' TYP
.182 .192 DIA − .02 .04 DEEP − 3 HOLES EQUALLY SPACED ON A 4.125 DBC BSC
⊕ F .010 DIA
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
AXIS M
⊥ A .0005
SEE NOTE 8
3
.1245 .1247 DIA THRU − CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
⊕ F .005 DIA
SEE NOTE 14
AXIS A
REF
5
NO. 12 (.216) − 28 NF − 2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ F .005 DIA
SEE NOTE 14
AXIS A
AXIS B
REF
37° BSC
2
REF
SEE DETAIL L
SECTION K−K
4 PLACES
7
.155 .157 DIA THRU
⊕ .010 DIA
DETAIL L
SCALE 4×1
10 PLACES
SEE NOTE 14
.010
.020
DETAIL H
SCALE 2/1
TYPICAL INSTALLATION FOR ITEM 5
1 REF
.1245 .1247 DIA THRU ITEM 1
CSK 85°±5° TO .18 .20 DIA FAR SIDE − PRESS FIT IN ITEM 1
2 REF
6 REF
.1255 .1257 DIA THRU ITEM 2
CSK 85°±5° TO .18 .20 DIA FAR SIDE
SECTION F−F
SEE NOTE 14
SCALE 2/1
.1255 .1257 DIA THRU ITEM 1
CSK 85°±5° TO .18 .20 DIA FAR SIDE
6 REF
1 REF
.1245 .1247 DIA THRU ITEM 2
CSK 85°±5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM 2
2 REF
SECTION G−G
SEE NOTE 14
SCALE: 2×1
ODIFIED THRU
A 6 HOLES
A 6.750 DBC BSC
LES SPACED
BC BSC
.02 ×45°±5°
2 PLACES
−F−
M
N
15° BSC
15° BSC
60° BSC
4 PLACES
15° 0'
65° BSC
65° BSC
45° BSC
15° BSC
3.8125 3.8127 DIA
3.562
3.377
3.381
−J−
⌒ .001
B
B
1.962
1.958
N
⌒ .001
−K−
45° REF
10° BSC
15° BSC
M
.140
.150
.362
.366
⊥ J .005
C C
AXIS L
⊥ B .0005
SEE NOTE 7
3
.1245 .1247 DIA THRU − CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14
DATUM PLANE N REF
23°−30' BSC
23°−30' BSC
K
K
DATUM PLANE P REF
VIEW P−P
SEE DETAIL L
2 REF
20° BSC
DATUM PLANE P REF
SECTION M−M
SEE DETAIL L
2 REF
10°40' BSC
2 PLACES
20° BSC
21° 20' BSC
2 PLACES
DATUM PLANE P REF
SECTION N−N
4
3
2
1
D
C
B
A
MASTER
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE TDRR 00159	11 Dec 62		WK
D	TDRR 00960	4-29-63		WK
E	TDRR 01049	4-30-63		WK

REPLACES REV B WITH CHANGE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
10	NUT, CLINCH FLUSH MOUNTED	1000076-1			7
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: ~

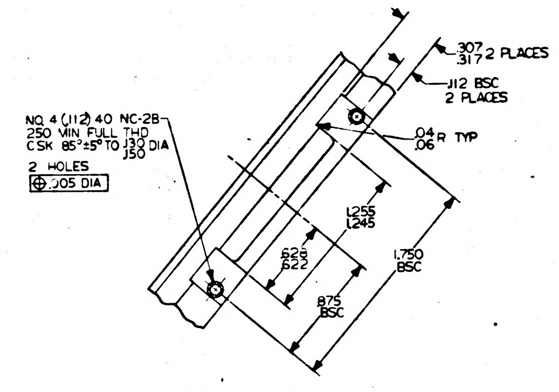
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D M WHITE
APPROVED FOR MSC W G
BY DIRECTION M.I.T.

HOUSING ASSEMBLY
MIDDLE GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT

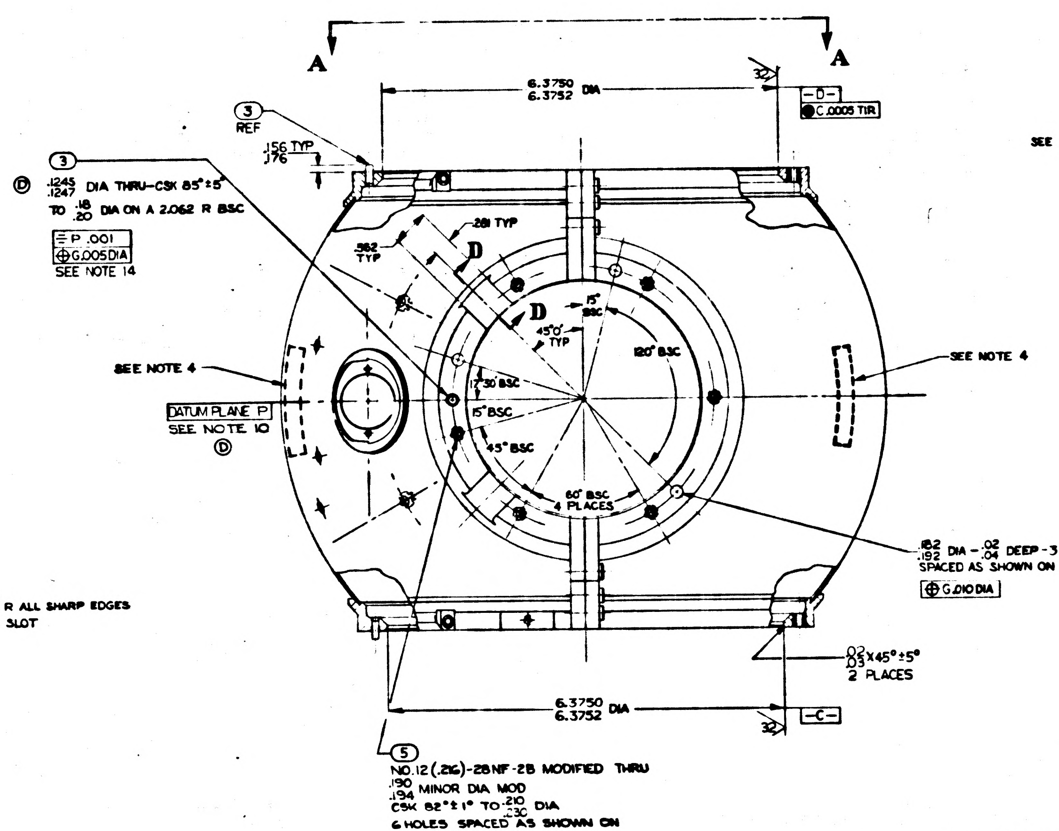
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000074
SHEET 1 OF 1

1000074 E

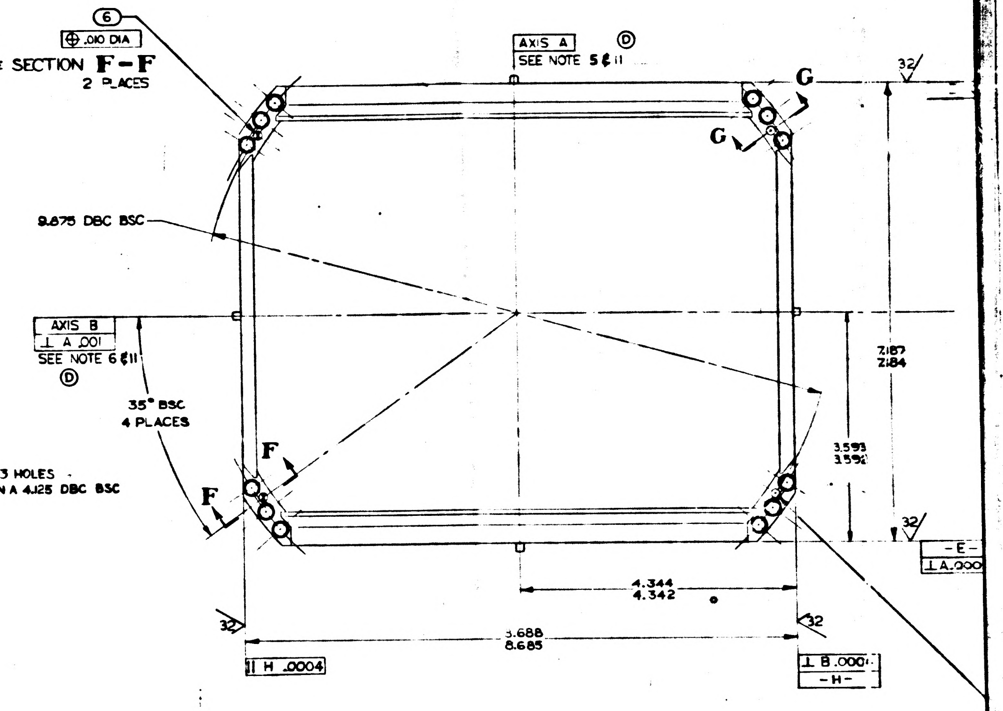


.307 .317 2 PLACES
.112 BSC 2 PLACES
NO. 4 (.112) 40 NC-2B .250 MIN FULL THD CSK 85°±5° TO .130 .150 DIA
2 HOLES
⊕ .005 DIA
.04 .06 R TYP
1.255 1.245
.625 .622
1.750 BSC
.875 BSC

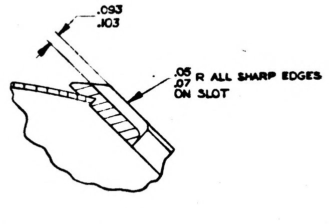
VIEW J-J
TYP-4 PLACES
SCALE: 2 X 1



A
A
6.3750 6.3752 DIA
32
-D-
◎ C .0005 TIR
③ REF
.156 TYP .176
③
Ⓓ .1245 .1247 DIA THRU-CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
⌯ P .001
⊕ G .005 DIA
SEE NOTE 14
.562 TYP
.281 TYP
D
D
15° BSC
45°0' TYP
120° BSC
17°30' BSC
15° BSC
45° BSC
60° BSC 4 PLACES
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
Ⓓ
SEE NOTE 4
.182 .192 DIA - .02 .04 DEEP-3 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .010 DIA
.02 .03 X45°±5° 2 PLACES
6.3750 6.3752 DIA
32
-C-
⑤
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .005 DIA
SEE NOTE 14
Ⓓ



⑥
⊕ .010 DIA
SEE SECTION F-F 2 PLACES
AXIS A
SEE NOTE 5 & 11 Ⓓ
G
G
32
9.875 DBC BSC
AXIS B
⊥ A .001
SEE NOTE 6 & 11
Ⓓ
35° BSC 4 PLACES
2.187 2.184
3.593 3.592
F
F
32
-E-
⊥ A .000
4.344 4.342
32
8.688 8.685
32
∥ H .0004
⊥ B .000
-H-



.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT

SECTION D-D
TYP-4 PLACES
SCALE: 2=1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005 .015
3. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ② AND MATCHING SERIAL NO. ON ① AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B

Ⓔ Ⓓ 7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM ③ MARKED "X" ESTABLISHES AXIS L

Ⓓ 8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM ③ MARKED "Y" ESTABLISHES AXIS M

Ⓓ 9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N

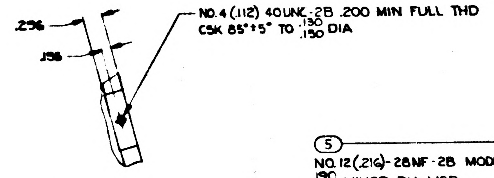
Ⓓ 10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P

Ⓓ 11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②

Ⓓ 12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

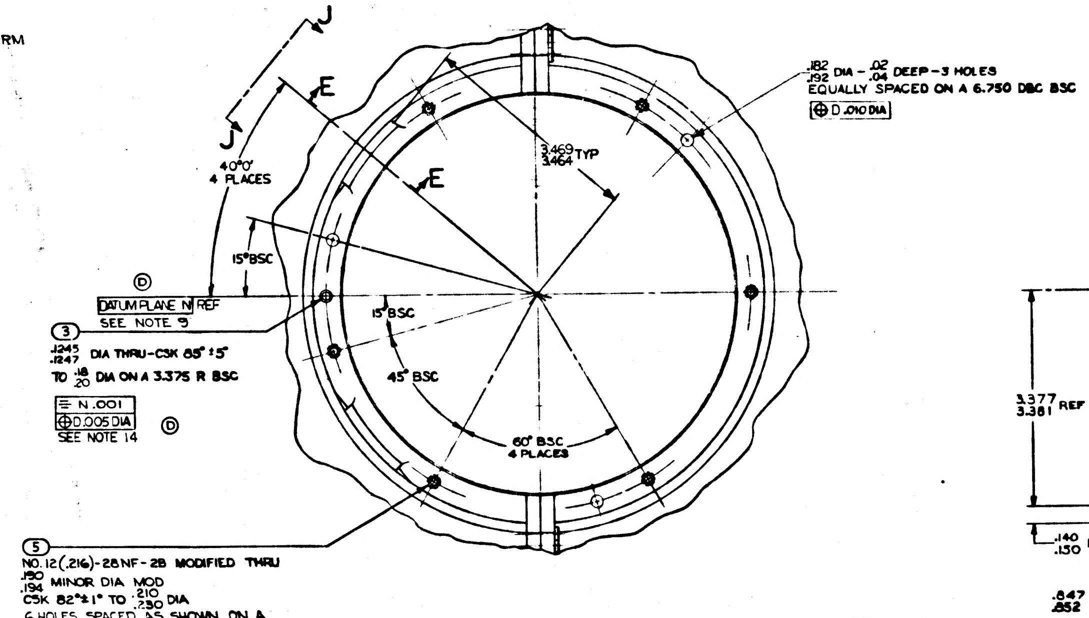
Ⓓ 13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ±1°F

Ⓓ 14. ORDER OF OPERATIONS (NON-MANDATORY)
- A. ASSEMBLE ITEMS ① & ② USING NO.6 SCREWS & NUTS
- B. DRILL, REAM & C'SINK FOR ITEM ⑥
- C. INSTALL ITEM ⑥
- D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
- E. STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MINUTES
- F. FINISH MACHINE
- G. REMOVE ITEM ⑥ AND ANODIC COAT PER NOTE 12
- H. INSTALL ITEMS ③④⑤⑥ & ⑦



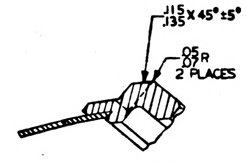
.296
.156
NO.4 (.112) 40UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130 .150 DIA

Ⓓ VIEW Q-Q



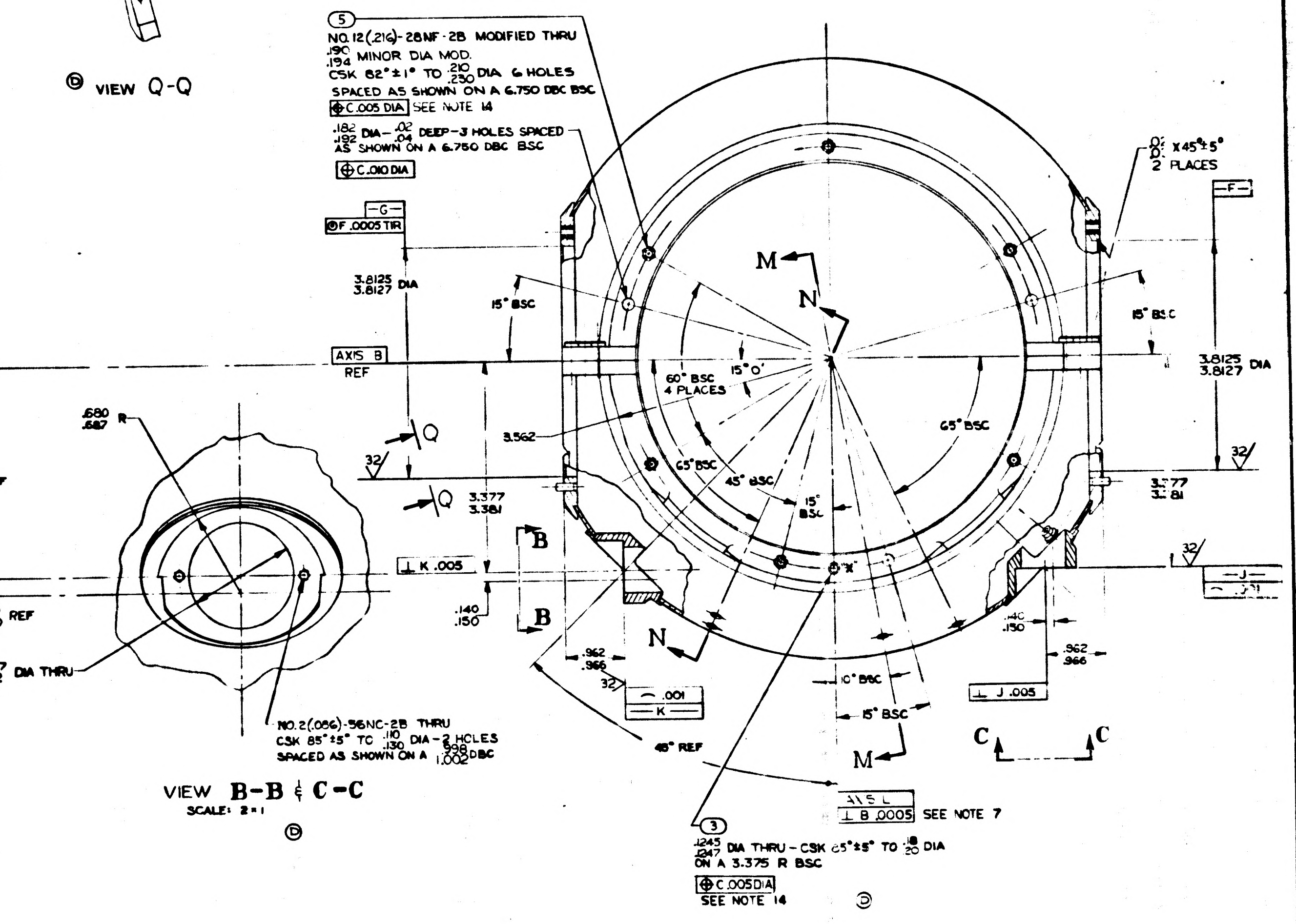
J
E
J
E
40°0' 4 PLACES
15° BSC
3.469 3.464 TYP
.182 .192 DIA - .02 .04 DEEP-3 HOLES EQUALLY SPACED ON A 6.750 DBC BSC
⊕ D .010 DIA
Ⓓ
DATUM PLANE N REF
SEE NOTE 9
③
.1245 .1247 DIA THRU-CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
⌯ N .001
⊕ D .005 DIA
SEE NOTE 14
Ⓓ
15° BSC
45° BSC
60° BSC 4 PLACES
⑤
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ D .005 DIA
SEE NOTE 14
Ⓓ

VIEW A-A



.115 .135 X45°±5°
.05 .07 R 2 PLACES

SECTION E-E
TYP-4 PLACES
SCALE: 2X1



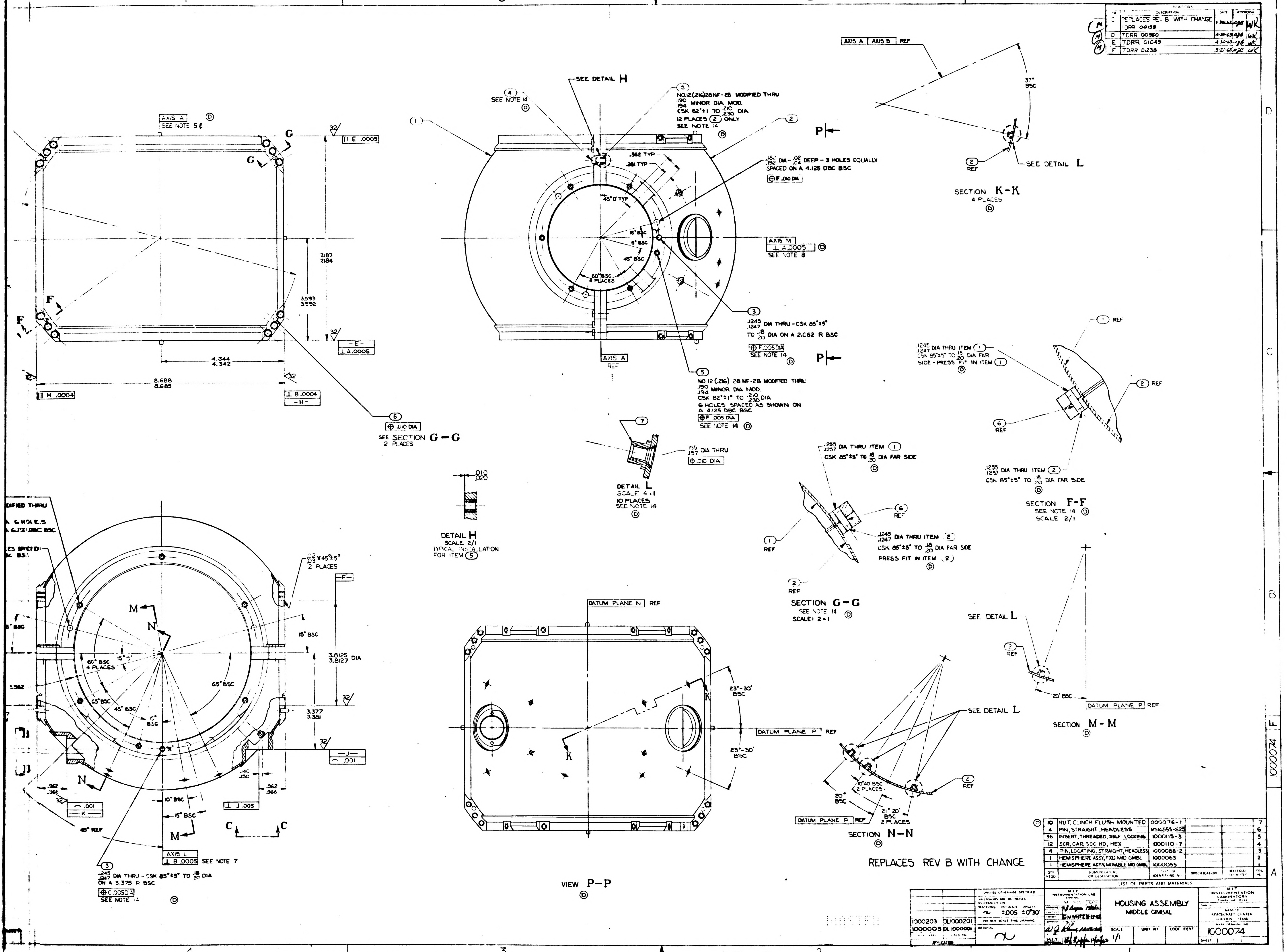
⑤
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .005 DIA SEE NOTE 14
.182 .192 DIA - .02 .04 DEEP-3 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .010 DIA
-G-
◎ F .0005 TIR
3.8125 3.8127 DIA
15° BSC
AXIS B REF
M
N
60° BSC 4 PLACES
15°0'
65° BSC
3.562
65° BSC
45° BSC
15° BSC
Q
Q
32
3.377 3.381
3.377 3.381 REF
.680 .687 R
.847 .852 DIA THRU
NO.2 (.086)-56NC-2B THRU CSK 85°±5° TO .110 .130 DIA-2 HOLES SPACED AS SHOWN ON A .998 1.002 DBC
B
B
⊥ K .005
.140 .150
.140 .150 REF
N
.962 .966
32
⌒ .001
-K-
10° BSC
15° BSC
45° REF
M
C
C
.02 .03 X45°±5° 2 PLACES
-F-
15° BSC
3.8125 3.8127 DIA
32
3.377 3.381
32
-J-
.140 .150
.962 .966
⊥ J .005
AXIS L
⊥ B .0005 SEE NOTE 7
③
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14
Ⓓ

VIEW B-B & C-C
SCALE: 2=1
Ⓓ

1000074	REV E	SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

		REVISIONS		
	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE TDRR 00159	11 Dec 62	ajB	WK
D	TDRR 00960	4-24-63	ajB	WK
E	TDRR 01049	4-30-63	ajB	WK
F	TDRR 01238	5-21-63	ajB	WK



4
3
2
1
D
C
B
A
AXIS A
SEE NOTE 5 ℄
32
∥ E .0005
G
G
F
F
2.187
2.184
3.593
3.592
32
-E-
⊥ A .0005
4.344
4.342
8.688
8.685
32
∥ H .0004
⊥ B .0004
-H-
6
⊕ .010 DIA
SEE SECTION G-G
2 PLACES
SEE DETAIL H
4
SEE NOTE 14
1
5
NO.12(.216)28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1 TO .210 .230 DIA
12 PLACES 2 ONLY
SEE NOTE 14
2
P
.562 TYP
.281 TYP
45° 0' TYP
15° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
.182 .192 DIA - .02 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 4.125 DBC BSC
⊕ F .010 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
3
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
⊕ F .005 DIA
SEE NOTE 14
AXIS A
REF
P
5
NO. 12 (.216) - 28 NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ F .005 DIA
SEE NOTE 14
AXIS A
AXIS B
REF
37° BSC
2
REF
SEE DETAIL L
SECTION K-K
4 PLACES
7
.155 .157 DIA THRU
⊕ .010 DIA
DETAIL L
SCALE 4:1
10 PLACES
SEE NOTE 14
.010 .020
DETAIL H
SCALE 2/1
TYPICAL INSTALLATION FOR ITEM 5
1 REF
.1245 .1247 DIA THRU ITEM 1
CSK 85°±5° TO .18 .20 DIA FAR SIDE - PRESS FIT IN ITEM 1
2 REF
6 REF
.1255 .1257 DIA THRU ITEM 2
CSK 85°±5° TO .18 .20 DIA FAR SIDE
SECTION F-F
SEE NOTE 14
SCALE 2/1
.1255 .1257 DIA THRU ITEM 1
CSK 85°±5° TO .18 .20 DIA FAR SIDE
6 REF
1 REF
.1245 .1247 DIA THRU ITEM 2
CSK 85°±5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM 2
2 REF
SECTION G-G
SEE NOTE 14
SCALE: 2:1
SEE DETAIL L
2 REF
20° BSC
DATUM PLANE P REF
SECTION M-M
DIFIED THRU
6 HOLES
6.125 DBC BSC
LES SPACED
BSC
.02 .03 X 45°±5° 2 PLACES
-F-
M
N
15° BSC
3.8125 3.8127 DIA
60° BSC 4 PLACES
15° 0'
65° BSC
65° BSC
45° BSC
15° BSC
3.562
3.377 3.381
32
32
-J-
⌒ .001
.140 .150
.962 .966
.962 .966
32
⌒ .001
-K-
⊥ J .005
10° BSC
15° BSC
N
M
C
C
45° REF
AXIS L
⊥ B .0005
SEE NOTE 7
3
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14
DATUM PLANE N REF
23°-30' BSC
23°-30' BSC
K
K
DATUM PLANE P REF
VIEW P-P
SEE DETAIL L
20° BSC
10°40' BSC 2 PLACES
21° 20' BSC 2 PLACES
2 REF
DATUM PLANE P REF
SECTION N-N
1000074
F

REPLACES REV B WITH CHANGE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
10	NUT, CLINCH FLUSH MOUNTED	1000076-1			7
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED DATE
CHECKED
DRAWN D M WHITE 9-27-62
APPROVED
M.I.T.

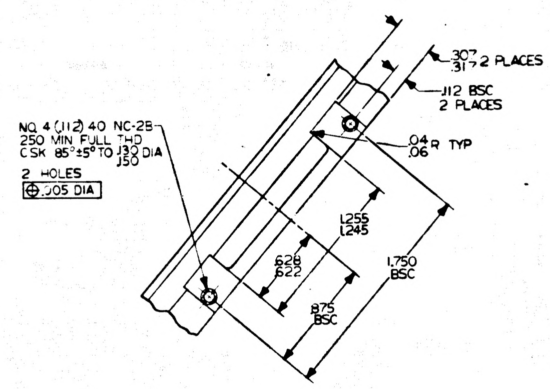
HOUSING ASSEMBLY
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

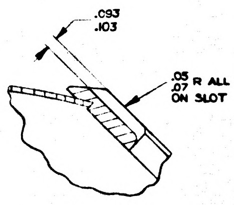
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000074
SHEET 1 OF 1

MASTER

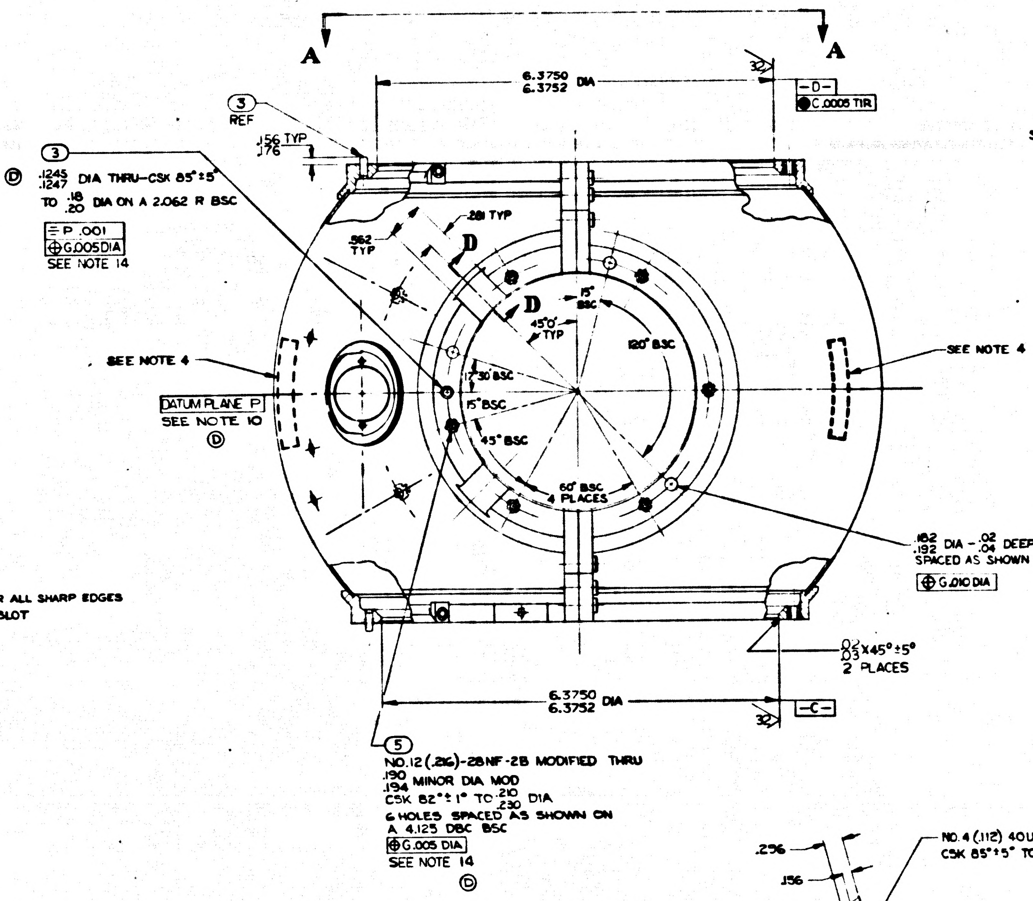
INCHES
PHOTOGRAPHIC SCALE ONLY

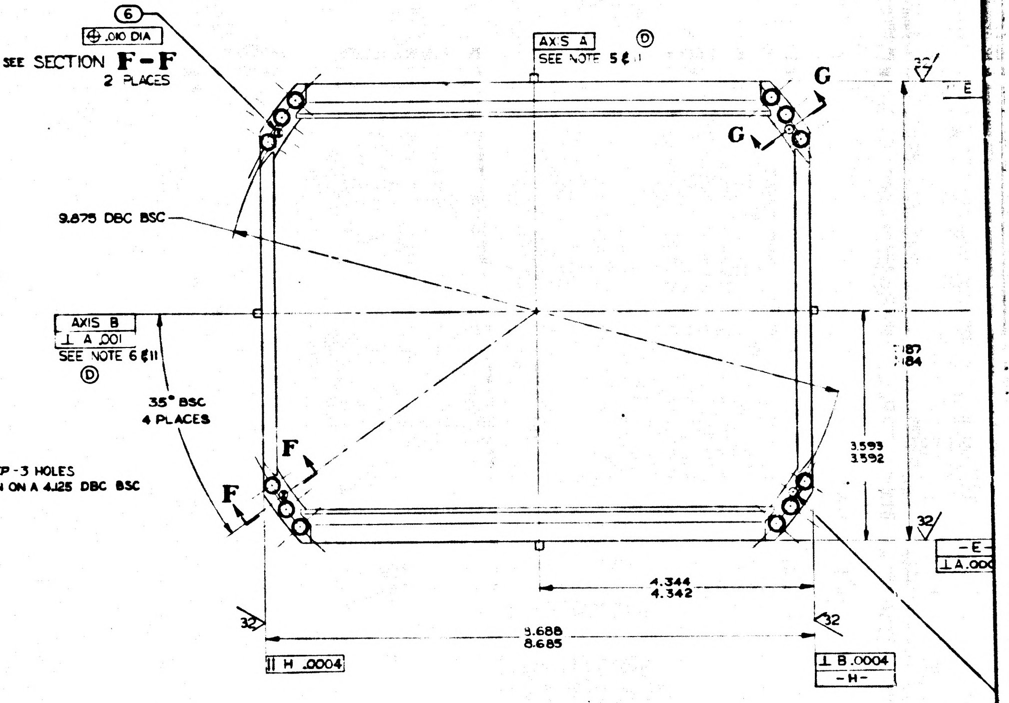

NO. 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
2 HOLES
⊕ .005 DIA
.307/.317 2 PLACES
.112 BSC
2 PLACES
.04/.06 R TYP
1.255/1.245
.628/.622
1.750 BSC
.875 BSC

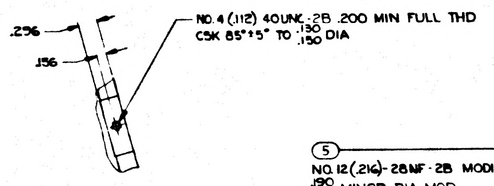
VIEW J-J
TYP-4 PLACES
SCALE: 2 X 1


.093/.103
.05/.07 R ALL SHARP EDGES ON SLOT

SECTION D-D
TYP -4 PLACES
SCALE: 2=1


A
A
6.3750/6.3752 DIA
32
-D-
● C .0005 TIR
3
REF
.156/.176 TYP
3
D
.1245/.1247 DIA THRU-CSK 85°±5°
TO .18/.20 DIA ON A 2.062 R BSC
≡ P .001
⊕ G .005 DIA
SEE NOTE 14
.281 TYP
.562 TYP
D
D
15° BSC
45°0' TYP
120° BSC
17°30' BSC
15° BSC
45° BSC
60° BSC 4 PLACES
SEE NOTE 4
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
D
.182/.192 DIA - .02/.04 DEEP-3 HOLES
SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .010 DIA
.02/.03 X 45°±5°
2 PLACES
6.3750/6.3752 DIA
32
-C-
5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MOD
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN ON
A 4.125 DBC BSC
⊕ G .005 DIA
SEE NOTE 14
D

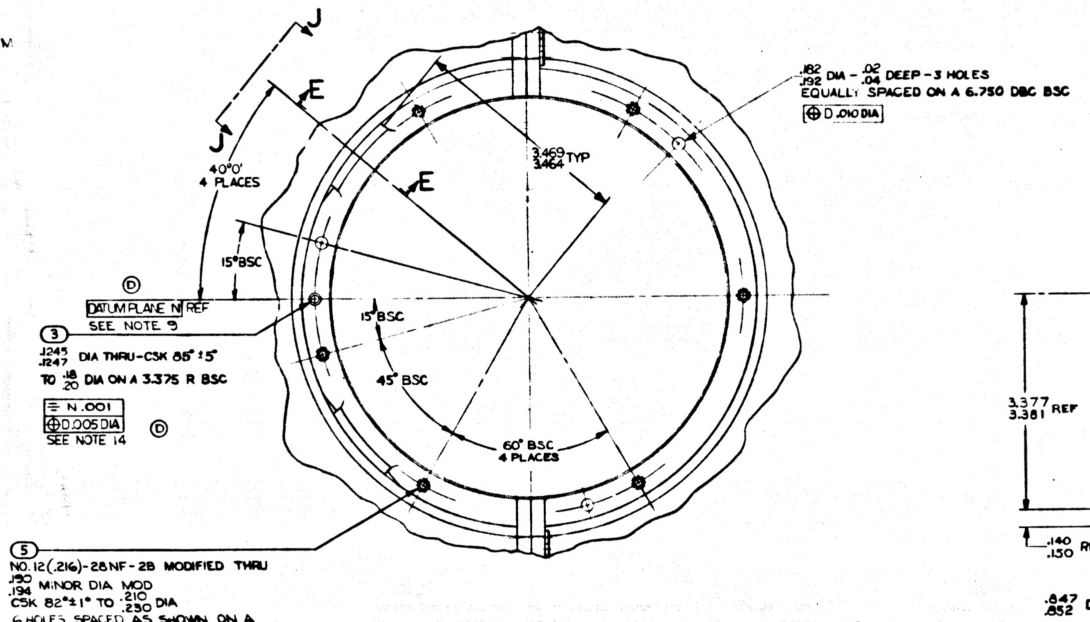

6
⊕ .010 DIA
SEE SECTION F-F
2 PLACES
AXIS A
SEE NOTE 5 & 11
D
G
G
32
-E-
9.875 DBC BSC
AXIS B
⊥ A .001
SEE NOTE 6 & 11
D
35° BSC
4 PLACES
F
F
.187/.184
3.593/3.592
32
-E-
⊥ A .000
4.344/4.342
32
32
8.688/8.685
∥ H .0004
⊥ B .0004
-H-


.296
.156
NO. 4 (.112) 40UNC-2B .200 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA

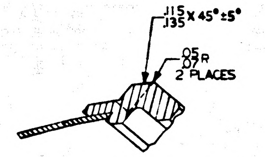
D VIEW Q-Q

NOTES

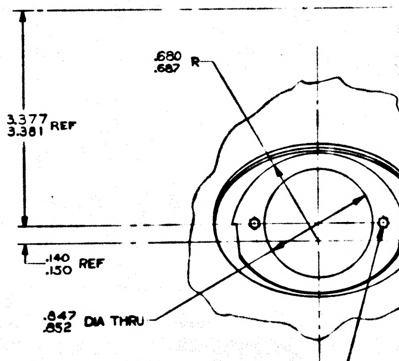
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005/.015
3. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO. REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON (2) AND MATCHING SERIAL NO. ON (1) AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
(E)(D) 7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM (3) MARKED "X" ESTABLISHES AXIS L
(D) 8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM (3) MARKED "Y" ESTABLISHES AXIS M
(D) 9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
(D) 10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
(D) 11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF (1) & (2)
(D) 12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
(D) 13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ± 1°F
(D) 14. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ASSEMBLE ITEMS (1) & (2) USING NO. 6 SCREWS & NUTS
   - B. DRILL, REAM & C'SINK FOR ITEM (6)
   - C. INSTALL ITEM (6)
   - D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
   - E. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   - F. FINISH MACHINE
   - G. REMOVE ITEM (6) AND ANODIC COAT PER NOTE 12
   - H. INSTALL ITEMS (3)(4)(5)(6) & (7)
15. MACHINING PADS (IF ADDED TO ITEM (2)) MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT


J
J
E
E
40°0'
4 PLACES
15° BSC
D
DATUM PLANE N REF
SEE NOTE 9
3
.1245/.1247 DIA THRU-CSK 85°±5°
TO .18/.20 DIA ON A 3.375 R BSC
≡ N .001
⊕ D .005 DIA
SEE NOTE 14
D
3.469/3.464 TYP
15° BSC
45° BSC
60° BSC
4 PLACES
.182/.192 DIA - .02/.04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DBC BSC
⊕ D .010 DIA
5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MOD
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN ON A
6.750 DBC BSC
⊕ D .005 DIA
SEE NOTE 14
D

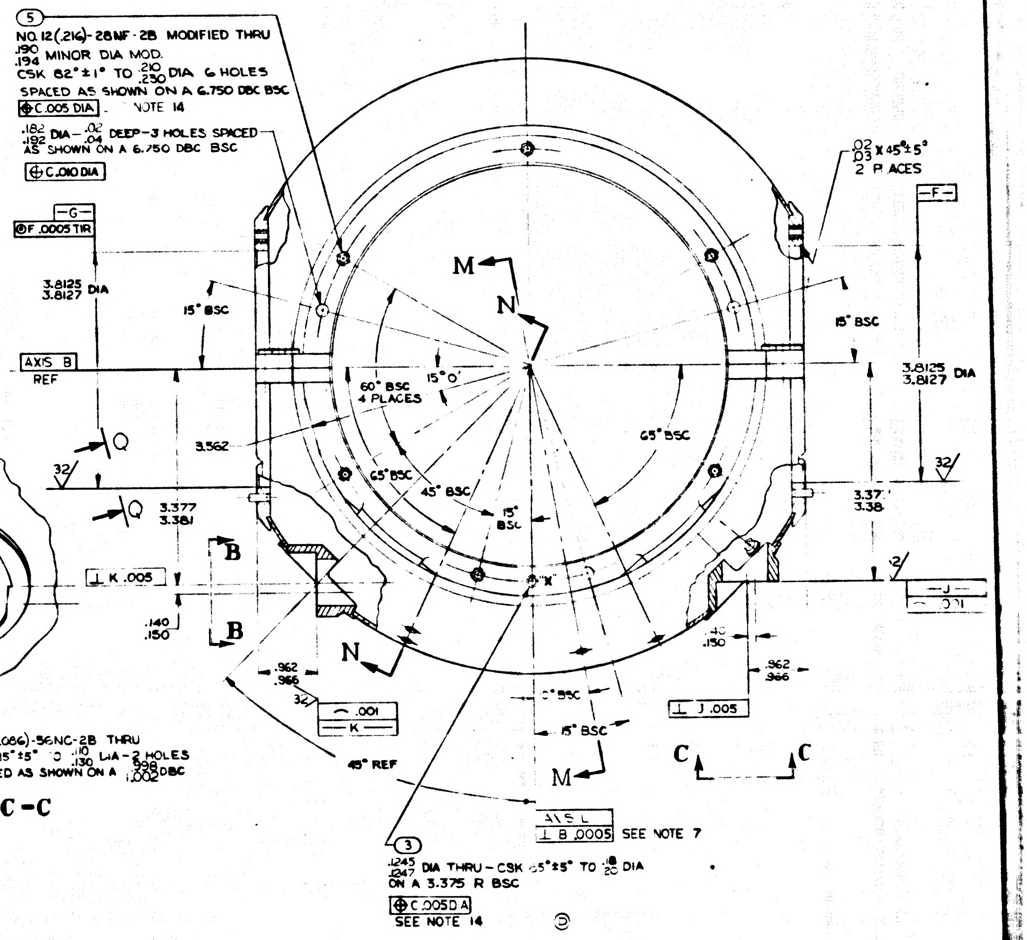
VIEW A-A


.115/.135 X 45°±5°
.05/.07 R
2 PLACES

SECTION E-E
TYP-4 PLACES
SCALE: 2X1

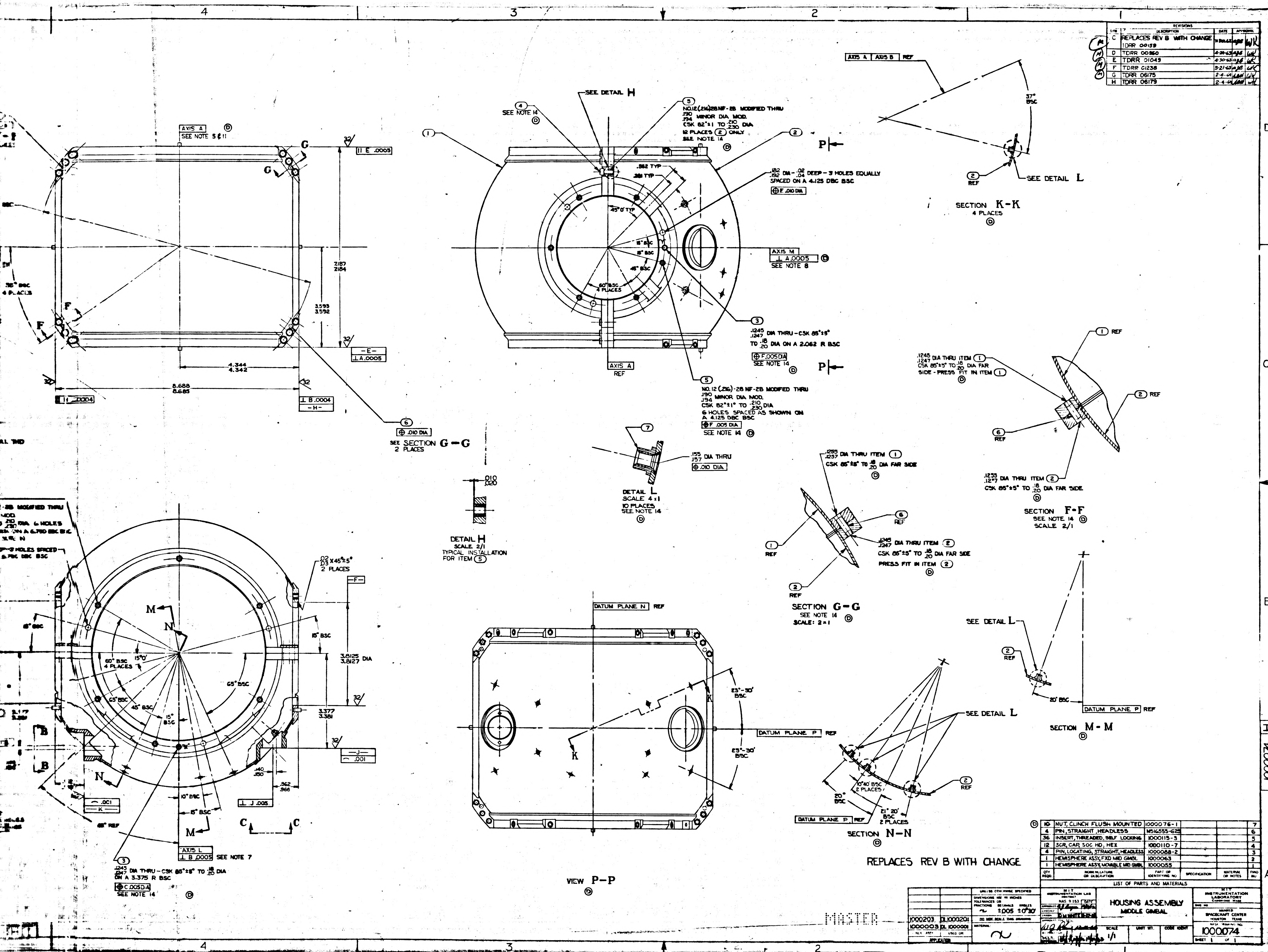

.680/.687 R
3.377/3.381 REF
.140/.150 REF
.847/.852 DIA THRU
NO. 2 (.086)-56NC-2B THRU
CSK 85°±5° TO .110/.130 DIA-2 HOLES
SPACED AS SHOWN ON A .998/1.002 DBC

VIEW B-B & C-C
SCALE: 2=1
D


5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MOD.
CSK 82°±1° TO .210/.230 DIA 6 HOLES
SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .005 DIA NOTE 14
.182/.192 DIA - .02/.04 DEEP-3 HOLES SPACED
AS SHOWN ON A 6.750 DBC BSC
⊕ C .010 DIA
-G-
◎ F .0005 TIR
3.8125/3.8127 DIA
15° BSC
AXIS B
REF
M
N
15°0'
60° BSC
4 PLACES
3.562
65° BSC
65° BSC
45° BSC
15° BSC
Q
Q
32
3.377/3.381
B
B
⊥ K .005
.140/.150
N
.962/.966
32
⌒ .001
-K-
45° REF
15° BSC
M
C
C
"X"
.02/.03 X 45°±5°
2 PLACES
-F-
15° BSC
3.8125/3.8127 DIA
32
3.377/3.381
32
-J-
⌒ .001
.140/.150
.962/.966
⊥ J .005
AXIS L
⊥ B .0005 SEE NOTE 7
3
.1245/.1247 DIA THRU-CSK 85°±5° TO .18/.20 DIA
ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14
D

1000074	REV F	SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY



4
3
2
1
D
C
B
A
AXIS A
SEE NOTE 5 & 11
Ⓓ
G
G
F
F
‖ E .0005
7.187
7.184
3.593
3.592
32
–E–
⊥ A .0005
4.344
4.342
8.688
8.685
⊥ B .0004
–H–
.36° BSC
4 PLACES
⑥
⊕ .010 DIA
SEE SECTION G–G
2 PLACES
SEE DETAIL H
④
SEE NOTE 14
Ⓓ
⑤
NO.12(.216)28NF-2B MODIFIED THRU
.190
.194 MINOR DIA MOD.
CSK 82°±1 TO .210
.230 DIA
12 PLACES ② ONLY
SEE NOTE 14
Ⓓ
①
②
P
.582 TYP
.281 TYP
45° 0' TYP
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
.182
.192 DIA – .02
.04 DEEP – 3 HOLES EQUALLY
SPACED ON A 4.125 DBC BSC
⊕ E .010 DIA
AXIS M
⊥ A .0005
Ⓓ
SEE NOTE 8
③
.1245
.1247 DIA THRU – CSK 85°±5°
TO .18
.20 DIA ON A 2.062 R BSC
⊕ F .005 DIA
SEE NOTE 14
Ⓓ
AXIS A
REF
P
⑤
NO. 12 (.216)-28 NF-2B MODIFIED THRU
.190
.194 MINOR DIA MOD.
CSK 82°±1° TO .210
.230 DIA
6 HOLES SPACED AS SHOWN ON
A 4.125 DBC BSC
⊕ F .005 DIA
SEE NOTE 14 Ⓓ
⑦
.155
.157 DIA THRU
⊕ .010 DIA
DETAIL L
SCALE 4×1
10 PLACES
SEE NOTE 14
Ⓓ
.010
.020
DETAIL H
SCALE 2/1
TYPICAL INSTALLATION
FOR ITEM ⑤
AXIS A | AXIS B | REF
37° BSC
② REF
SEE DETAIL L
SECTION K–K
4 PLACES
Ⓓ
① REF
.1245
.1247 DIA THRU ITEM ①
CSK 85°±5° TO .18
.20 DIA FAR
SIDE - PRESS FIT IN ITEM ①
Ⓓ
② REF
⑥ REF
.1255
.1257 DIA THRU ITEM ②
CSK 85°±5° TO .18
.20 DIA FAR SIDE
Ⓓ
SECTION F–F
SEE NOTE 14 Ⓓ
SCALE 2/1
.1255
.1257 DIA THRU ITEM ①
CSK 85°±5° TO .18
.20 DIA FAR SIDE
Ⓓ
⑥ REF
① REF
.1245
.1247 DIA THRU ITEM ②
CSK 85°±5° TO .18
.20 DIA FAR SIDE
PRESS FIT IN ITEM ②
Ⓓ
② REF
SECTION G–G
SEE NOTE 14 Ⓓ
SCALE: 2=1
SEE DETAIL L
② REF
20° BSC
DATUM PLANE P REF
SECTION M–M
Ⓓ
SEE DETAIL L
② REF
10°40' BSC
2 PLACES
20° BSC
21° 20' BSC
2 PLACES
DATUM PLANE P REF
SECTION N–N
Ⓓ
DATUM PLANE N REF
K
K
23°-30' BSC
23°-30' BSC
DATUM PLANE P REF
VIEW P–P
Ⓓ
.02
.03 X 45°±5°
2 PLACES
–F–
M
N
15° BSC
15°0'
60° BSC
4 PLACES
65° BSC
65° BSC
45° BSC
15° BSC
3.8125
3.8127 DIA
32
3.377
3.381
32
–J–
⌒ .001
.140
.150
.962
.966
⊥ J .005
10° BSC
15° BSC
M
N
B
B
⌒ .001
–K–
C
C
AXIS L
⊥ B .0005 SEE NOTE 7
③
.1245
.1247 DIA THRU – CSK 85°±5° TO .18
.20 DIA
ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14
Ⓓ
I
1000074
MASTER

SYM	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE IDRR 00159	11 Dec 62	ajb	WK
D	TDRR 00960	4-24-63	ajb	WK
E	TDRR 01049	4-30-63	ajb	WK
F	TDRR 01238	5-21-63	ajb	WK
G	TDRR 06175	2-4-64		WK
H	TDRR 06179	2-4-64		WK

REPLACES REV B WITH CHANGE

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
Ⓓ 10	NUT, CLINCH FLUSH MOUNTED	1000076-1			7
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL1000201
1000003	DL 1000001

APPLICATION

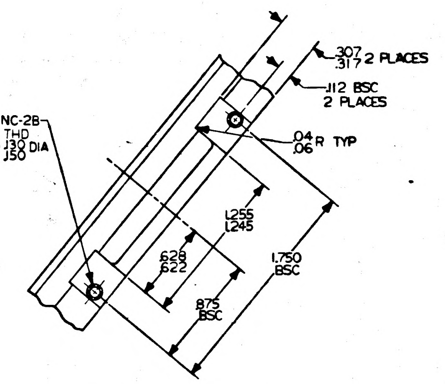
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D M WHITE
APPROVED FOR NASA
BY DIRECTION
M.I.T.

HOUSING ASSEMBLY
MIDDLE GIMBAL

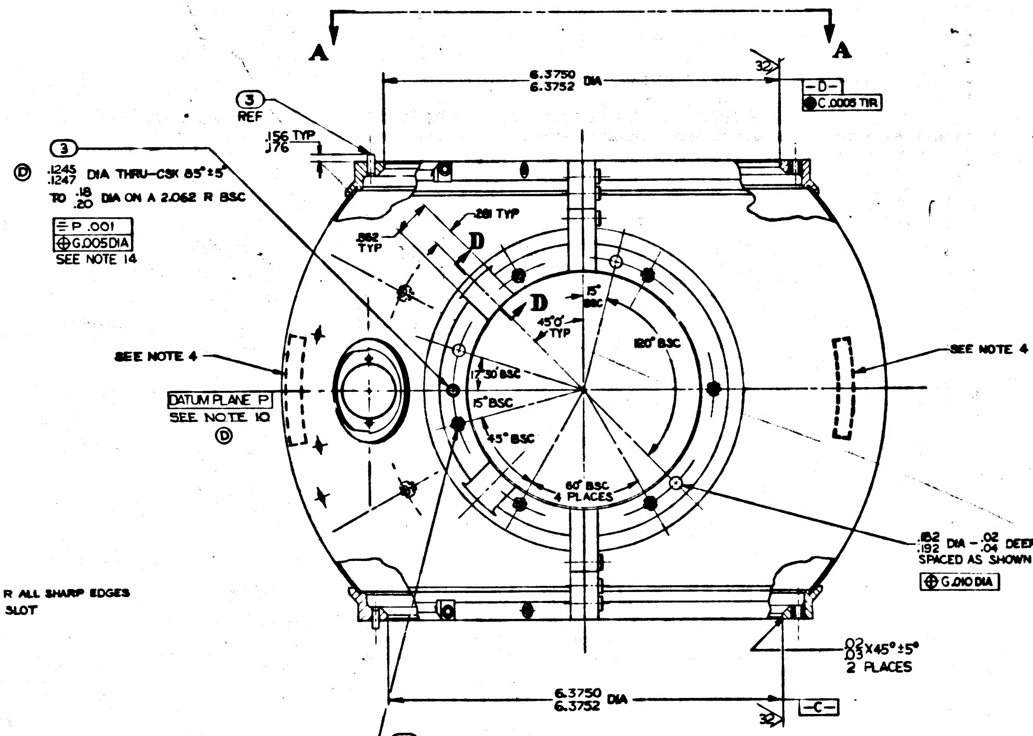
SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000074
SHEET 1 OF 1

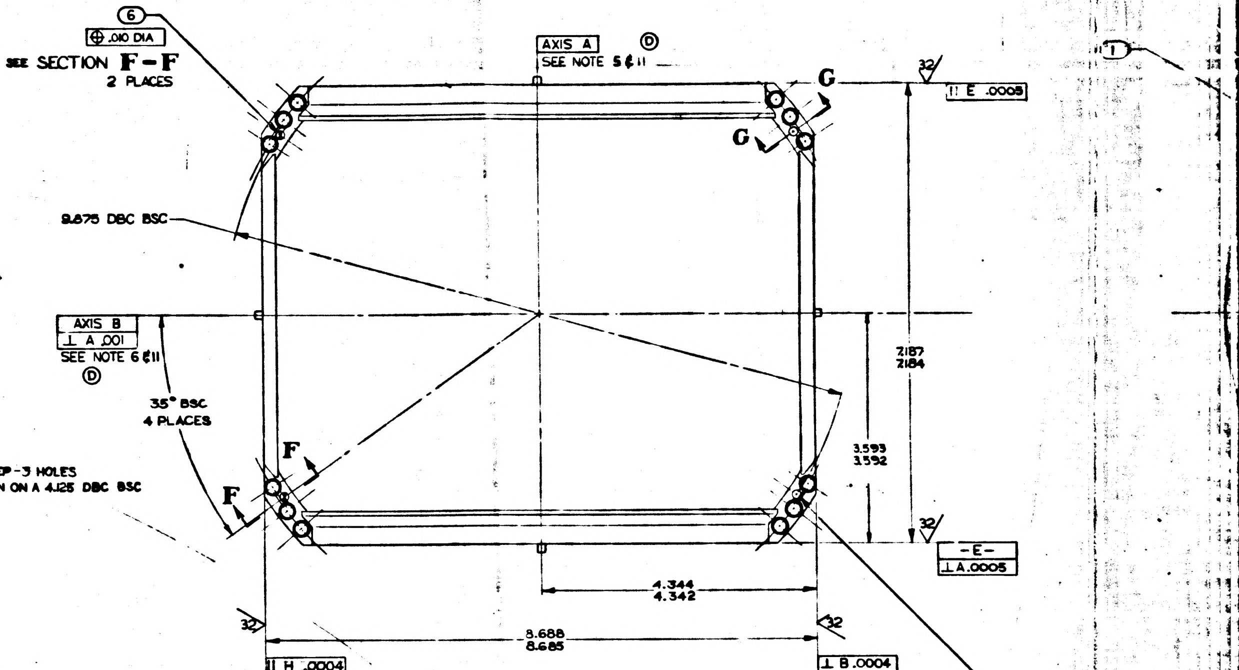


NO. 4 (.112) 40 NC-2B .250 MIN FULL THD CSK 85°±5° TO .130/.150 DIA
2 HOLES
⊕ .005 DIA
.307/.317 2 PLACES
.112 BSC 2 PLACES
.04/.06 R TYP
1.255/1.245
1.750 BSC
.628/.622
.875 BSC

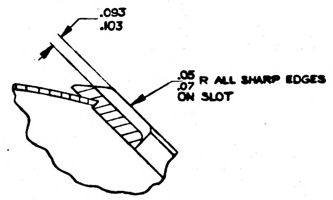
VIEW J-J
TYP-4 PLACES
SCALE: 2X1



A
A
6.3750/6.3752 DIA
-D-
⊕ C .0005 TIR
③ REF
.156/.176 TYP
③ .1245/.1247 DIA THRU-CSK 85°±5° TO .18/.20 DIA ON A 2.062 R BSC
= P .001
⊕ G .005 DIA
SEE NOTE 14
.562 TYP
.281 TYP
D
D
45°0' TYP
15° BSC
120° BSC
17°30' BSC
15° BSC
45° BSC
60° BSC 4 PLACES
SEE NOTE 4
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
.182/.192 DIA - .02/.04 DEEP - 3 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .010 DIA
.02/.03 X45°±5° 2 PLACES
6.3750/6.3752 DIA
-C-
⑤ NO.12 (.216)-28NF-2B MODIFIED THRU .190/.194 MINOR DIA MOD CSK 82°±1° TO .210/.230 DIA 6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G .005 DIA
SEE NOTE 14



⑥ ⊕ .010 DIA
SEE SECTION F-F 2 PLACES
AXIS A
SEE NOTE 5 & 11
G
G
∥ E .0008
9.875 DBC BSC
AXIS B
⊥ A .001
SEE NOTE 6 & 11
7.187/7.184
35° BSC 4 PLACES
3.593/3.592
F
F
-E-
⊥ A .0005
4.344/4.342
8.688/8.685
∥ H .0004
⊥ B .0004
-H-
⑥ ⊕ .010 DIA
SEE SECTION G-G 2 PLACES

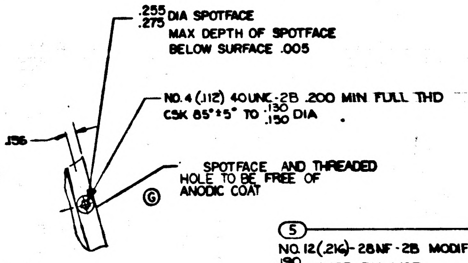


.093/.103
.05/.07 R ALL SHARP EDGES ON SLOT

SECTION D-D
TYP-4 PLACES
SCALE: 2=1

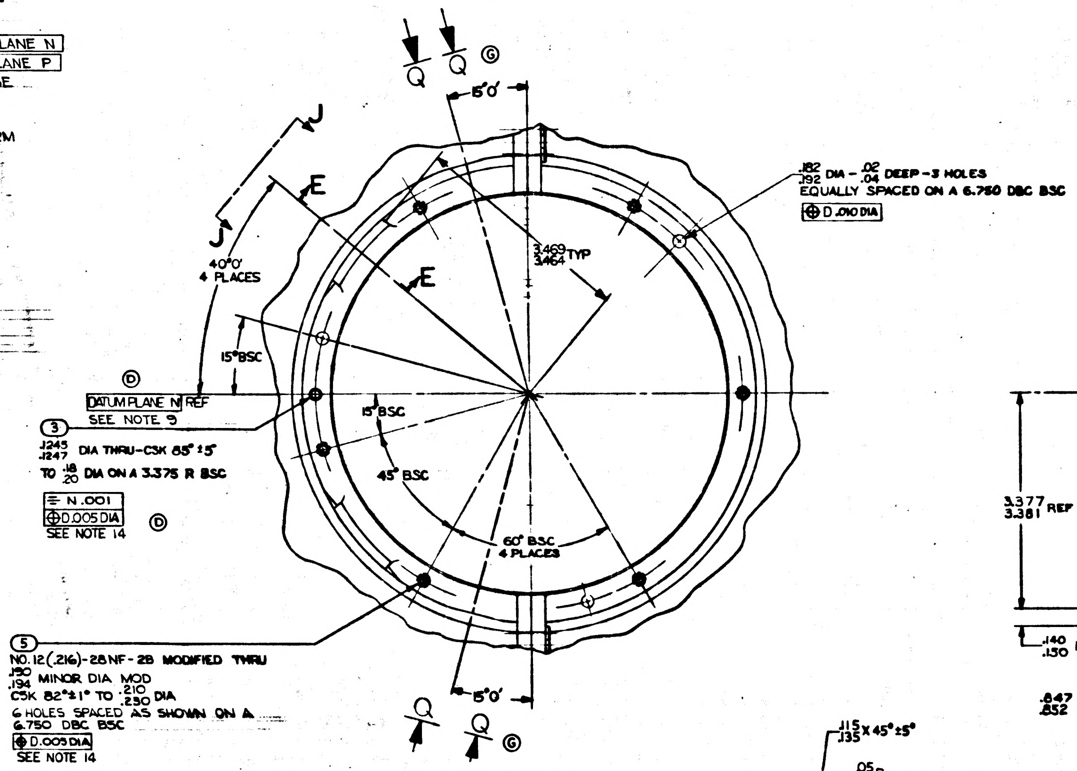
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005/.015
3. 63∨ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ② AND MATCHING SERIAL NO. ON ① AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE [-C-] AND BORE [-D-] ESTABLISHES [AXIS A]
6. A LINE PASSING THE CENTER OF BORE [-F-] AND BORE [-G-] ESTABLISHES [AXIS B]
Ⓔ Ⓓ 7. A LINE INTERSECTING [AXIS A] AND CENTER OF ITEM ③ MARKED "X" ESTABLISHES [AXIS L]
Ⓓ 8. A LINE INTERSECTING [AXIS B] AND CENTER OF ITEM ③ MARKED "Y" ESTABLISHES [AXIS M]
Ⓓ 9. A PLANE CONTAINING [AXIS A] & [AXIS L] ESTABLISHES [DATUM PLANE N]
Ⓓ 10. A PLANE CONTAINING [AXIS B] & [AXIS M] ESTABLISHES [DATUM PLANE P]
Ⓓ 11. [AXIS A] MUST INTERSECT [AXIS B] WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
Ⓓ 12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
Ⓓ 13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ± 1°F
Ⓓ 14. ORDER OF OPERATIONS (NON-MANDATORY)
    A. ASSEMBLE ITEMS ① & ② USING NO.6 SCREWS & NUTS
    B. DRILL, REAM & C'SINK FOR ITEM ⑥
    C. INSTALL ITEM ⑥
    D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
    E. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
    F. FINISH MACHINE
    G. REMOVE ITEM ⑥ AND ANODIC COAT PER NOTE 12
    H. INSTALL ITEMS ③ ④ ⑤ ⑥ & ⑦
15. MACHINING PADS (IF ADDED TO ITEM ②) MUST BE MACHINED OFF WITHIN .015 OF ORIGINAL SURFACE PRIOR TO ANODIC COAT.
16. ALTERNATE FINISH BORES [-C-] [-D-] [-F-] & [-G-] AND SURFACES [-E-] [-H-] [-R-] & [-S-] MAY BE CHEMICAL FINISHED PER MIL-C-5541



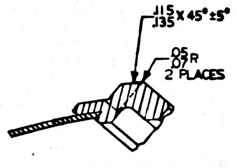
.255/.275 DIA SPOTFACE MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO. 4 (.112) 40UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130/.150 DIA
.156
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT

VIEW Q-Q
3 PLACES



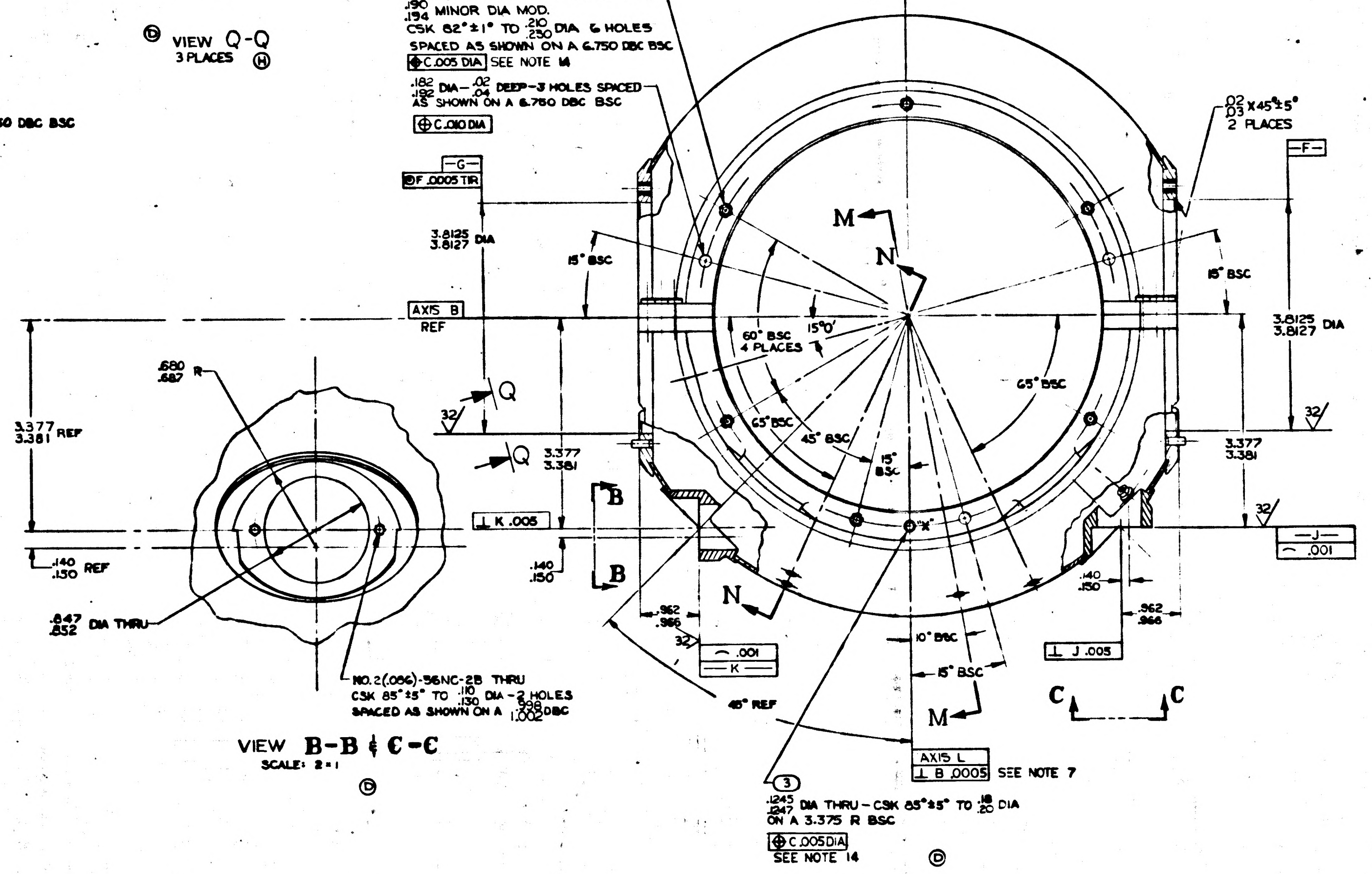
Q
Q
15°0'
J
E
E
J
40°0' 4 PLACES
3.469/3.464 TYP
15° BSC
DATUM PLANE N REF
SEE NOTE 9
③ .1245/.1247 DIA THRU-CSK 85°±5° TO .18/.20 DIA ON A 3.375 R BSC
= N .001
⊕ D .005 DIA
SEE NOTE 14
15° BSC
45° BSC
60° BSC 4 PLACES
.182/.192 DIA - .02/.04 DEEP - 3 HOLES EQUALLY SPACED ON A 6.750 DBC BSC
⊕ D .010 DIA
⑤ NO. 12 (.216)-28NF-2B MODIFIED THRU .190/.194 MINOR DIA MOD CSK 82°±1° TO .210/.250 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ D .005 DIA
SEE NOTE 14
15°0'
Q
Q

VIEW A-A



.115/.135 X 45°±5°
.05/.07 R 2 PLACES

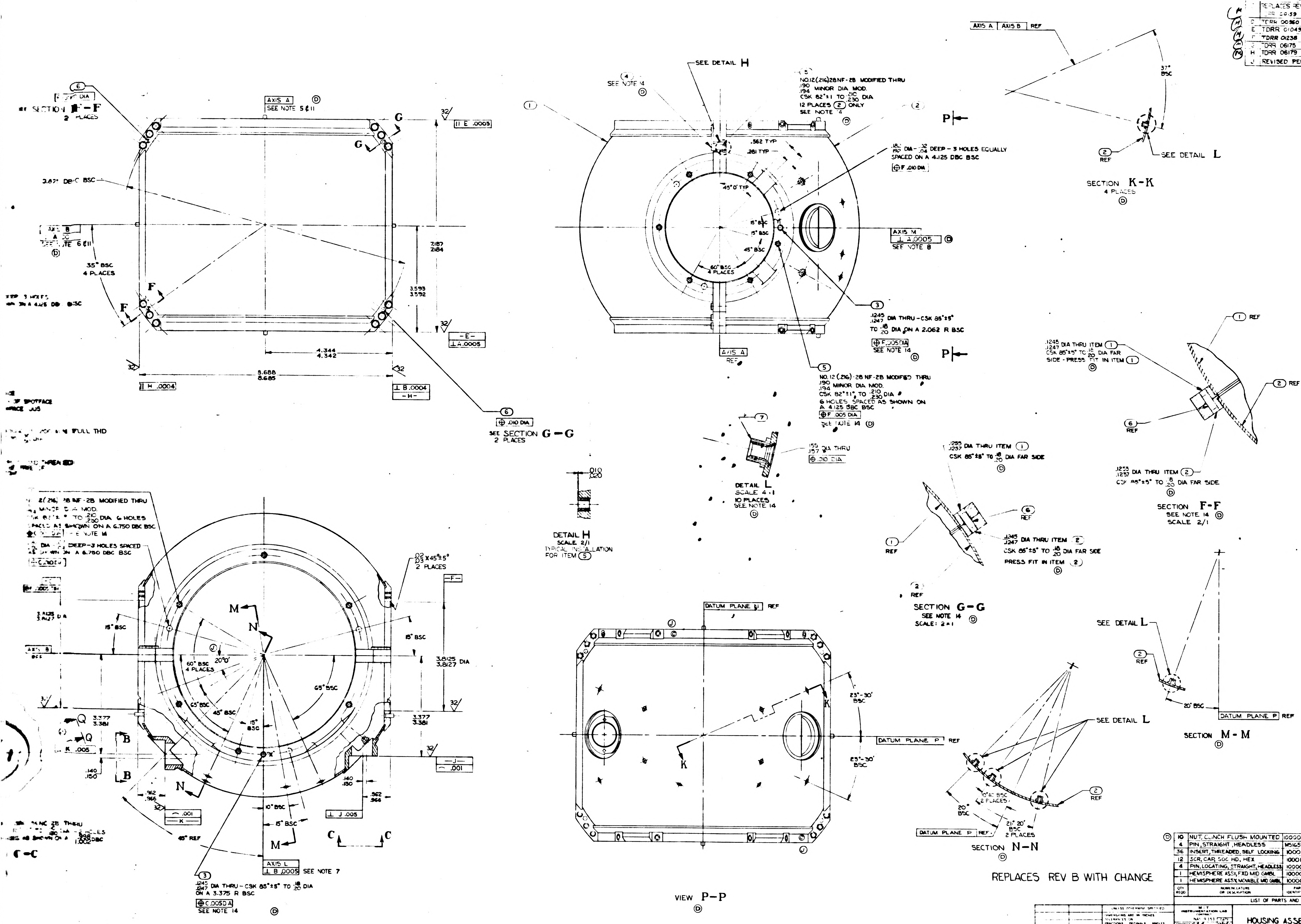
SECTION E-E
TYP-4 PLACES
SCALE: 2X1



⑤ NO. 12 (.216)-28NF-2B MODIFIED THRU .190/.194 MINOR DIA MOD. CSK 82°±1° TO .210/.250 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .005 DIA SEE NOTE 14
.182/.192 DIA - .02/.04 DEEP - 3 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C .010 DIA
-G-
⊕ F .0005 TIR
3.8125/3.8127 DIA
15° BSC
AXIS B REF
M
N
15°0'
60° BSC 4 PLACES
65° BSC
65° BSC
45° BSC
15° BSC
Q
Q
3.377/3.381 REF
3.377/3.381
3.377/3.381
.680/.687 R
⊥ K .005
B
B
.140/.150 REF
.140/.150
.140/.150
.847/.852 DIA THRU
NO. 2 (.086)-56NC-2B THRU CSK 85°±5° TO .110/.130 DIA - 2 HOLES SPACED AS SHOWN ON A .998/1.002 DBC
.962/.966
.962/.966
N
⌒ .001
-K-
10° BSC
15° BSC
45° REF
M
⊥ J .005
C C
.02/.03 X 45°±5° 2 PLACES
-F-
15° BSC
3.8125/3.8127 DIA
-J-
⌒ .001
AXIS L
⊥ B .0005 SEE NOTE 7
③ .1245/.1247 DIA THRU - CSK 85°±5° TO .18/.20 DIA ON A 3.375 R BSC
⊕ C .005 DIA
SEE NOTE 14

VIEW B-B & C-C
SCALE: 2=1

REV	DESCRIPTION	DATE	APPROVAL	
	REPLACES REV B WITH CHANGE TDRR 00159	11 Dec 62	ajb	WK
D	TDRR 00960	4-24-63	ajb	WK
E	TDRR 01049	4-30-63	ajb	WK
F	TDRR 01238	5-21-63	ajb	WK
G	TDRR 06175	2-4-64		WK
H	TDRR 06179	2-4-64		WK
J	REVISED PER TDRR 08082	12 MAY 64	JG	


SECTION F-F 2 PLACES
AXIS A SEE NOTE 5 & 11
3.875 DBC BSC
35° BSC 4 PLACES
4.344 4.342
8.688 8.685
H .0004
B .0004
-H-
-E-
A .0005
E .0005
2.187 2.184
3.593 3.592
.010 DIA
SEE SECTION G-G 2 PLACES
SEE DETAIL H
SEE NOTE 14
NO.12 (.216)-28NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD. CSK 82°±1 TO .210 .230 DIA 12 PLACES ② ONLY SEE NOTE 14
.562 TYP
.281 TYP
45°0' TYP
15° BSC
45° BSC
60° BSC 4 PLACES
.182 DIA -.12 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 4.125 DBC BSC
F .010 DIA
AXIS M A .0005 SEE NOTE 8
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
F .005 DIA SEE NOTE 14
NO.12 (.216)-28 NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD. CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
F .005 DIA SEE NOTE 14
AXIS A REF
P
DETAIL H SCALE 2/1 TYPICAL INSTALLATION FOR ITEM ⑤
.010 .020
.155 .157 DIA THRU
.010 DIA
DETAIL L SCALE 4:1 10 PLACES SEE NOTE 14
AXIS A AXIS B REF
37° BSC
SEE DETAIL L
SECTION K-K 4 PLACES
.1245 .1247 DIA THRU ITEM ① CSK 85°±5° TO .18 .20 DIA FAR SIDE - PRESS FIT IN ITEM ①
.1255 .1257 DIA THRU ITEM ② CSK 85°±5° TO .18 .20 DIA FAR SIDE
SECTION F-F SEE NOTE 14 SCALE 2/1
.1255 .1257 DIA THRU ITEM ① CSK 85°±5° TO .18 .20 DIA FAR SIDE
.1245 .1247 DIA THRU ITEM ② CSK 85°±5° TO .18 .20 DIA FAR SIDE PRESS FIT IN ITEM ②
SECTION G-G SEE NOTE 14 SCALE: 2=1
REF
3.8125 3.8127 DIA
15° BSC
60° BSC 4 PLACES
20°0'
65° BSC
45° BSC
3.377 3.381
K .005
.140 .150
.962 .966
10° BSC
15° BSC
45° REF
J .005
.001
-J-
-K-
-F-
.02 .03 X45°±5° 2 PLACES
AXIS B
AXIS L B .0005 SEE NOTE 7
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
C .005 DIA SEE NOTE 14
M N Q B C
DATUM PLANE J REF
DATUM PLANE P REF
23°-30' BSC
K
VIEW P-P
SEE DETAIL L
10°40' BSC 2 PLACES
20° BSC
21°20' BSC 2 PLACES
DATUM PLANE P REF
SECTION N-N
20° BSC
DATUM PLANE P REF
SECTION M-M

REPLACES REV B WITH CHANGE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
10	NUT, CLINCH FLUSH MOUNTED	1000076-1			7
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
1000003	DL 1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M.I.T.
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
DRAWN D M WHITE 9-27-62
APPROVED FOR MSC W J Rhine 12-10-62
M.I.T.

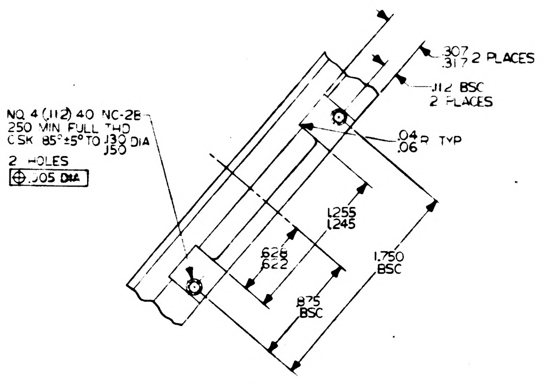
HOUSING ASSEMBLY
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

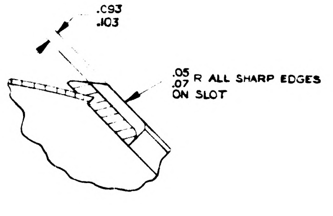
M.I.T.
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000074
SHEET 1 OF 1

1000074 J

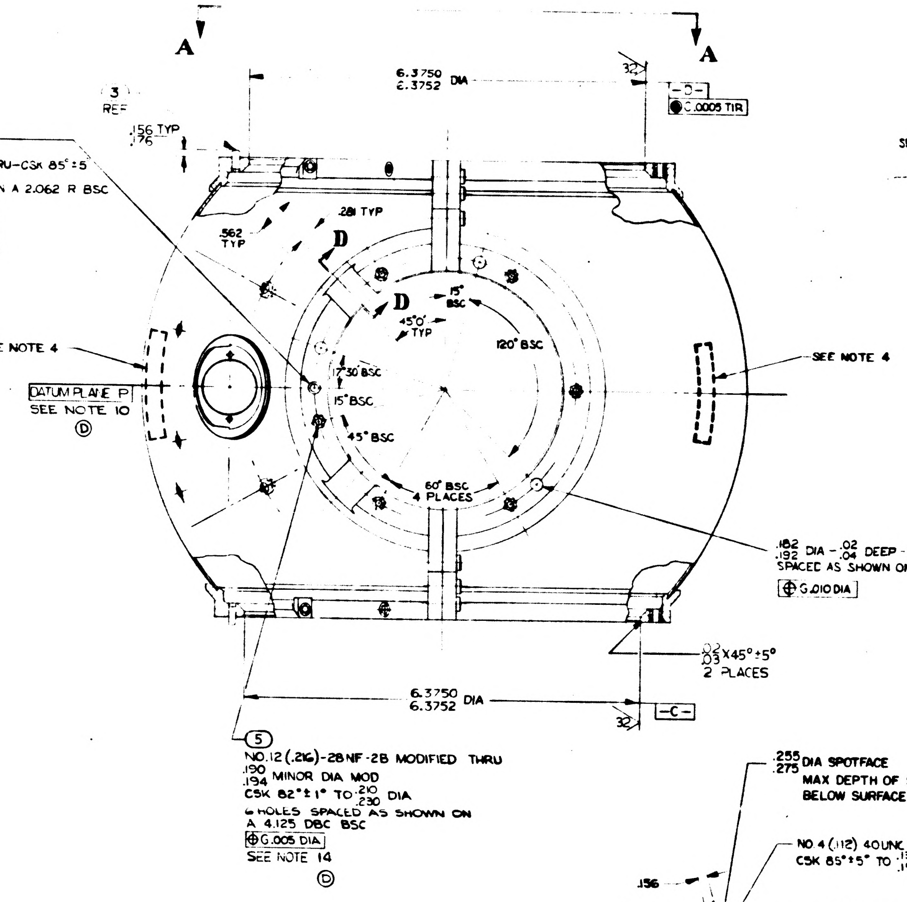
2/1000074

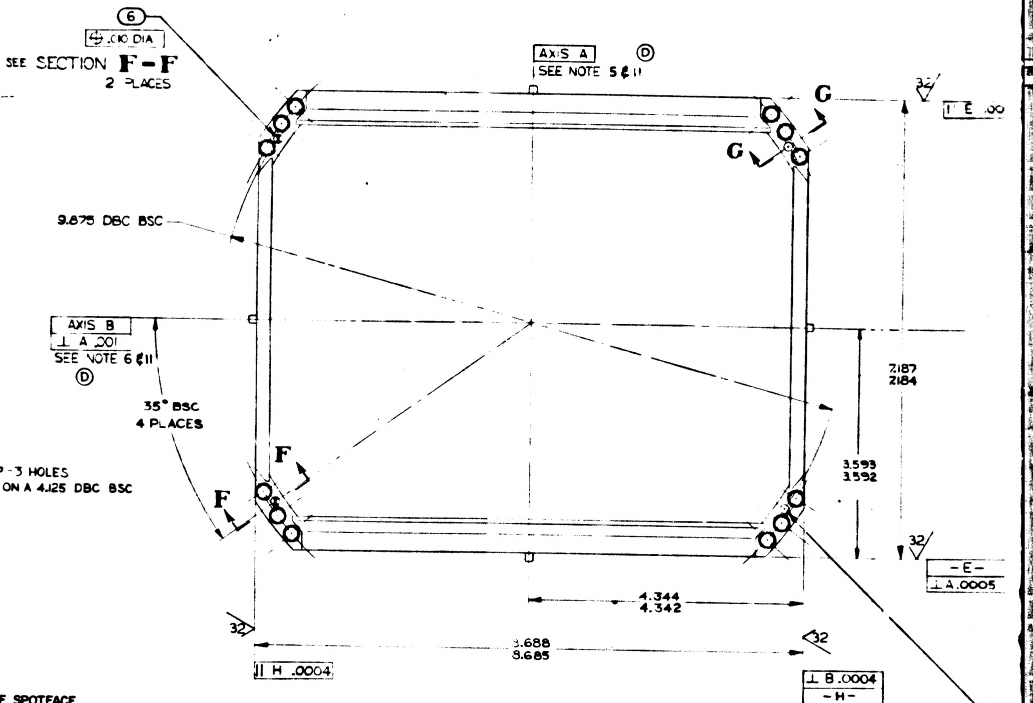

.307 .317 2 PLACES
.112 BSC 2 PLACES
NO. 4 (.112) 40 NC-2B .250 MIN FULL THD CSK 85°±5° TO .130 .150 DIA 2 HOLES
.005 DIA
.04 .06 R TYP
1.255 1.245
.628 .622
1.750 BSC
.875 BSC

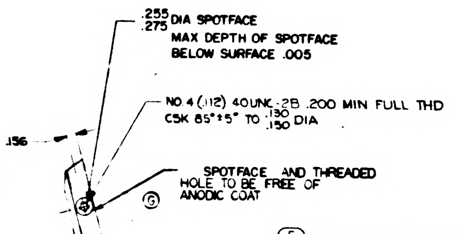
VIEW J-J
TYP-4 PLACES
SCALE: 2 x 1


.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT

SECTION D-D
TYP-4 PLACES
SCALE: 2=1


A
A
6.3750 6.3752 DIA
-D-
C .0005 TIR
.3 REF
.156 .176 TYP
3
.1245 .1247 DIA THRU-CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
P .001
G .005 DIA
SEE NOTE 14
.281 TYP
.562 TYP
D
D
15° BSC
45°0' TYP
120° BSC
SEE NOTE 4
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
7.30 BSC
15° BSC
45° BSC
60° BSC 4 PLACES
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
G .010 DIA
.02 .03 X 45° ± 5° 2 PLACES
6.3750 6.3752 DIA
-C-
5
NO. 12 (.216)-28NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
G .005 DIA
SEE NOTE 14

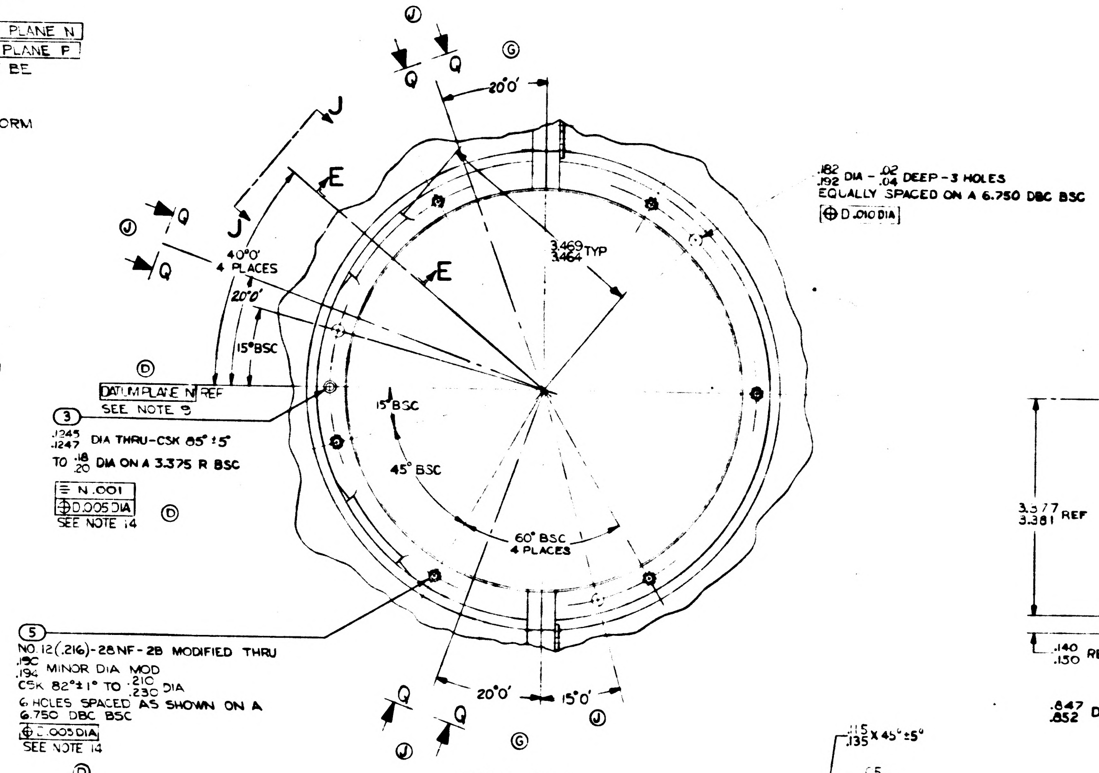

6
.010 DIA
SEE SECTION F-F 2 PLACES
AXIS A
SEE NOTE 5 & 11
G
G
E .001
9.875 DBC BSC
AXIS B
A .001
SEE NOTE 6 & 11
35° BSC 4 PLACES
F
F
2.187 2.184
3.593 3.592
-E-
A .0005
4.344 4.342
3.688 3.685
H .0004
B .0004
-H-


.255 .275 DIA SPOTFACE MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO. 4 (.112) 40UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130 .150 DIA
.156
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT

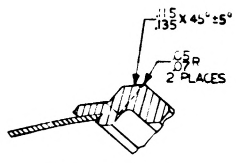
VIEW Q-Q
4 PLACES

NOTES

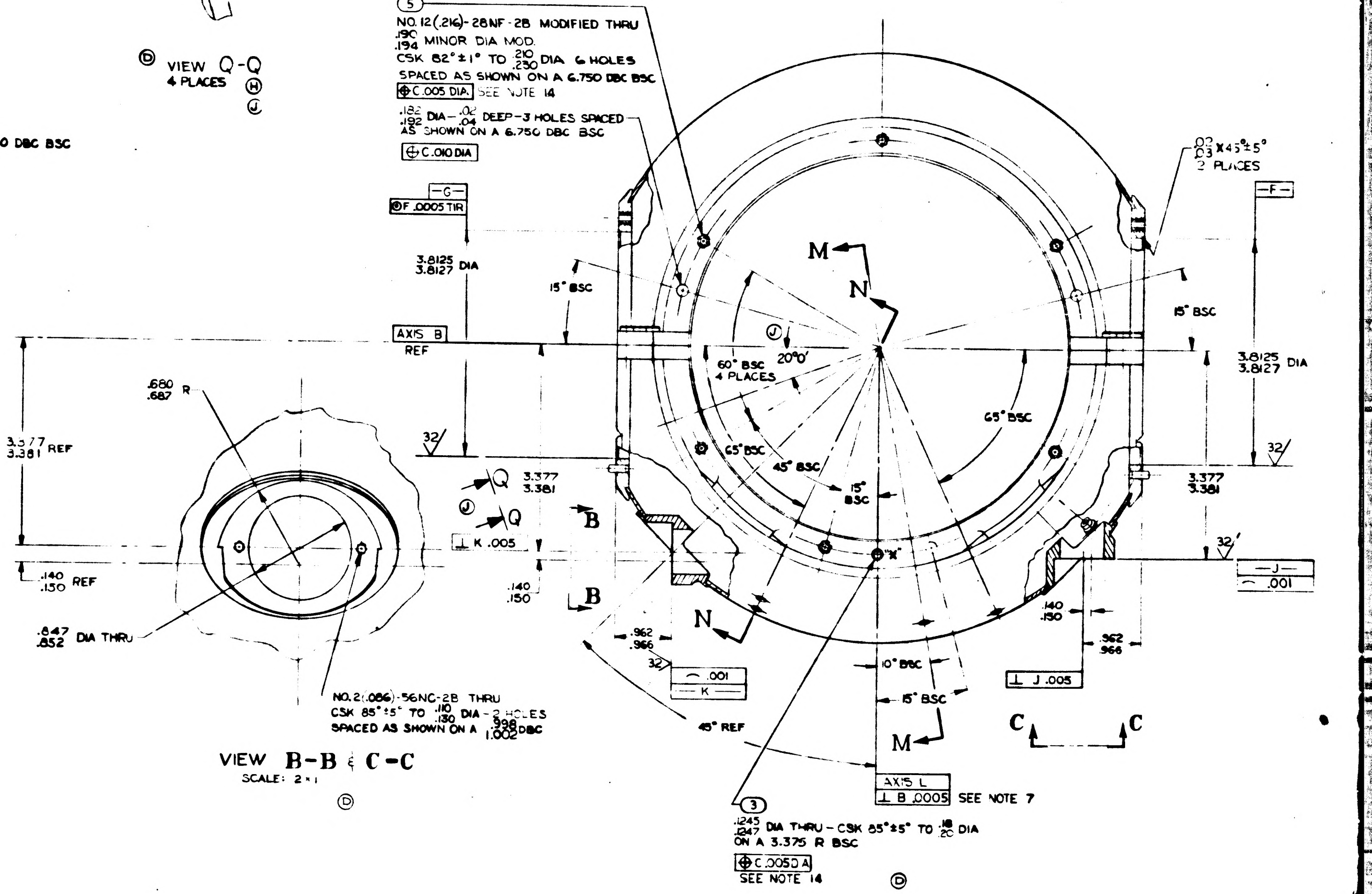
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005 .015
3. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON (2) AND MATCHING SERIAL NO. ON (1) AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM (3) MARKED "X" ESTABLISHES AXIS L
8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM (3) MARKED "Y" ESTABLISHES AXIS M
9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF (1) & (2)
12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ± 1°F
14. ORDER OF OPERATIONS (NON-MANDATORY)
    - A. ASSEMBLE ITEMS (1) & (2) USING NO. 6 SCREWS & NUTS
    - B. DRILL, REAM & C'SINK FOR ITEM (6)
    - C. INSTALL ITEM (6)
    - D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
    - E. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
    - F. FINISH MACHINE
    - G. REMOVE ITEM (6) AND ANODIC COAT PER NOTE 12
    - H. INSTALL ITEMS (3) (4) (5) (6) & (7)
15. MACHINING PADS (IF ADDED TO ITEM (2)) MUST BE MACHINED OFF WITHIN .015 OF ORIGINAL SURFACE PRIOR TO ANODIC COAT.
16. ALTERNATE FINISH BORES -C- -D- -F- & -G- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541


J
Q
Q
20°0'
J
E
E
Q
Q
J
40°0' 4 PLACES
20°0'
15° BSC
3.469 3.464 TYP
DATUM PLANE N REF
SEE NOTE 9
3
.1245 .1247 DIA THRU-CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
N .001
D .005 DIA
SEE NOTE 14
15° BSC
45° BSC
60° BSC 4 PLACES
.182 .192 DIA - .02 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 6.750 DBC BSC
D .010 DIA
5
NO. 12 (.216)-28NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
G .005 DIA
SEE NOTE 14
20°0'
15°0'
Q
Q
J
J

VIEW A-A


.115 .135 X 45° ± 5°
.05 .07 R 2 PLACES

SECTION E-E
TYP-4 PLACES
SCALE: 2X1

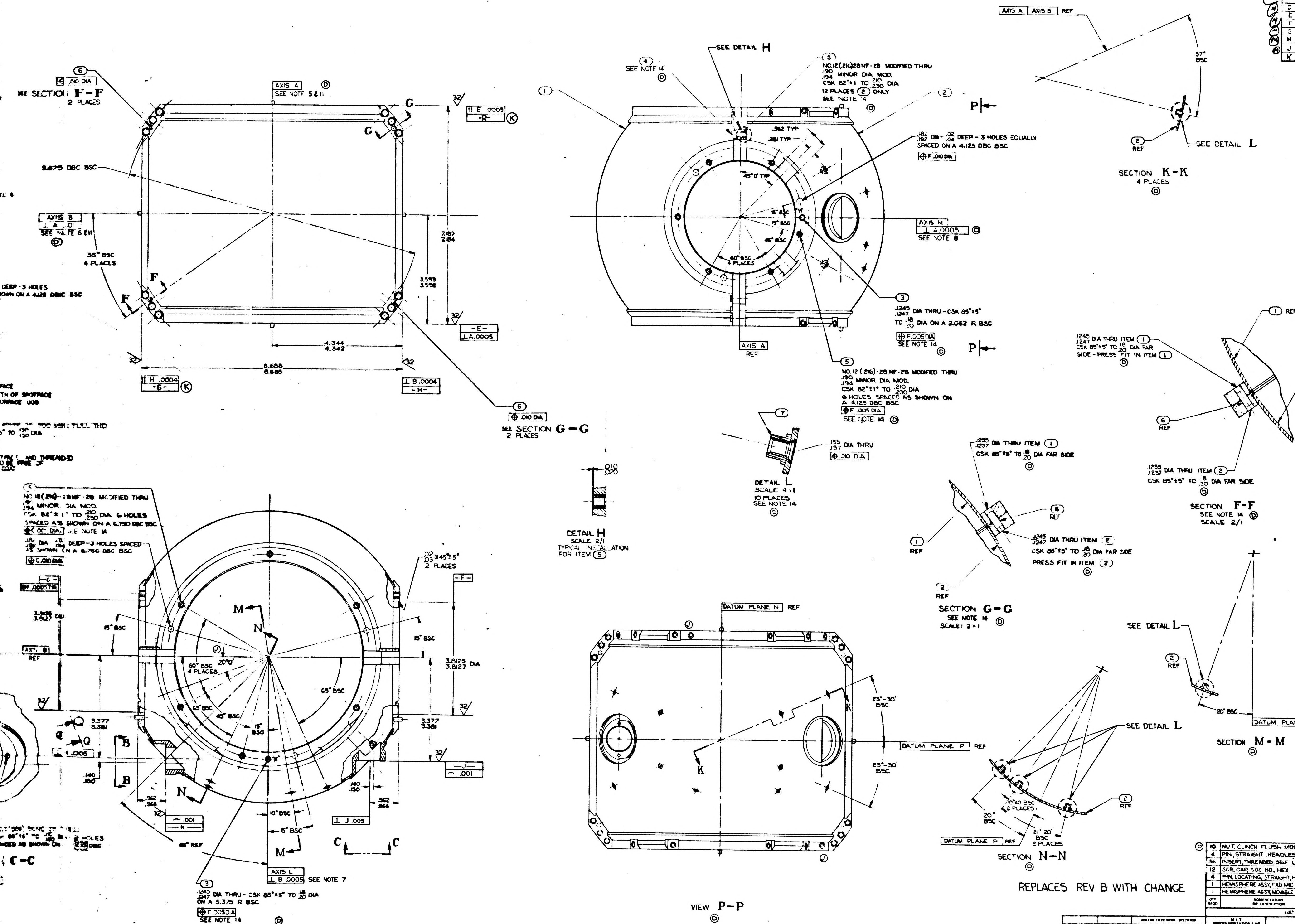

5
NO. 12 (.216)-28NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
C .005 DIA
SEE NOTE 14
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
C .010 DIA
-G-
F .0005 TIR
3.8125 3.8127 DIA
15° BSC
.02 .03 X 45° ± 5° 2 PLACES
-F-
M
N
15° BSC
3.8125 3.8127 DIA
AXIS B REF
20°0'
60° BSC 4 PLACES
65° BSC
65° BSC
45° BSC
15° BSC
3.377 3.381 REF
.680 .687 R
3.377 3.381
3.377 3.381
K .005
B
B
.140 .150 REF
.140 .150
.847 .852 DIA THRU
.962 .966
.001
-K-
N
.140 .150
.362 .366
-J-
.001
10° BSC
15° BSC
45° REF
J .005
M
AXIS L
B .0005
SEE NOTE 7
C
C
NO. 2 (.086)-56NC-2B THRU CSK 85°±5° TO .110 .130 DIA - 2 HOLES SPACED AS SHOWN ON A .998 1.002 DBC
3
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
C .0050 A
SEE NOTE 14

VIEW B-B & C-C
SCALE: 2=1

1000074 REV J SHEET 1

17/1000074

REV	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE TDRR 00159	11 Dec 62	[illegible]	WK
D	TDRR 00950	4-24-63	[illegible]	WK
E	TDRR 01049	4-30-63	[illegible]	WK
F	TDRR 01238	5-21-63	[illegible]	WK
G	TDRR 06175	2-4-64	[illegible]	WK
H	TDRR 06179	2-4-64	[illegible]	WK
J	REVISED PER TDRR 08082	12 MAY 64	JG	[illegible]
K	REVISED PER TDRR 08760	6 JUN 64	NB	RWT



SEE SECTION F-F 2 PLACES
.010 DIA
AXIS A SEE NOTE 5 & 11
8.875 DBC BSC
AXIS B ⊥ A .0005 SEE NOTE 6 & 11
35° BSC 4 PLACES
2.187 2.184
3.593 3.592
4.344 4.342
8.688 8.685
⊥ B .0004 -H-
⊥ A .0005 -E-
SEE SECTION G-G 2 PLACES
SEE DETAIL H
SEE NOTE 14
NO.12 (.216) 28 NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD. CSK 82°±1 TO .210 .230 DIA 12 PLACES ② ONLY SEE NOTE 14
.182 .192 DIA - .02 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 4.125 DBC BSC
P
AXIS M ⊥ A .0005 SEE NOTE 8
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
SEE NOTE 14
AXIS A REF
NO. 12 (.216) - 28 NF-2B MODIFIED THRU .190 .194 MINOR DIA MOD. CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
SEE NOTE 14
.155 .157 DIA THRU
DETAIL L SCALE 4:1 10 PLACES SEE NOTE 14
DETAIL H SCALE 2/1 TYPICAL INSTALLATION FOR ITEM ⑤
AXIS A | AXIS B | REF
37° BSC
SEE DETAIL L
SECTION K-K 4 PLACES
.1245 .1247 DIA THRU ITEM ① CSK 85°±5° TO .18 .20 DIA FAR SIDE - PRESS FIT IN ITEM ①
.1255 .1257 DIA THRU ITEM ② CSK 85°±5° TO .18 .20 DIA FAR SIDE
SECTION F-F SEE NOTE 14 SCALE 2/1
.1255 .1257 DIA THRU ITEM ① CSK 85°±5° TO .18 .20 DIA FAR SIDE
.1245 .1247 DIA THRU ITEM ② CSK 85°±5° TO .18 .20 DIA FAR SIDE PRESS FIT IN ITEM ②
SECTION G-G SEE NOTE 14 SCALE: 2=1
SEE DETAIL L
DATUM PLANE P REF
SECTION M-M
DATUM PLANE N REF
23°-30' BSC
DATUM PLANE P REF
VIEW P-P
SEE DETAIL L
20° 40' BSC 2 PLACES
21° 20' BSC 2 PLACES
SECTION N-N
3.8128 3.8127 DIA
3.377 3.381
.140 .150
.962 .966
⊥ J .005
AXIS L ⊥ B .0005 SEE NOTE 7
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
C .005 D A SEE NOTE 14
60° BSC 4 PLACES
65° BSC
45° BSC
15° BSC
10° BSC
45° REF
.02 .03 X45°±5° 2 PLACES

REPLACES REV B WITH CHANGE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
10	NUT CLINCH FLUSH MOUNTED	1000076-1			7
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

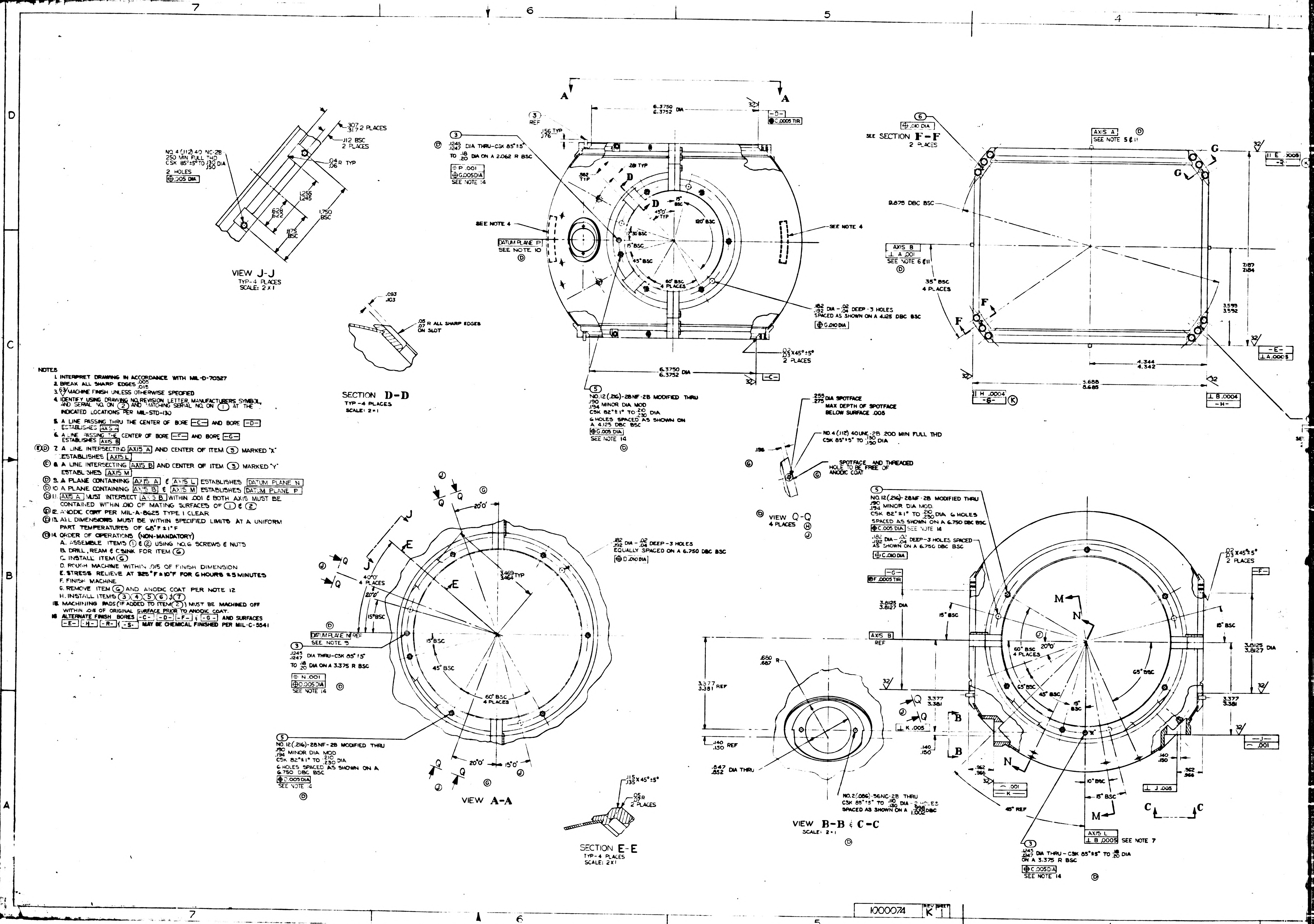
MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D M WHITE
APPROVED FOR MSC W.G. [illegible] 12-11-62
M.I.T.

HOUSING ASSEMBLY
MIDDLE GIMBAL

SCALE 1/1 | UNIT WT | CODE IDENT

MIT INSTRUMENTATION LABORATORY Cambridge, Mass.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000074
SHEET 1 OF 1

1000074 K

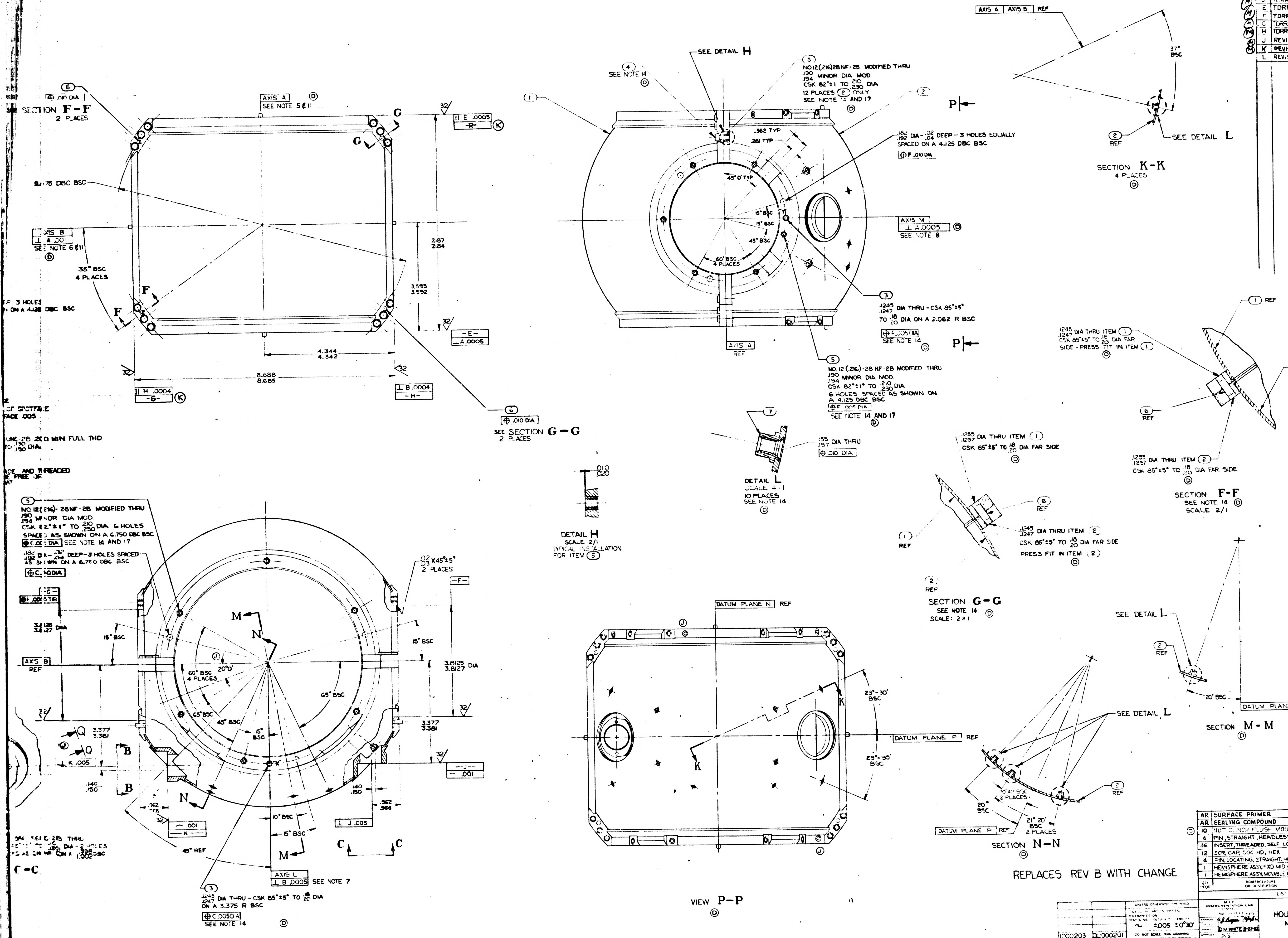

VIEW J-J
TYP-4 PLACES
SCALE: 2 X 1
NO. 4 (.112) 40 NC-2B .250 MIN FULL THD CSK 85°±5° TO .130/.150 DIA 2 HOLES
.307/.317 2 PLACES
.112 BSC 2 PLACES
.04/.06 R TYP
SECTION D-D
TYP-4 PLACES
SCALE: 2=1
.05/.07 R ALL SHARP EDGES ON SLOT
6.3750/6.3752 DIA
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
.182/.192 DIA - .02/.04 DEEP - 3 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
NO. 12 (.216) - 28NF-2B MODIFIED THRU .190/.194 MINOR DIA MOD CSK 82°±1° TO .210/.230 DIA 6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
SEE NOTE 14
SEE SECTION F-F 2 PLACES
AXIS A SEE NOTE 5 & 11
AXIS B SEE NOTE 6 & 11
9.875 DBC BSC
35° BSC 4 PLACES
4.344/4.342
3.688/3.685
.255/.275 DIA SPOTFACE MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO. 4 (.112) 40UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130/.150 DIA
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT
VIEW Q-Q
4 PLACES
VIEW A-A
DATUM PLANE N REF
SEE NOTE 9
.1245/.1247 DIA THRU-CSK 85°±5° TO .18/.20 DIA ON A 3.375 R BSC
SECTION E-E
TYP-4 PLACES
SCALE: 2X1
.115/.135 X 45°±5°
.05/.09 R 2 PLACES
VIEW B-B & C-C
SCALE: 2=1
NO. 2 (.086) -56NC-2B THRU CSK 85°±5° TO .110/.130 DIA - 3 HOLES SPACED AS SHOWN ON A .998/1.002 DBC
.647/.652 DIA THRU
3.8125/3.8127 DIA
AXIS B REF
AXIS L
SEE NOTE 7
45° REF

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ② AND MATCHING SERIAL NO. ON ① AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
Ⓔ Ⓓ 7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM ③ MARKED "X" ESTABLISHES AXIS L
Ⓒ 8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM ③ MARKED "Y" ESTABLISHES AXIS M
Ⓓ 9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
Ⓓ 10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
Ⓓ 11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
Ⓓ 12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
Ⓓ 13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ± 1°F
Ⓓ 14. ORDER OF OPERATIONS (NON-MANDATORY)
   A. ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
   B. DRILL, REAM & C'SINK FOR ITEM ⑥
   C. INSTALL ITEM ⑥
   D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
   E. STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   F. FINISH MACHINE
   G. REMOVE ITEM ⑥ AND ANODIC COAT PER NOTE 12
   H. INSTALL ITEMS ③ ④ ⑤ ⑥ & ⑦
15. MACHINING PADS (IF ADDED TO ITEM ②) MUST BE MACHINED OFF WITHIN .015 OF ORIGINAL SURFACE PRIOR TO ANODIC COAT.
16. ALTERNATE FINISH BORES -C- -D- -F- & -G- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541

1000074 REV K SHEET 1

1/1000074

SYM	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE DRR 00159	11 Dec 62	ajB	WK
D	TDRR 00960	4-24-63	ajB	WK
E	TDRR 01049	4-30-63	ajB	WK
F	TDRR 01238	5-21-63	ajB	WK
G	TDRR 06175	2-4-64	LAW	WK
H	TDRR 06179	2-4-64	LAW	WK
J	REVISED PER TDRR 08082	12 MAY 64	JG	CJP
K	REVISED PER TDRR 08760	8 JUN 64	HB	RWT
L	REVISED PER TDRR 14106	19 NOV 64	JWP	EF



SECTION F-F 2 PLACES
SEE NOTE 5 & 11
AXIS A
AXIS B
8.688 8.685
4.344 4.342
35° BSC 4 PLACES
SEE SECTION G-G 2 PLACES
SEE DETAIL H
SEE NOTE 14
NO.12 (.216) 28NF-2B MODIFIED THRU
12 PLACES ② ONLY
SEE NOTE 14 AND 17
AXIS M
SEE NOTE 8
AXIS A REF
DETAIL L SCALE 4:1 10 PLACES SEE NOTE 14
DETAIL H SCALE 2/1 TYPICAL INSTALLATION FOR ITEM ⑤
SECTION K-K 4 PLACES
SEE DETAIL L
37° BSC
AXIS A AXIS B REF
SECTION G-G SEE NOTE 14 SCALE: 2:1
SECTION F-F SEE NOTE 14 SCALE 2/1
SECTION M-M
DATUM PLANE P REF
DATUM PLANE N REF
VIEW P-P
SECTION N-N
AXIS L
SEE NOTE 7
HOUSING ASSEMBLY MIDDLE GIMBAL

REPLACES REV B WITH CHANGE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AR	SURFACE PRIMER	GRADE NR	MIL-S-22473		9
AR	SEALING COMPOUND	GRADE AV	MIL-S-22473		8
10	NUT, CLINCH FLUSH MOUNTED	1000076-1			7
4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M I T
INSTRUMENTATION LAB
APPROVED G J Bergen 12 Dec 62
DRAWN D M WHITE 9-27-62
APPROVED W J Rhine 12-12-62
M.I.T. APPROVAL J H Hopkins 12 Dec 62

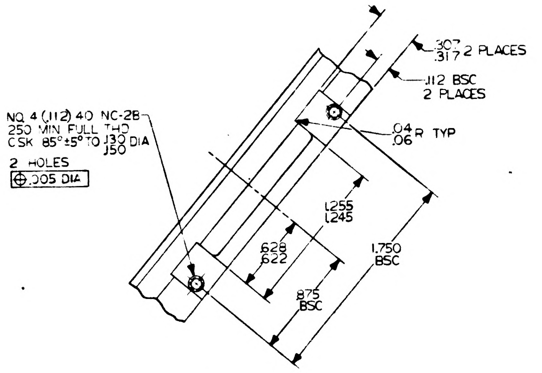
HOUSING ASSEMBLY
MIDDLE GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

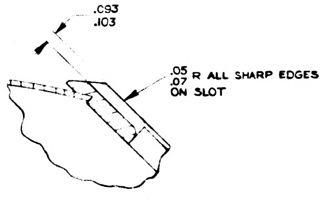
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000074
SHEET 1

1000074 REV SHEET 1

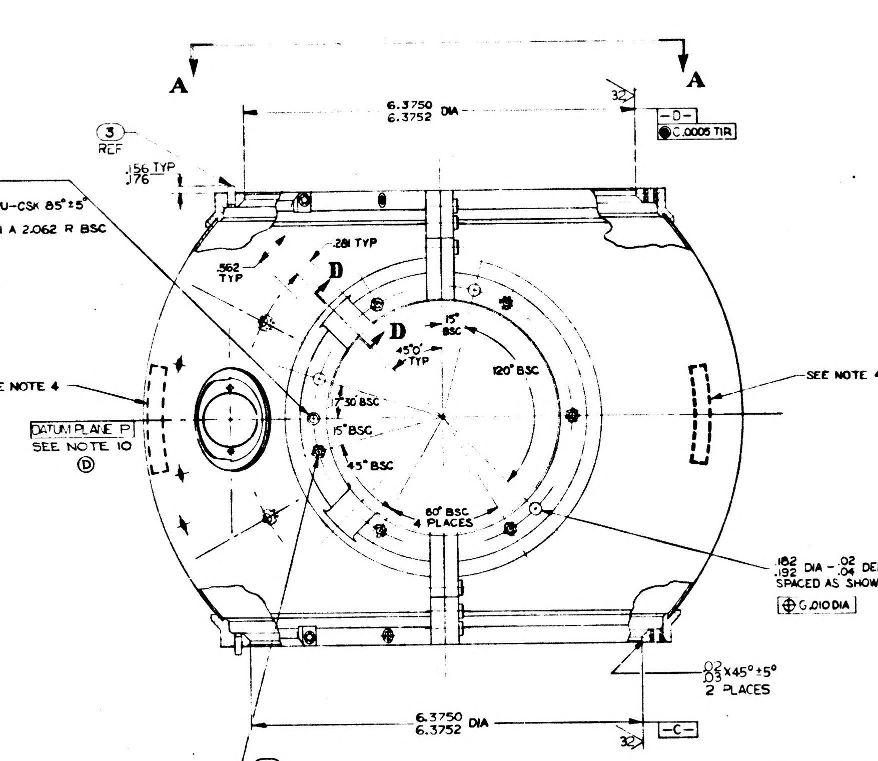
2/1000074


.307 .317 2 PLACES
.112 BSC 2 PLACES
NO. 4 (.112) 40 NC-2B .250 MIN FULL THD CSK 85°±5° TO .130 .150 DIA 2 HOLES
.005 DIA
.04 .06 R TYP
1.255 1.245
1.750 BSC
.628 .622
.875 BSC

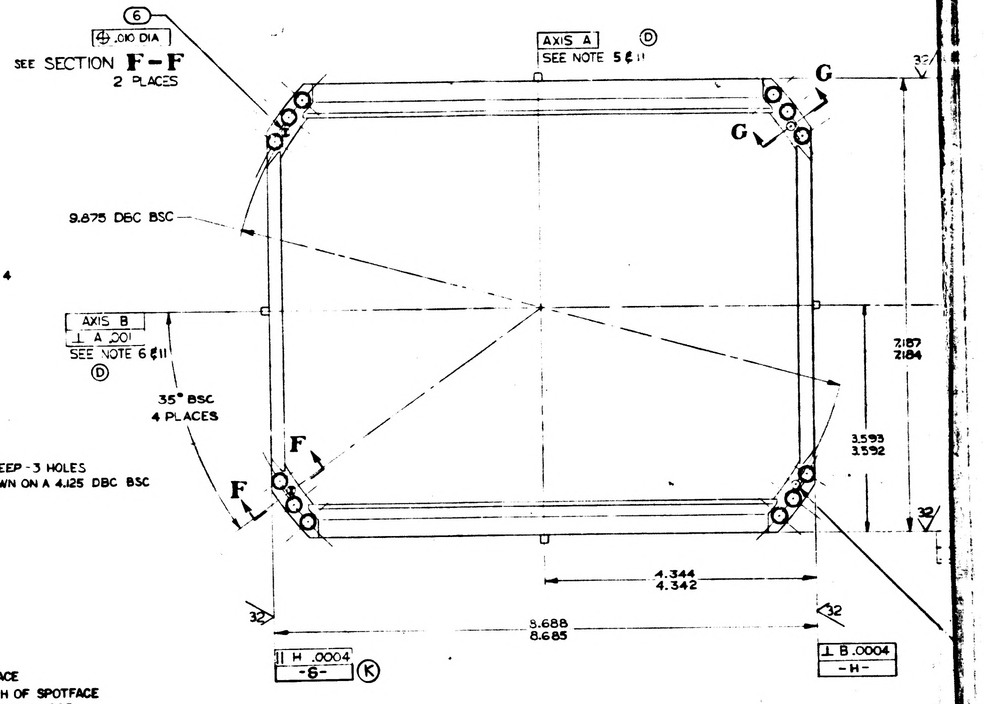
VIEW J-J
TYP-4 PLACES
SCALE: 2×1

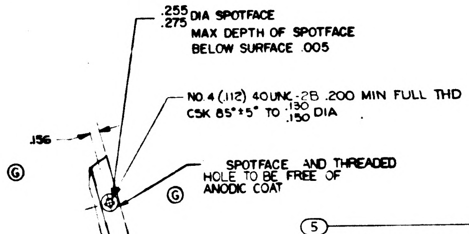

.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT

SECTION D-D
TYP 4 PLACES
SCALE: 2×1


A
A
6.3750 6.3752 DIA
-D-
C .0005 TIR
3 REF
.156 .176 TYP
3
.1245 .1247 DIA THRU-CSK 85°±5° TO .18 .20 DIA ON A 2.062 R BSC
P .001
G .005 DIA
SEE NOTE 14
.562 TYP
.281 TYP
D
D
15° BSC
45°0' TYP
120° BSC
SEE NOTE 4
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
30° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
G .010 DIA
.03 .02 X 45°±5° 2 PLACES
6.3750 6.3752 DIA
-C-

5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
G .005 DIA
SEE NOTE 14 AND 17

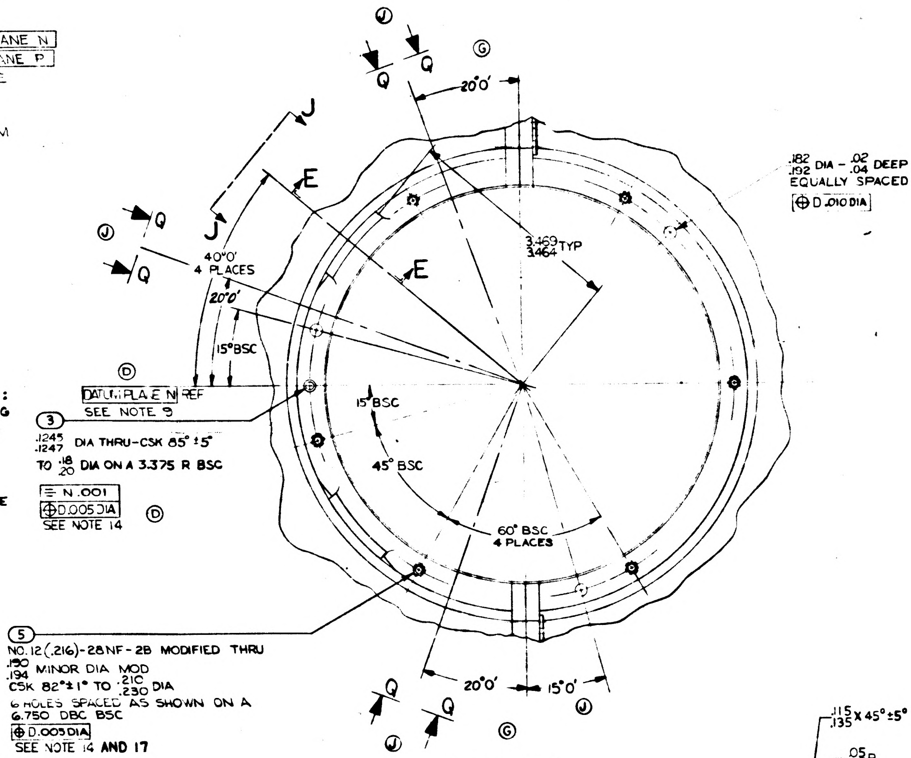

6
.010 DIA
SEE SECTION F-F 2 PLACES
AXIS A
SEE NOTE 5 & 11
G
G
9.875 DBC BSC
AXIS B
⊥ A .001
SEE NOTE 6 & 11
35° BSC 4 PLACES
F
F
2.187 2.184
3.593 3.592
4.344 4.342
8.688 8.685
H .0004
-G-
K
⊥ B .0004
-H-


.255 .275 DIA SPOTFACE MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO. 4 (.112) 40UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130 .150 DIA
.136
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT

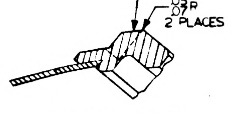
VIEW Q-Q
4 PLACES

NOTES

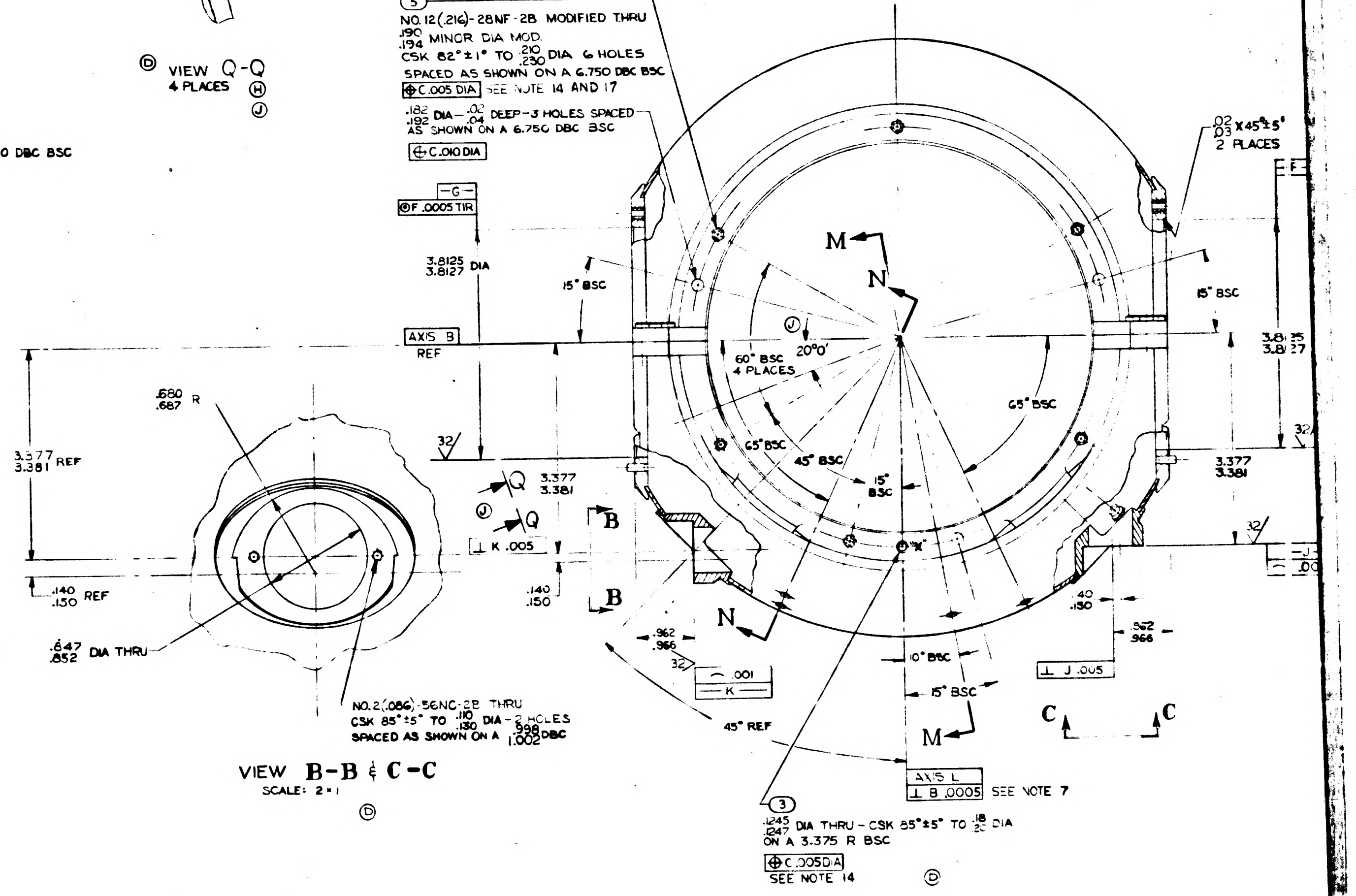
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ② AND MATCHING SERIAL NO. ON ① AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM ③ MARKED "X" ESTABLISHES AXIS L
8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM ③ MARKED "Y" ESTABLISHES AXIS M
9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ±1°F
14. ORDER OF OPERATIONS (NON-MANDATORY)
    - A. ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
    - B. DRILL, REAM & C'SINK FOR ITEM ⑥
    - C. INSTALL ITEM ⑥
    - D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
    - E. STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MINUTES
    - F. FINISH MACHINE
    - G. REMOVE ITEM ⑥ AND ANODIC COAT PER NOTE 12
    - H. INSTALL ITEMS ③ ④ ⑤ ⑥ & ⑦
15. MACHINING PADS (IF ADDED TO ITEM ②) MUST BE MACHINED OFF WITHIN .015 OF ORIGINAL SURFACE PRIOR TO ANODIC COAT.
16. ALTERNATE FINISH BORES -C- -D- -F- & -G- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541
17. JUST PRIOR TO THE ASSEMBLY OF ITEM ⑤ APPLY ITEM ⑧ AS FOLLOWS:
    - A. PREPARE SURFACES OF ITEM ⑤ AND ITS MATING HOLE BY WETTING WITH ITEM ⑨. BRUSH OR WIPE SURFACES WHILE WET TO REMOVE GREASE AND OTHER FOREIGN MATERIAL.
    - B. APPLY THIN COAT OF ITEM ⑧ TO OUTSIDE THREADS AND KEYS OF ITEM ⑤. CAUTION: DO NOT ALLOW SEALER TO REMAIN ON INTERNAL THREADS OF THE INSERT.
    - C. ASSEMBLE ITEM ⑤ AND ALLOW 8 HOURS AT ROOM TEMPERATURE FOR CURING.


Q
Q
20°0'
J
E
J
E
Q
Q
40°0' 4 PLACES
20°0'
15° BSC
3.469 3.464 TYP
.182 .192 DIA - .02 .04 DEEP - 3 HOLES EQUALLY SPACED ON A 6.750 DBC BSC
D .010 DIA
DATUM PLANE N REF
SEE NOTE 9
3
.1245 .1247 DIA THRU-CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
N .001
D .005 DIA
SEE NOTE 14
15° BSC
45° BSC
60° BSC 4 PLACES
5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
D .005 DIA
SEE NOTE 14 AND 17
20°0'
15°0'
Q
Q

VIEW A-A


.115 .135 X 45°±5°
.05 .07 R 2 PLACES

SECTION E-E
TYP-4 PLACES
SCALE: 2×1

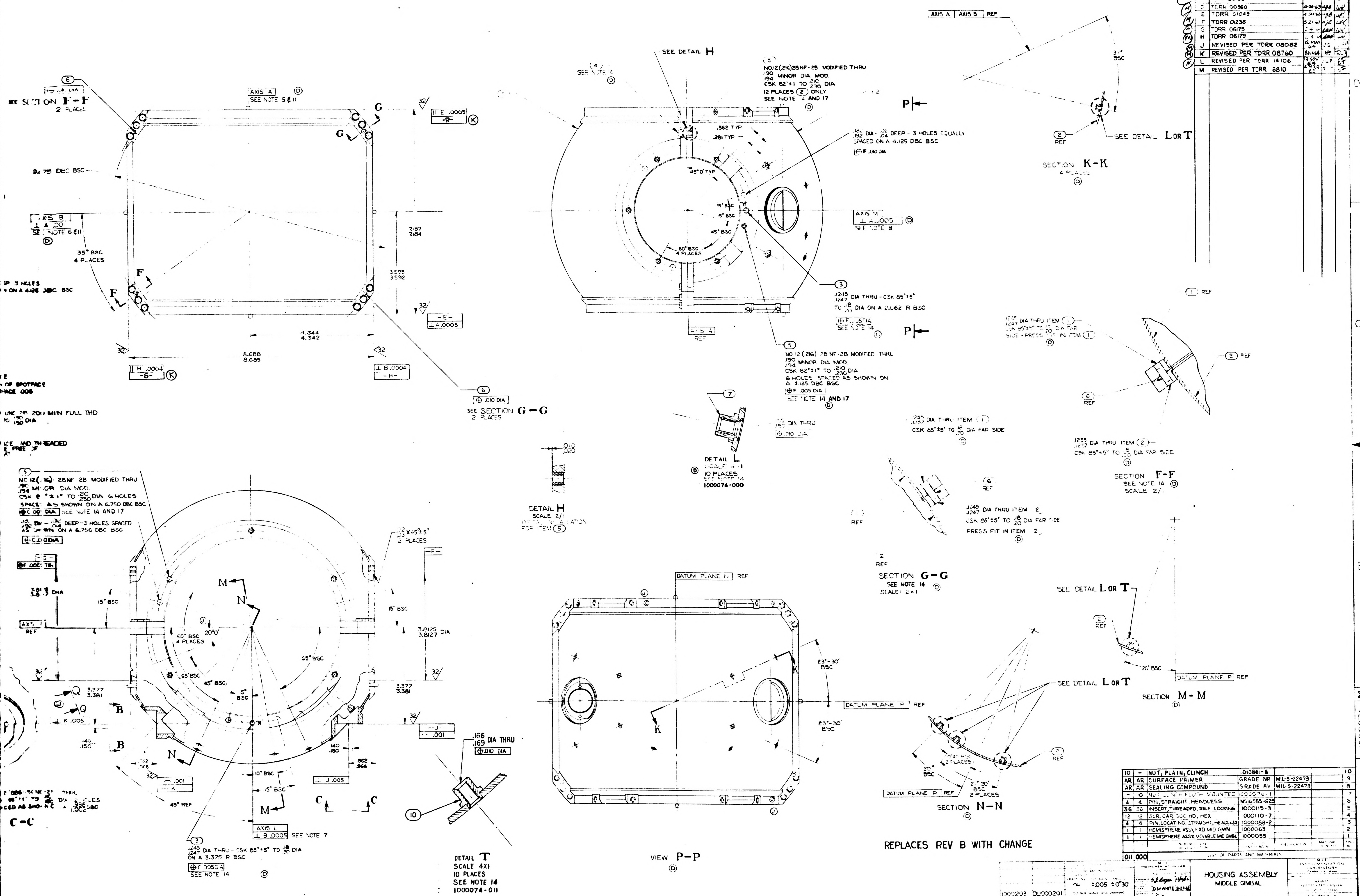

5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
C .005 DIA SEE NOTE 14 AND 17
.182 .192 DIA - .02 .04 DEEP - 3 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
C .010 DIA
-G-
F .0005 TIR
3.8125 3.8127 DIA
.02 .03 X 45°±5° 2 PLACES
M
N
15° BSC
15° BSC
AXIS B REF
3.835 3.827
60° BSC 4 PLACES
20°0'
65° BSC
65° BSC
45° BSC
15° BSC
.680 .687 R
3.377 3.381 REF
Q
3.377 3.381
Q
K .005
B
B
.140 .150
.140 .150 REF
.647 .652 DIA THRU
N
.962 .966
.001
-K-
10° BSC
15° BSC
45° REF
M
C
C
J .005
.40
.962 .966
3.377 3.381
NO. 2 (.086)-56NC-2B THRU CSK 85°±5° TO .110 .130 DIA - 2 HOLES SPACED AS SHOWN ON A .998 1.002 DBC
AXIS L
B .0005 SEE NOTE 7
3
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA ON A 3.375 R BSC
C .005 DIA
SEE NOTE 14

VIEW B-B & C-C
SCALE: 2×1

1000074 REV SHEET 1

1/1000074

C	REPLACES REV B WITH CHANGE TDRR 00159	11 DEC 62	GJB	WK
D	TDRR 00960	4-24-63	GJB	WK
E	TDRR 01049	4-30-63	GJB	WK
F	TDRR 01238	5-21-63	GJB	WK
G	TDRR 06175	2-4-64	AAW	WK
H	TDRR 06179	2-4-64	AAW	WK
J	REVISED PER TDRR 08082	12 MAY 64	JG	
K	REVISED PER TDRR 08760	6 JUN 64		
L	REVISED PER TDRR 14106	19 NOV 64		EF
M	REVISED PER TDRR 8810	MAR 65		EF



SEE SECTION F-F 2 PLACES
AXIS A
SEE NOTE 5 & 11
G
24.75 DBC BSC
AXIS B
SEE NOTE 6 & 11
35° BSC 4 PLACES
F
2.187
2.184
3.593
3.592
4.344
4.342
8.688
8.685
-E-
-H-
-R-
SEE SECTION G-G 2 PLACES
SEE DETAIL H
SEE NOTE 14
NO.12(.216)28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1 TO .210 .230 DIA
12 PLACES ONLY
SEE NOTE 4 AND 17
P
.562 TYP
.281 TYP
45° 0' TYP
15° BSC
5° BSC
45° BSC
60° BSC 4 PLACES
DEEP - 3 HOLES EQUALLY SPACED ON A 4.125 DBC BSC
AXIS M
SEE NOTE 8
DIA THRU - CSK 85°±5°
DIA ON A 2.062 R BSC
SEE NOTE 14
NO.12 (.216) 28 NF-2B MODIFIED THRU
.190 .194 MINOR DIA MOD
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN ON A 4.125 DBC BSC
SEE NOTE 14 AND 17
AXIS A REF
DETAIL L
SCALE 4/1
10 PLACES
SEE NOTE 14
1000074-000
DETAIL H
SCALE 2/1
FOR ITEM 5
AXIS A
AXIS B
REF
37° BSC
SEE DETAIL L OR T
SECTION K-K
4 PLACES
REF
SECTION F-F
SEE NOTE 14
SCALE 2/1
DIA THRU ITEM 1
CSK 85°±5° TO DIA FAR SIDE
DIA THRU ITEM 2
PRESS FIT IN ITEM 2
SECTION G-G
SEE NOTE 14
SCALE 2/1
SEE DETAIL L OR T
SECTION M-M
DATUM PLANE P REF
DATUM PLANE N REF
23°-30' BSC
K
VIEW P-P
10°-40' BSC 2 PLACES
21°-20' BSC 2 PLACES
20° BSC
SECTION N-N
NO.12(.216)-28NF 2B MODIFIED THRU
.190 .194 MINOR DIA MOD.
CSK 82°±1° TO .210 .230 DIA 6 HOLES
SPACED AS SHOWN ON A 6.750 DBC BSC
SEE NOTE 14 AND 17
DEEP-3 HOLES SPACED AS SHOWN ON A 6.750 DBC BSC
M
N
15° BSC
3.8125
3.8127 DIA
60° BSC 4 PLACES
20°0'
65° BSC
45° BSC
Q
B
C-C
3.377
3.381
AXIS L
SEE NOTE 7
.1245 .1247 DIA THRU - CSK 85°±5° TO .18 .20 DIA
ON A 3.375 R BSC
SEE NOTE 14
.166 .169 DIA THRU
DETAIL T
SCALE 4X1
10 PLACES
SEE NOTE 14
1000074-011
-J-

REPLACES REV B WITH CHANGE

10	-	NUT, PLAIN, CLINCH	1010861-6			10
AR	AR	SURFACE PRIMER	GRADE NR	MIL-S-22473		9
AR	AR	SEALING COMPOUND	GRADE AV	MIL-S-22473		8
-	10	NUT CLINCH FLUSH MOUNTED	1000076-1			7
4	4	PIN, STRAIGHT, HEADLESS	MS16555-625			6
36	36	INSERT, THREADED, SELF LOCKING	1000115-3			5
12	12	SCR, CAP, SOC HD, HEX	1000110-7			4
4	4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			3
1	1	HEMISPHERE ASSY, FXD MID GMBL	1000063			2
1	1	HEMISPHERE ASSY, MOVABLE MID GMBL	1000055			1
		NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL & NOTES	FIND NO.
011	000	LIST OF PARTS AND MATERIALS				

1000203 DL1000201
1000003 DL1000001
APPLICATION

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M.I.T. INSTRUMENTATION LAB
APPROVED G J Bergen 12/4/62
DM WHITE 9-27-62
W J Rhine 12-12-62
M.I.T. APPROVAL 12/12/62

HOUSING ASSEMBLY
MIDDLE GIMBAL

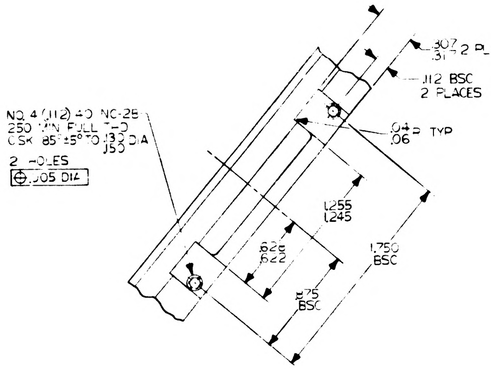
SCALE 1/1
UNIT WT
CODE IDENT

M.I.T.
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000074
SHEET 1 OF 1

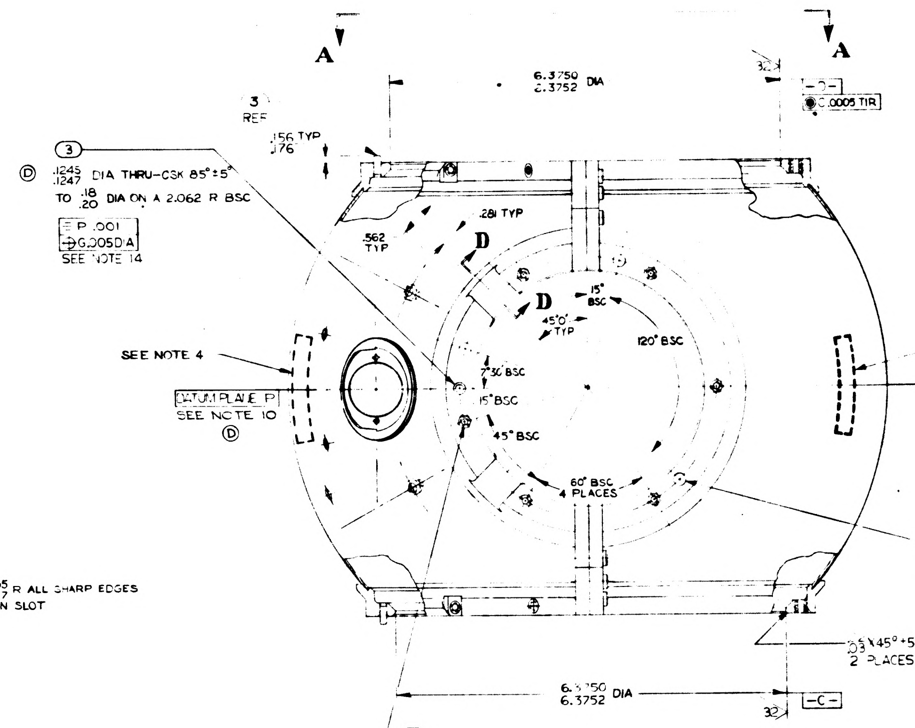
1000074

1000074 REV M SHEET 1

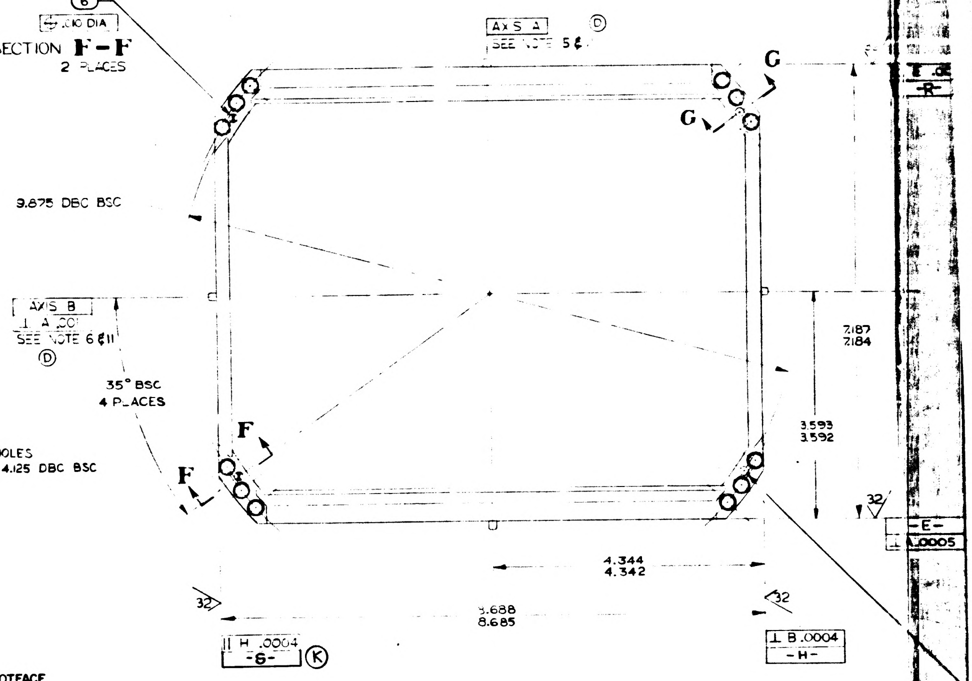
2/1000074

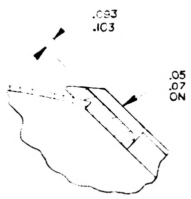

.307
.317 2 PLACES
.112 BSC
2 PLACES
NO. 4 (.112) 40 NC-2B
250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
2 HOLES
⊕ .005 DIA
.04/.06 R TYP
1.255
1.245
.628
.622
1.750
BSC
.875
BSC

VIEW J-J
TYP-2 PLACES
SCALE: 2×1


A
A
6.3750
6.3752 DIA
32
-D-
◎ C .0005 TIR
3
REF
.156 TYP
.176
3
Ⓓ .1245/.1247 DIA THRU-CSK 85°±5°
TO .18/.20 DIA ON A 2.062 R BSC
≡ P .001
⊕ G.005 DIA
SEE NOTE 14
.562
TYP
.281 TYP
D
D
15°
BSC
45°0'
TYP
120° BSC
SEE NOTE 4
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
Ⓓ
7°30' BSC
15° BSC
45° BSC
60° BSC
4 PLACES
.05/.07 R ALL SHARP EDGES
ON SLOT
.182/.192 DIA - .02/.04 DEEP - 3 HOLES
SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ G.010 DIA
.02/.03 ×45°+5°
2 PLACES
6.3750
6.3752 DIA
32
-C-

5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MOD
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN ON
A 4.125 DBC BSC
⊕ G.005 DIA
SEE NOTE 14 AND 17
Ⓓ

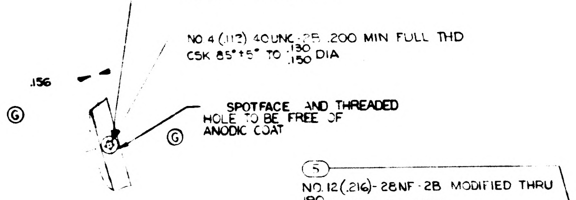

6
⌭ .010 DIA
SEE SECTION F-F
2 PLACES
AXIS A
SEE NOTE 5 & 9
Ⓓ
G
G
9.875 DBC BSC
AXIS B
⊥ A .001
SEE NOTE 6 & 11
Ⓓ
35° BSC
4 PLACES
7.187
7.184
F
F
3.593
3.592
32
-E-
⊥ A .0005
4.344
4.342
32
8.688
8.685
32
∥ H .0004
-S-
Ⓚ
⊥ B .0004
-H-
-R-



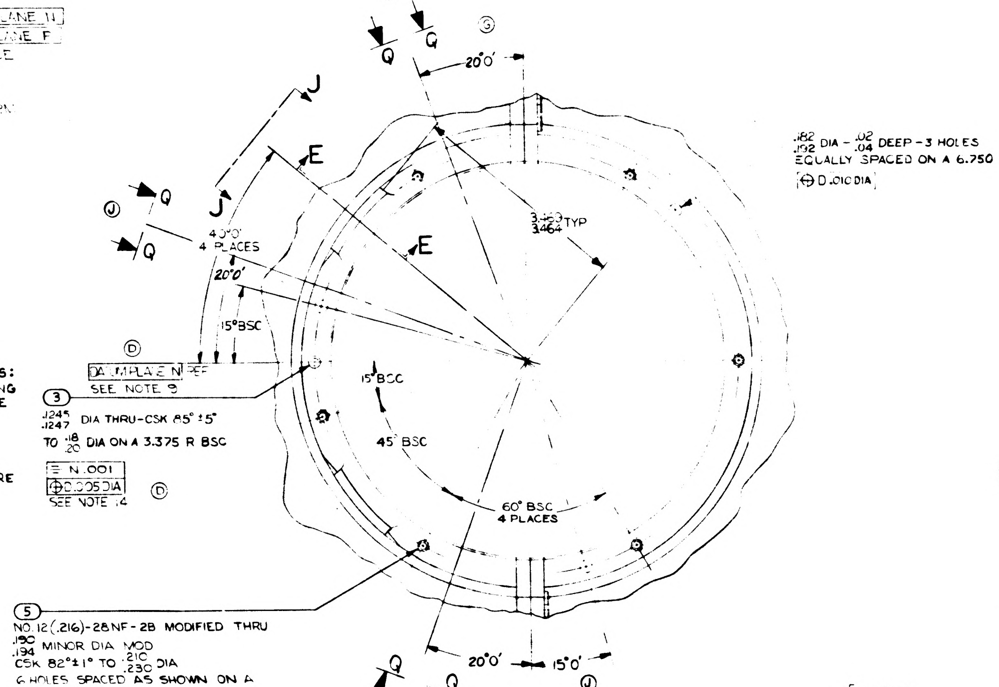
SECTION D-D
TYP-4 PLACES
SCALE: 2×1

NOTES

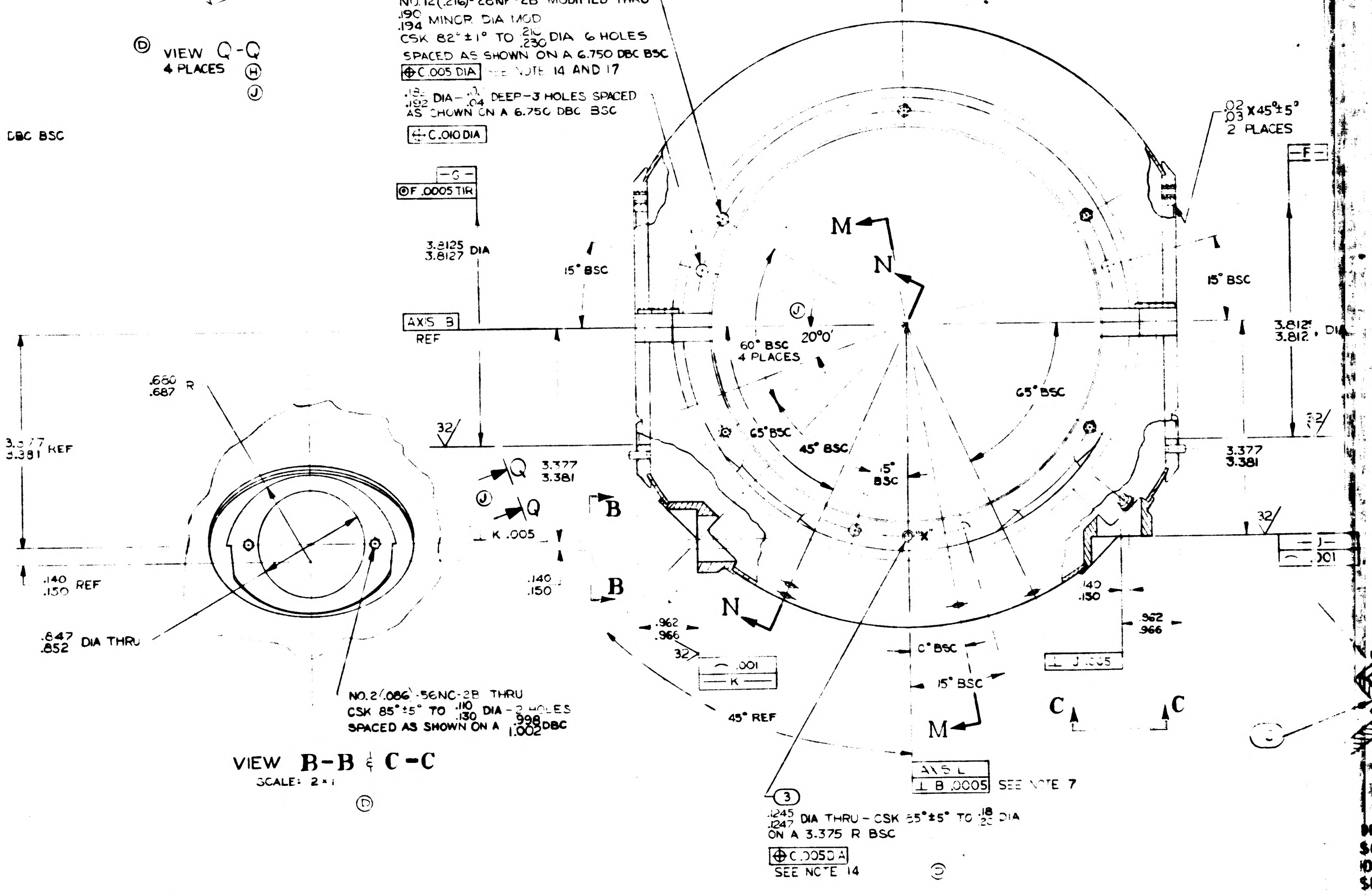
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005/.015
3. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO. REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON (2) AND MATCHING SERIAL NO. ON (1) AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
Ⓔ Ⓓ 7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM (3) MARKED "X" ESTABLISHES AXIS L
Ⓓ 8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM (3) MARKED "Y" ESTABLISHES AXIS M
Ⓓ 9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
Ⓓ 10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE F
Ⓓ 11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF (1) & (2)
Ⓓ 12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
Ⓓ 13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURES OF 68°F ±1°F
Ⓓ 14. ORDER OF OPERATIONS **(NON-MANDATORY)**
    - A. ASSEMBLE ITEMS (1) & (2) USING NO. 6 SCREWS & NUTS
    - B. DRILL, REAM & CSINK FOR ITEM (6)
    - C. INSTALL ITEM (6)
    - D. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
    - **E. STRESS RELIEVE AT 325°F ±10°F FOR 6 HOURS ±5 MINUTES**
    - F. FINISH MACHINE
    - G. REMOVE ITEM (6) AND ANODIC COAT PER NOTE 12
    - H. INSTALL ITEMS (3), (4), (5), (6), & (7) OR (10)
15. MACHINING PADS (IF ADDED TO ITEM (2)) MUST BE MACHINED OFF WITHIN .015 OF ORIGINAL SURFACE PRIOR TO ANODIC COAT.
16. ALTERNATE FINISH BORES -C-, -D-, -F-, & -G- AND SURFACES -E-, -H-, -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541
17. JUST PRIOR TO THE ASSEMBLY OF ITEM (5) APPLY ITEM (8) AS FOLLOWS:
    - A. PREPARE SURFACES OF ITEM (5) AND ITS MATING HOLE BY WETTING WITH ITEM (9). BRUSH OR WIPE SURFACES WHILE WET TO REMOVE GREASE AND OTHER FOREIGN MATERIAL.
    - B. APPLY THIN COAT OF ITEM (8) TO OUTSIDE THREADS AND KEYS OF ITEM (5). CAUTION: DO NOT ALLOW SEALER TO REMAIN ON INTERNAL THREADS OF THE INSERT.
    - C. ASSEMBLE ITEM (5) AND ALLOW 8 HOURS AT ROOM TEMPERATURE FOR CURING.


.255/.275 DIA SPOTFACE
MAX DEPTH OF SPOTFACE
BELOW SURFACE .005
NO 4 (.112) 40UNC-2B .200 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
.156
Ⓖ
SPOTFACE AND THREADED
HOLE TO BE FREE OF
ANODIC COAT
Ⓖ

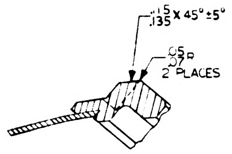
Ⓓ VIEW Q-Q
4 PLACES Ⓗ Ⓙ


Ⓙ
Q
Q
Ⓖ
20°0'
J
E
J
E
Ⓙ
Q
Q
40°0'
4 PLACES
20°0'
15° BSC
3.463
3.464 TYP
.182/.192 DIA - .02/.04 DEEP - 3 HOLES
EQUALLY SPACED ON A 6.750 DBC BSC
⊕ D .010 DIA
Ⓓ
DATUM PLANE N REF
SEE NOTE 9
3
.1245/.1247 DIA THRU-CSK 85°±5°
TO .18/.20 DIA ON A 3.375 R BSC
≡ N .001
⊕ D.005 DIA
SEE NOTE 14
Ⓓ
15° BSC
45° BSC
60° BSC
4 PLACES
5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MOD
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN ON A
6.750 DBC BSC
⊕ D.005 DIA
SEE NOTE 14 AND 17
Ⓓ
20°0'
15°0'
Q
Q
Ⓙ
Ⓙ
Ⓖ

VIEW A-A


5
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MOD
CSK 82°±1° TO .210/.230 DIA 6 HOLES
SPACED AS SHOWN ON A 6.750 DBC BSC
⊕ C.005 DIA SEE NOTE 14 AND 17
.182/.192 DIA - .02/.04 DEEP-3 HOLES SPACED
AS SHOWN ON A 6.750 DBC BSC
⊕ C.010 DIA
-G-
◎ F .0005 TIR
3.8125
3.8127 DIA
15° BSC
AXIS B
REF
M
N
Ⓙ
20°0'
60° BSC
4 PLACES
65° BSC
65° BSC
45° BSC
15°
BSC
.02/.03 ×45°±5°
2 PLACES
-F-
15° BSC
3.812
3.812 DIA
32
3.377
3.381
32
-J-
⌒ .001
3.377
3.381 REF
.660
.687 R
32
Q 3.377
3.381
Ⓙ
Q
⊥ K .005
B
B
.140
.150
.140
.150 REF
.647
.852 DIA THRU
NO. 2 (.086)-56NC-2B THRU
CSK 85°±5° TO .110/.130 DIA - 2 HOLES
SPACED AS SHOWN ON A .998/1.002 DBC
N
.962
.966
32
⌒ .001
-K-
"X"
45° REF
C° BSC
15° BSC
M
C
C
.140
.150
.962
.966
⊥ J .005
AXIS L
⊥ B .0005 SEE NOTE 7
3
.1245/.1247 DIA THRU - CSK 85°±5° TO .18/.20 DIA
ON A 3.375 R BSC
⊕ C.005 DIA
SEE NOTE 14

VIEW B-B & C-C
SCALE: 2×1
Ⓓ


.115/.135 X 45°±5°
.05/.07 R
2 PLACES

SECTION E-E
TYP-4 PLACES
SCALE: 2×1

1000074	REV M	SHEET 1

1/1000074

	1000074

REVISIONS TDRR 00065			
SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000063	Hemisphere Assy, Fixed Middle Gimbal	1
1000055	Hemisphere Assy, Movable Middle Gimbal	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10/17/62
BY DIRECTION MIT Approval
W A Kapfer 10/17/62

MIDDLE GIMBAL HOUSING
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000074

SHEET OF

NASA PROCUREMENT
SPEC NO. PS-1000075
28 December 1962
Class A
TDRR 00210

DESCRIPTION AND REQUIREMENTS PUBLICATION

FOR

PROCUREMENT OF

MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS

TYPE 62B130a4U U

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment	MIT	NASA
A	TDRR # 06374	18 FEB 1964	WC	

This specification consists of
pages i to iiii and 1 to 5 inclusive.

NASA DOCUMENT
~~ND~~ PS-1000075
28 December 1962
Class A Release
TDRR-00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

W.A. Kopper 25 Dec '62
MIT Instrumentation Laboratory Date

NASA/MSC Approval 12/28/62
Date

DESCRIPTION AND REQUIREMENTS PUBLICATION

FOR PROCUREMENT OF

MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS

TYPE 62B130 a4U

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1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	3
4	QUALITY ASSURANCE PROVISIONS	4
5	PREPARATION FOR DELIVERY	5
6	NOTES	5

DESCRIPTION AND REQUIREMENTS PUBLICATION

FOR PROCUREMENT OF

MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS

TYPE 62B130 a4U

1. SCOPE

1.1 SCOPE. This specification establishes the requirements for the procurement of the ~~frameless, dc~~ torque motor, hereinafter called motor.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

~~Military~~

~~MIL-E-[illegible] Environmental Testing, Aeronautical and Associated Equipment, General Specification for~~

NASA

ND-1002012	Description and Requirements Publication for Procurement of Motor, Torque, Direct-Current, Frameless, General Specification for, National Aeronautics and Space Administration

STANDARDS

Military

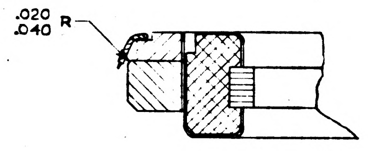
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts.

DRAWINGS

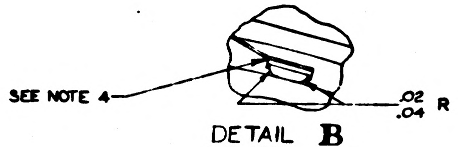
NASA

1000075	Motor, Torque, DC, Frameless, Specification Control Drawing.

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ			REVISIONS		
Ⓜ		A₂	TDR 00010	3-0-62	ajc
Ⓜ		B₁	IDR 00078	10-31-62	

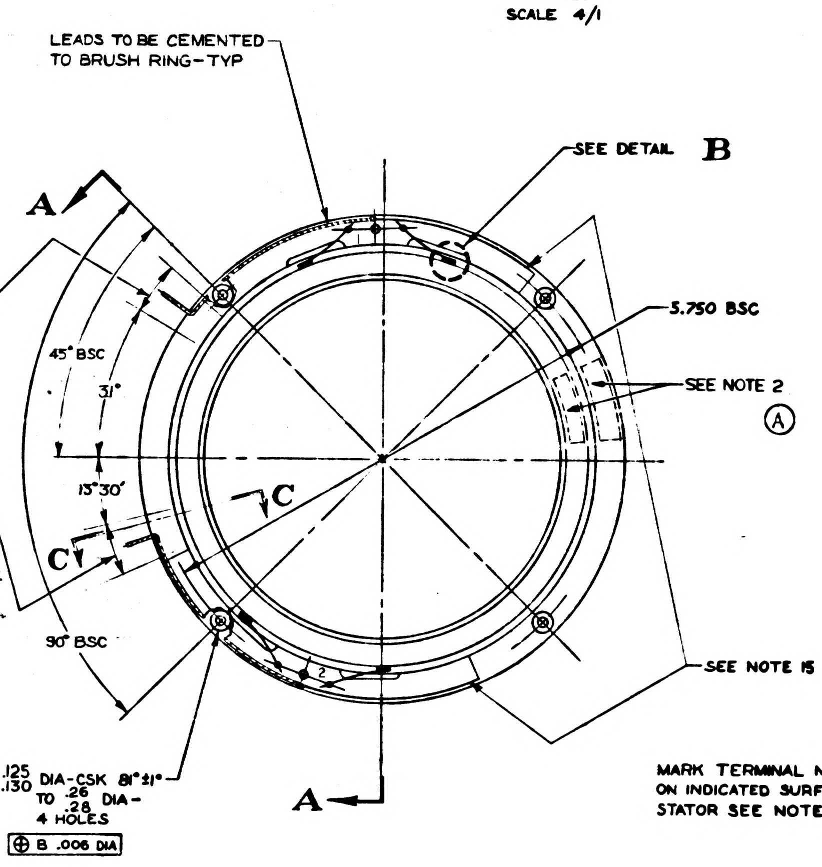


SECTION C-C
TYP 2 PLACES
SCALE 2/1

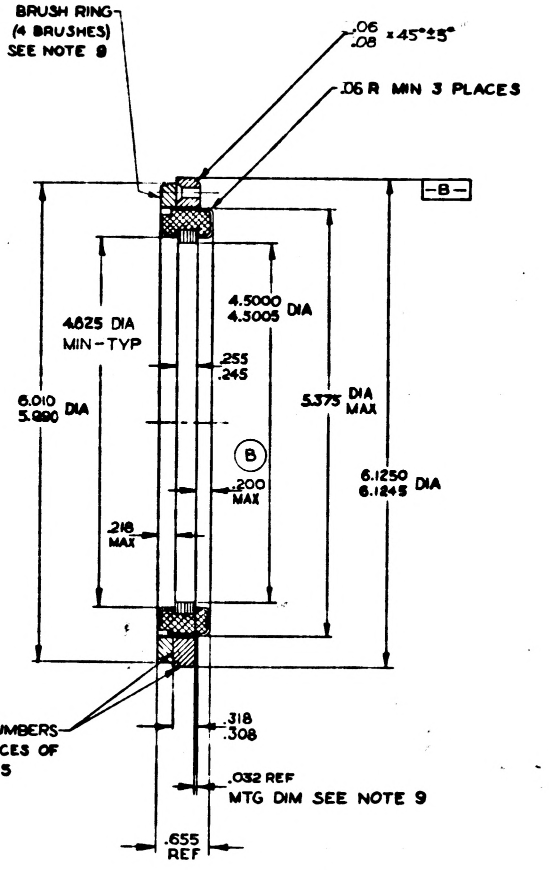


SEE NOTE 4
.02
.04 R

DETAIL B
4 PLACES
SCALE 4/1



LEADS TO BE CEMENTED TO BRUSH RING-TYP
SEE DETAIL B
A
10°30' +5°0' -0°0'
LEADS MUST BE FREE TO BEND 90° & EXIT WITHIN THIS AREA
45° BSC
31°
5.750 BSC
SEE NOTE 2
Ⓐ
13°30'
C
C
90° BSC
SEE NOTE 15
.125 .130 DIA-CSK 81°±1° TO .26 .28 DIA - 4 HOLES
⊕ B .006 DIA
A



BRUSH RING (4 BRUSHES) SEE NOTE 8
.06 .08 × 45°±5°
.06 R MIN 3 PLACES
-B-
4.825 DIA MIN-TYP
4.5000 4.5005 DIA
.255 .245
6.010 5.990 DIA
5.375 DIA MAX
Ⓑ
.200 MAX
6.1250 6.1245 DIA
.218 MAX
MARK TERMINAL NUMBERS ON INDICATED SURFACES OF STATOR SEE NOTE 5
.318 .308
.032 REF MTG DIM SEE NOTE 9
.655 REF

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & SERIAL NO. & MFR'S SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E 24
   LENGTH: 6 INCHES MIN.
4. CHECK BRUSH FORCE AT HEEL OF BRUSH. BRUSH FORCE TO BE 30 TO 50 GRAMS. SEE DETAIL B
5. PART MUST MEET REQUIREMENTS OF OS 8838/
6. BLACK LEAD AT TERMINAL NO. 1
7. WHITE LEAD AT TERMINAL NO. 2
8. CAUTION: DO NOT REMOVE STATOR FROM ROTOR WITHOUT REPLACING BRUSH RING WITH A MAGNETIC KEEPER RING
9. Ⓐ A VARIATION OF ±.019 IN .032 MOUNTING DIM WILL RESULT IN NOT LESS THAN 75% OF THE BRUSH WIDTH REMAINING ON THE COMMUTATOR UNDER THESE CONDITIONS THE BRUSH WILL NOT INTERFERE WITH THE INSULATION OF THE ARMATURE
10. STATOR TO BE INSPECTED BY USING GAGE (LATER) OF $\frac{6.1256}{6.1253}$ ID & MUST BE $\boxed{◉ .003 \text{ TIR}}$ WITH GAGE SURFACE MOUNTING SCREWS TO BE INSTALLED FOR THIS INSPECTION. ROTOR MUST GO ON ARBOR OF $\frac{4.4993}{4.4995}$ DIA & MUST BE $\boxed{◉ .0015 \text{ TIR}}$ WITH ARBOR SURFACE
11. BREAK CORNERS $\frac{.005}{.015}$ R
12. BRUSH RING TO BE FASTENED TO STATOR USING LONG-LOK SCREWS
13. GOLD PLATE COMMUTATOR PER MIL-G-45204 TYPE II CLASS 3
    ALT: COMMUTATOR MATERIAL SILVER PER MIL-S-13282 OR COIN SILVER.
14. MOTOR TO MEET SPECIFICATION REQUIREMENTS WHEN THE STATOR AND ROTOR AXES ARE ECCENTRIC BY .002 AND OUT OF PARALLEL BY .5 MILLIRADIANS.
15. BRUSH RING TO BE 2 SEGMENTS
16. + DC AT TERMINAL NO. 1 WILL RESULT IN A CCW ROTATION OF THE INNER RING WHEN VIEWED FROM THE COMMUTATOR SIDE.

ORIGINAL SOURCES OF SUPPLY:

Ⓐ
INLAND MOTOR CORP. OF VIRGINIA
NORTHAMPTON, MASS.

KEARFOTT DIV., GENERAL PRECISION INC.
166 BEARHILL ROAD
WALTHAM, 54, MASS.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	
1000006	DL 100C001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: ———

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
DATE
APPROVED 7-31-62
CHECKED
DRAWN DM WHITE 7-17-62
APPROVED FOR MSC 7/31/62
BY DIRECTION
MIT APPROVAL J.W. 7/31/62

MOTOR, TORQUE
DC, FRAMELESS
SPECIFICATION CONTROL DRAWING

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000075
SHEET 1 OF 1

1000075 B

NASA PROCUREMENT
SPEC NO. PS-1000075 B
28 December 1962
Class A
TDRR 00210

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS
TYPE 62B130a4U U
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment	MIT	NASA
A	TDRR 06374	18 FEB 1964	WK	
B	TDRR 11900	19 AUG 1964	WK	

This specification consists of pages i to iii and 1 to 5 inclusive.

NASA DOCUMENT
~~ND~~ PS-1000075
28 December 1962
Class A Release
TDRR-00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

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This document does not supersede any existing publication or instructions.

MIT Instrumentation Laboratory 28 Dec '62
Date

NASA/MSC Approval 12/28/62
Date

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS
TYPE 62B130a4U U

1. SCOPE

1.1 SCOPE. This specification establishes the requirements for the procurement of the frameless, dc torque motor, hereinafter called motor, [illegible]

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-E-5272	Environmental Testing, Aeronautical and Associated Equipment, General Specification for

NASA

ND-1002012	Description and Requirements Publication for Procurement of Motor, Torque, Direct-Current, Frameless, General Specification for, National Aeronautics and Space Administration

STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts.

DRAWINGS

NASA

1000075	Motor, Torque, DC, Frameless, Specification Control Drawing.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NASA PROCUREMENT
SPEC NO. PS-1000075 B
28 December 1962
Class A
TDRR 00210

DESCRIPTION AND REQUIREMENTS PUBLICATION

FOR

PROCUREMENT OF

MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS

TYPE 62B130a4U

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment	MIT	NASA
A	TDRR 06374	18 FEB 1964		
B	TDRR 11900	19 AUG 1964		

This specification consists of
pages i to iiii and 1 to 5 inclusive.

NASA DOCUMENT
~~ND~~ PS-1000075
28 December 1962
Class A Release
JDRC - 00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

28 Dec 62
MIT Instrumentation Laboratory — Date

12/28/62
NASA/MSC Approval — Date

NASA PROCUREMENT
SPEC. NO. PS- 1000075

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

EXAMINED AND APPROVED

Act - Contl & Guidance Proj Mgr. 12/28/62
APPROVED BY TITLE DATE

APPROVED BY TITLE DATE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Robert J. Therrien Staff Member 28 December 1962
EXAMINED BY TITLE DATE

John E Miller Director - IMU 28 December 1962
APPROVED BY TITLE DATE

David G Hoag Tech Dir 28 Dec 62
APPROVED BY TITLE DATE

AC SPARK PLUG DIVISION, GENERAL MOTORS CORPORATION

Henry J. [illegible] Sr. Specification Writer 19 December 1962
PREPARED BY TITLE DATE

A J Italiano 28 DEC 1962
ACCEPTED BY TITLE DATE

NASA PROCUREMENT
SPEC NO. PS-1000075

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS
TYPE 62B130 a4U

TABLE OF CONTENTS

Section	Title	Page
1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	3
4	QUALITY ASSURANCE PROVISIONS	4
5	PREPARATION FOR DELIVERY	5
6	NOTES	5

NASA PROCUREMENT
SPEC NO. PS-1000075

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS
TYPE 62B130a4U

1. SCOPE

1.1 SCOPE. This specification establishes the requirements for the procurement of the frameless, dc torque motor, hereinafter called motor,

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

NASA

ND-1002012	Description and Requirements Publication for Procurement of Motor, Torque, Direct-Current, Frameless, General Specification for, National Aeronautics and Space Administration

STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts.

DRAWINGS

NASA

1000075	Motor, Torque, DC, Frameless, Specification Control Drawing.

(Copies of specifications and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 General The motor shall conform to the requirements of this specification. Details not specified herein shall be as specified in Specification ND-1002012.

3.2 Design and Construction. The motor shall be of the design, construction, and physical dimensions shown on the National Aeronautics and Space Administration (NASA) drawing 1000075. The manufacture, materials, and mechanical and electrical construction of the motor shall be in accordance with the requirements of Specification ND-1002012.

3.3 Initial Qualification. Motors furnished under this specification shall be representative of a product which has been tested and has passed the qualification tests specified in 4.1.

3.4 Acceptance Inspection. Motors furnished under this specification shall be inspected by the contractor as specified in 4.3. Acceptance shall be based on 100 percent compliance on a unit basis.

3.5 Specific Characteristic Requirements The motor shall have the following specific characteristic requirements at 50° ± 5°C (122° ± 9° F) unless otherwise specified:

Sensitivity	
Average torque over one complete revolution	250 ounce-inches per ampere ± 10% at 0.28 ampere ± 1%
Linearity Deviation Less Than	± 5%
Peak Test Current	0.28 ampere ± 1%
Low Test Current	0.1 ampere ± 1%
*Self Inductance	0.03 henry, nominal
Air Gap Per Side	0.005 inch minimum
Power	
At 0.28 ampere at 25° C	6.5 watts, nominal
Ripple Torque	
At 0.28 ampere	10 ounce-inches peak-to-peak
Frictional Torque	5 ounce-inches, nominal 8 ounce-inches, maximum
DC Resistance at 25°C	100 ohms maximum at any position

*Reference values (to be finalized after fabrication)

4. QUALITY ASSURANCE PROVISIONS

4.1 Initial Qualification Inspection Motors for initial qualification shall be selected at random from units that have met the requirements of 4.3. If any motor of a test sample fails to withstand all environmental and life tests specified herein, initial qualification shall be withheld until proof of compliance is given to the qualifying agency. Delivery of production motors before receipt of initial qualification shall be at the discretion of the procuring activity.

4.1.1 Sample Size The sample size shall be three motors.

4.1.2 Vibration, Operating Condition The motor shall be capable of withstanding the vibration test of Standard MIL-STD-202, method 204, test condition B, except that a double amplitude of 0.3 inch shall be maintained from 5 to 36 cps. The unit shall then be subjected to 20 g's vibration from 36 to 2,000 cps and back to 36 cps. A double amplitude of 0.3 inch shall then be maintained from 36 to 5 cps. Sweep time and duration shall consist of one sweep at a logarithmic rate of 2 minutes per octave, approximately equal to 35 minutes on each of 3 axis for a total vibrational test time of 105 minutes. During the test the motor armature shall rotate at least at 1 rpm while delivering maximum rated continuous torque and the direction of rotation shall be reversed once each minute. There shall be no discontinuity of input current greater than 30 percent during the test. At the conclusion of the test the motors shall meet the requirements of 4.1.7.

4.1.3 Shock The motor shall be able to withstand six impact shocks, one in each direction along each of three orthogonal axes. Each shock pulse shall be a half sinusoid with a maximum amplitude of 50±5 g's, and a time duration of 11±1 milliseconds when measured with a filter having a bandwidth of 5 to 100 cps. The maximum g shall be reached in approximately 5.5 milliseconds. At the conclusion of the test the motors shall meet the requirements of 4.1.7.

4.1.4 Temperature Cycling Three temperature cycles shall be performed, each cycle consisting of 4 hours at -65°C, 4 hours at +85°C, and 10 minutes maximum between temperature extremes. After the test and when the motor has stabilized at room ambient conditions, the motor shall meet the requirements of 4.1.7.

4.1.5 Oxygen Compatibility The motor shall be tested for 4 days in a pure oxygen atmosphere at 3.5 psia. During the test the motor armature shall rotate at least at 1 rpm while delivering one-half maximum rated continuous torque and the direction of rotation shall be reversed once each minute. During and at the conclusion of the test the motor shall meet the requirements of 4.1.7.

4.1.6 Accelerated Life The motor shall be tested for 250 hours of accelerated life at 90°C at 160 rpm minimum with one-half of maximum rated current applied. Sensitivity and starting torque shall be determined after each successive 50 hours of test time. At the conclusion of 250 hours of test the motor shall meet the requirements of 4.1.7.

4.1.7 Failure Definitions

4.1.7.1 Insulation Resistance Insulation resistance shall not be less than 100 megohms.

4.1.7.2 Brush Pressure Brush pressure shall not have more than a 20 gram spread for all measurements of any individual brush. The pressure of any brush shall not decrease by more than 15 grams from the original value.

4.1.7.3 Sensitivity Sensitivity shall not decrease by more than 15 percent of the original value.

4.1.7.4 Friction Friction shall not increase more than 25 percent from the original value or exceed the normal tolerance, whichever is greater.

4.1.7.5 Brush Wear Rate The brush wear rate at 160 rpm shall not be greater than 0.002 inch per 50 hours period of operation as specified in 4.1.6 and 4.2.

4.1.7.6 Other Tolerances for Failure. All other tolerances shall be within the norm when measured at room ambient temperature.

4.2 Extended Life Inspection Life testing shall be continued under the conditions specified in 4.1.6, except the motors shall be tested for an additional 1750 hours, or until destruction, whichever occurs first. ~~Sensitivity and starting torque shall be determined after each 250 hours and the tests of 4.1.7. shall be performed upon test completion.~~ In addition, one of each ten motors from production shall be life tested to conditions of 4.1.6 and this paragraph for 2000 hours, or until destruction.

4.3 Acceptance Inspection Acceptance inspection, as specified herein, shall be performed on 100 percent of the items submitted for acceptance. Acceptance inspection shall consist of the following:

(a) Visual Inspection
(b) Air-Gap Per Side (Mechanical Inspection)
(c) Dielectric Strength
(d) Insulation Resistance
(e) Speed
(f) Brush Pressure
(g) Sensitivity
(h) Linearity Determination
(i) Ripple Torque
(j) Friction
(k) DC Resistance

4.4 Final Qualfication Inspection Final qualification shall be granted after compliance with the requirements of 3.5.

5. PREPARATION FOR DELIVERY

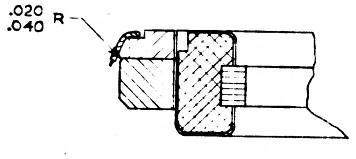
5.1 Preparation for delivery shall be in accordance with the requirements of Specification MD-1002012.

6. NOTES

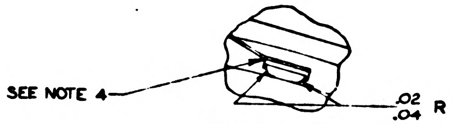
6.1 The notes specified in Specification MD-1002012, and as specified herein, are applicable to this motor.

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A₃	TDR 00010	9-10-62	ajG
	B₁	TDR 00078	10-31-62	ajG
	C	TDR 00146	12-12-62	ajG

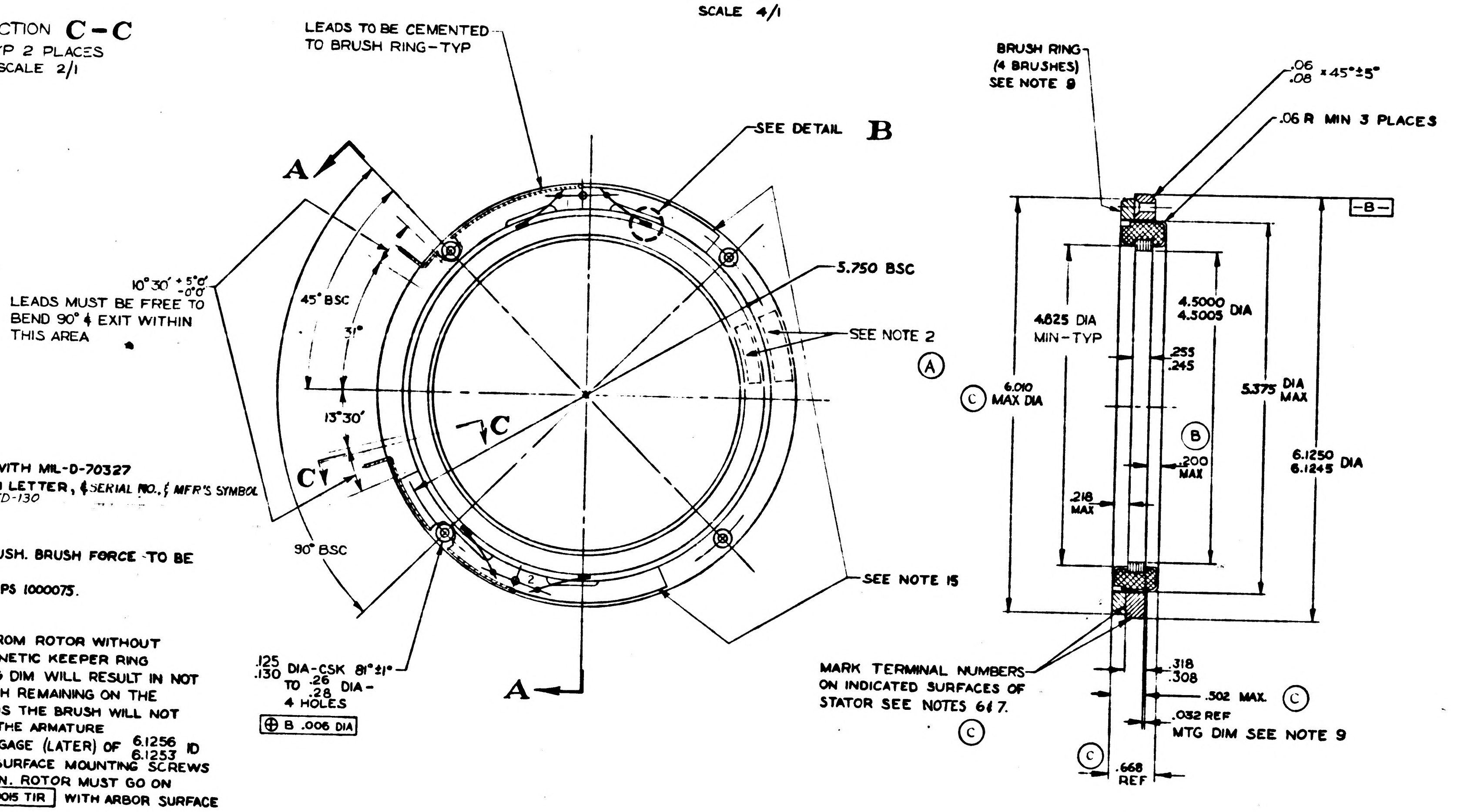
REVISIONS



SECTION **C-C**
TYP 2 PLACES
SCALE 2/1


SEE NOTE 4
.02
.04 R

DETAIL **B**
4 PLACES
SCALE 4/1


LEADS TO BE CEMENTED TO BRUSH RING-TYP
SEE DETAIL B
A
A
10°30′ +5°0′ -0°0′
LEADS MUST BE FREE TO BEND 90° & EXIT WITHIN THIS AREA
45° BSC
31°
13°30′
C
C
90° BSC
5.750 BSC
SEE NOTE 2
Ⓐ
SEE NOTE 15
.125
.130 DIA-CSK 81°±1° TO .26
.28 DIA-4 HOLES
⊕ B .006 DIA
2
BRUSH RING (4 BRUSHES) SEE NOTE 8
.06
.08 × 45°±5°
.06 R MIN 3 PLACES
-B-
4.825 DIA MIN-TYP
4.5000
4.5005 DIA
.255
.245
Ⓒ 6.010 MAX DIA
5.375 DIA MAX
Ⓑ
.200 MAX
6.1250
6.1245 DIA
.218 MAX
MARK TERMINAL NUMBERS ON INDICATED SURFACES OF STATOR SEE NOTES 6 & 7.
Ⓒ
.318
.308
.502 MAX. Ⓒ
.032 REF
MTG DIM SEE NOTE 9
Ⓒ
.668 REF

SECTION **A-A**

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & SERIAL NO. & MFR'S SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E 24
   LENGTH: 6 INCHES MIN.
4. CHECK BRUSH FORCE AT HEEL OF BRUSH. BRUSH FORCE TO BE 30 TO 50 GRAMS. SEE DETAIL **B**
5. Ⓒ PART MUST MEET REQUIREMENTS OF PS 1000075.
6. BLACK LEAD AT TERMINAL NO. 1
7. WHITE LEAD AT TERMINAL NO. 2
8. CAUTION: DO NOT REMOVE STATOR FROM ROTOR WITHOUT REPLACING BRUSH RING WITH A MAGNETIC KEEPER RING
9. Ⓐ A VARIATION OF ±.019 IN .032 MOUNTING DIM WILL RESULT IN NOT LESS THAN 75% OF THE BRUSH WIDTH REMAINING ON THE COMMUTATOR UNDER THESE CONDITIONS THE BRUSH WILL NOT INTERFERE WITH THE INSULATION OF THE ARMATURE
10. STATOR TO BE INSPECTED BY USING GAGE (LATER) OF $\frac{6.1256}{6.1253}$ ID & MUST BE $\boxed{◉ .003 \text{ TIR}}$ WITH GAGE SURFACE MOUNTING SCREWS TO BE INSTALLED FOR THIS INSPECTION. ROTOR MUST GO ON ARBOR OF $\frac{4.4993}{4.4995}$ DIA & MUST BE $\boxed{◉ .0015 \text{ TIR}}$ WITH ARBOR SURFACE
11. Ⓒ BREAK CORNERS $\frac{.005}{.015}$
12. BRUSH RING TO BE FASTENED TO STATOR USING LONG-LOK SCREWS
13. GOLD PLATE COMMUTATOR PER MIL-G-45204 TYPE II CLASS 3
    ALT: COMMUTATOR MATERIAL SILVER PER MIL-S-13282 OR COIN SILVER.
14. MOTOR TO MEET SPECIFICATION REQUIREMENTS WHEN THE STATOR AND ROTOR AXES ARE ECCENTRIC BY .002 AND OUT OF PARALLEL BY .5 MILLIRADIANS.
15. BRUSH RING TO BE 2 SEGMENTS
16. + DC AT TERMINAL NO. 1 WILL RESULT IN A CCW ROTATION OF THE INNER RING WHEN VIEWED FROM THE COMMUTATOR SIDE.

ORIGINAL SOURCES OF SUPPLY:

Ⓐ INLAND MOTOR CORP. OF VIRGINIA
NORTHAMPTON, MASS.

KEARFOTT DIV., GENERAL PRECISION INC.
164 BEARHILL ROAD
WALTHAM, 54, MASS.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	DL 1000201
1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: ———

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
		DATE
APPROVED	A. J. Boyce	7-31-62
CHECKED		
DRAWN	D M WHITE	7-17-62

APPROVED FOR MSC
7/31/62
BY DIRECTION
MIT APPROVAL J W 7/31/62

MOTOR, TORQUE
DC, FRAMELESS
SPECIFICATION CONTROL DRAWING

SCALE 1/1
UNIT WT.
CODE IDENT.

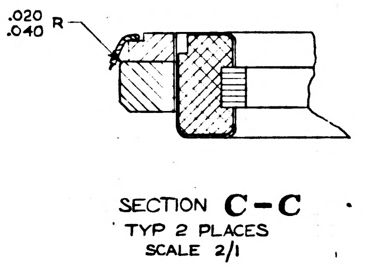
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

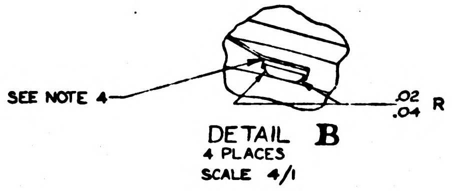
NASA DRAWING NO
1000075
SHEET 1 OF 1

1000075 C

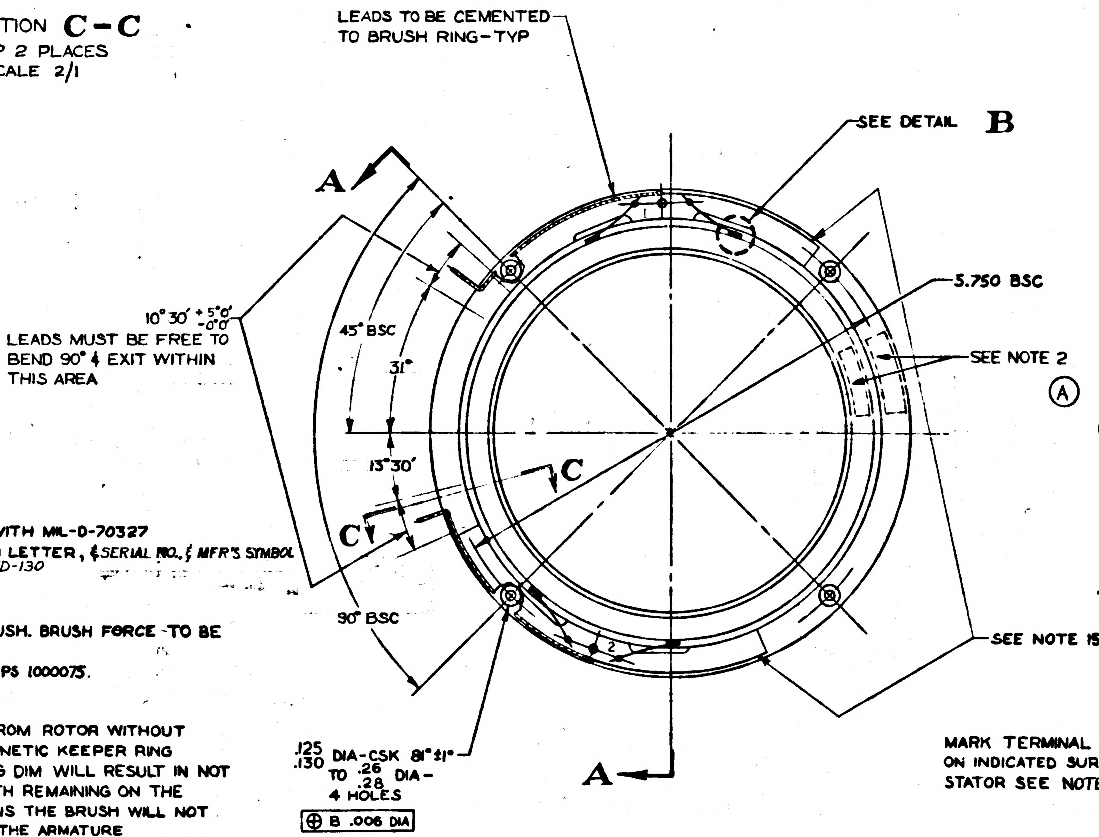
ZONE	SYM	REVISIONS TDR 00003 DESCRIPTION	DATE	APPROVAL
	A	TDR 00010	9-0-62	ajc
	B	TDR 00078	10-31-62	ajb WAK
	C	TDR 00146	12-12-62	ajb WK
	D	TDR 00847	4-17-63	

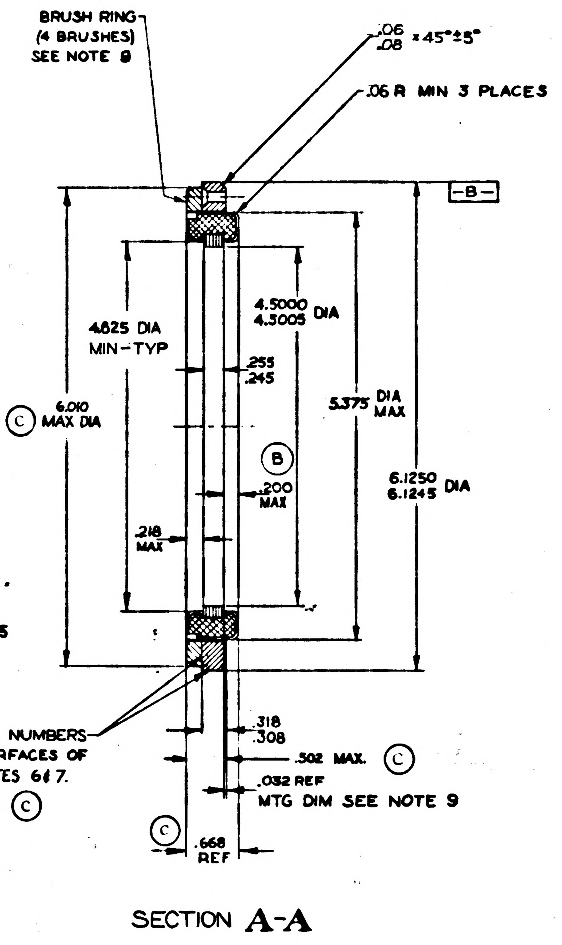


SECTION **C-C**
TYP 2 PLACES
SCALE 2/1


SEE NOTE 4
.02
.04 R

DETAIL **B**
4 PLACES
SCALE 4/1


LEADS TO BE CEMENTED TO BRUSH RING-TYP
SEE DETAIL B
A
10° 30' +5°0' -0°0'
LEADS MUST BE FREE TO BEND 90° & EXIT WITHIN THIS AREA
45° BSC
31°
5.750 BSC
SEE NOTE 2
Ⓐ
13°30'
C
C
90° BSC
SEE NOTE 15
A
.125
.130 DIA-CSK 81°±1° - TO .26
.28 DIA -
4 HOLES
⊕ B .006 DIA


BRUSH RING (4 BRUSHES) SEE NOTE 8
.06
.08 ×45°±5°
.06 R MIN 3 PLACES
-B-
4.625 DIA MIN-TYP
4.5000
4.5005 DIA
.255
.245
Ⓒ 6.010 MAX DIA
5.375 DIA MAX
Ⓑ
.200 MAX
6.1250
6.1245 DIA
.218 MAX
MARK TERMINAL NUMBERS ON INDICATED SURFACES OF STATOR SEE NOTES 6 & 7.
Ⓒ
.318
.308
.502 MAX. Ⓒ
.032 REF
MTG DIM SEE NOTE 9
Ⓒ .668 REF

SECTION **A-A**

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & SERIAL NO., & MFR'S SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E 24
   LENGTH: 6 INCHES MIN.
4. CHECK BRUSH FORCE AT HEEL OF BRUSH. BRUSH FORCE TO BE 30 TO 50 GRAMS. SEE DETAIL **B**
5. Ⓒ PART MUST MEET REQUIREMENTS OF PS 1000075.
6. BLACK LEAD AT TERMINAL NO. 1
7. WHITE LEAD AT TERMINAL NO. 2
8. CAUTION: DO NOT REMOVE STATOR FROM ROTOR WITHOUT REPLACING BRUSH RING WITH A MAGNETIC KEEPER RING
9. Ⓐ A VARIATION OF ±.019 IN .032 MOUNTING DIM WILL RESULT IN NOT LESS THAN 75% OF THE BRUSH WIDTH REMAINING ON THE COMMUTATOR UNDER THESE CONDITIONS THE BRUSH WILL NOT INTERFERE WITH THE INSULATION OF THE ARMATURE
10. STATOR TO BE INSPECTED BY USING GAGE (LATER) OF $\frac{6.1256}{6.1253}$ ID & MUST BE [◉ .003 TIR] WITH GAGE SURFACE MOUNTING SCREWS TO BE INSTALLED FOR THIS INSPECTION. ROTOR MUST GO ON ARBOR OF $\frac{4.4993}{4.4995}$ DIA & MUST BE [◉ .0015 TIR] WITH ARBOR SURFACE
11. Ⓒ BREAK CORNERS $\frac{.005}{.015}$
12. Ⓓ BRUSH RING TO BE FASTENED TO STATOR USING SCREWS NASA PART NO. 1000104-4.
13. GOLD PLATE COMMUTATOR PER MIL-G-45204 TYPE II CLASS 3
    ALT: COMMUTATOR MATERIAL SILVER PER MIL-S-13282 OR COIN SILVER.
14. Ⓓ DESIGN REQUIREMENT: MOTOR TO MEET SPEC. REQUIREMENTS WHEN THE STATOR AND ROTOR AXES ARE ECCENTRIC BY .002 AND OUT OF PARALLEL BY .5 MILLIRADIANS.
15. BRUSH RING TO BE 2 SEGMENTS
16. + DC AT TERMINAL NO. 1 WILL RESULT IN A CCW ROTATION OF THE INNER RING WHEN VIEWED FROM THE COMMUTATOR SIDE.

ORIGINAL SOURCES OF SUPPLY:

Ⓐ INLAND MOTOR CORP. OF VIRGINIA
NORTHAMPTON, MASS.
PART NO T 5402-A

Ⓓ KEARFOTT DIV., GENERAL PRECISION INC.
166 BEARHILL ROAD
WALTHAM, 54, MASS.
PART NO. CZ06631007

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	DL 1000201
1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ± 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: ———

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A. J. Boyce 7-31-62
CHECKED
DRAWN D M WHITE 7-17-62
APPROVED FOR MSC 7/31/62
BY DIRECTION
MIT APPROVAL J W Hursh 7/31/62

MOTOR, TORQUE
DC, FRAMELESS
SPECIFICATION CONTROL
DRAWING

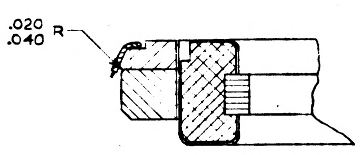
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000075
SHEET 1 OF 1

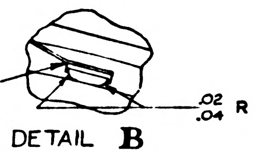
1000075 C

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

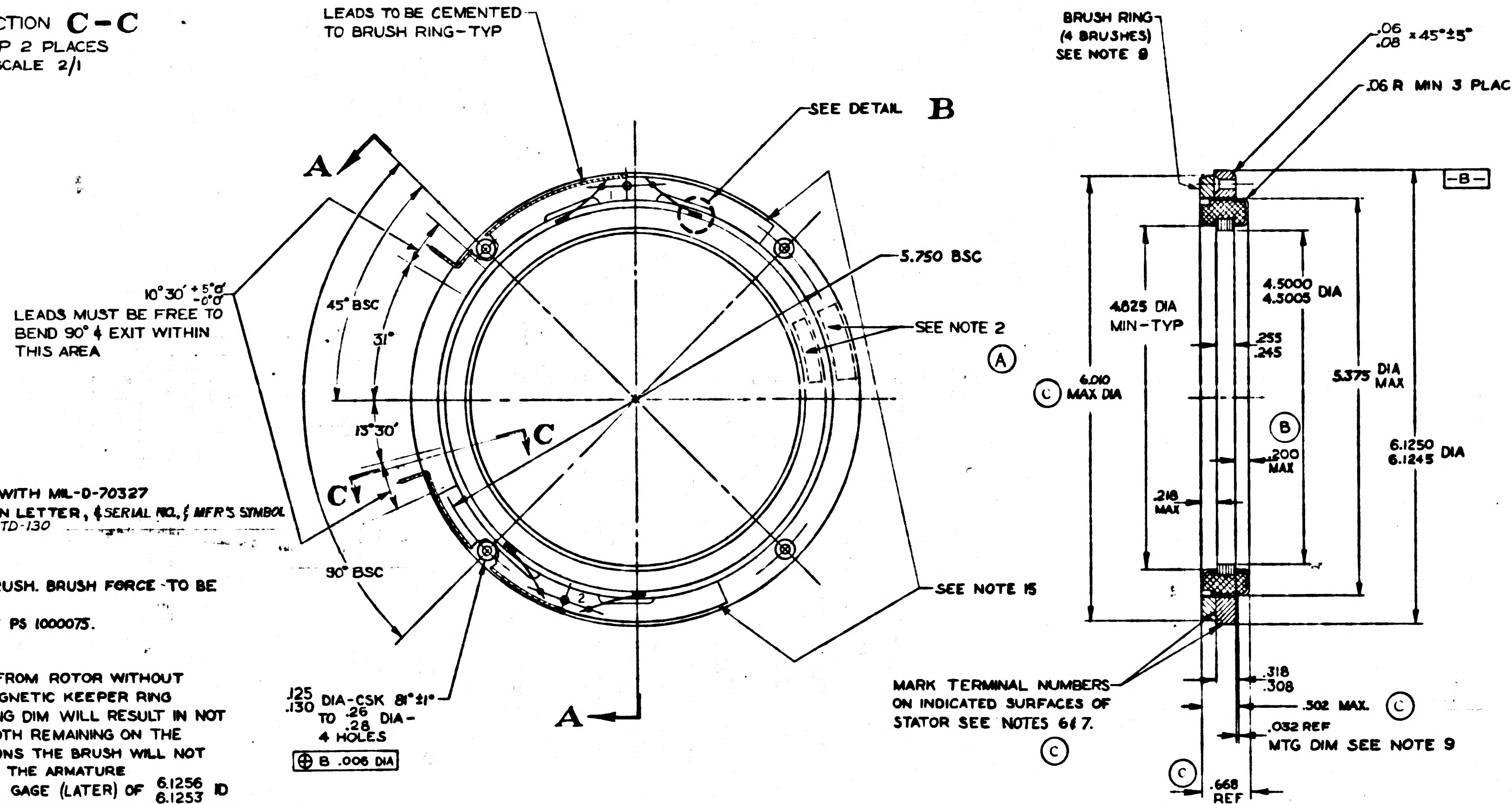
		REVISIONS	TDR 00003	
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A₃	TDR 00010	9-0-62	AJG
	B₁	TDR 00078	10-31-62	AJG WK
	C	TDR 00146	12-12-62	AJG WK
	D	TDR 00847	4-17-63	LAH WK
	E	TDR 01441	6-5-6-	AJB RIE



SECTION **C–C**
TYP 2 PLACES
SCALE 2/1


SEE NOTE 4
.02
.04 R

DETAIL **B**
4 PLACES
SCALE 4/1


LEADS TO BE CEMENTED TO BRUSH RING–TYP
SEE DETAIL B
A
10°30′ +5°0′ −0°0′
LEADS MUST BE FREE TO BEND 90° & EXIT WITHIN THIS AREA
45° BSC
31°
13°30′
C
C
90° BSC
2
.125
.130 DIA-CSK 81°±1° TO .26
.28 DIA – 4 HOLES
⊕ B .006 DIA
A
5.750 BSC
SEE NOTE 2
Ⓐ
SEE NOTE 15
BRUSH RING (4 BRUSHES) SEE NOTE 9
.06
.08 × 45°±5°
.06 R MIN 3 PLACES
–B–
Ⓒ 6.010 MAX DIA
4.625 DIA MIN–TYP
4.5000
4.5005 DIA
.255
.245
5.375 DIA MAX
Ⓑ
.200 MAX
.218 MAX
6.1250
6.1245 DIA
MARK TERMINAL NUMBERS ON INDICATED SURFACES OF STATOR SEE NOTES 6 & 7.
Ⓒ
.318
.308
.502 MAX. Ⓒ
.032 REF
MTG DIM SEE NOTE 9
Ⓒ
.668 REF

SECTION **A-A**

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & SERIAL NO., & MFR'S SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
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   LENGTH: 6 INCHES MIN.
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5. Ⓒ PART MUST MEET REQUIREMENTS OF PS 1000075.
6. BLACK LEAD AT TERMINAL NO. 1
7. WHITE LEAD AT TERMINAL NO. 2
8. CAUTION: DO NOT REMOVE STATOR FROM ROTOR WITHOUT REPLACING BRUSH RING WITH A MAGNETIC KEEPER RING
9. Ⓐ A VARIATION OF ±.019 IN .032 MOUNTING DIM WILL RESULT IN NOT LESS THAN 75% OF THE BRUSH WIDTH REMAINING ON THE COMMUTATOR UNDER THESE CONDITIONS THE BRUSH WILL NOT INTERFERE WITH THE INSULATION OF THE ARMATURE
10. STATOR TO BE INSPECTED BY USING GAGE (LATER) OF $\frac{6.1256}{6.1253}$ ID ℄ MUST BE $\boxed{◎ .003\ TIR}$ WITH GAGE SURFACE MOUNTING SCREWS TO BE INSTALLED FOR THIS INSPECTION. ROTOR MUST GO ON ARBOR OF $\frac{4.4993}{4.4995}$ DIA ℄ MUST BE $\boxed{◎ .0015\ TIR}$ WITH ARBOR SURFACE
11. Ⓒ BREAK CORNERS $\frac{.005}{.015}$
12. Ⓓ BRUSH RING TO BE FASTENED TO STATOR USING SCREWS NASA PART NO. 1000104-4.
13. Ⓔ GOLD PLATE COMMUTATOR PER MIL-G-45204 TYPE I OR II CLASS 3
    ALT: COMMUTATOR MATERIAL SILVER PER MIL-S-13282 OR COIN SILVER.
14. Ⓓ DESIGN REQUIREMENT: MOTOR TO MEET SPEC. REQUIREMENTS WHEN THE STATOR AND ROTOR AXES ARE ECCENTRIC BY .002 AND OUT OF PARALLEL BY .5 MILLIRADIANS.
15. BRUSH RING TO BE 2 SEGMENTS
16. + DC AT TERMINAL NO. 1 WILL RESULT IN A CCW ROTATION OF THE INNER RING WHEN VIEWED FROM THE COMMUTATOR SIDE.

ORIGINAL SOURCES OF SUPPLY:

Ⓐ INLAND MOTOR CORP. OF VIRGINIA
NORTHAMPTON, MASS.
PART NO. T 5402-A

Ⓓ KEARFOTT DIV., GENERAL PRECISION INC.
166 BEARHILL ROAD
WALTHAM, 54, MASS.
PART NO. CZ06631007

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	DL 1000201
1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	7-31-62
CHECKED		
DRAWN	DM WHITE	7-17-62

APPROVED FOR MSC 7/31/62
BY DIRECTION
MIT APPROVAL 7/31/62

MOTOR, TORQUE
DC, FRAMELESS
SPECIFICATION CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.
1/1		

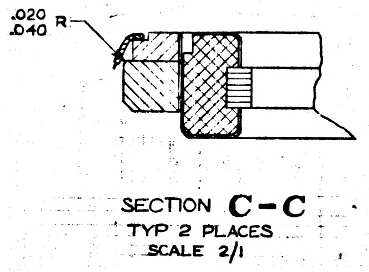
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000075
SHEET 1 OF 1

1000075 E

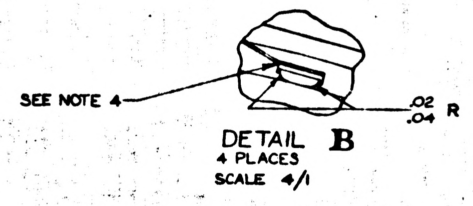
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A_3	TDR 00010	9-10-62	ajG	
	B_1	TDR 00078	10-31-62	ajB	WK
	C	TDR 00146	12-12-62	ajB	WK
	D	TDR 00847	4-17-63		WK
	E	TDR 01441	6-5-63	ajB	RJB
	F	TDR 01979	7-17-63	ajB	WK

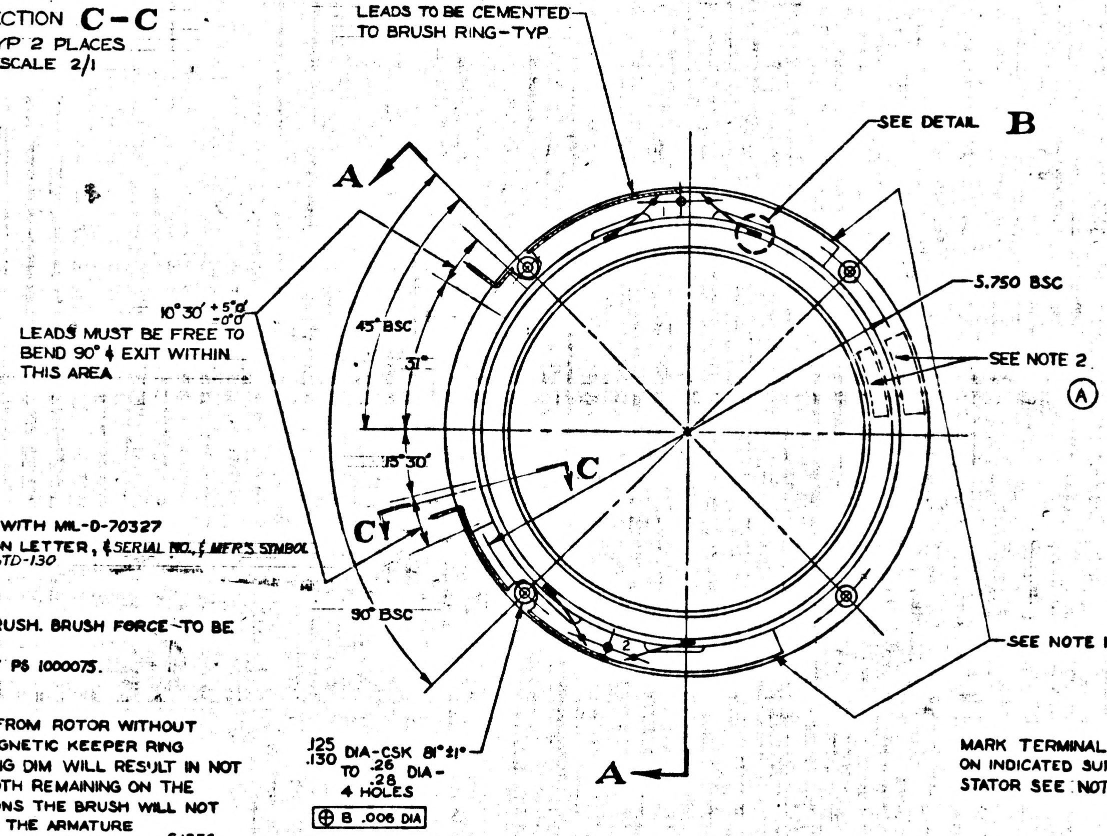
REVISIONS TDR 00003



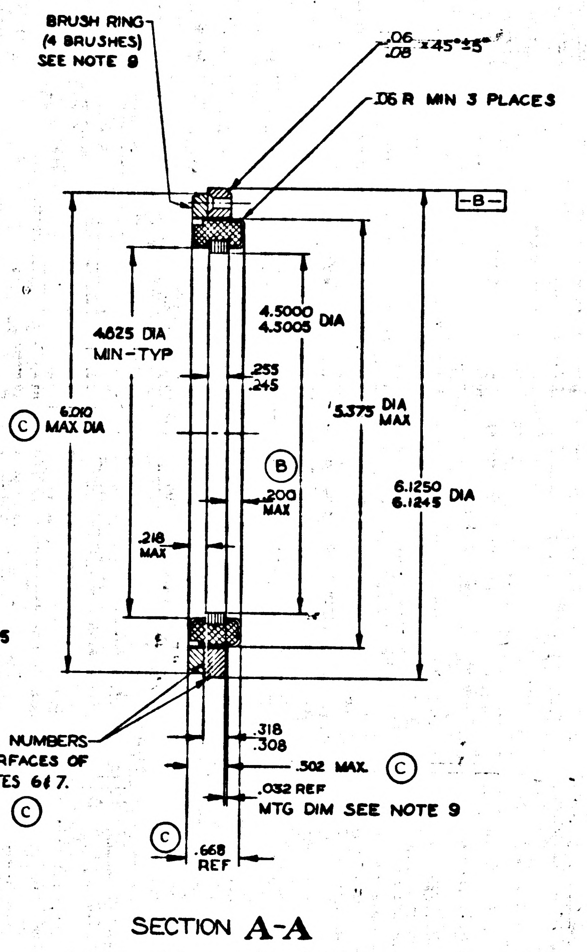
.020
.040 R
SECTION C−C
TYP 2 PLACES
SCALE 2/1



SEE NOTE 4
.02
.04 R
DETAIL B
4 PLACES
SCALE 4/1



LEADS TO BE CEMENTED TO BRUSH RING−TYP
SEE DETAIL B
A
10°30′ +5° −0°
LEADS MUST BE FREE TO BEND 90° & EXIT WITHIN THIS AREA
45° BSC
31°
5.750 BSC
SEE NOTE 2
15°30′
C
C
90° BSC
SEE NOTE 15
.125
.130 DIA-CSK 81°±1°
TO .26
.28 DIA-
4 HOLES
⊕ B .006 DIA
A



BRUSH RING (4 BRUSHES) SEE NOTE 9
.06
.08 ×45°±5°
.06 R MIN 3 PLACES
−B−
4.625 DIA MIN−TYP
4.5000
4.5005 DIA
.255
.245
6.010 MAX DIA
5.375 DIA MAX
.200 MAX
6.1250
6.1245 DIA
.218 MAX
MARK TERMINAL NUMBERS ON INDICATED SURFACES OF STATOR SEE NOTES 6 & 7.
.318
.308
.502 MAX
.032 REF
MTG DIM SEE NOTE 9
.668 REF
SECTION A-A

Ⓐ Ⓒ Ⓑ Ⓒ Ⓒ Ⓒ

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & SERIAL NO. & MFR'S SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E 24
   LENGTH: 6 INCHES MIN.
4. CHECK BRUSH FORCE AT HEEL OF BRUSH. BRUSH FORCE TO BE 30 TO 50 GRAMS. SEE DETAIL **B**
5. Ⓒ PART MUST MEET REQUIREMENTS OF PS 1000075.
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7. WHITE LEAD AT TERMINAL NO. 2
8. CAUTION: DO NOT REMOVE STATOR FROM ROTOR WITHOUT REPLACING BRUSH RING WITH A MAGNETIC KEEPER RING
9. Ⓐ A VARIATION OF ±.019 IN .032 MOUNTING DIM WILL RESULT IN NOT LESS THAN 75% OF THE BRUSH WIDTH REMAINING ON THE COMMUTATOR UNDER THESE CONDITIONS THE BRUSH WILL NOT INTERFERE WITH THE INSULATION OF THE ARMATURE
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12. Ⓓ BRUSH RING TO BE FASTENED TO STATOR USING SCREWS NASA PART NO 1000104-4.
13. Ⓔ GOLD PLATE COMMUTATOR PER MIL-G-45204 TYPE I OR II CLASS 3
    ALT: COMMUTATOR MATERIAL SILVER PER MIL-S-13282 OR COIN SILVER.
14. Ⓓ DESIGN REQUIREMENT: MOTOR TO MEET SPEC. REQUIREMENTS WHEN THE STATOR AND ROTOR AXES ARE ECCENTRIC BY .002 AND OUT OF PARALLEL BY .5 MILLIRADIANS.
15. BRUSH RING TO BE 2 SEGMENTS
16. + DC AT TERMINAL NO. 1 WILL RESULT IN A CCW ROTATION OF THE INNER RING WHEN VIEWED FROM THE COMMUTATOR SIDE.

Ⓕ PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	DL 1000201
1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ± 0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
		DATE
APPROVED	A J Boyce	7-31-62
CHECKED		
DRAWN	D M WHITE	7-17-62

APPROVED FOR MSC
7/31/62
BY DIRECTION
MIT APPROVAL J W Hursh 7/31/62

MOTOR, TORQUE
DC, FRAMELESS
SPECIFICATION CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.
1/1		

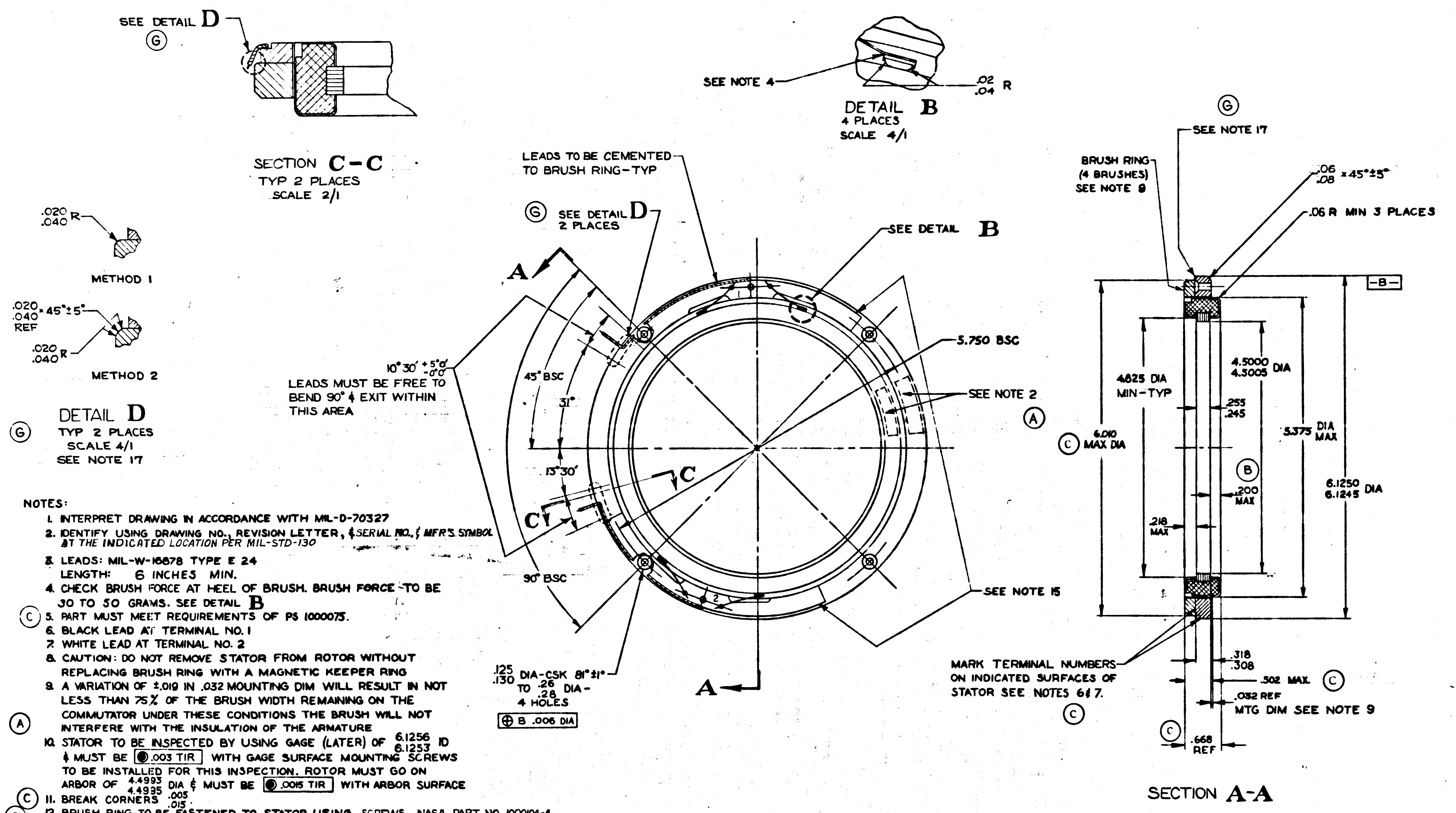
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000075
SHEET 1 OF 1

1000075 F

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY


SEE DETAIL D
Ⓖ
SECTION C-C
TYP 2 PLACES
SCALE 2/1
.020
.040 R
METHOD 1
.020
.040 x 45°±5°
REF
.020
.040 R
METHOD 2
DETAIL D
Ⓖ TYP 2 PLACES
SCALE 4/1
SEE NOTE 17
SEE NOTE 4
.02
.04 R
DETAIL B
4 PLACES
SCALE 4/1
LEADS TO BE CEMENTED TO BRUSH RING-TYP
Ⓖ SEE DETAIL D
2 PLACES
SEE DETAIL B
A
10°30' +5°0' -0°0'
LEADS MUST BE FREE TO BEND 90° & EXIT WITHIN THIS AREA
45° BSC
31°
13°30'
C
C
90° BSC
5.750 BSC
SEE NOTE 2
Ⓐ
SEE NOTE 15
.125
.130 DIA-CSK 81°±1°
TO .26
.28 DIA-
4 HOLES
⊕ B .006 DIA
A
Ⓖ
SEE NOTE 17
BRUSH RING
(4 BRUSHES)
SEE NOTE 9
.06
.08 x 45°±5°
.06 R MIN 3 PLACES
-B-
4.825 DIA
MIN-TYP
4.5000
4.5005 DIA
.255
.245
Ⓒ 6.010
MAX DIA
5.375 DIA
MAX
Ⓑ
.200
MAX
6.1250
6.1245 DIA
.218
MAX
MARK TERMINAL NUMBERS ON INDICATED SURFACES OF STATOR SEE NOTES 6 & 7.
Ⓒ
.318
.308
.502 MAX. Ⓒ
.032 REF
MTG DIM SEE NOTE 9
Ⓒ .668
REF
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & *SERIAL NO. & MFR'S SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130*
3. LEADS: MIL-W-16878 TYPE E 24
   LENGTH: 6 INCHES MIN.
4. CHECK BRUSH FORCE AT HEEL OF BRUSH. BRUSH FORCE TO BE 30 TO 50 GRAMS. SEE DETAIL **B**
5. Ⓒ PART MUST MEET REQUIREMENTS OF PS 1000075.
6. BLACK LEAD AT TERMINAL NO. 1
7. WHITE LEAD AT TERMINAL NO. 2
8. CAUTION: DO NOT REMOVE STATOR FROM ROTOR WITHOUT REPLACING BRUSH RING WITH A MAGNETIC KEEPER RING
9. Ⓐ A VARIATION OF ±.019 IN .032 MOUNTING DIM WILL RESULT IN NOT LESS THAN 75% OF THE BRUSH WIDTH REMAINING ON THE COMMUTATOR UNDER THESE CONDITIONS THE BRUSH WILL NOT INTERFERE WITH THE INSULATION OF THE ARMATURE
10. STATOR TO BE INSPECTED BY USING GAGE (LATER) OF $\frac{6.1256}{6.1253}$ ID & MUST BE $\boxed{◉ .003 \text{ TIR}}$ WITH GAGE SURFACE MOUNTING SCREWS TO BE INSTALLED FOR THIS INSPECTION. ROTOR MUST GO ON ARBOR OF $\frac{4.4993}{4.4935}$ DIA & MUST BE $\boxed{◉ .0015 \text{ TIR}}$ WITH ARBOR SURFACE
11. Ⓒ BREAK CORNERS $\frac{.005}{.015}$.
12. Ⓓ BRUSH RING TO BE FASTENED TO STATOR USING SCREWS NASA PART NO. 1000104-4.
13. Ⓔ GOLD PLATE COMMUTATOR PER MIL-G-45204 TYPE I OR II CLASS 3
    ALT: COMMUTATOR MATERIAL SILVER PER MIL-S-13282 OR COIN SILVER.
14. Ⓓ DESIGN REQUIREMENT: MOTOR TO MEET SPEC. REQUIREMENTS WHEN THE STATOR AND ROTOR AXES ARE ECCENTRIC BY .002 AND OUT OF PARALLEL BY .5 MILLIRADIANS.
15. BRUSH RING TO BE 2 SEGMENTS
16. + DC AT TERMINAL NO. 1 WILL RESULT IN A CCW ROTATION OF THE INNER RING WHEN VIEWED FROM THE COMMUTATOR SIDE.
17. Ⓖ METHOD 1: BREAK ENTIRE EDGE PER NOTE 11
    RADIUS PER DETAIL D IN TWO AREAS INDICATED
    METHOD 2: BREAK ENTIRE EDGE .020/.040 x 45°±5°
    RADIUS PER DETAIL D IN TWO AREAS INDICATED

Ⓕ PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

REVISIONS TDR 00003

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ		A₃	TDR 00010	9-10-62	agc
Ⓜ		B₁	TDR 00078	10-31-62	ajb WAK
Ⓜ		C	TDR 00146	12-12-62	ajb WK
Ⓜ		D	TDR 00847	4-17-63	WK
Ⓜ		E	TDR 01441	6-5-63	ajb RJB
Ⓜ		F	TDR 01979	7-17-63	ajb WK
		G	TDR 04051	10-23-63	WK

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓖ

NEXT ASSY	USED ON
	DL 1001500
MULTIPLE	DL 1000201
USAGE	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ± 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A. J. Boyce	7-31-62
CHECKED		
DRAWN	D M WHITE	7-17-62
APPROVED FOR MSC		7/31/62
BY DIRECTION		
MIT APPROVAL	J. W. Kupfer	7/31/62

MOTOR, TORQUE
DC, FRAMELESS
SPECIFICATION CONTROL
DRAWING

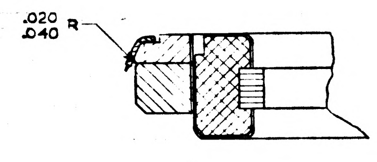
SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000075
SHEET 1 OF 1

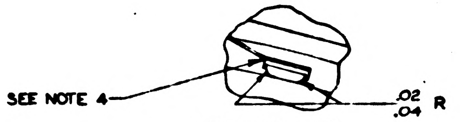
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

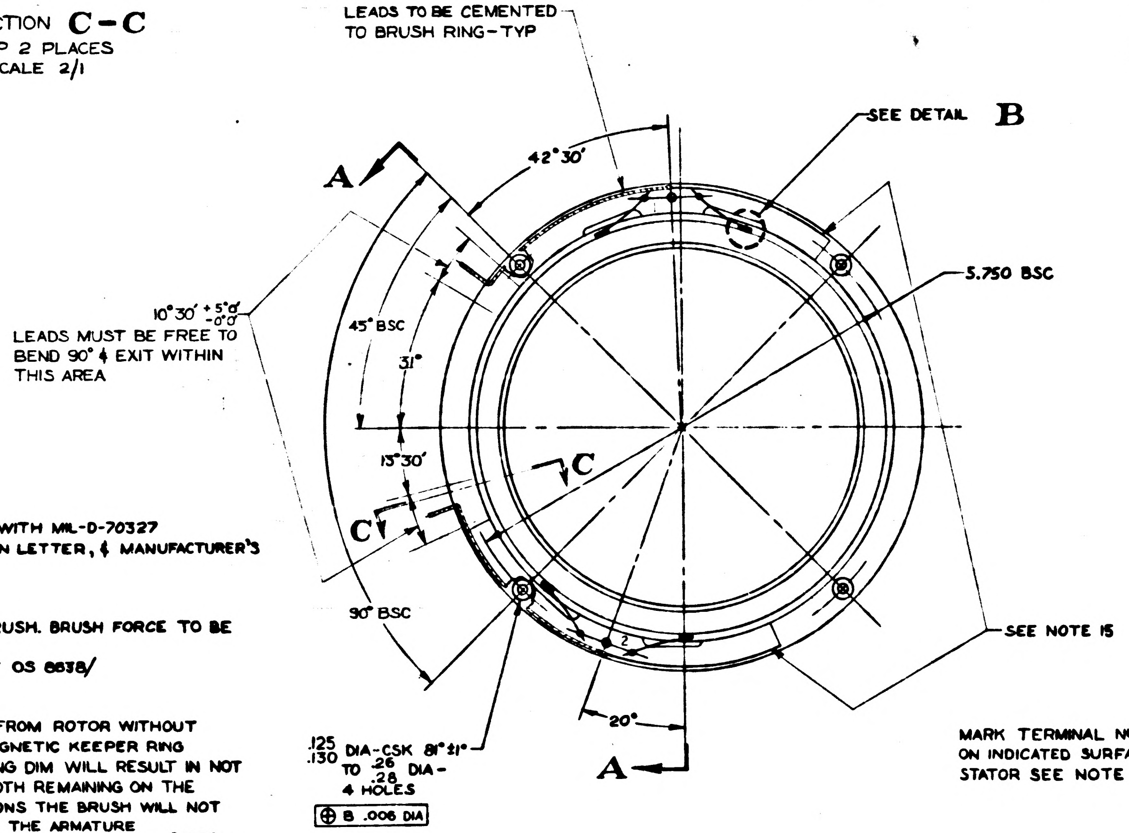
REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

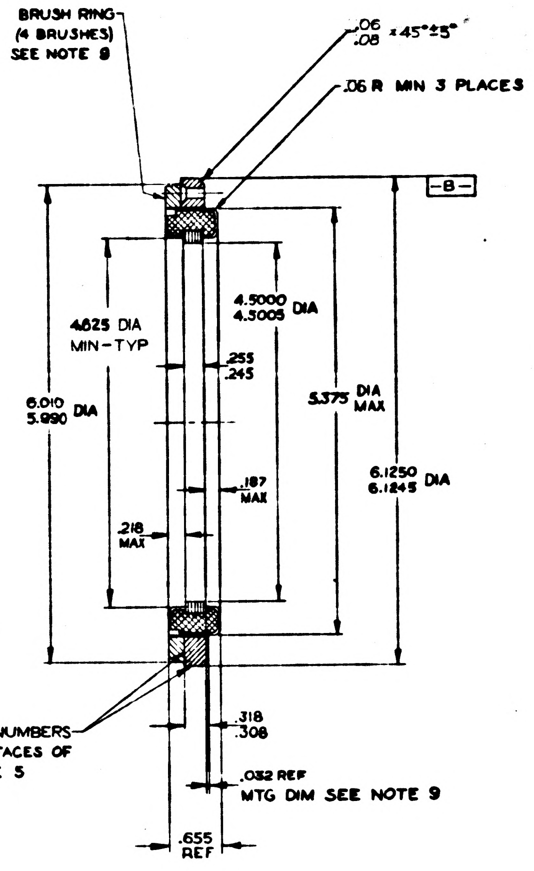


SECTION **C–C**
TYP 2 PLACES
SCALE 2/1


SEE NOTE 4
.02
.04 R

DETAIL **B**
4 PLACES
SCALE 4/1


LEADS TO BE CEMENTED TO BRUSH RING–TYP
SEE DETAIL B
A
42°30'
10°30' +5°0' −0°0'
LEADS MUST BE FREE TO BEND 90° & EXIT WITHIN THIS AREA
45° BSC
31°
5.750 BSC
13°30'
C
C
90° BSC
SEE NOTE 15
20°
A
.125
.130 DIA-CSK 81°±1° TO .26 .28 DIA- 4 HOLES
⊕ B .005 DIA


BRUSH RING (4 BRUSHES) SEE NOTE 8
.06
.08 × 45°±5°
.06 R MIN 3 PLACES
-B-
4.625 DIA MIN-TYP
4.5000
4.5005 DIA
.255
.245
6.010
5.990 DIA
5.375 DIA MAX
.187 MAX
.218 MAX
6.1250
6.1245 DIA
.318
.308
.032 REF
MTG DIM SEE NOTE 9
.655 REF

MARK TERMINAL NUMBERS ON INDICATED SURFACES OF STATOR SEE NOTE 5

SECTION **A-A**

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURER'S SYMBOL PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E 24
   LENGTH: 6 INCHES MIN.
4. CHECK BRUSH FORCE AT HEEL OF BRUSH. BRUSH FORCE TO BE 30 TO 50 GRAMS. SEE DETAIL **B**
5. PART MUST MEET REQUIREMENTS OF OS 8838/
6. BLACK LEAD AT TERMINAL NO. 1
7. WHITE LEAD AT TERMINAL NO. 2
8. CAUTION: DO NOT REMOVE STATOR FROM ROTOR WITHOUT REPLACING BRUSH RING WITH A MAGNETIC KEEPER RING
9. A VARIATION OF ±.019 IN .032 MOUNTING DIM WILL RESULT IN NOT LESS THAN 75% OF THE BRUSH WIDTH REMAINING ON THE COMMUTATOR UNDER THESE CONDITIONS THE BRUSH WILL NOT INTERFERE WITH THE INSULATION OF THE ARMATURE
10. STATOR TO BE INSPECTED BY USING GAGE (LATER) OF $\frac{6.1256}{6.1253}$ ID & MUST BE ◉ .003 TIR WITH GAGE SURFACE MOUNTING SCREWS TO BE INSTALLED FOR THIS INSPECTION. ROTOR MUST GO ON ARBOR OF $\frac{4.4993}{4.4995}$ DIA & MUST BE ◉ .0015 TIR WITH ARBOR SURFACE
11. BREAK CORNERS $\frac{.005}{.015}$ R
12. BRUSH RING TO BE FASTENED TO STATOR USING LONG-LOK SCREWS
13. GOLD PLATE COMMUTATOR PER MIL-G-45204 TYPE II CLASS 3
14. MOTOR TO MEET SPECIFICATION REQUIREMENTS WHEN THE STATOR & ROTOR AXES ARE ECCENTRIC BY .002 & OUT OF PARALLEL BY .5 MILLIRADIANS
15. BRUSH RING TO BE TWO SEGMENTS.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	
1000006	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: ——

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D M WHITE 7-17-62
APPROVED FOR MSC
7/31/62
BY DIRECTION
MIT APPROVAL J W 7/31/62

MOTOR, TORQUE DC, FRAMELESS SPECIFICATION CONTROL DRAWING

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000075
SHEET 1 OF 1

1000075

NASA DOCUMENT
~~MIT~~ PS-1000075
28 December 1962
Class A Release
TDRR-00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components, the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

28 Dec '62
MIT Instrumentation Laboratory Date

12/28/62
NASA/MSC Approval Date

NASA PROCUREMENT
SPEC NO. PS-1000075
28 December 1962
Class A
TDRR

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS
TYPE 62B130a4U
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[illegible] Director
Apollo Program

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment

This specification consists of pages i to iii, and 1 to 5 inclusive.

NASA PROCUREMENT
SPEC NO. PS-1000075

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS
TYPE 62B130 a4U

TABLE OF CONTENTS

Section	Title	Page
1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	3
4	QUALITY ASSURANCE PROVISIONS	4
5	PREPARATION FOR DELIVERY	5
6	NOTES	5

NASA PROCUREMENT
SPEC NO. PS-1000075

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR PROCUREMENT OF
MOTOR, TORQUE, DIRECT CURRENT, FRAMELESS
TYPE 62B130 a4U

1. SCOPE

1.1 SCOPE. This specification establishes the requirements for the procurement of the frameless, dc torque motor, hereinafter called motor.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL [illegible]	[illegible] Aeronautical and [illegible] Equipment, General Specification for

NASA

ND-1002012	Description and Requirements Publication for Procurement of Motor, Torque, Direct-Current, Frameless, General Specification for, National Aeronautics and Space Administration

STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts.

DRAWINGS

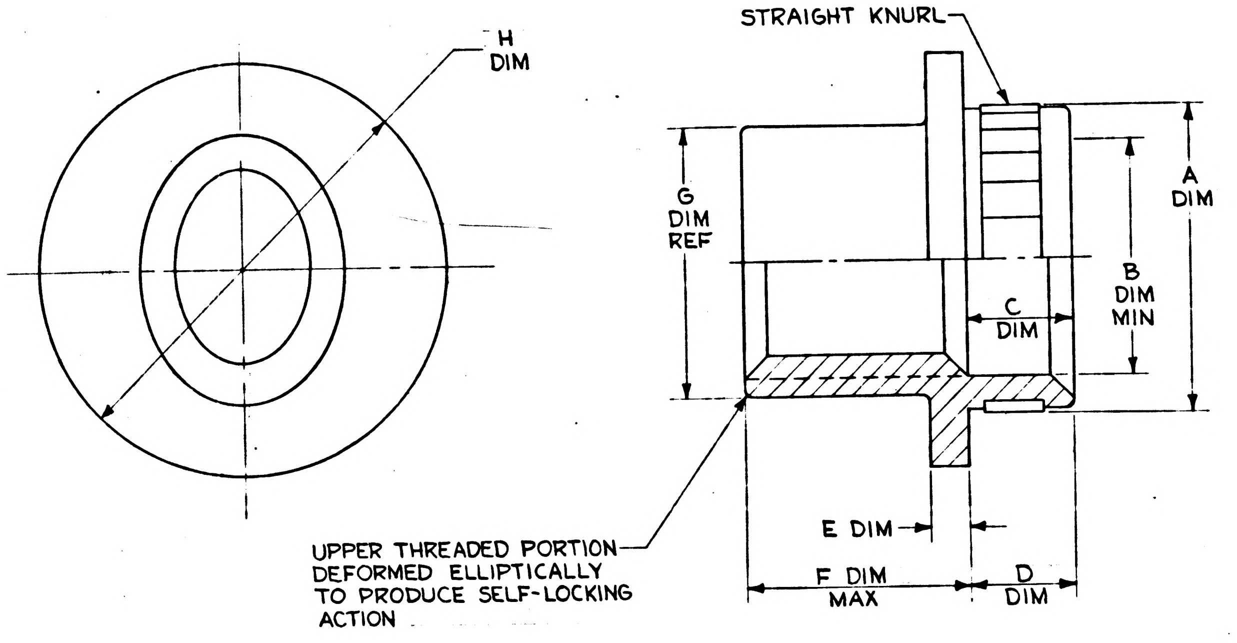
NASA

1000075	Motor, Torque, DC, Frameless, Specification Control Drawing.

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NUMBER	A DIM	B DIM (MIN.)	C DIM	D DIM	E DIM	F DIM (MAX.)	G DIM	H DIM (MAX.)	Ⓐ
1000076-1	NO. 4(.112)-40 UNC-3B	K7001-04-4	.168 .158	.113	.030 .050	.041 .035	.025	.124	.135	.223	Ⓐ
1000076-2	NO. 10(.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.091 .085	.032	.188	.225	.348	Ⓐ
1000076-3	NO. 4(.112)-40 UNC-3B	K7001-04-9	.168 .158	.115	.080 .100	.091 .085	.025	.124	.135	.223	Ⓐ

REVISIONS TDRR 00157

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00772	10 APR 63	WK


H DIM
STRAIGHT KNURL
G DIM REF
A DIM
B DIM MIN
C DIM
E DIM
F DIM MAX
D DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 IDENTIFY USING DRAWING NO., REV. LETTER, APPLICABLE DASH NO., AND MANUFACTURERS SYMBOL PER MIL-STD-130

Ⓐ 3 SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3

4 PART MUST CONFORM TO MIL-N-25027

5 DRY LUBRICANT COATING TO BE IN ACCORDANCE WITH MIL-L-25504

ORIGINAL SOURCE OF SUPPLY:
KAYNAR MFG. CO. INC.
BOX 2001 TERMINAL ANNEX
LOS ANGELES 54, CALIFORNIA
KAYNAR MFG PART NO. SEE TABLE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
A286 CRES STEEL
AMS 5735

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	C J Boyce	12/11/62
CHECKED		
DRAWN	RES	11-6-62

APPROVED FOR MSC
W J Rhine 12-12-62
BY DIRECTION MIT APPROVAL
W L Kopp 12/12/62

NUT, CLINCH FLUSH MOUNTED

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000076

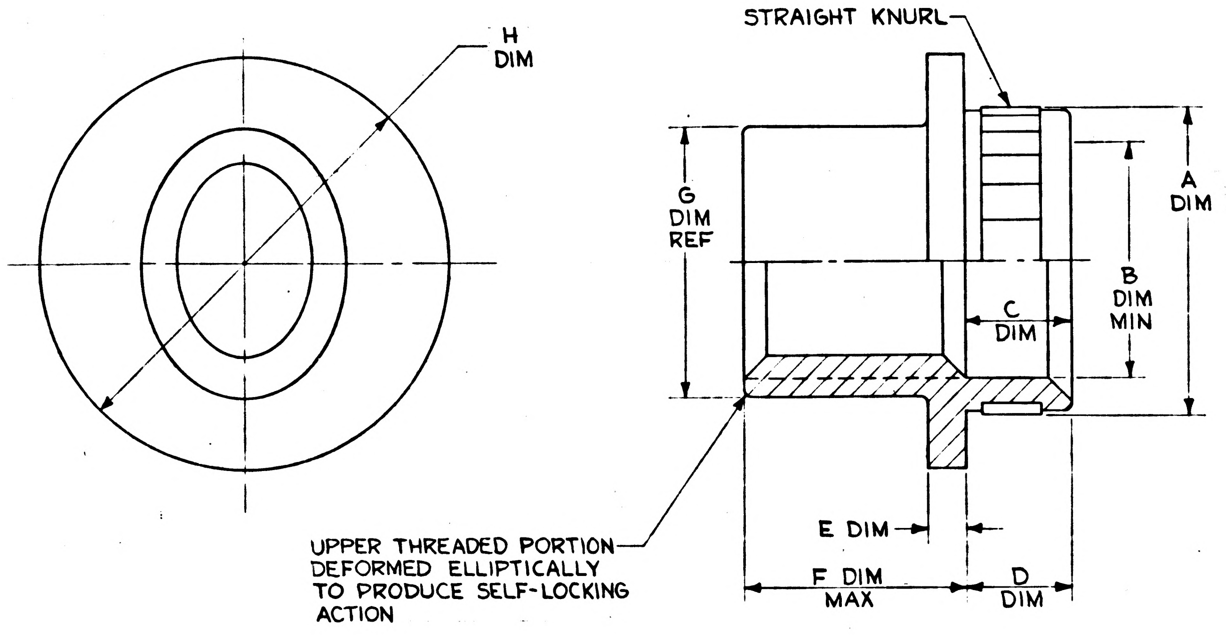
SHEET 1 OF 1

A 1000076

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00157					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 00772	10 APR 63	ajB	WK.
	B	TDRR 01032	1 MAY 63	ajB	WK

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NUMBER	A DIM	B DIM (MIN.)	C DIM	D DIM	E DIM	F DIM (MAX.)	G DIM	H DIM (MAX.)	Ⓐ
1000076-1	NO. 4 (.112)-40 UNC-3B	K7001-04-4	.168 .158	.113	.030 .050	.041 .035	.025	.124	.135	.223	Ⓐ
1000076-2	NO. 10 (.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.091 .085	.032	.188	.225	.348	Ⓐ
1000076-3	NO. 4 (.112)-40 UNC-3B	K7001-04-9	.168 .158	.113	.080 .100	.091 .085	.025	.124	.135	.223	Ⓐ
1000076-4	NO. 2 (.086)-56 UNC-3B	K7001-02-4	.137 .127	.087	.030 .050	.041 .035	.025	.110	.106	.192	Ⓑ


H DIM
STRAIGHT KNURL
G DIM REF
A DIM
B DIM MIN
C DIM
E DIM
F DIM MAX
D DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REV. LETTER, APPLICABLE DASH NO., AND MANUFACTURERS SYMBOL PER MIL-STD-130
3. Ⓐ SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3
4. PART MUST CONFORM TO MIL-N-25027
5. DRY LUBRICANT COATING TO BE IN ACCORDANCE WITH MIL-L-25504

ORIGINAL SOURCE OF SUPPLY:
KAYNAR MFG. CO. INC.
BOX 2001 TERMINAL ANNEX
LOS ANGELES 54, CALIFORNIA
KAYNAR MFG PART NO. SEE TABLE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
A286 CRES STEEL
AMS 5735

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	12/11/62
CHECKED		
DRAWN	RES	11-6-62
APPROVED FOR MSC	WJ Rhine	12-12-62
BY DIRECTION MIT APPROVAL	W L Kopp	12/12/62

NUT, CLINCH
FLUSH MOUNTED
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

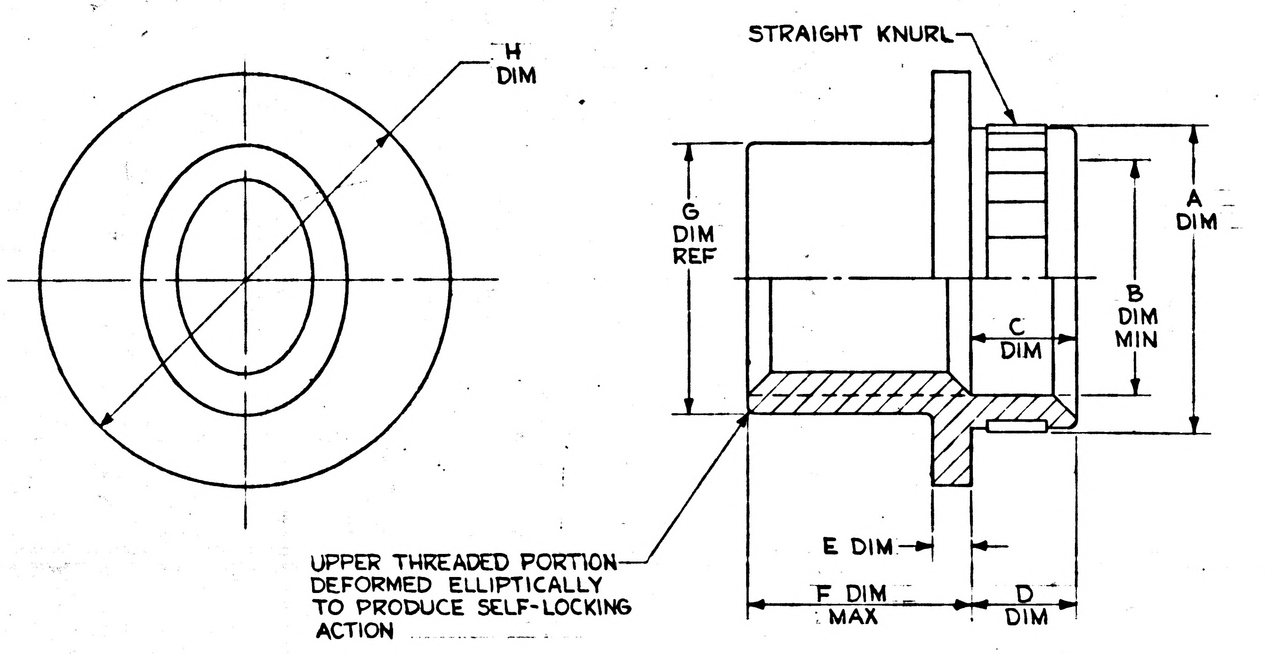
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000076
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NUMBER	A DIM	B DIM (MIN.)	C DIM	D DIM	E DIM	F DIM (MAX.)	G DIM	H DIM (MAX.)	Ⓐ
1000076-1	NO. 4(.112)-40 UNC-3B	K7001-04-4	.168 .158	.113	.030 .050	.041 .035	.025	.124	.135	.223	Ⓐ
1000076-2	NO. 10(.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.091 .085	.032	.188	.225	.348	Ⓐ
1000076-3	NO. 4(.112)-40 UNC-3B	K7001-04-9	.168 .158	.113	.080 .100	.091 .085	.025	.124	.135	.223	Ⓐ
1000076-4	NO. 2(.086)-56UNC-3B	K7001-02-4	.137 .127	.087	.030 .050	.041 .035	.025	.110	.106	.192	Ⓑ
1000076-5	NO. 2(.086)-56 UNC-3B	K7001-02-6	.137 .127	.087	.030 .050	.061 .055	.025	.110	.106	.192	Ⓒ

REVISIONS TDRR 00157

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ		A	TDRR 00772	10 APR 63	agB	WK
Ⓜ		B	TDRR 01032	1 MAY 63	agB	WK
		C	TDRR 01236	15 MAY 63	agB	WK


H DIM
STRAIGHT KNURL
G DIM REF
A DIM
B DIM MIN
C DIM
E DIM
F DIM MAX
D DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REV. LETTER, APPLICABLE DASH NO., AND MANUFACTURERS SYMBOL PER MIL-STD-130
3. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3
4. PART MUST CONFORM TO MIL-N-25027
5. DRY LUBRICANT COATING TO BE IN ACCORDANCE WITH MIL-L-25504

ORIGINAL SOURCE OF SUPPLY:
KAYNAR MFG. CO. INC.
BOX 2001 TERMINAL ANNEX
LOS ANGELES 54, CALIFORNIA
KAYNAR MFG PART NO. SEE TABLE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
A286 CRES STEEL
AMS 5735

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN	RES	11-6-62

APPROVED FOR MSC
W J Rhine 12-12-62
BY DIRECTION MIT APPROVAL
12/12/62

NUT, CLINCH
FLUSH MOUNTED
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000076
SHEET 1 OF 1

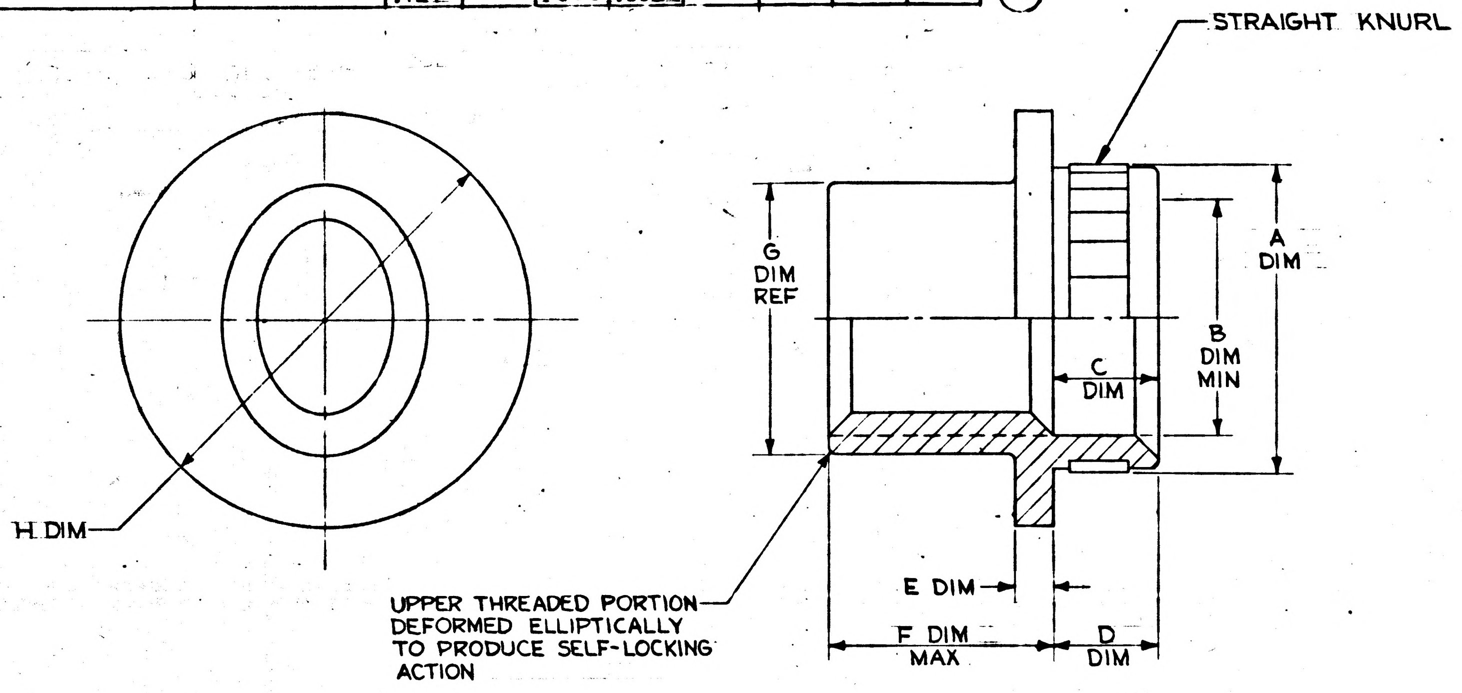
1000076 C

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NUMBER	A DIM	B DIM (MIN.)	C DIM	D DIM	E DIM	F DIM (MAX.)	G DIM	H DIM (MAX.)	Ⓐ
1000076-1	NO.4(.112)-40 UNC-3B	K7001-04-4	.168 .158	.113	.030 .050	.041 .035	.025	.124	.135	.223	Ⓐ
1000076-2	NO.10(.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.091 .085	.032	.188	.225	.348	Ⓐ
1000076-3	NO.4(.112)-40 UNC-3B	K7001-04-9	.168 .158	.113	.080 .100	.091 .085	.025	.124	.135	.223	Ⓐ
1000076-4	NO.2(.086)-56UNC-3B	K7001-02-4	.137 .127	.087	.030 .050	.041 .035	.025	.110	.106	.192	Ⓑ
1000076-5	NO.2(.086)-56 UNC-3B	K7001-02-6	.137 .127	.087	.030 .050	.061 .055	.025	.110	.106	.192	Ⓒ

REVISIONS TDRR 00157

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00772	10APR63	ajB	WK.
	B	TDRR 01032	1MAY63	ajB	WK
	C	TDRR 01236	15MAY63	ajB	WK.
	D	REPLACED BY REV.E WITH CHANGES TDRR 02304	7-30-63	ajB	WK.


STRAIGHT KNURL
G DIM REF
A DIM
B DIM MIN
C DIM
H DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION
E DIM
F DIM MAX
D DIM

NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 IDENTIFY USING DRAWING NO., REV. LETTER, APPLICABLE DASH NO., AND MANUFACTURERS SYMBOL PER MIL-STD-130
3 SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3
4 PART MUST CONFORM TO MIL-N-25027
5 DRY LUBRICANT COATING TO BE IN ACCORDANCE WITH MIL-L-25504

REPLACED BY REV. E WITH CHANGES

ORIGINAL SOURCE OF SUPPLY:
KAYNAR MFG. CO. INC.
BOX 2001 TERMINAL ANNEX
LOS ANGELES 54, CALIFORNIA
KAYNAR MFG PART NO. SEE TABLE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
MULTIPLE	DL1000201
USAGE	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: A286 CRES STEEL AMS 5735

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	12/11/62
CHECKED		
DRAWN	RES	11-6-62

APPROVED FOR MSC
WJ Rhine 12-12-62
BY DIRECTION MIT APPROVAL
WR Kopple 12/12/62

NUT, CLINCH
FLUSH MOUNTED
SPECIFICATION CONTROL DRAWING

SCALE | UNIT WT. | CODE IDENT.

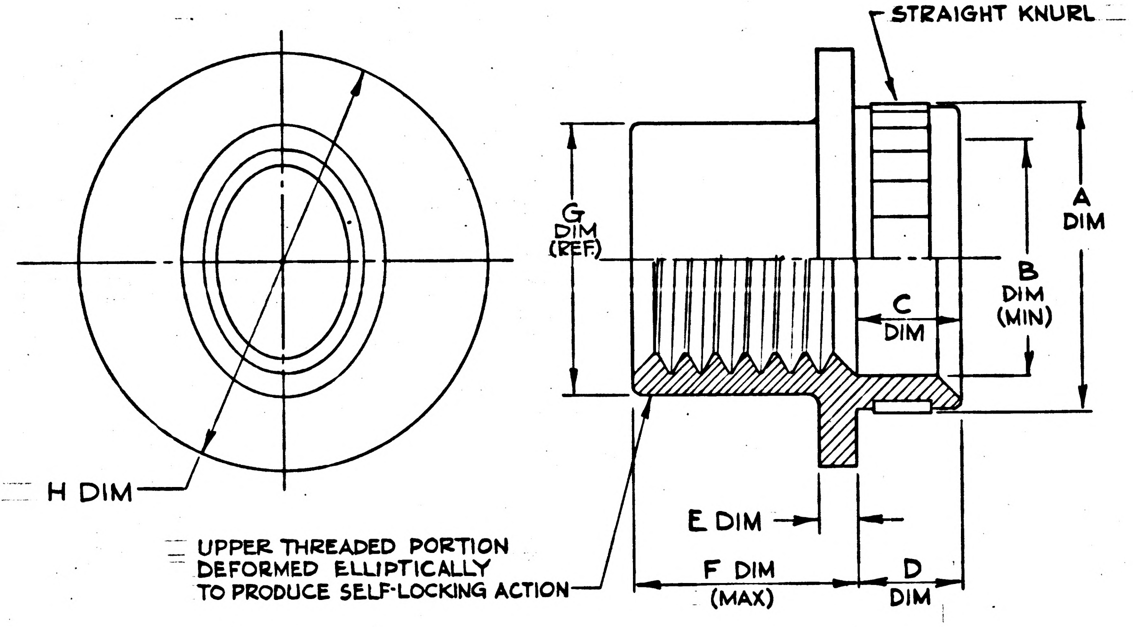
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000076
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000076

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
—	E	REPLACES REV. D WITH CHANGES TDRR 02304	7-30-63	ajb	WK

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NO.	A DIM	B DIM (MIN.)	C DIM	D DIM	E DIM	F DIM (MAX.)	G DIM	H DIM (MAX.)
1000076-1	NO.4(.112)-40 UNC-3B	K7001-04-4	.168 .158	.113	.030 .050	.041 .035	.025	.124	.135	.223
1000076-2	NO.10(.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.091 .085	.032	.188	.225	.348
1000076-3	NO.4(.112)-40 UNC-3B	K7001-04-9	.168 .158	.113	.080 .100	.091 .085	.025	.124	.135	.223
1000076-4	NO.2(.086)-56 UNC-3B	K7001-02-4	.137 .127	.087	.030 .050	.041 .035	.025	.110	.106	.192
1000076-5	NO.2(.086)-56 UNC-3B	K7001-02-6	.137 .127	.087	.030 .050	.061 .055	.025	.110	.106	.192
1000076-6	NO.10(.190)-32 UNF-3B	K7001-3-4	.262 .252	.194	.030 .050	.041 .035	.032	.188	.225	.348
1000076-7	NO.10(.190)-32 UNF-3B	K7001-3-6	.262 .252	.194	.050 .070	.061 .055	.032	.188	.225	.348
1000076-8	NO.6(.138)-32 UNC-3B	K7001-06-4	.200 .190	.142	.030 .050	.041 .035	.025	.141	.161	.254
1000076-9	NO.6(.138)-32 UNC-3B	K7001-06-6	.200 .190	.142	.050 .070	.061 .055	.025	.141	.161	.254


STRAIGHT KNURL
G DIM (REF)
A DIM
B DIM (MIN)
C DIM
H DIM
E DIM
F DIM (MAX)
D DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3
   - C. IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NO., REVISION LETTER & MANUFACTURER'S SYMBOL OR NAME PER MIL-STD-130. MANUFACTURER'S PART NO MAY ALSO BE USED.
   - D. PARTS SHALL MEET THE REQUIREMENTS OF MIL-N-25027
2. INSPECTION & ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS
     1. MATERIAL: A 286 CRES STEEL AMS 5735
     2. LUBRICANT: DRY COATING IN ACCORDANCE WITH MIL-L-25504
     3. DIMENSIONS: PER CHART

REPLACES REV. D WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE REQ'D: 2-A-1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	7/30/63
CHECKED		
DRAWN	A.T.P.	7/29/63

APPROVED FOR MSC
Jacob Barnard
MIT/IL APPROVAL — DATE
W Kupfer 31 July 63

NUT, CLINCH
FLUSH MOUNTED
SPECIFICATION CONTROL DWG.

SCALE —
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000076
SHEET 1 OF 1

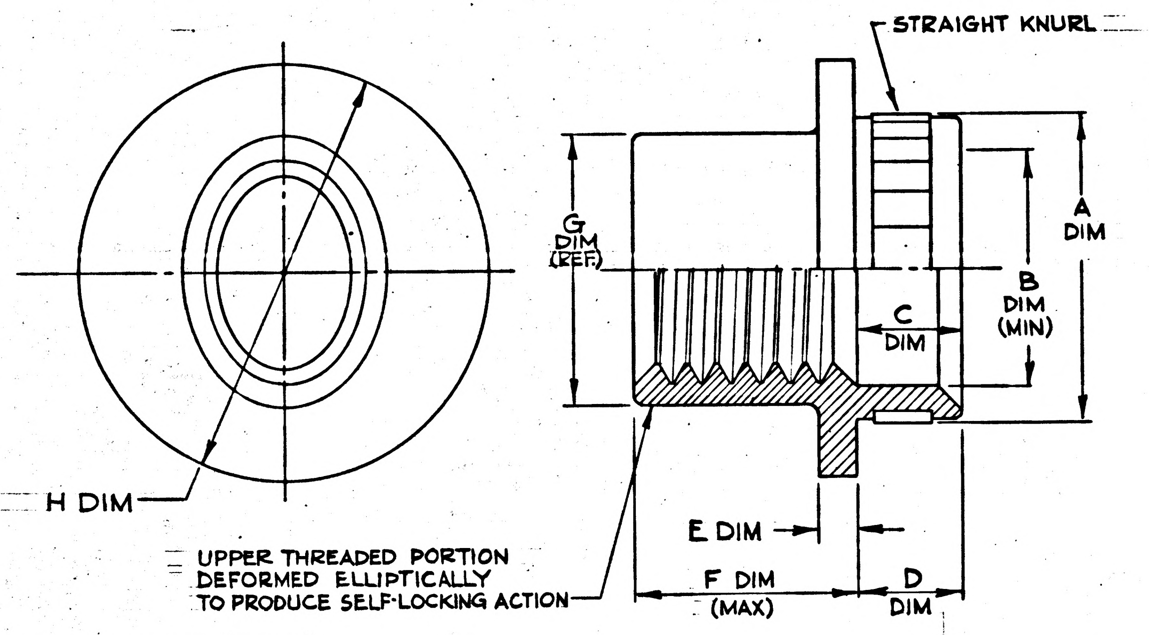
1000076 E

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NO.	A DIM	B DIM (MIN.)	C DIM	D DIM	E DIM	F DIM (MAX.)	G DIM	H DIM (MAX.)
1000076-1	NO.4(.112)-40 UNC-3B	K7001-04-4	.168 .158	.113	.030 .050	.041 .035	.025	.124	.135	.223
1000076-2	NO.10(.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.091 .085	.032	.188	.225	.348
1000076-3	NO.4(.112)-40 UNC-3B	K7001-04-9	.168 .158	.113	.080 .100	.091 .085	.025	.124	.135	.223
1000076-4	NO.2(.086)-56 UNC-3B	K7001-02-4	.137 .127	.087	.030 .050	.041 .035	.025	.110	.106	.192
1000076-5	NO.2(.086)-56 UNC-3B	K7001-02-6	.137 .127	.087	.050 .070	.061 .055	.025	.110	.106	.192
1000076-6	NO.10(.190)-32 UNF-3B	K7001-3-4	.262 .252	.194	.030 .050	.041 .035	.032	.188	.225	.348
1000076-7	NO.10(.190)-32 UNF-3B	K7001-3-6	.262 .252	.194	.050 .070	.061 .055	.032	.188	.225	.348
1000076-8	NO.6(.138)-32 UNC-3B	K7001-06-4	.200 .190	.142	.030 .050	.041 .035	.025	.141	.161	.254
1000076-9	NO.6(.138)-32 UNC-3B	K7001-06-6	.200 .190	.142	.050 .070	.061 .055	.025	.141	.161	.254

Ⓕ

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
—	E	REPLACES REV. D WITH CHANGES TDRR 02304	7-30-63	ajs	wk
—	F	TDRR 04445	11-12-63	sah	


STRAIGHT KNURL
G DIM (REF)
A DIM
B DIM (MIN)
C DIM
H DIM
E DIM
F DIM (MAX)
D DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION

REQUIREMENTS:
1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3
   C. IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NO., REVISION LETTER & MANUFACTURER'S SYMBOL OR NAME PER MIL-STD-130. MANUFACTURER'S PART NO MAY ALSO BE USED.
   D. PARTS SHALL MEET THE REQUIREMENTS OF MIL-N-25027
2. INSPECTION & ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS
      1. MATERIAL: A 286 CRES STEEL AMS 5735
      2. LUBRICANT: DRY COATING IN ACCORDANCE WITH MIL-L-25504
      3. DIMENSIONS: PER CHART

REPLACES REV. D WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE REQ'D: 2-A-1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED A J Boyce DATE 7/30/63
CHECKED
DRAWN A.T.P. 7/29/63
APPROVED FOR MSC Jack Barnard
MIT/IL APPROVAL W Kupfer DATE 31 July 63

NUT, CLINCH
FLUSH MOUNTED
SPECIFICATION CONTROL DWG.

SCALE — UNIT WT. CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000076
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

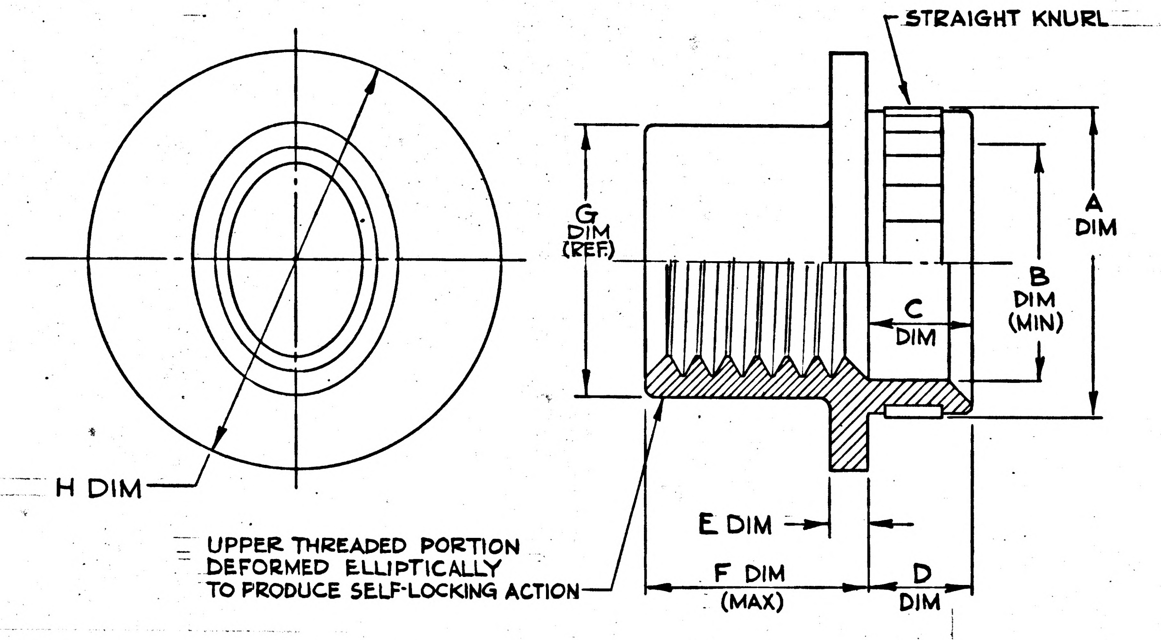
1000076 E

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NO.	A DIM	B DIM (MIN.)	C DIM	D DIM	E DIM	F DIM (MAX.)	G DIM	H DIM (MAX.)
1000076-1	NO.4(.112)-40 UNC-3B	K7001-04-4	.168 .158	.113	.030 .050	.041 .035	.025	.124	.135	.223
1000076-2	NO.10(.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.091 .085	.032	.188	.225	.348
1000076-3	NO.4(.112)-40UNC-3B	K7001-04-9	.168 .158	.113	.080 .100	.091 .085	.025	.124	.135	.223
1000076-4	NO.2(.086)-56UNC-3B	K7001-02-4	.137 .127	.087	.030 .050	.041 .035	.025	.110	.106	.192
1000076-5	NO.2(.086)-56UNC-3B	K7001-02-6	.137 .127	.087	.050 .070	.061 .055	.025	.110	.106	.192
1000076-6	NO.10(.190)-32UNF-3B	K7001-3-4	.262 .252	.194	.030 .050	.041 .035	.032	.188	.225	.348
1000076-7	NO.10(.190)-32UNF-3B	K7001-3-6	.262 .252	.194	.050 .070	.061 .055	.032	.188	.225	.348
1000076-8	NO.6(.138)-32UNC-3B	K7001-06-4	.200 .190	.142	.030 .050	.041 .035	.025	.141	.161	.254
1000076-9	NO.6(.138)-32UNC-3B	K7001-06-6	.200 .190	.142	.050 .070	.061 .055	.025	.141	.161	.254

Ⓕ

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	E	REPLACES REV. D WITH CHANGES TDRR 02304	7-30-63	ajs	wk
	F	TDRR 04445	11-12-63	saH	
	G	REPLACED BY REV H WITH CHANGES TDRR 07687	4-21-64	saH	



STRAIGHT KNURL
G DIM (REF.)
A DIM
B DIM (MIN)
C DIM
H DIM
E DIM
F DIM (MAX)
D DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3
   - C. IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NO., REVISION LETTER & MANUFACTURER'S SYMBOL OR NAME PER MIL-STD-130. MANUFACTURER'S PART NO MAY ALSO BE USED.
   - D. PARTS SHALL MEET THE REQUIREMENTS OF MIL-N-25027
2. INSPECTION & ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS
     1. MATERIAL: A 286 CRES STEEL AMS 5735
     2. LUBRICANT: DRY COATING IN ACCORDANCE WITH MIL-L-25504
     3. DIMENSIONS: PER CHART

REPLACES REV. D WITH CHANGES

REPLACED BY REV H WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE REQ'D: 2-A-1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Boyce 7/30/63
CHECKED
DRAWN A.T.P. 7/29/63
APPROVED FOR MSC Jack Barnard
MIT/IL APPROVAL W Cupper 31 July 63

NUT, CLINCH
FLUSH MOUNTED
SPECIFICATION CONTROL DWG.

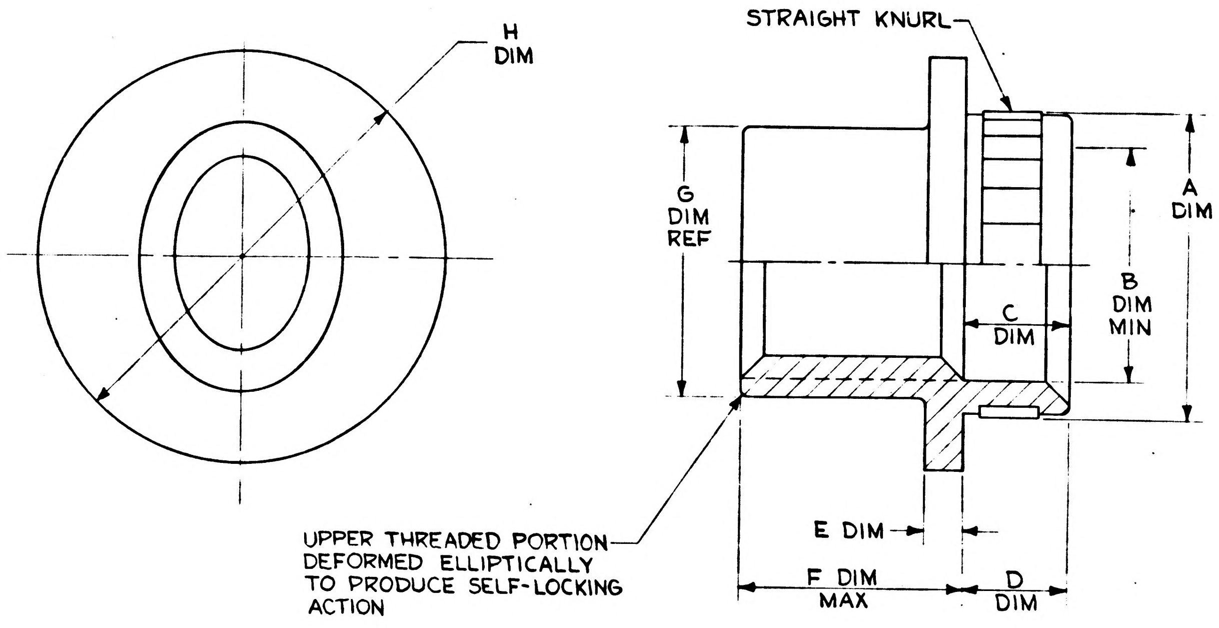
SCALE — | UNIT WT. | CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000076
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NUMBER	INTERNAL THREAD	KAYNAR MFG PART NUMBER	A DIM	B DIM	C DIM	D DIM	E DIM	F DIM	G DIM	H DIM
1000076-1	NO. 4(.112)-40 UNC-3B	K7001-04-4	.168 .158	.112	.030 .050	.037 .043	.025	.124	.135	.234 .204
1000076-2	NO. 10(.190)-32 UNF-3B	K7001-3-9	.262 .252	.194	.080 .100	.087 .093	.032	.188	.225	.359 .329

REVISIONS TDRR 00157				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


H DIM
STRAIGHT KNURL
G DIM REF
A DIM
B DIM MIN
C DIM
UPPER THREADED PORTION DEFORMED ELLIPTICALLY TO PRODUCE SELF-LOCKING ACTION
E DIM
F DIM MAX
D DIM

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REV. LETTER, APPLICABLE DASH NO., AND MANUFACTURERS SYMBOL PER MIL-STD-130
3. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3
4. PART MUST CONFORM TO MIL-N-25027
5. DRY LUBRICANT COATING TO BE IN ACCORDANCE WITH MIL-L-25504

ORIGINAL SOURCE OF SUPPLY:
KAYNAR MFG. CO. INC.
BOX 2001 TERMINAL ANNEX
LOS ANGELES 54, CALIFORNIA
KAYNAR MFG PART NO. SEE TABLE

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
MULTIPLE	DL1000201
USAGE	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
A286 CRES STEEL
AMS 5735

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	CJ Boyce	12/11/62
CHECKED		
DRAWN	RES	11-6-62

APPROVED FOR MSC
WJ Rhine 12-12-62
BY DIRECTION MIT APPROVAL
12/12/62

NUT, CLINCH
FLUSH MOUNTED

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

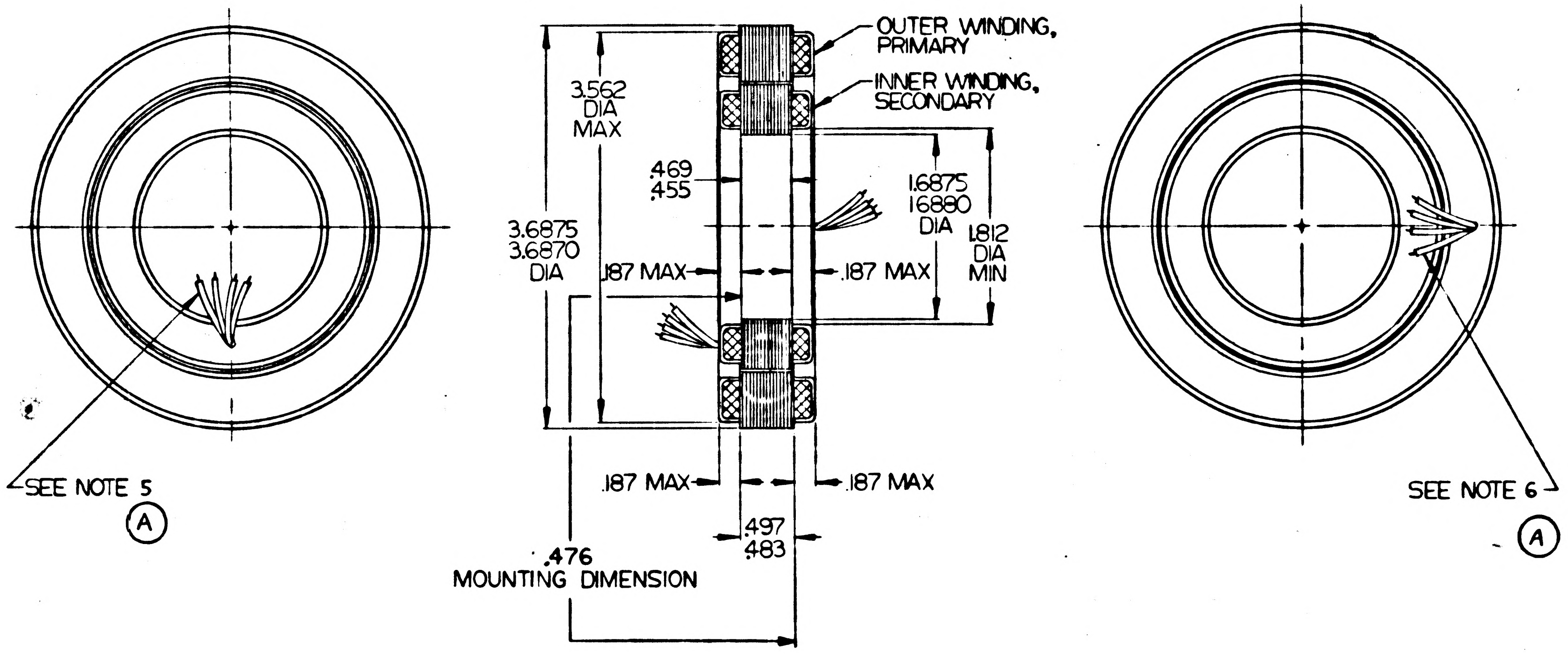
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000076

SHEET 1 OF 1

1000076

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDR 00005	8-13-62	ajB VKB



OUTER WINDING, PRIMARY
INNER WINDING, SECONDARY
3.562 DIA MAX
.469
.455
1.6875
1.6880
DIA
1.812 DIA MIN
3.6875
3.6870
DIA
.187 MAX
.187 MAX
.187 MAX
.187 MAX
.497
.483
.476 MOUNTING DIMENSION
SEE NOTE 5
A
SEE NOTE 6
A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° WHEN ELECTRICAL LEADS ARE POSITIONED AS SHOWN.
3. LEADS TO BE 12" MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
4. PART MUST CONFORM TO SPEC MIL-R-*later*
5. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1" RADIUS.
6. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1.450" RADIUS

(A)

ORIGINAL SOURCES OF SUPPLY

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY
PART NO. X1812158

CLIFTON PRECISION PRODUCTS CO., INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA
PART NO. *later*

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000015	
1000014	DL1000001
NEXT ASSY	USED ON
APPLICATION	

(A)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: ——

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	7-3/-62
CHECKED		
DRAWN	L. MILLS	7-12-62

APPROVED FOR MSC
Jack Barnard 7/31/62
BY DIRECTION
MIT APPROVAL: W. Kupfer 7/31/62

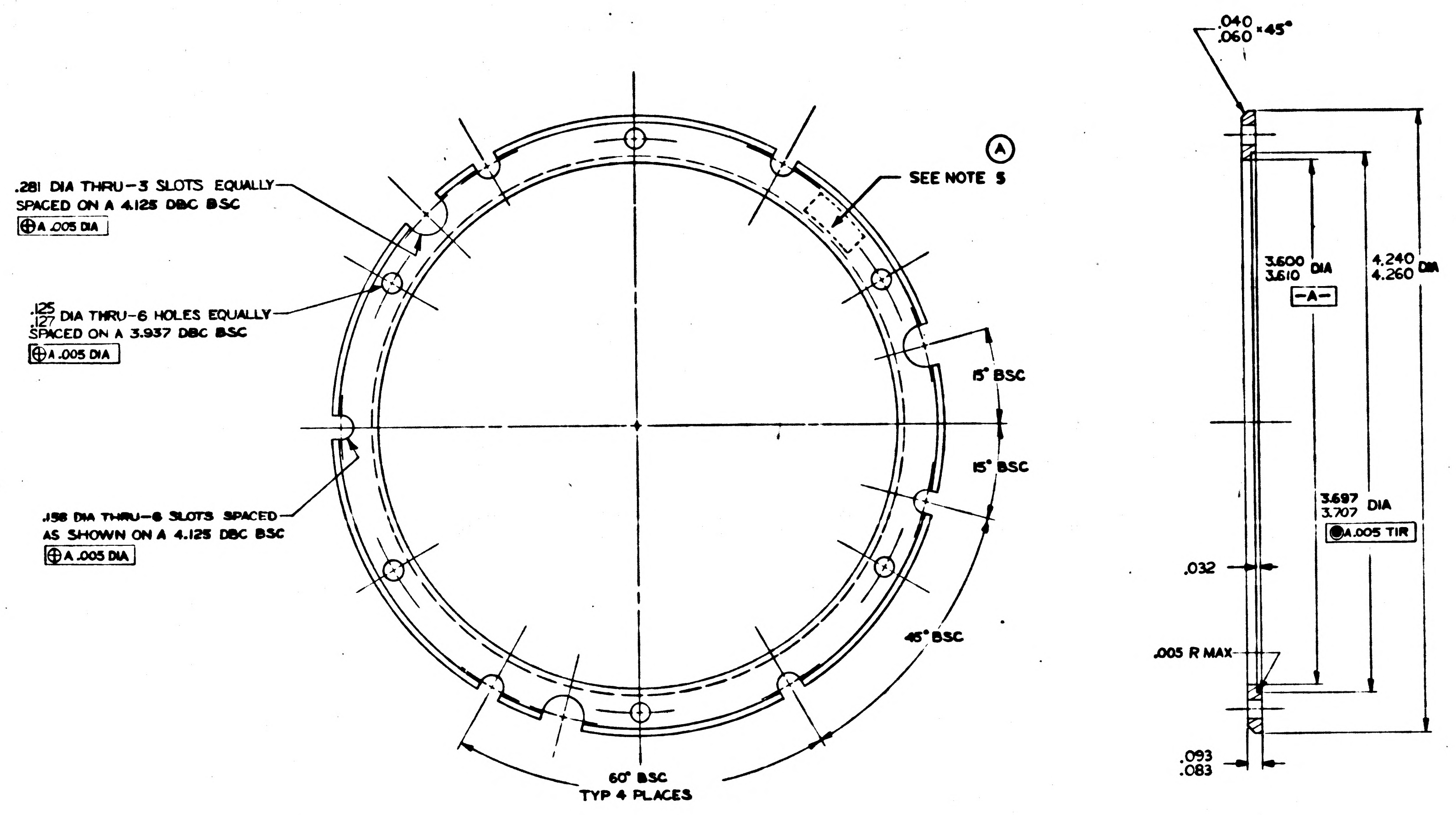
RESOLVER
FIFTEEN SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
1—1	—	—

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000078
SHEET 1 OF 1

1000078 A

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDR 00006	8-13-62	


.281 DIA THRU-3 SLOTS EQUALLY SPACED ON A 4.125 DBC BSC
⊕ A .005 DIA
.125/.127 DIA THRU-6 HOLES EQUALLY SPACED ON A 3.937 DBC BSC
⊕ A .005 DIA
.158 DIA THRU-6 SLOTS SPACED AS SHOWN ON A 4.125 DBC BSC
⊕ A .005 DIA
A
SEE NOTE 5
15° BSC
15° BSC
45° BSC
60° BSC TYP 4 PLACES
.040/.060 × 45°
3.600/3.610 DIA
-A-
4.240/4.260 DIA
3.697/3.707 DIA
◎ A .005 TIR
.032
.005 R MAX
.093/.083

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{63}$ ALL OVER
3. BREAK SHARP EDGES .005/.015
4. ANODIC COAT PER MIL-A-8625 TYPE I
5. Ⓐ IDENTIFY USING DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

Ⓐ 1000015	
1000014	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
——— ±.005 ±1°
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL-6061 TEMP T6, ALT SPEC QQ-A-327 TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		7-3/-62
CHECKED		
DRAWN	D.M. WHITE	7-19-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL: 7/31/62

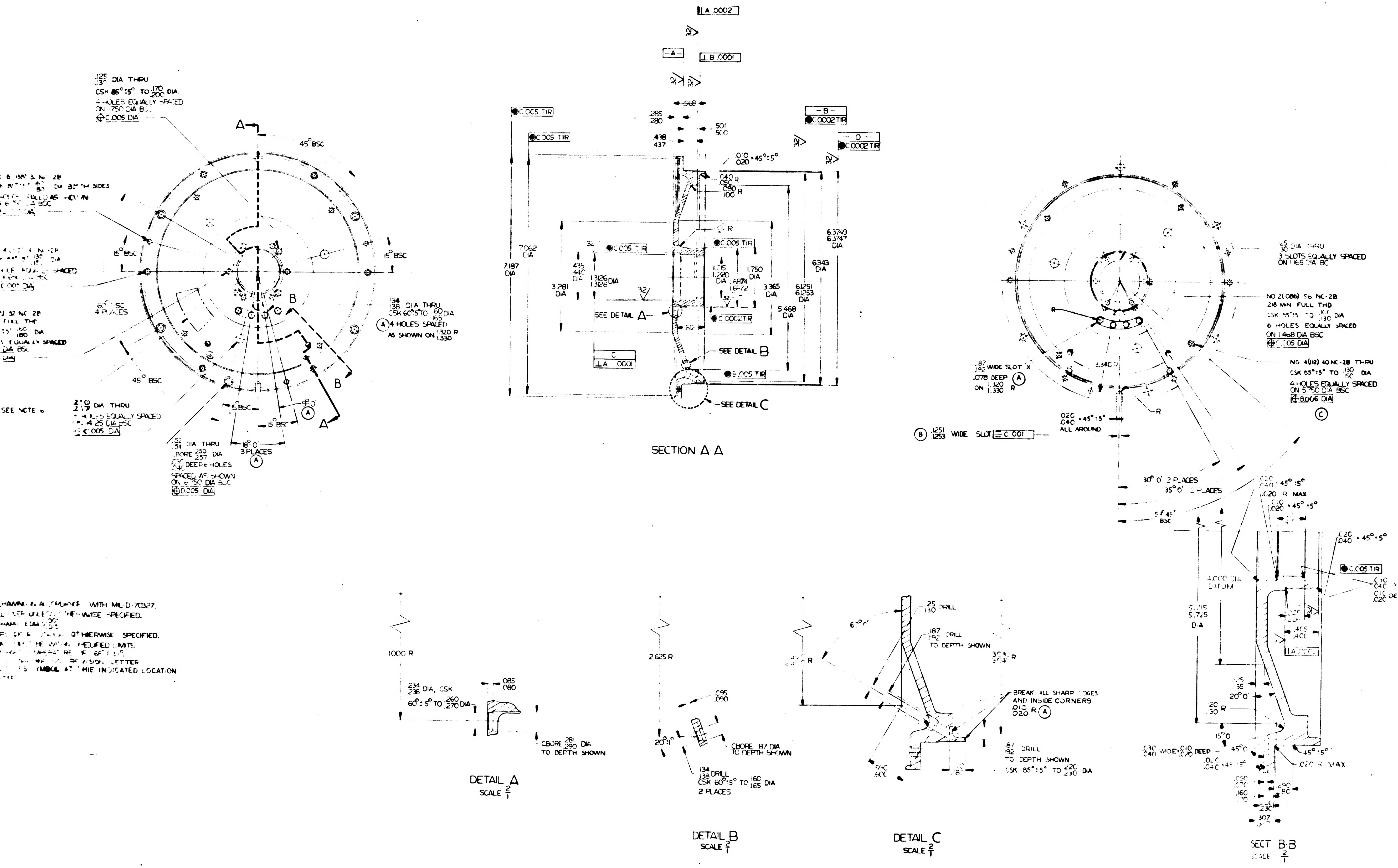
CLAMP, OUTER RING
15 SPEED RESOLVER

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000079
SHEET 1 OF 1

1000079 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDR 00014	8-6-62	
B	TDR 00024	9-11-62	
C	TDR 00039	10-8-62	


SECTION A-A
DETAIL A
SCALE 2/1
DETAIL B
SCALE 2/1
DETAIL C
SCALE 2/1
SECT B-B
SCALE 2/1
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
BERYLLIUM
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010/.020 R
4 HOLES EQUALLY SPACED
3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
.020/.040 × 45° ±5° ALL AROUND
SEE NOTE 6

DRAWING IN ACCORDANCE WITH MIL-D-70327.
WISE SPECIFIED.
EDGES .005/.015
OTHERWISE SPECIFIED.
SPECIFIED LIMITS
68° F ±1°.
REVISION LETTER
SYMBOL AT THE INDICATED LOCATION

INCHES
PHOTOGRAPHIC SCALE ONLY

1000080	REV C	SHEET 1

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

Ⓐ 1000014 NEXT ASSY — DL 1000001 USED ON — APPLICATION

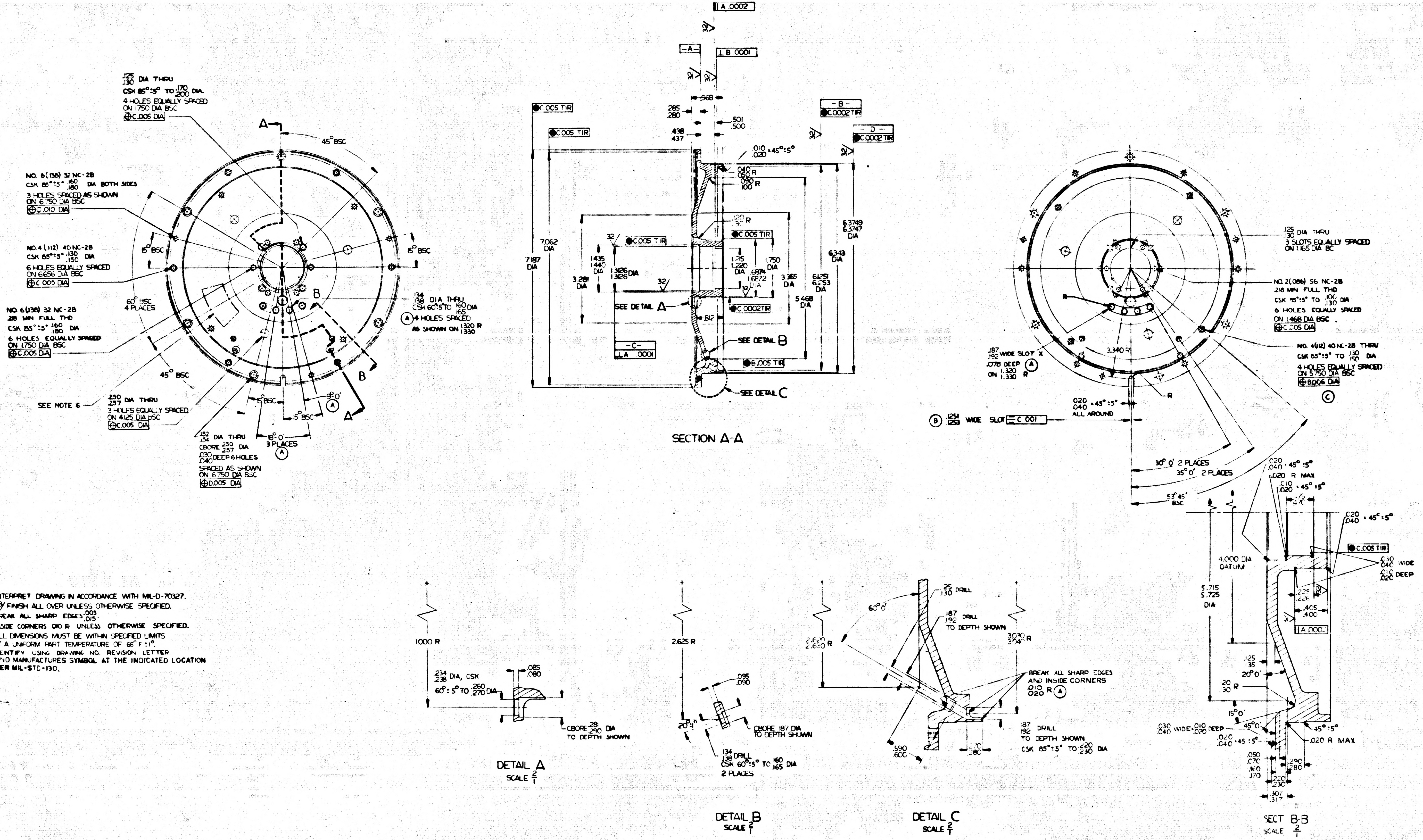
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

M.I.T. INSTRUMENTATION LAB
APPROVED
CHECKED
DRAWN L. MILLS
MIT

HOUSING, BEARING
5 SPEED, OUTER AXIS

M.I.T. INSTRUMENTATION LABORATORY CAMBRIDGE MASS
MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NASA DRAWING NO 1000080
SCALE 1—1 UNIT WT — CODE IDENT —
SHEET 1 OF 1

SYM	DESCRIPTION
A	TDR 0006
B	TDR 00021
C	TDR 00038


.125 .130 DIA THRU
CSK 85°±5° TO .170 .200 DIA.
4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕ C.005 DIA
A
45° BSC
NO. 6(.138) 32 NC-2B CSK 85°±5° .160 .180 DIA BOTH SIDES
3 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
⊕ C.010 DIA
NO. 4(.112) 40 NC-2B CSK 85°±5° .130 .150 DIA
6 HOLES EQUALLY SPACED ON 6.656 DIA BSC
⊕ C.005 DIA
NO. 6(.138) 32 NC-2B .218 MIN FULL THD CSK 85°±5° .160 .180 DIA
6 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕ C.005 DIA
15° BSC
60° BSC 4 PLACES
.134 .138 DIA THRU CSK 60°±5° TO .160 .165 DIA
Ⓐ 4 HOLES SPACED AS SHOWN ON 1.320 1.330 R
B
45° BSC
SEE NOTE 6
.250 .257 DIA THRU
3 HOLES EQUALLY SPACED ON 4.125 DIA BSC
⊕ C.005 DIA
.152 .154 DIA THRU CBORE .250 .257 DIA .030 .040 DEEP 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
⊕ D.005 DIA
18° 0' 3 PLACES Ⓐ
Ⓒ
⊥ A .0002
-A-
⊥ B .0001
32/
.968
.285 .280
.438 .437
.501 .500
◎ C.005 TIR
◎ C.005 TIR
-B- ◎ C.0002 TIR
-D- ◎ C.0002 TIR
.010 .020 × 45° ±5°
.040 .050 R
.090 .100 R
.120 .130 R
7.062 DIA
7.187 DIA
3.281 DIA
1.435 1.440 DIA
1.3126 1.3128 DIA
1.215 1.220 DIA
1.6874 1.6872 DIA
1.750 DIA
3.365 DIA
5.468 DIA
6.125 6.253 DIA
6.343 DIA
6.3749 6.3747 DIA
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
.812
-C- ⊥ A .0001
◎ C.0002 TIR
◎ C.005 TIR
◎ B.005 TIR
.125 .130 DIA THRU
3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
NO. 2(.086) 56 NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .130 DIA
6 HOLES EQUALLY SPACED ON 1.468 DIA BSC.
⊕ C.005 DIA
NO. 4(.112) 40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA
4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
⊕ B.006 DIA
Ⓒ
.187 .192 WIDE SLOT × .078 DEEP Ⓐ ON 1.320 1.330 R
3.340 R
.020 .040 × 45° ±5° ALL AROUND
Ⓑ .1251 .1253 WIDE SLOT ═ C .001
30° 0' 2 PLACES
35° 0' 2 PLACES
53° 45' BSC
.020 .040 × 45° ±5°
.020 R MAX
.010 .020 × 45° ±5°
.020 .040 × 45° ±5°
◎ C.005 TIR
.030 .040 WIDE
.010 .020 DEEP
4.000 DIA DATUM
5.715 5.725 DIA
.225 .226
.405 .400
⊥ A .0002
.125 .135
20° 0'
.120 .130 R
15° 0'
.030 .040 WIDE × .010 .020 DEEP
45° 0'
.020 .040 × 45° ±5°
45° ±5°
.020 R MAX
.050 .070
.160 .170
.290 .280
.230
.307 .317
1.000 R
.234 .238 DIA, CSK 60° ± 5° TO .260 .270 DIA
.085 .080
CBORE .281 .290 DIA TO DEPTH SHOWN
2.625 R
.095 .090
20°
CBORE .187 DIA TO DEPTH SHOWN
.134 .138 DRILL CSK 60°±5° TO .160 .165 DIA 2 PLACES
.125 .130 DRILL
63° 0'
.187 .192 DRILL TO DEPTH SHOWN
2.650 2.620 R
3.030 3.040 R
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010 .020 R Ⓐ
.187 .192 DRILL TO DEPTH SHOWN CSK 85°±5° TO .220 .230 DIA
.590 .600
.280

SECTION A-A

DETAIL A
SCALE 2/1

DETAIL B
SCALE 2/1

DETAIL C
SCALE 2/1

SECT B-B
SCALE 2/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ±1°.
6. IDENTIFY USING DRAWING NO. REVISION LETTER AND MANUFACTURES SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION

LIST OF PARTS AND MATERIALS

Ⓐ 1000014	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

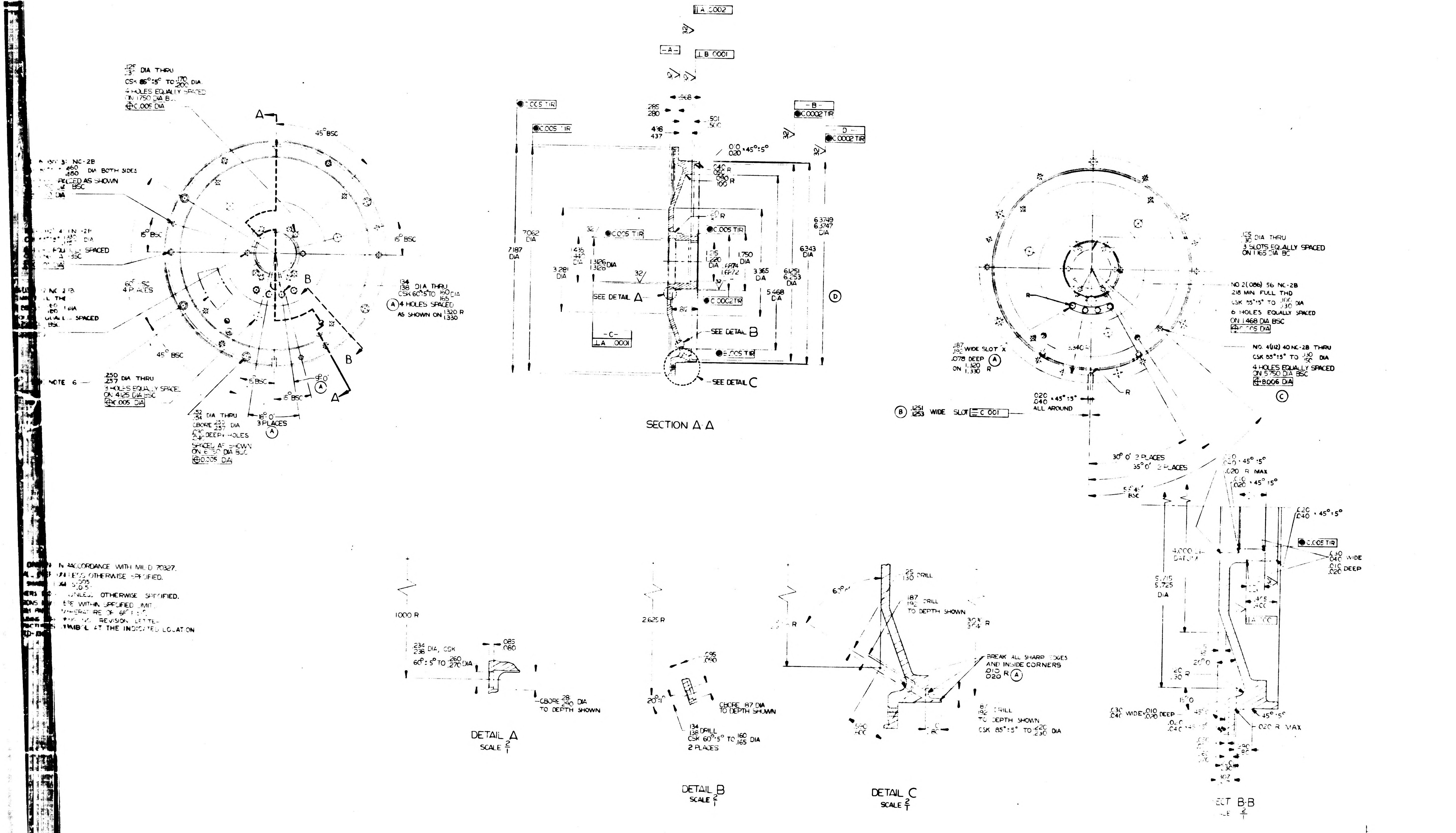
M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN
APPROVED FOR NASA
BY DIRECTION

HOUSING, BEARING
15 SPEED, OUTER AXIS

SCALE	UNIT WT	CODE IDENT
1-1	—	—

1000080	REV C	SHEET 1

A	TDR 00014	9-6-62		
B	TDR 00024	9-11-62		
C	TDR 00039	10-8-62		
D	TDRR 00154	12-12-62		



A
A
B
B
45° BSC
15° BSC
15° BSC
45° BSC
.125 .135 DIA THRU
CSK 85°±5° TO .170 .200 DIA.
4 HOLES EQUALLY SPACED
ON 1.750 DIA B
⊕ 0.005 DIA
.460 .480 DIA BOTH SIDES
LOCATED AS SHOWN
BSC
EQUALLY SPACED
NC-2B
EQUALLY SPACED
BSC
.134 .138 DIA THRU
CSK 60°±5° TO .160 .165 DIA
Ⓐ 4 HOLES SPACED
AS SHOWN ON 1.320 R 1.330
NOTE 6
.250 .257 DIA THRU
3 HOLES EQUALLY SPACED
ON 4.125 DIA BSC
⊕ 0.005 DIA
.152 .154 DIA THRU
CBORE .232 .237 DIA
.045 .050 DEEP 4 HOLES
SPACED AS SHOWN
ON 6.130 DIA BSC
⊕ 0.005 DIA
15° 0'
3 PLACES Ⓐ
6° BSC
5 BSC
Ⓐ
SECTION A-A
⊥ A .0002
-A-
⊥ B .0001
-B-
● 0.0002 TIR
-D-
● 0.0002 TIR
● 0.005 TIR
● 0.005 TIR
.285 .280
.418 .437
.501 .500
.010 .020 × 45° ± 5°
.040 .050 R
.090 .100 R
7.187 DIA
7.062 DIA
3.281 DIA
1.415 1.410 DIA
1.3126 1.3128 DIA
● 0.005 TIR
SEE DETAIL A
⊥ A .0001
-C-
● 0.005 TIR
1.215 1.220 DIA
1.750 DIA
1.6874 1.6872
3.365 DIA
● 0.0002 TIR
SEE DETAIL B
5.468 DIA
6.1251 6.1253 DIA
6.343 DIA
6.3749 6.3747 DIA
Ⓓ
● 0.005 TIR
SEE DETAIL C
32
.812
.125 .130 DIA THRU
3 SLOTS EQUALLY SPACED
ON 1.165 DIA BC
NO 2(.086) 56 NC-2B
.218 MIN FULL THD
CSK 85°±5° TO .100 .130 DIA
6 HOLES EQUALLY SPACED
ON 1.468 DIA BSC
⊕ 0.005 DIA
NO 4(.112) 40 NC-2B THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES EQUALLY SPACED
ON 5.750 DIA BSC
⊕ 0.006 DIA
Ⓒ
.187 .192 WIDE SLOT "X"
.078 DEEP Ⓐ
ON 1.320 1.330 R
R
R
3.540
.020 .040 × 45° ± 5°
ALL AROUND
Ⓑ 1.251 1.253 WIDE SLOT ⊥ C .001
30° 0' 2 PLACES
35° 0' 2 PLACES
BSC
.020 .040 × 45° ± 5°
.020 R MAX
.010 .020 × 45° ± 5°
.020 .040 × 45° ± 5°
● 0.005 TIR
.030 .040 WIDE
.010 .020 DEEP
4.000 DATUM
5.715 5.725 DIA
⊥ A .0001
.020 .030 R
.030 .040 WIDE × .010 .020 DEEP
45° ± 5°
.020 R MAX
SECT B-B
SCALE 2/1
1.000 R
.234 .236 DIA, CSK
60° ± 5° TO .260 .270 DIA
.083 .080
CBORE .28 .290 DIA
TO DEPTH SHOWN
DETAIL A
SCALE 2/1
2.625 R
.095 .090
CBORE .187 DIA
TO DEPTH SHOWN
.134 .138 DRILL
CSK 60° ± 5° TO .160 .165 DIA
2 PLACES
DETAIL B
SCALE 2/1
.125 .130 DRILL
.187 .192 DRILL
TO DEPTH SHOWN
R
BREAK ALL SHARP EDGES
AND INSIDE CORNERS
.010 .020 R Ⓐ
.187 .192 DRILL
TO DEPTH SHOWN
CSK 85° ± 5° TO .220 .230 DIA
DETAIL C
SCALE 2/1

IN ACCORDANCE WITH MIL-D 70327.
UNLESS OTHERWISE SPECIFIED.
5 .005 .015
UNLESS OTHERWISE SPECIFIED.
WITHIN SPECIFIED LIMIT
TEMPERATURE OF 68° F
REVISION LETTER
SYMBOL AT THE INDICATED LOCATION

INCHES
PHOTOGRAPHIC SCALE ONLY

Ⓓ 1000161 DL 1000201
Ⓐ 1000014 DL 1000001

± .005 ± 0° 30'

MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

A.J. Bergen 7-31-62
L. Mills 6-21-62
MIT

LIST OF PARTS AND MATERIALS

HOUSING, BEARING
16 SPEED, OUTER AXIS Ⓓ

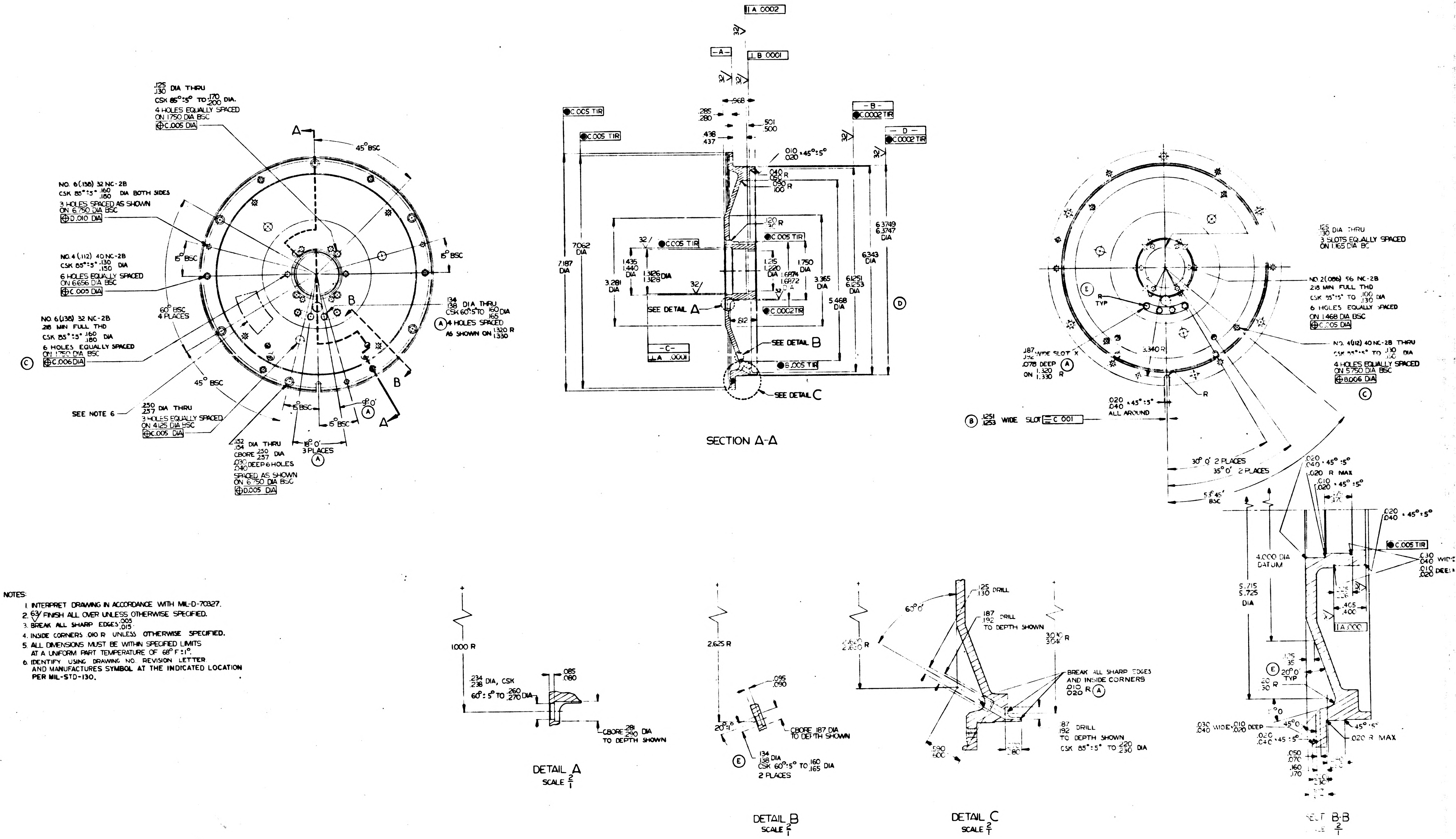
SCALE 1-1

MIT INSTRUMENTATION LABORATORY

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NASA DRAWING NO 1000080

1000080	REV D	SHEET 1



SECTION A-A
DETAIL A
SCALE 2/1
DETAIL B
SCALE 2/1
DETAIL C
SCALE 2/1
SECT B-B
SCALE 2/1
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
SEE NOTE 6
.125 .130 DIA THRU
CSK 85°±5° TO .170 .200 DIA.
4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
NO. 6(.138) 32 NC-2B
3 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
NO. 4 (.112) 40 NC-2B
6 HOLES EQUALLY SPACED ON 6.656 DIA BSC
6 HOLES EQUALLY SPACED ON 6.750 DIA BSC
.250 .257 DIA THRU
3 HOLES EQUALLY SPACED ON 4.125 DIA BSC
.152 .154 DIA THRU
SPACED AS SHOWN ON 6.750 DIA BSC
.134 .138 DIA THRU
4 HOLES SPACED AS SHOWN ON 1.320 1.330 R
.125 .130 DIA THRU
3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
NO. 2(.086) 56 NC-2B
.218 MIN FULL THD
6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
NO. 4(.112) 40 NC-2B THRU
4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
.1251 .1253 WIDE SLOT
ALL AROUND
4.000 DIA DATUM
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010 .020 R

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ±1°.
6. IDENTIFY USING DRAWING NO. REVISION LETTER AND MANUFACTURES SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
000161	DL 1000201
1000014	DL 1000001

APPLICATION

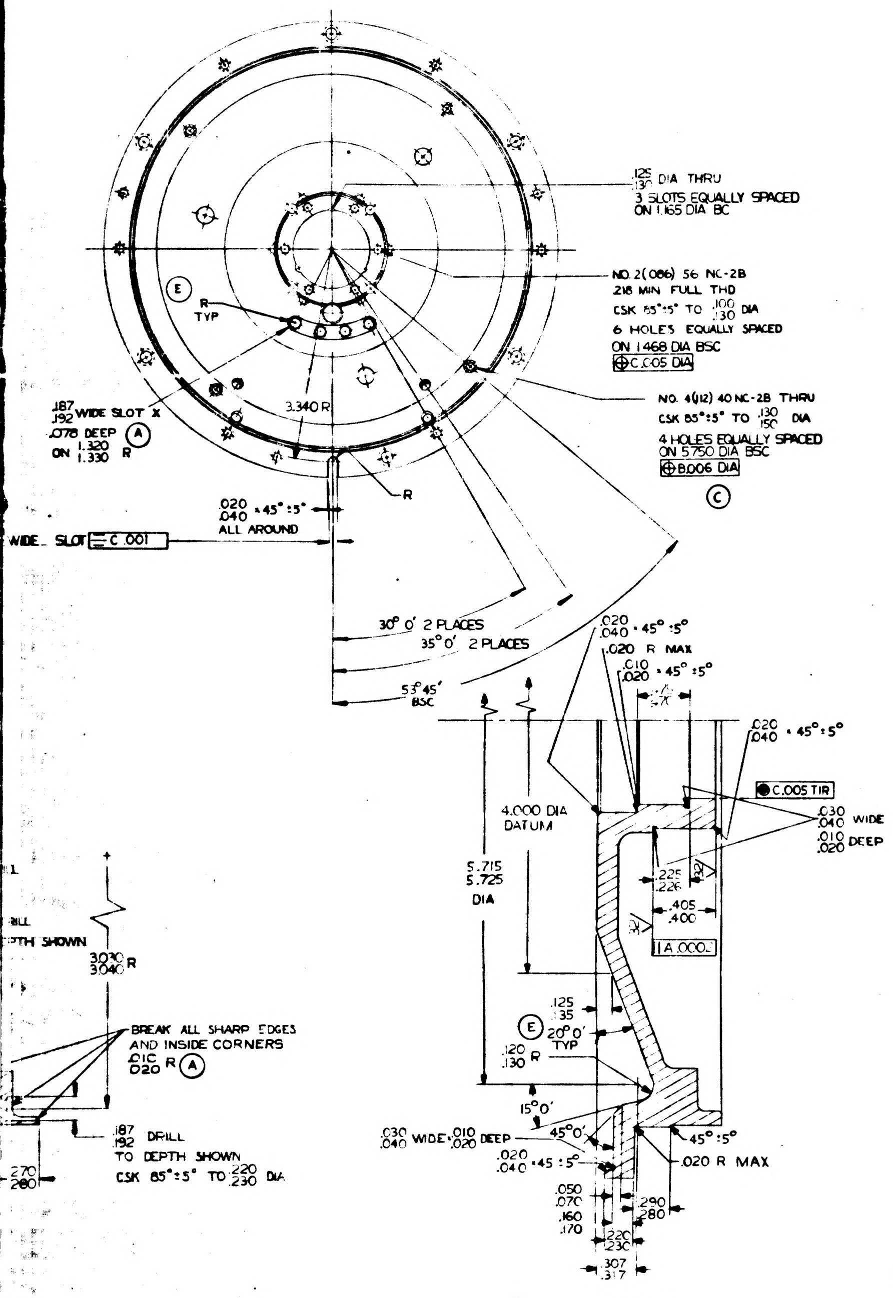
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-1531

QTY REQD

	REV	SHEET
1000080	E	1

TDR 00003

SYM	DESCRIPTION	DATE		
A	TDR 00014	8-6-62	ajB	DKK
B	TDR 00024	9-11-62	ajB	WK
C	TDR 00039	10-8-62	ajB	WK
D	TDRR 00154	12-12-62	ajB	WK
E	TDRR 00592	9-3-63	ajB	W



.125 / .130 DIA THRU
3 SLOTS EQUALLY SPACED
ON 1.165 DIA BC
NO. 2(.086) 56 NC-2B
.218 MIN FULL THD
CSK 85°±5° TO .100 / .130 DIA
6 HOLES EQUALLY SPACED
ON 1.468 DIA BSC
⊕ C .005 DIA
E
R TYP
.187 / .192 WIDE SLOT X
.078 DEEP A
ON 1.320 / 1.330 R
3.340 R
NO. 4(.112) 40 NC-2B THRU
CSK 85°±5° TO .130 / .150 DIA
4 HOLES EQUALLY SPACED
ON 5.750 DIA BSC
⊕ B .006 DIA
C
R
.020 / .040 × 45° ±5°
ALL AROUND
WIDE SLOT ≡ C .001
30° 0′ 2 PLACES
35° 0′ 2 PLACES
53° 45′ BSC
.020 / .040 × 45° ±5°
.020 R MAX
.010 / .020 × 45° ±5°
.020 / .040 × 45° ±5°
● C .005 TIR
.030 / .040 WIDE
.010 / .020 DEEP
4.000 DIA DATUM
5.715 / 5.725 DIA
.225 / .226
32
.405 / .400
32
∥ A .0002
.125 / .135
E 20° 0′ TYP
.120 / .130 R
15° 0′
.030 / .040 WIDE × .010 / .020 DEEP
45° 0′
.020 / .040 × 45° ±5°
45° ±5°
.020 R MAX
.050 / .070
.160 / .170
.290 / .280
.220 / .230
.307 / .317
DRILL
DEPTH SHOWN
3.030 / 3.040 R
BREAK ALL SHARP EDGES
AND INSIDE CORNERS
.010 / .020 R A
.187 / .192 DRILL
TO DEPTH SHOWN
CSK 85°±5° TO .220 / .230 DIA
.270 / .280

SECT B-B
SCALE 2/1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
D 1000161	DL 1000201
A 1000014	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30′
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED C.J. Bergen 7-31-62
CHECKED L. Hall 6-21-62
DRAWN
MIT

HOUSING, BEARING
15 & 16 SPEED, OUTER AXIS
D

SCALE 1–1
UNIT WT —
CODE IDENT —

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000080
SHEET

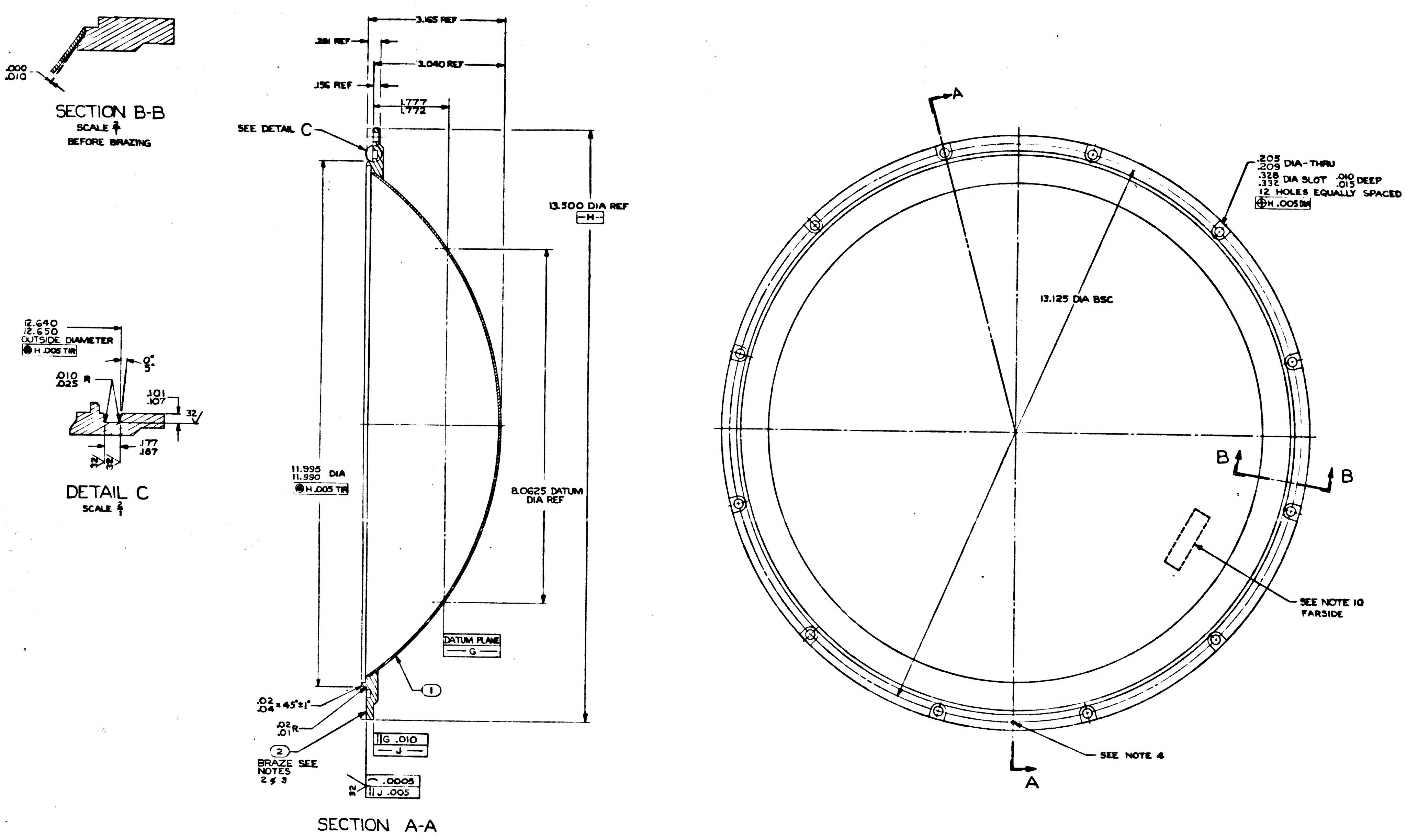
1000080 E

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

Ⓜ

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00152	12-12-62	GgB WK

REVISIONS TDRR 00105



.000
.010
SECTION B-B
SCALE 2/1
BEFORE BRAZING
12.640
12.650
OUTSIDE DIAMETER
H .005 TIR
0°
5°
.010
.025 R
.101
.107
32
.177
.187
32
32
DETAIL C
SCALE 2/1
3.165 REF
.281 REF
3.040 REF
.156 REF
1.777
1.772
SEE DETAIL C
13.500 DIA REF
H
11.995
11.990 DIA
H .005 TIR
8.0625 DATUM DIA REF
DATUM PLANE
G
1
.02
.04 x 45° ± 1°
.02
.01 R
2
BRAZE SEE NOTES 2 & 3
G .010
J
.0005
J .005
32
SECTION A-A
A
A
.205
.209 DIA-THRU
.328
.332 DIA SLOT .010
.015 DEEP
12 HOLES EQUALLY SPACED
H .005 DIA
13.125 DIA BSC
B
B
SEE NOTE 10
FARSIDE
SEE NOTE 4

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
3. DIP BRAZE PER NAVORD OD17547 AND AIR COOL
4. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN HARDNESS TO BE CHECKED AT INDICATED AREA ONLY
   - A SOLUTION HEAT TREAT AT 970°F ± 10° FOR 2 HOURS ± 5 MIN. AIR BLAST QUENCH
   - B AGE AT 350°F ± 10° FOR 6 HOURS ± 10 MIN
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. 63/ MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
7. Ⓐ ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   - A ROUGH MACHINE
   - B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN
   - C FINISH MACHINE
8. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
9. PRESSURE TEST USING HELIUM LEAK DETECTOR
   ALLOWABLE LEAK RATE - 1.0 X 10^{-5} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
10. IDENTIFY USING DRAWING NO. REVISION LETTER & MANUFACTURING SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER FIXED	1000064			2
1	HEMISPHERE CASE COVER	1000060-2			1

LIST OF PARTS AND MATERIALS

Ⓐ

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: ~

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN G. QUINN 7/
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

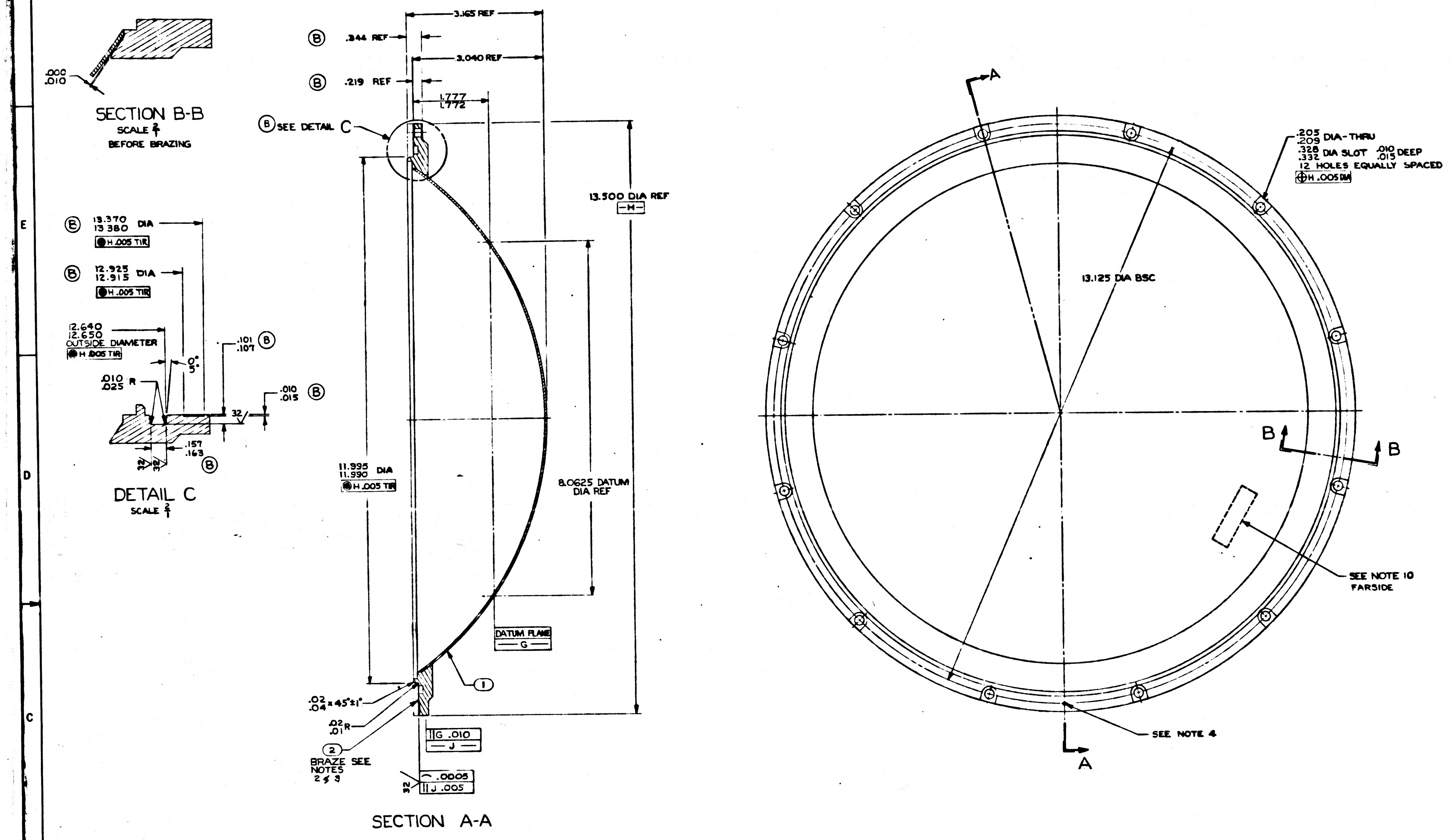
CASE COVER FIXED
BRAZING & MACHINING
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000081
SHEET 1 OF 1

1000081 A

REVISIONS TDRR 00105				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00152	12-12-62	WK
	B	TDRR 00259	1-8-63	



.000
.010
SECTION B-B
SCALE 4/1
BEFORE BRAZING
Ⓑ 13.370
13.380 DIA
H .005 TIR
Ⓑ 12.925
12.915 DIA
H .005 TIR
12.640
12.650
OUTSIDE DIAMETER
H .005 TIR
0°
5°
.101
.107 Ⓑ
.010
.025 R
32
.010
.015 Ⓑ
.157
.163 Ⓑ
DETAIL C
SCALE 4/1
Ⓑ .344 REF
Ⓑ .219 REF
3.165 REF
3.040 REF
1.777
1.772
Ⓑ SEE DETAIL C
13.500 DIA REF
-H-
11.995
11.990 DIA
H .005 TIR
8.0625 DATUM
DIA REF
DATUM PLANE
-G-
①
.02
.04 x 45° ±1°
.02
.01 R
②
BRAZE SEE
NOTES
2 & 3
G .010
-J-
.0005
J .005
32
SECTION A-A
A
A
13.125 DIA BSC
.205
.209 DIA-THRU
.328
.332 DIA SLOT .010
.015 DEEP
12 HOLES EQUALLY SPACED
H .005 DIA
B
B
SEE NOTE 10
FARSIDE
SEE NOTE 4

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
3. DIP BRAZE PER NAVORD OD17547 AND AIR COOL
4. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN HARDNESS TO BE CHECKED AT INDICATED AREA ONLY
   A SOLUTION HEAT TREAT AT 970°F ±10° FOR 2 HOURS ±5 MIN. AIR BLAST QUENCH
   B AGE AT 350°F ±10° FOR 6 HOURS ±10 MIN
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. 63/ MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
Ⓐ 7. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   A ROUGH MACHINE
   B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN
   C FINISH MACHINE
8. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
9. PRESSURE TEST USING HELIUM LEAK DETECTOR
   ALLOWABLE LEAK RATE - 1.0×10^{-5} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
10. IDENTIFY USING DRAWING NO. REVISION LETTER & MANUFACTURING SYMBOL
   PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER FIXED	1000064			2
1	HEMISPHERE CASE COVER	1000060-2			1

LIST OF PARTS AND MATERIALS

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED DATE 11/2/62
CHECKED
DRAWN G. QUINN 7/19/62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 2/14/63

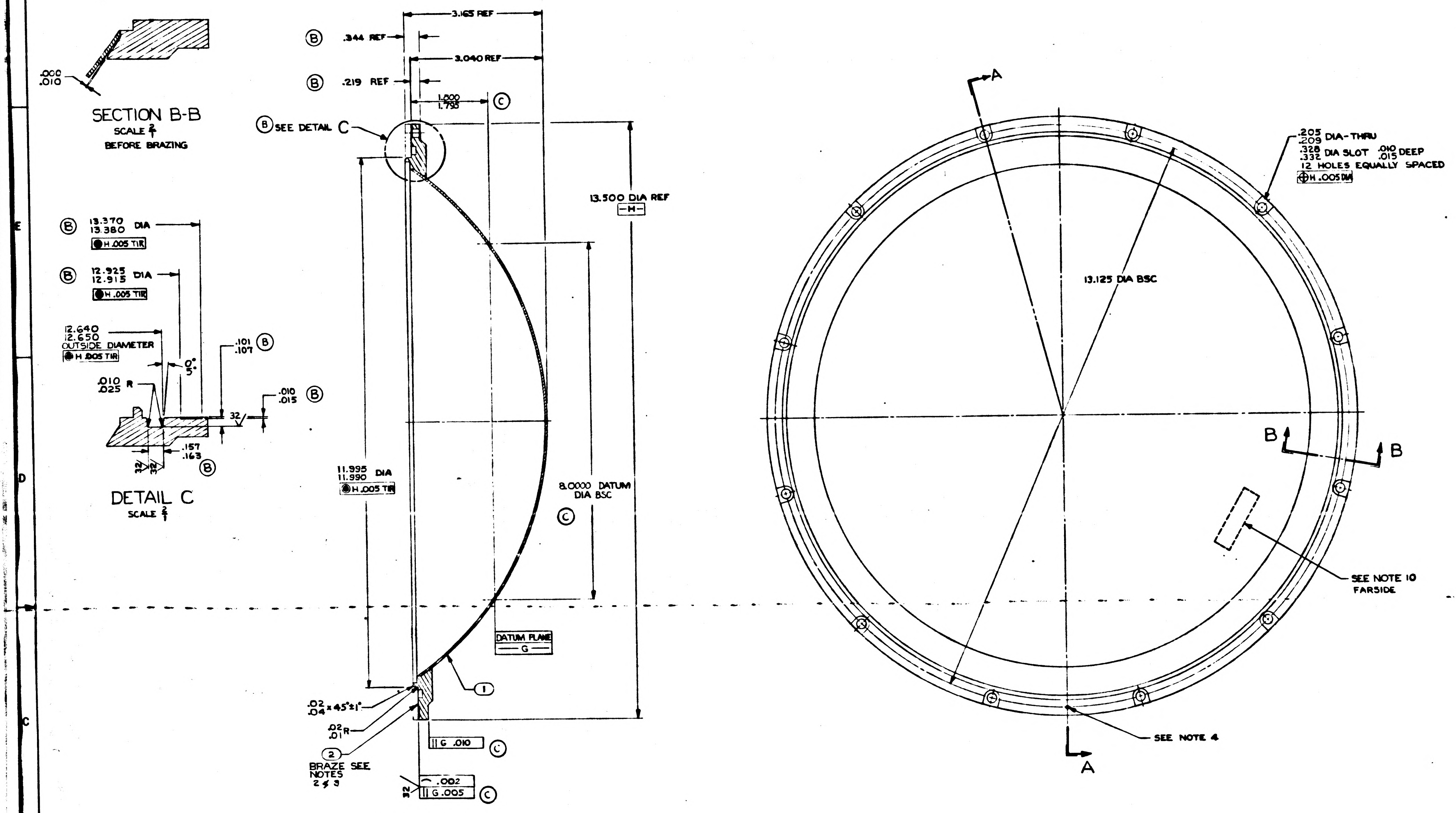
CASE COVER FIXED
BRAZING & MACHINING
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000081
SHEET 1 OF 1

1000081 B

			REVISIONS	TDRR 00105		
	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ		A	TDRR 00152	12-12-62	ggB	WR
Ⓜ		B	TDRR 00259	1-8-63	gjm	
		C	TDRR 00430	2-15-63		


SECTION B-B
SCALE 2/1
BEFORE BRAZING
.000 .010
Ⓑ 13.370 13.380 DIA
H .005 TIR
Ⓑ 12.925 12.915 DIA
H .005 TIR
12.640 12.650 OUTSIDE DIAMETER
H .005 TIR
.010 .025 R
0° 5°
.101 .107 Ⓑ
.010 .015 Ⓑ
32
.157 .163 Ⓑ
DETAIL C
SCALE 2/1
Ⓑ .344 REF
3.165 REF
Ⓑ .219 REF
3.040 REF
1.800 1.795 Ⓒ
Ⓑ SEE DETAIL C
13.500 DIA REF
-H-
11.995 11.990 DIA
H .005 TIR
8.0000 DATUM DIA BSC
Ⓒ
DATUM PLANE
G
1
.02 .04 x 45°±1°
.02 .01 R
2
BRAZE SEE NOTES 2 & 3
G .010 Ⓒ
.002
G .005 Ⓒ
SECTION A-A
A
A
.205 .209 DIA-THRU
.328 .332 DIA SLOT .010 .015 DEEP
12 HOLES EQUALLY SPACED
H .005 DIA
13.125 DIA BSC
B
B
SEE NOTE 10 FARSIDE
SEE NOTE 4

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
3. DIP BRAZE PER NAVORD OD17547 AND AIR COOL
4. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN HARDNESS TO BE CHECKED AT INDICATED AREA ONLY
   - A SOLUTION HEAT TREAT AT 970°F ±10° FOR 2 HOURS ±6 MIN. AIR BLAST QUENCH
   - B AGE AT 350°F ±10° FOR 6 HOURS ±10 MIN
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. 63 MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
7. Ⓐ ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   - A ROUGH MACHINE
   - B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN
   - C FINISH MACHINE
8. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
9. PRESSURE TEST USING HELIUM LEAK DETECTOR
   ALLOWABLE LEAK RATE - 1.0×10^{-5} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
10. IDENTIFY USING DRAWING NO. REVISION LETTER & MANUFACTURING SYMBOL PER MIL-STD-130

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER FIXED	000064			2
1	HEMISPHERE CASE COVER	1000060-2			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

Ⓐ

PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: ~

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 11/2/62
CHECKED
DRAWN G. QUINN 7/19/62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

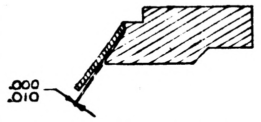
CASE COVER FIXED
BRAZING & MACHINING
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

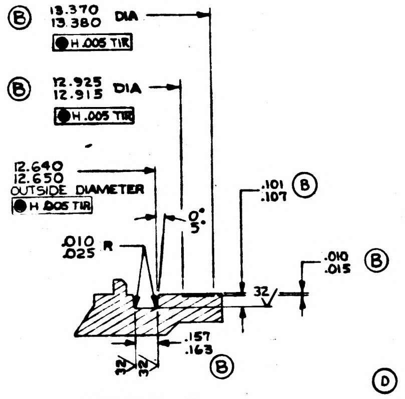
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000081
SHEET 1 OF 1

1000081 C

REVISIONS		TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00152	12-12-62	WR
	B	TDRR 00259	1-8-63	
	C	TDRR 00430	2-15-63	
	D	TDRR 00588	3-19-63	WR

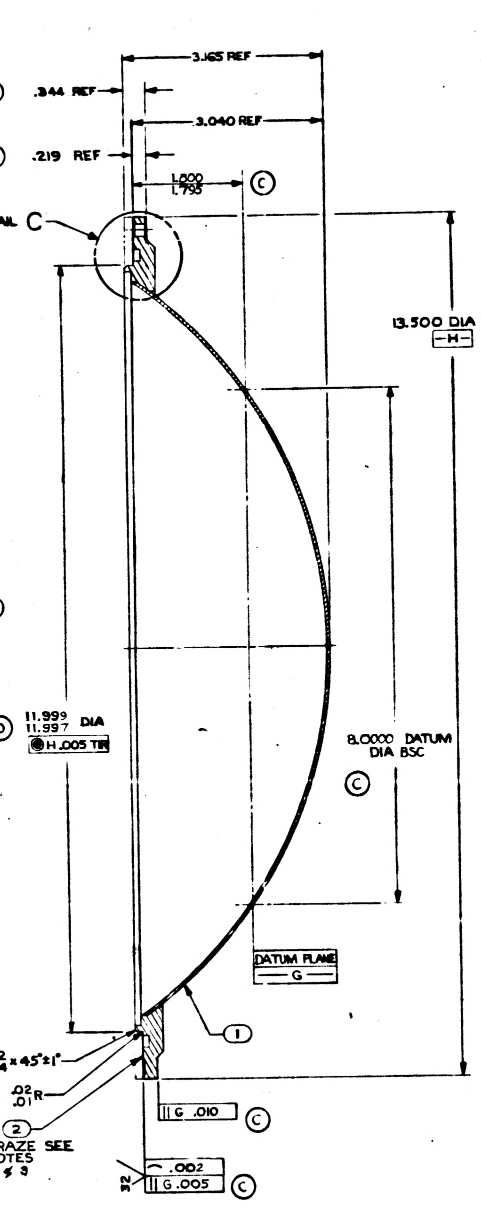


SECTION B-B
SCALE 2/1
BEFORE BRAZING



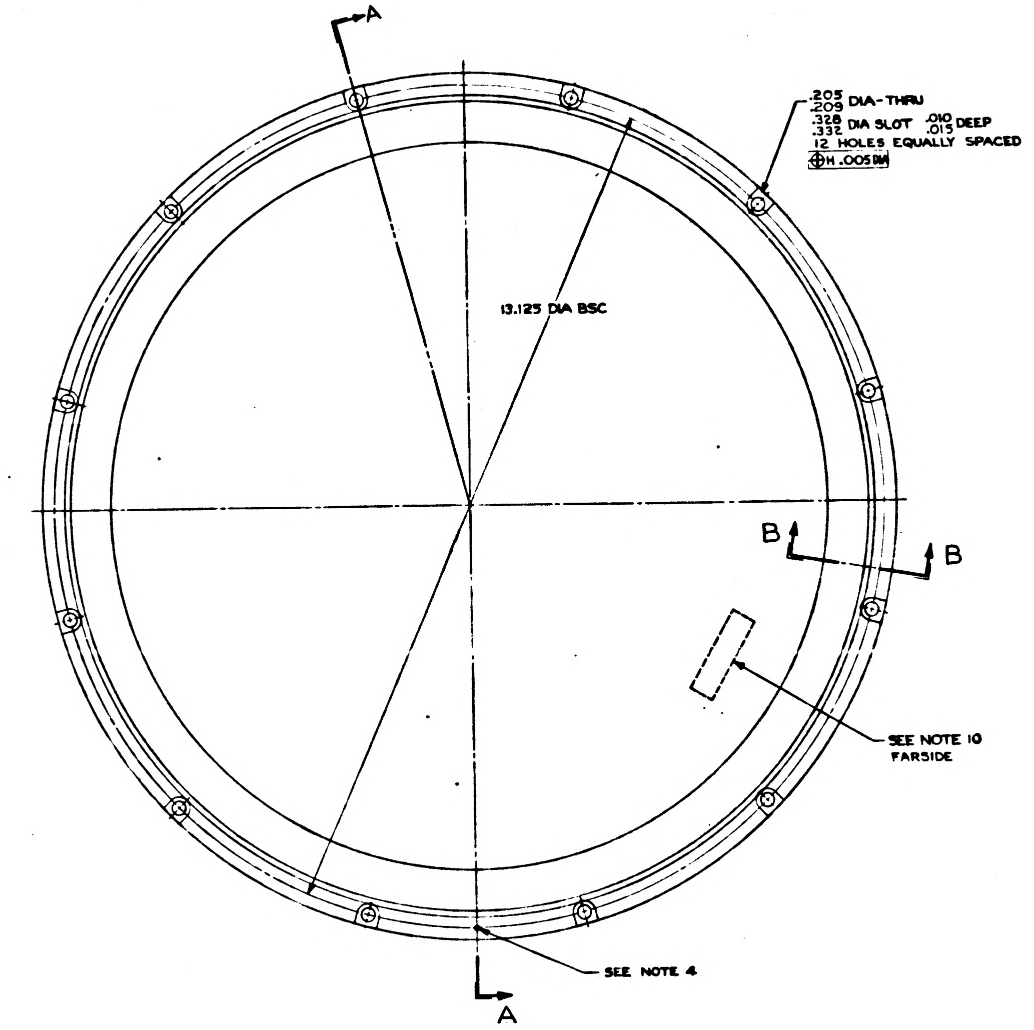
Ⓑ 13.370 13.380 DIA
H .005 TIR
Ⓑ 12.925 12.915 DIA
H .005 TIR
12.640 12.650 OUTSIDE DIAMETER
H .005 TIR
0° 5°
.010 .025 R
.101 .107 Ⓑ
.010 .015 Ⓑ
32
.157 .163 Ⓑ
32

DETAIL C
SCALE 2/1



3.165 REF
Ⓑ .344 REF
3.040 REF
Ⓑ .219 REF
1.800 1.795 Ⓒ
Ⓑ SEE DETAIL C
13.500 DIA REF
-H-
Ⓓ 11.999 11.997 DIA
H .005 TIR
8.0000 DATUM DIA BSC
Ⓒ
DATUM PLANE
-G-
①
.02 .04 x 45° ±1°
.02 .01 R
②
BRAZE SEE NOTES 2 & 3
G .010 Ⓒ
.002
G .005 Ⓒ
32

SECTION A-A



A
A
.205 .209 DIA-THRU
.328 .332 DIA SLOT .010 .015 DEEP
12 HOLES EQUALLY SPACED
H .005
13.125 DIA BSC
B
B
SEE NOTE 10 FARSIDE
SEE NOTE 4

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
3. DIP BRAZE PER NAVORD OD17547 AND AIR COOL
4. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN HARDNESS TO BE CHECKED AT INDICATED AREA ONLY
   A SOLUTION HEAT TREAT AT 970°F ±10° FOR 2 HOURS ±5 MIN. AIR BLAST QUENCH
   B AGE AT 350°F ±10° FOR 6 HOURS ±10 MIN
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. 63/ MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
Ⓐ 7. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   A ROUGH MACHINE
   B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN
   C FINISH MACHINE
8. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
9. PRESSURE TEST USING HELIUM LEAK DETECTOR
   ALLOWABLE LEAK RATE - 1.0×10^{-5} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
10. IDENTIFY USING DRAWING NO. REVISION LETTER & MANUFACTURING SYMBOL PER MIL-STD-130

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER FIXED	1000064			2
1	HEMISPHERE CASE COVER	1000060-2			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN G. QUINN 7/19/62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

CASE COVER FIXED
BRAZING & MACHINING
ASSEMBLY

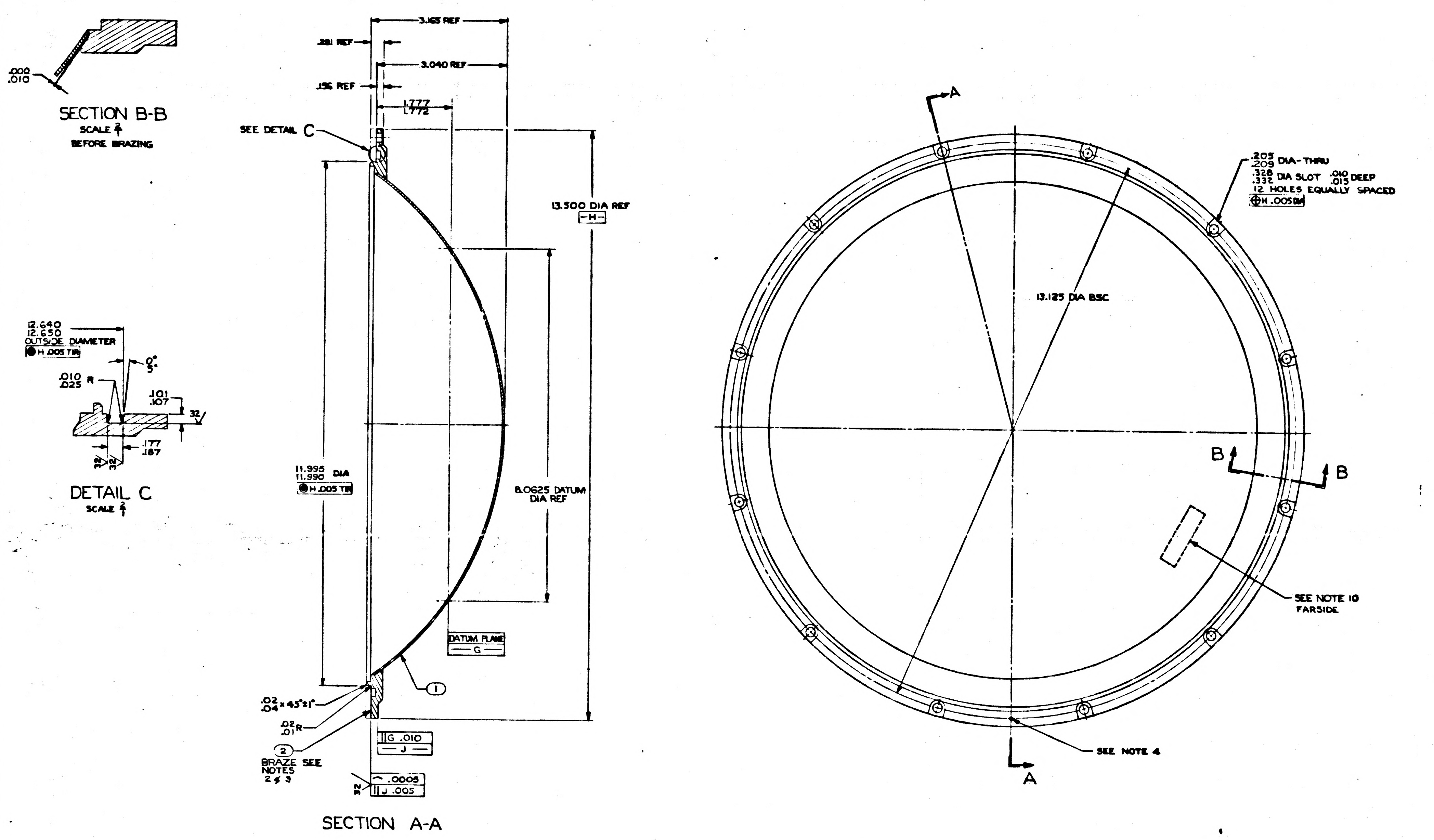
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000081
SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

1000081

REVISIONS		TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



.000
.010
SECTION B-B
SCALE 4/1
BEFORE BRAZING
12.640
12.650
OUTSIDE DIAMETER
H .005 TIR
.010
.025 R
0°
5°
.101
.107
32
.177
.187
DETAIL C
SCALE 4/1
3.165 REF
.281 REF
3.040 REF
.156 REF
1.777
1.772
SEE DETAIL C
13.500 DIA REF
-H-
11.995
11.990 DIA
H .005 TIR
8.0625 DATUM DIA REF
DATUM PLANE
G
1
.02
.04 x 45°±1°
.02
.01 R
2
BRAZE SEE NOTES 2 & 3
G .010
J
.0005
J .005
SECTION A-A
A
A
.205
.209 DIA-THRU
.328
.332 DIA SLOT .010
.015 DEEP
12 HOLES EQUALLY SPACED
H .005
13.125 DIA BSC
B
B
SEE NOTE 10 FARSIDE
SEE NOTE 4

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
3. DIP BRAZE PER NAVORD OD17547 AND AIR COOL
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   A SOLUTION HEAT TREAT AT 970°F ±10° FOR 2 HOURS ±5 MIN. AIR BLAST QUENCH
   B AGE AT 350°F ±10° FOR 6 HOURS ±10 MIN
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. 63/ MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
7. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   A ROUGH MACHINE
   B STRESS RELIEVE AT 340°F ± 10° FOR 2 HOURS ± 10 MIN
   C FINISH MACHINE
8. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
9. PRESSURE TEST USING HELIUM LEAK DETECTOR
   ALLOWABLE LEAK RATE - 1.0×10^{-5} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
10. IDENTIFY USING DRAWING NO. REVISION LETTER & MANUFACTURING SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER FIXED	1000064			2
1	HEMISPHERE CASE COVER	1000060-2			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: ~

PHOTOGRAPHIC SCALE ONLY

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED [illegible] DATE 7/2/[illegible]
CHECKED
DRAWN G. QUINN 7/2/[illegible]
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

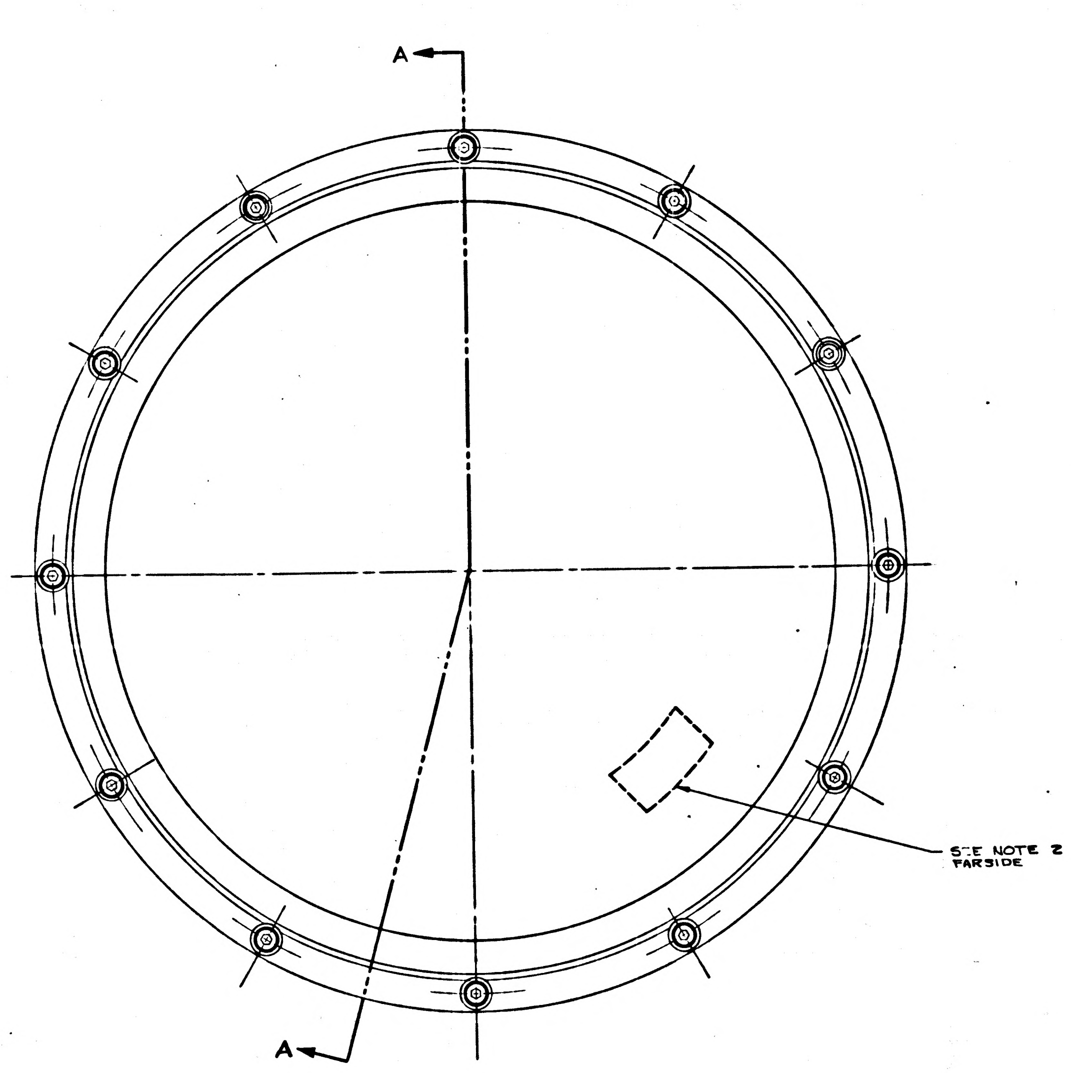
CASE COVER FIXED
BRAZING & MACHINING
ASSEMBLY

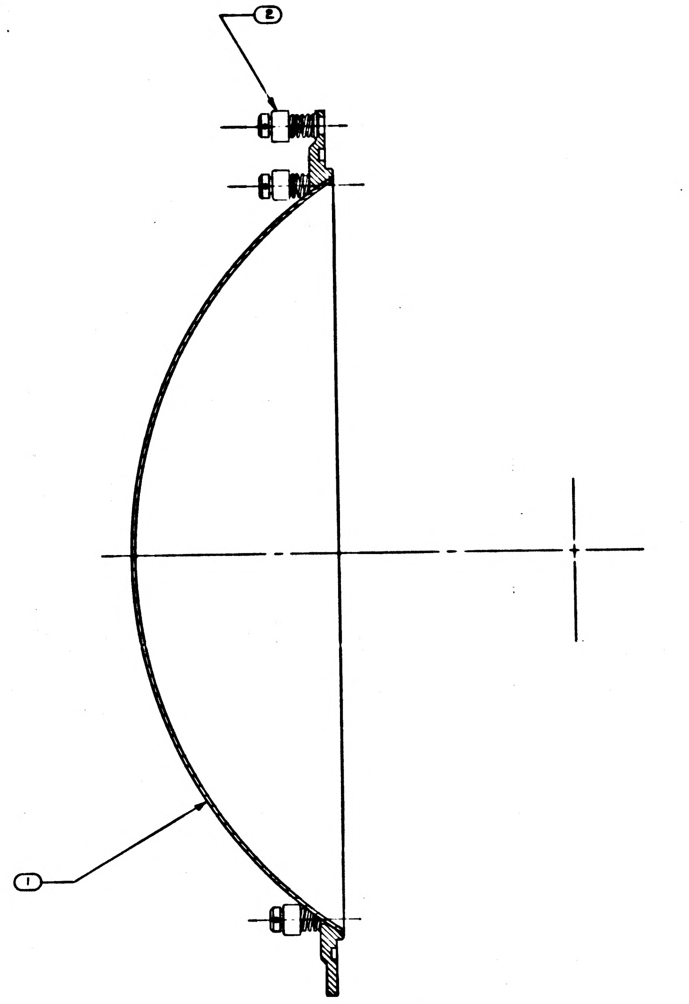
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000081
SHEET 1 OF 1

1000081

REVISIONS TDRR 00105				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00784	4-8-63	





SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130 AT INDICATED LOCATION

Ⓐ 3. CASE COVER MOVABLE NASA DWG. NO 1000240 MAY BE USED AS AN ALTERNATE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL - OR NOTES	FIND NO.
12	SCREW CAPTIVE ASS'Y	1000141-2			2
1	CASE COVER MOVABLE BRAZ. & MACH. ASSY	1000139		SEE NOTE #3	1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		
CHECKED		
DRAWN	RWC	1-14-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

CASE COVER
MOVABLE ASSEMBLY

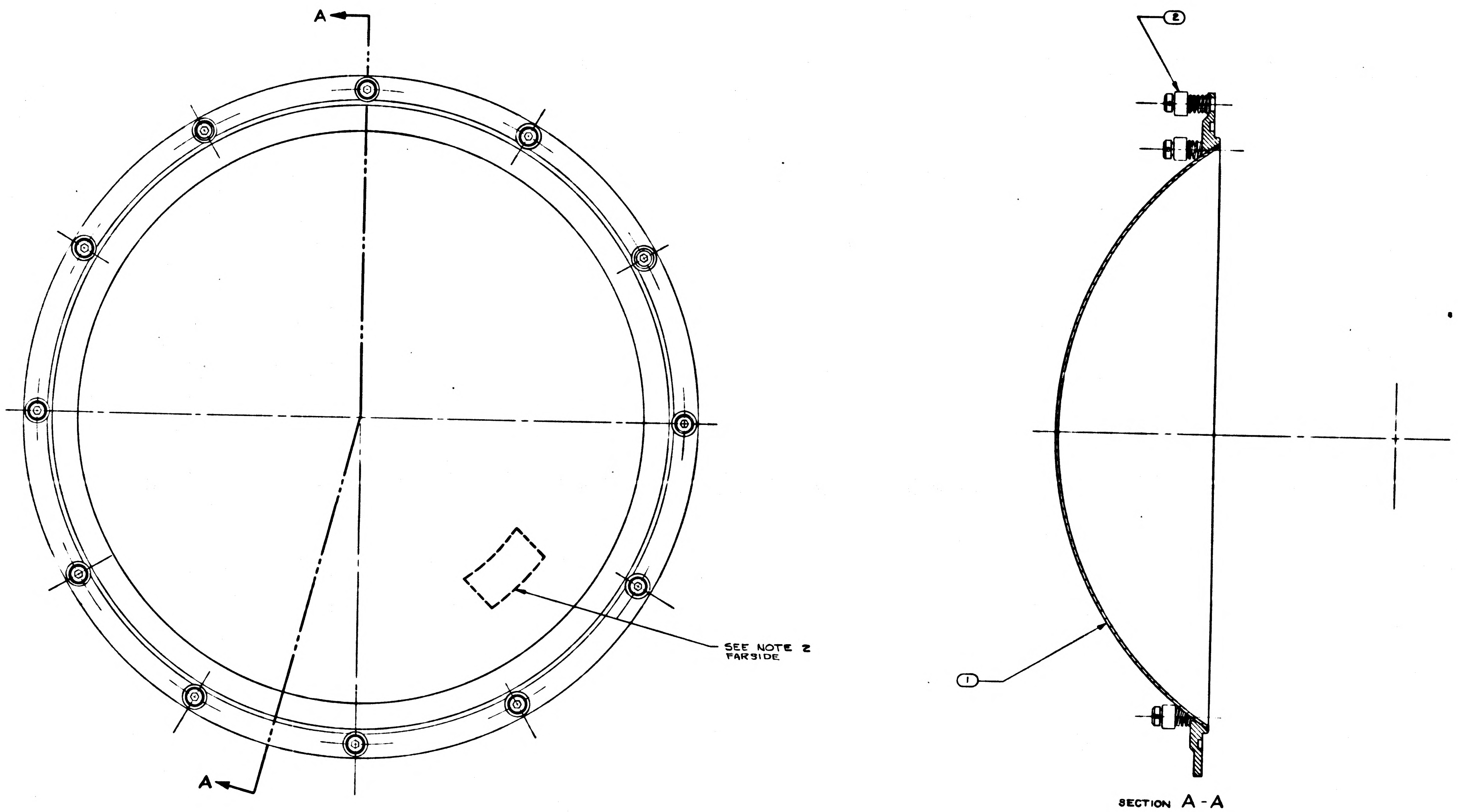
SCALE 1-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000082
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000082 A

REVISIONS TDRR 00105				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130 AT INDICATED LOCATION

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
12	SCREW CAPTIVE ASS'Y	1000141-2			2
1	CASE COVER MOVABLE BRAZ. & MACH. ASSY	1000139			1

LIST OF PARTS AND MATERIALS

1000001	DL 000001
NEXT ASSY	USED ON

APPLICATION

PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	Boyce	
CHECKED		
DRAWN	RWC	1-14-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 21 Nov 62

CASE COVER MOVABLE ASSEMBLY

SCALE 1-1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000082

SHEET 1 OF 1

	1000083

REVISIONS TDRR 00079				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00110	8Nov62	ajB	

PART NUMBER	DESCRIPTION	REQUIRED
1000127	Hemisphere Case	2
1000072	Gusset Plate, Case	4
1000111	Flange, Case Center, Mounting	1
1000113	Flange, Case, Housing, Bearing	2
1000114	Flange, Case Center	1
1000107	Bracket, Connector, Heat Exchanger Right Hand	2
1000108	Bracket, Connector, Heat Exchanger Left Hand	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC
BY DIRECTION MIT APPROVAL

CASE, CENTER BRAZED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000083

SHEET 1 OF 1

1000083

REVISIONS TDRR 00079

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00110	8Nov62	ajB	
B	TDR 00199	27 DEC 62	ajB	WK.

PART NUMBER	DESCRIPTION	REQUIRED
1000127	Hemisphere Case	2
1000072	Gusset Plate, Case	4
1000111	Flange, Case Center, Mounting	1
1000113	Flange, Case, Housing, Bearing	2
1000114	Flange, Case Center	1
1000107	Bracket, Connector, Heat Exchanger Right Hand	1
1000108	Bracket, Connector, Heat Exchanger Left Hand	1
1000054-1	Pin Straight Hdls	8
1000054-2	Pin Straight Hdls	24

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	DL 1000201
1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Bayer	10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC
BY DIRECTION MIT APPROVAL

CASE, CENTER BRAZED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000083
SHEET 1 OF 1

	1000083

REVISIONS TDRR 00079

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00110	8 Nov 62	ajB	
B	TDR 00199	27 DEC 62	ajB	WK.
C	TDR 00241	7 JAN 63		WK

PART NUMBER	DESCRIPTION	REQUIRED
1000127	Hemisphere Case	2
1000072	Gusset Plate, Case	4
1000111	Flange, Case Center, Mounting	1
1000113	Flange, Case, Housing, Bearing	2
1000114	Flange, Case Center	1
1000107	Bracket, Connector, Heat Exchanger Right Hand	1
1000108	Bracket, Connector, Heat Exchanger Left Hand	1
1000054-1	Pin Straight Hdls	8
1000054-2	Pin Straight Hdls	24
1000178	Adapter, Elbow, Crossover tube	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES

0 1 2

PHOTOGRAPHIC SCALE ONLY

	DL 1000201
1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC

BY DIRECTION MIT APPROVAL

W K

CASE, CENTER BRAZED

ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000083

SHEET 1 OF 1

PART NUMBER	DESCRIPTION	REQUIRED
1000127	Hemisphere Case	2
1000072	Gusset Plate, Case	4
1000111	Flange, Case Center, Mounting	1
1000113	Flange, Case, Housing, Bearing	2
1000114	Flange, Case Center	1
~~1000107~~	~~Bracket, Connector, Heat Exchanger Right Hand~~	~~1~~
~~1000108~~	~~Bracket, Connector, Heat Exchanger Left Hand~~	~~1~~
1000054-1	Pin Straight Hdls	8
1000054-2	Pin Straight Hdls	24
1000178	Adapter, Elbow, Crossover tube	2
1000181	Bracket, Connector Heat Exchanger Left Hand	1
1000182	Bracket, Connector, Heat Exchanger, Right Hand	1

1000083

REVISIONS TDRR 00079

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00110	8 Nov 62	ajB	[illegible]
B	TDR 00199	27 DEC 62	ajB	WK
C	TDR 00241	7 JAN 63	[illegible]	WK
D	TDR 00269	15 JAN 63	ajB	[illegible]

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	DL 1000201
1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC
BY DIRECTION MIT APPROVAL

CASE, CENTER BRAZED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000083
SHEET 1 OF 1

1000083

REVISIONS TDRR 00079

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00110	8Nov62	ajB	
B	TDR 00199	27DEC62	ajB	WK.
C	TDR 00241	7JAN63		WK
D	TDR 00269	15JAN63	ajB	
E	REPLACED BY REVISION F WITH CHANGES TDRR 00332	5FEB63	ajB	WK

PART NUMBER	DESCRIPTION	REQUIRED
1000127	Hemisphere Case	2
1000072	Gusset Plate, Case	4
1000111	Flange, Case Center, Mounting	1
1000113	Flange, Case, Housing, Bearing	2
1000114	Flange, Case Center	1
~~1000107~~	~~Bracket, Connector, Heat Exchanger Right Hand~~	~~1~~
~~1000108~~	~~Bracket, Connector, Heat Exchanger Left Hand~~	~~1~~
1000054-1	Pin Straight Hdls	8
1000054-2	Pin Straight Hdls	24
1000178	Adapter, Elbow, Crossover tube	2
1000181	Bracket, Connector Heat Exchanger Left Hand	1
1000182	Bracket, Connector, Heat Exchanger, Right Hand	1

REPLACED BY REV. F WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
	DL 1000201
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC
BY DIRECTION MIT APPROVAL
W. Kupfer 11/21/62

CASE, CENTER BRAZED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

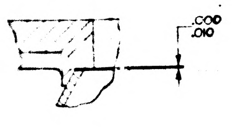
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

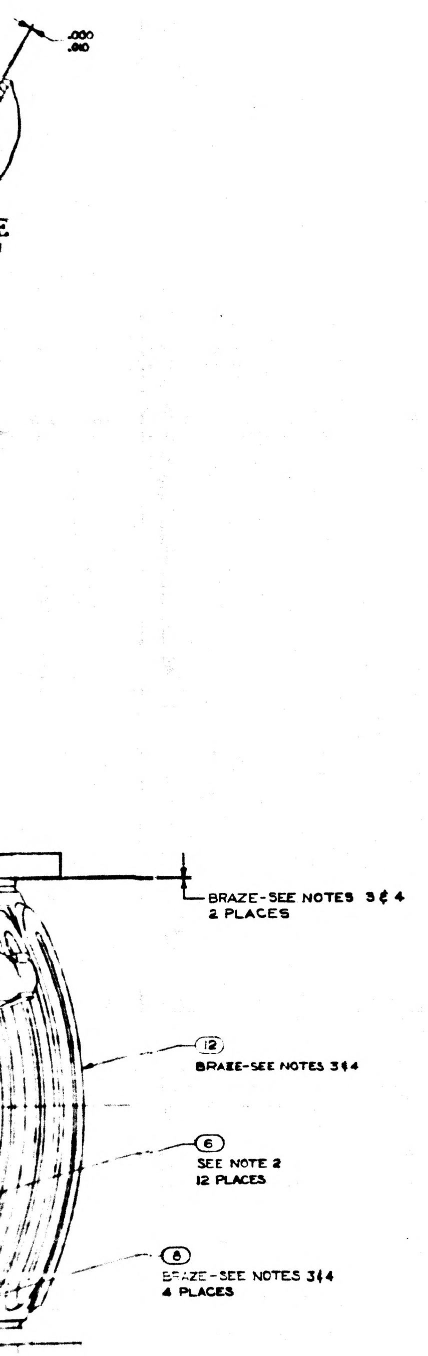
NASA DRAWING NO.
1000083

SHEET 1 OF 1

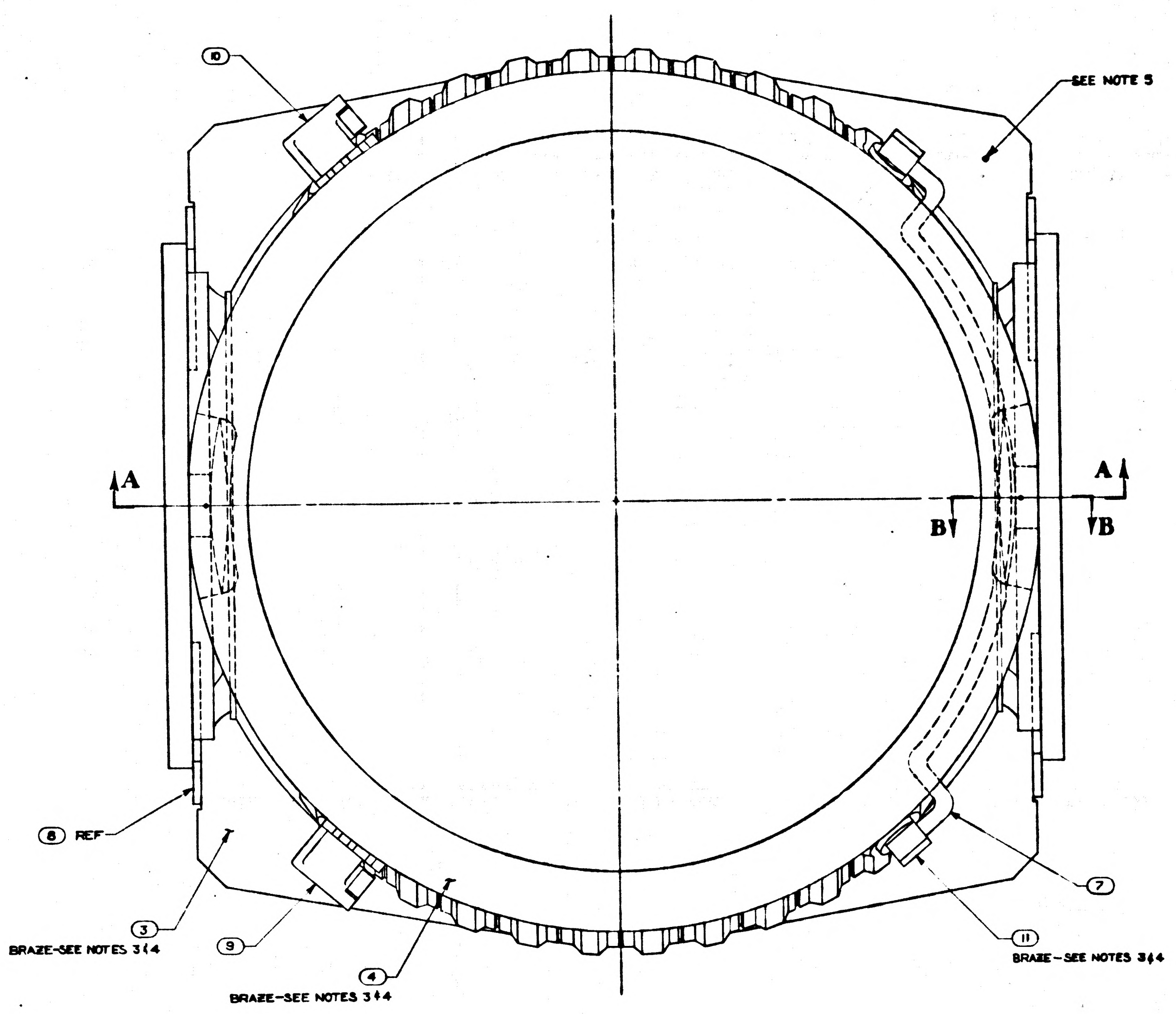
SYM	DESCRIPTION	DATE	APPROVAL	
F	REPLACES REV E WITH CHANGES TDRR 00332	2-6-63		WK



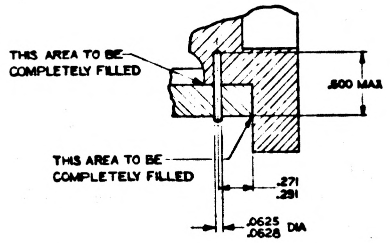
DETAIL D
SCALE: 2/1



.000
.010
E
BRAZE-SEE NOTES 3 & 4
2 PLACES
12
BRAZE-SEE NOTES 3 & 4
6
SEE NOTE 2
12 PLACES
8
BRAZE-SEE NOTES 3 & 4
4 PLACES

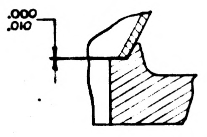


10
SEE NOTE 5
A
A
B
B
8 REF
7
3
BRAZE-SEE NOTES 3 & 4
9
4
BRAZE-SEE NOTES 3 & 4
11
BRAZE-SEE NOTES 3 & 4

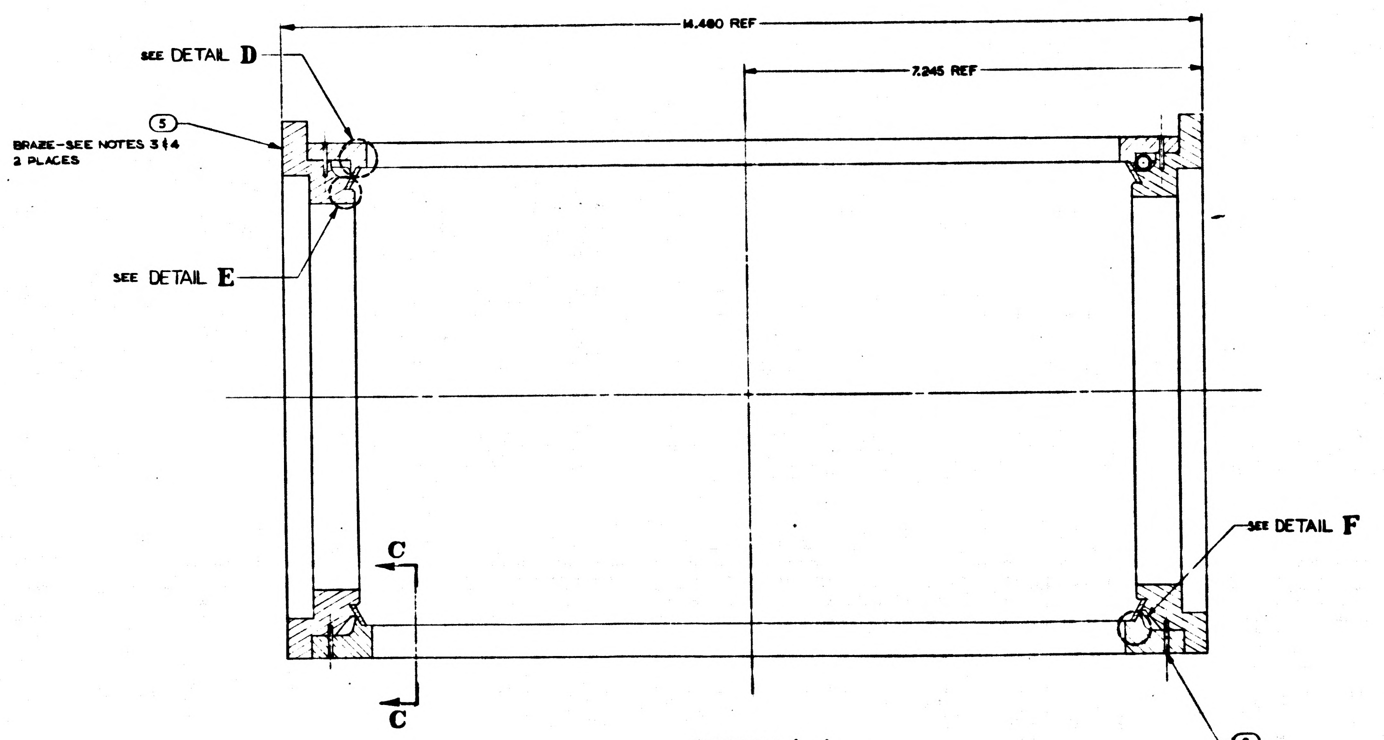


THIS AREA TO BE COMPLETELY FILLED
.600 MAX
THIS AREA TO BE COMPLETELY FILLED
.271
.291
.0625
.0628 DIA

SECTION B-B
SCALE: 2/1
4 PLACES

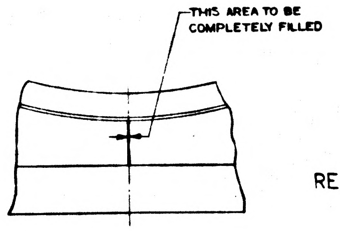


DETAIL F
SCALE: 2/1



14.480 REF
7.245 REF
SEE DETAIL D
5
BRAZE-SEE NOTES 3 & 4
2 PLACES
SEE DETAIL E
C
C
SEE DETAIL F
6
SEE NOTE 2
4 PLACES

SECTION A-A



THIS AREA TO BE COMPLETELY FILLED

VIEW C-C
SCALE: 2/1
4 PLACES

REPLACES REV E WITH CHANGES

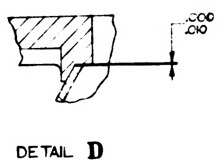
MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	HYDROFORMED HT EXCH CASE	1000128			12
2	ADPT, ELL., CROSSOVER TUBE	1000178			11
1	BRKT, CONN HEAT EXCH RH	1000182			10
1	BRKT, CONN HEAT EXCH LH	1000181			9
4	GUSSET PLATE, CASE	1000072			8
1	TUBING, CROSS OVER	1000183			7
16	PIN, STRAIGHT, HEADLESS	1000054-2			6
2	FLG, CASE, HSG BRG	1000113			5
1	FLANGE, CASE, CENTER	1000114			4
1	FLG, CASE, CTR MTG	1000111			3
8	PIN, STRAIGHT, HEADLESS	1000054-1			2
2	HEMISPHERE, CASE	1000127			1

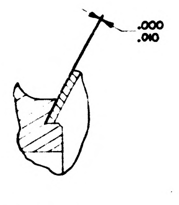
LIST OF PARTS AND MATERIALS

	DL1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS — ANGLES 0°30' DO NOT SCALE THIS DRAWING	M I T INSTRUMENTATION LAB CONTRACT NAS 9 153 APPROVED A J Kosmala DATE 3/6/63 CHECKED DRAWN R M WHITE 10-22-62 APPROVED FOR MSC William S. Smith 6/3/63 BY DIRECTION M.I.T. APPROVAL	CASE CENTER BRAZING ASSEMBLY	M I T INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
1000085	DL 1000001	MATERIAL ~		SCALE 1/1 — UNIT WT — CODE IDENT	MANNED SPACECRAFT CENTER HOUSTON TEXAS NASA DRAWING NO 1000083 SHEET 1 OF 1
NEXT ASSY	USED ON				
APPLICATION					

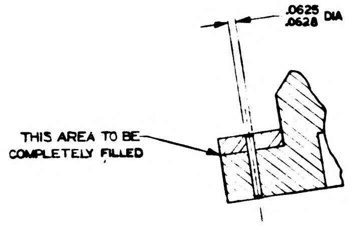
1000083 F



DETAIL D
SCALE: 2/1



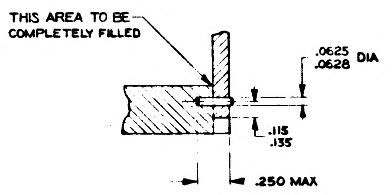
DETAIL E
SCALE: 2/1


.0625
.0628 DIA
THIS AREA TO BE
COMPLETELY FILLED

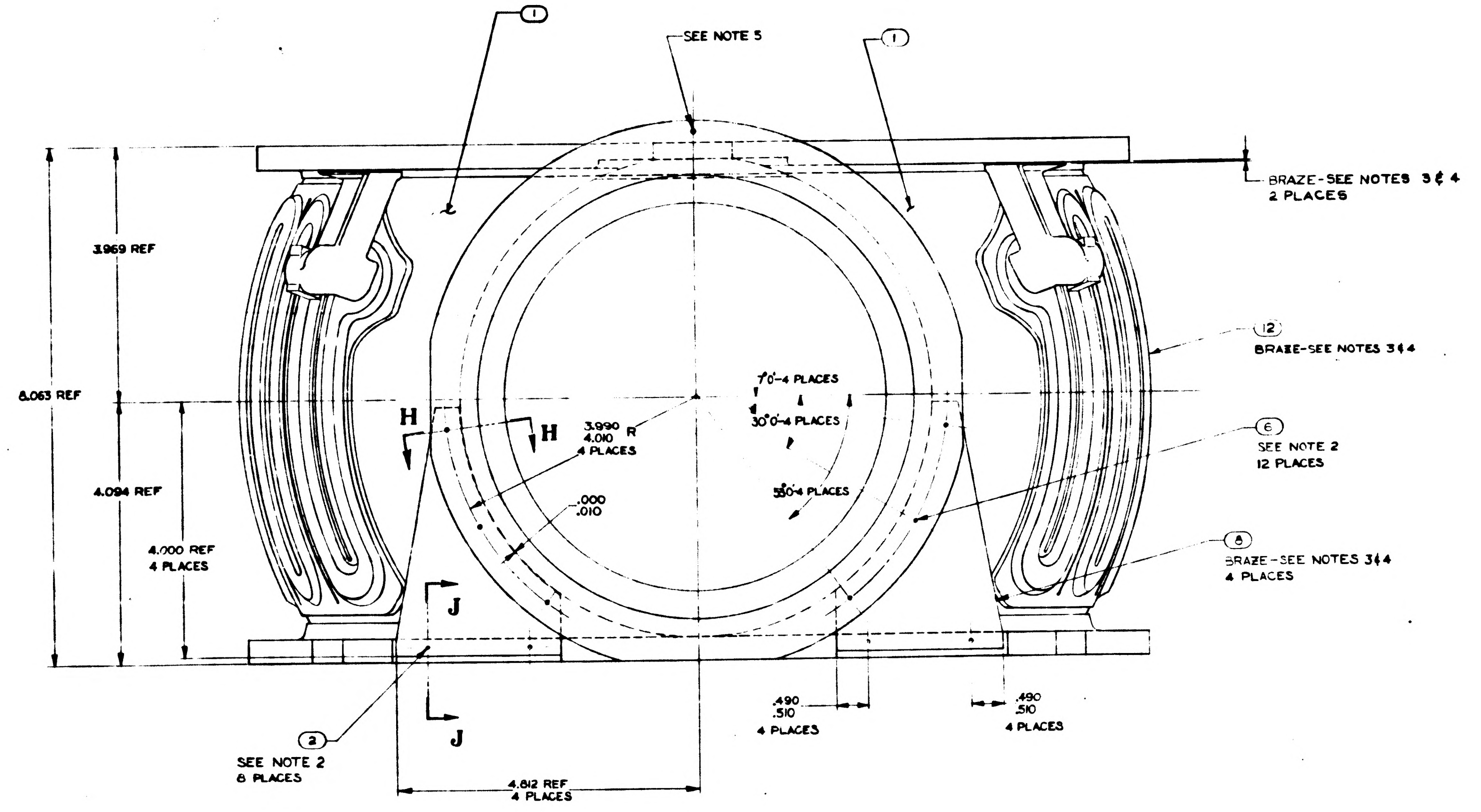
SECTION H-H
SCALE: 2/1
12 PLACES

NOTES:

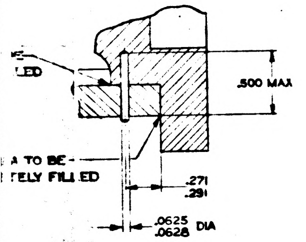
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEMS ② & ⑥ ARE OPTIONAL, BUT WHEN USED THEY MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 80 MIN HARDNESS TO BE CHECKED AT INDICATED AREAS ONLY
6. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFATURERS SYMBOL PER MIL-STD-130
   PRESSURE TEST CASE: 30 PSI AIR AT 68°F ±5°. LEAKAGE NOT TO EXCEED 1.0×10^{-5} CC/SEC
8. HYDROSTATIC PROOF TEST HEAT EXCHANGER PASSAGES AND FITTINGS AT 60 PSI. NO LEAK PERMISSABLE


THIS AREA TO BE
COMPLETELY FILLED
.0625
.0628 DIA
.115
.135
.250 MAX

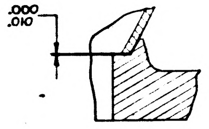
SECTION J-J
SCALE: 2/1
8 PLACES


①
SEE NOTE 5
①
BRAZE-SEE NOTES 3 & 4
2 PLACES
3.969 REF
8.063 REF
4.094 REF
4.000 REF
4 PLACES
H
H
3.990
4.010 R
4 PLACES
.000
.010
7°0'-4 PLACES
30°0'-4 PLACES
55°0'-4 PLACES
⑫
BRAZE-SEE NOTES 3&4
⑥
SEE NOTE 2
12 PLACES
⑧
BRAZE-SEE NOTES 3&4
4 PLACES
J
J
②
SEE NOTE 2
8 PLACES
4.812 REF
4 PLACES
.490
.510
4 PLACES
.490
.510
4 PLACES

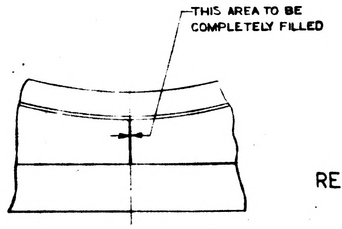
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
F	REPLACES REV E WITH CHANGES TDRR 00332	2-6-63	WK
G	TDRR 00610	3-20-6	



SECTION B-B
SCALE: 2/1
4 PLACES



DETAIL F
SCALE: 2/1



VIEW C-C
SCALE: 2/1
4 PLACES

REPLACES REV E WITH CHANGES

Ⓖ

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	ADPT, ELL., CROSSOVER TUBE	1000178			11
2	HYDROFORMED HEAT EXCH	1000128			10
2	BRKT, CONN HEAT EXCH	1000212			9
4	GUSSET PLATE, CASE	1000072			8
1	TUBING, CROSS OVER	1000183			7
16	PIN, STRAIGHT, HEADLESS	1000054-2			6
2	FLG, CASE, HSG BRG	1000113			5
1	FLANGE, CASE, CENTER	1000114			4
1	FLG, CASE, CTR MTG	1000111			3
8	PIN, STRAIGHT, HEADLESS	1000054-1			2
2	HEMISPHERE, CASE	1000127			1

LIST OF PARTS AND MATERIALS

MASTER

	DL1000201
1000085	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED DATE 3/6/63
CHECKED
DRAWN D.M.WHITE
APPROVED FOR NASA
BY DIRECTION
M.I.T.

CASE CENTER
BRAZING ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT

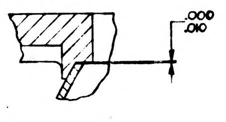
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000083
SHEET 1 OF 1

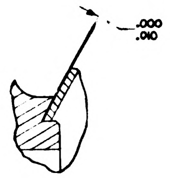
1000083 G

C 1000083

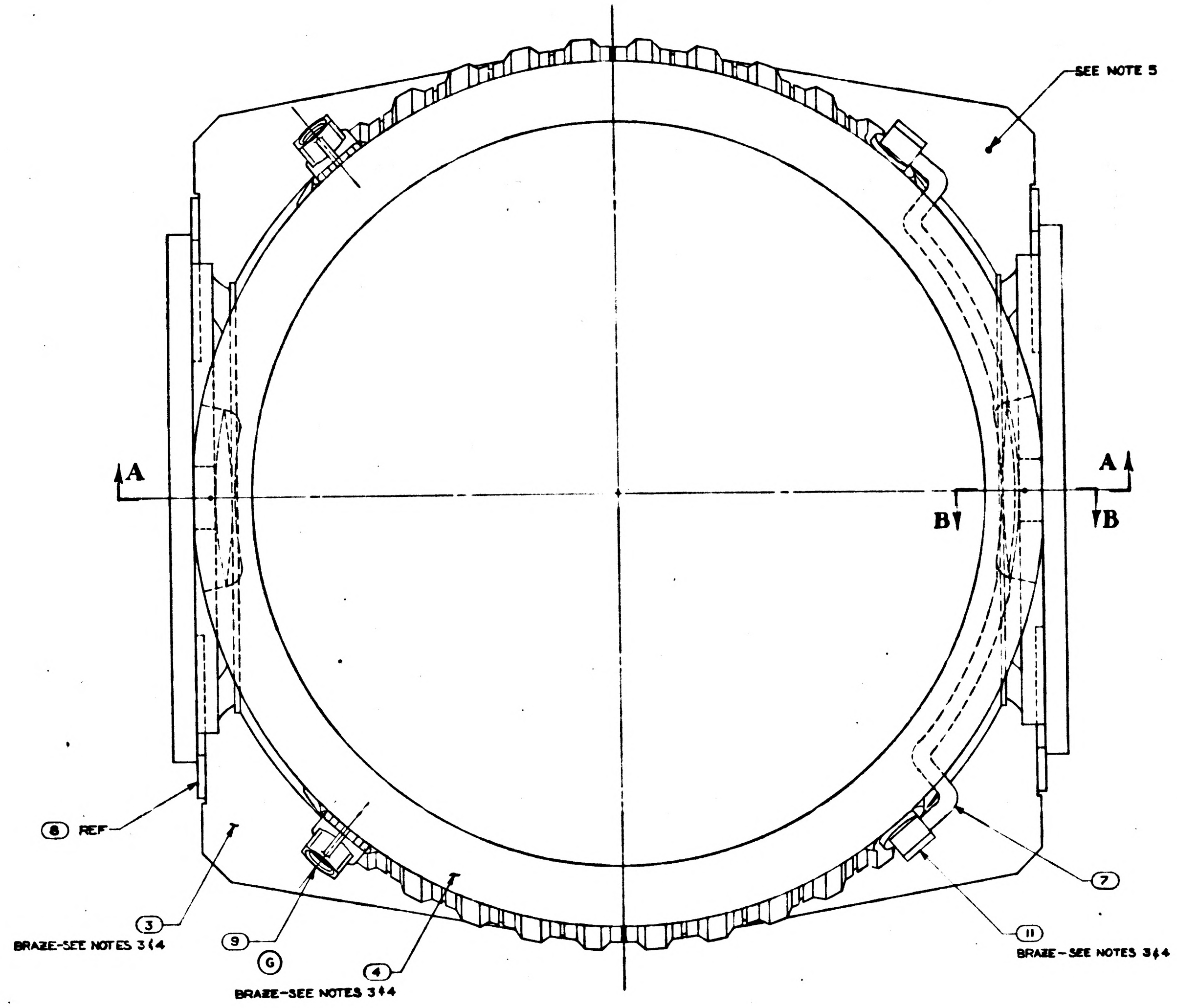
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

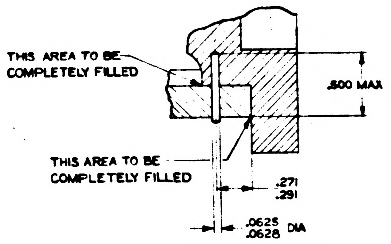


DETAIL **D**
SCALE: 2/1

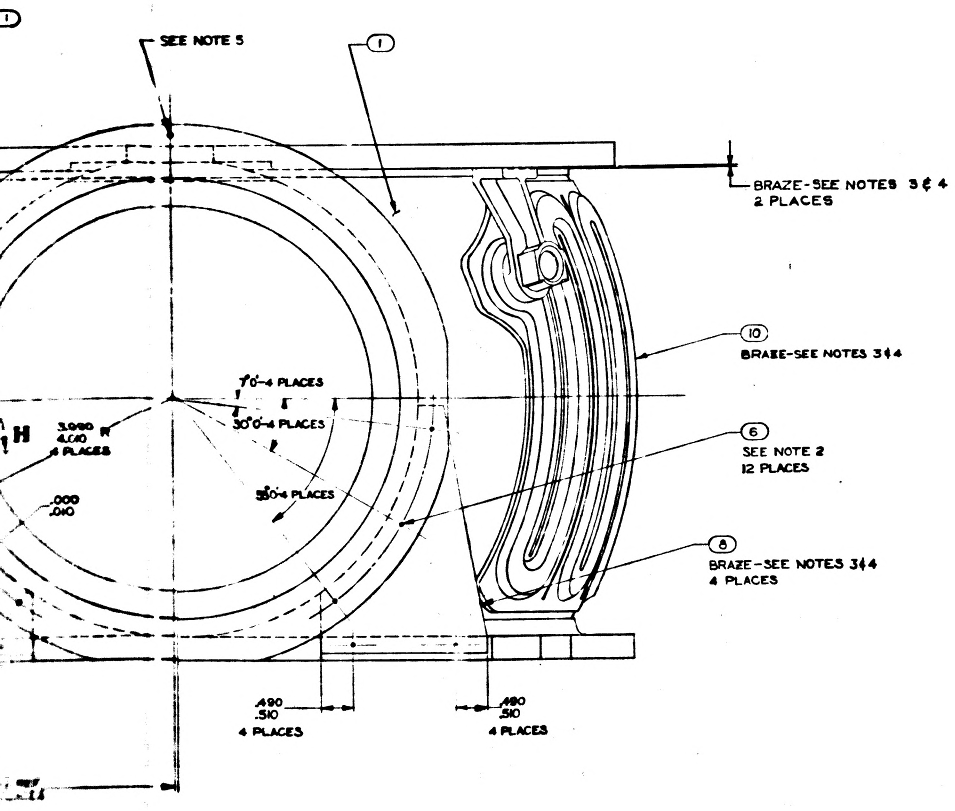


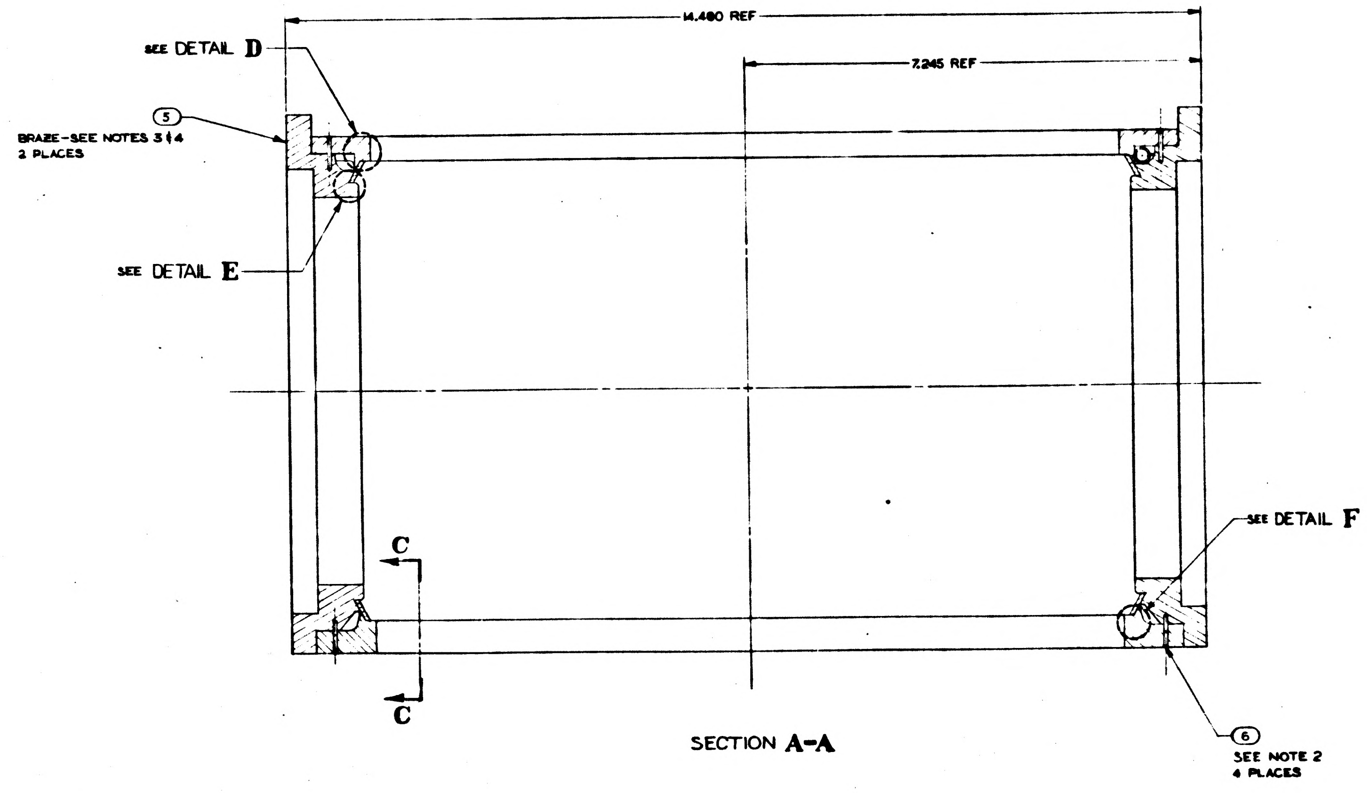
DETAIL **E**
SCALE: 2/1


SEE NOTE 5
A
A
B
B
8 REF
3
BRAZE-SEE NOTES 3 & 4
9
G
4
BRAZE-SEE NOTES 3 & 4
7
11
BRAZE-SEE NOTES 3 & 4

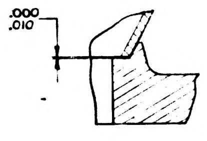

THIS AREA TO BE COMPLETELY FILLED
.600 MAX
THIS AREA TO BE COMPLETELY FILLED
.271
.291
.0625
.0628 DIA

SECTION **B-B**
SCALE: 2/1
4 PLACES

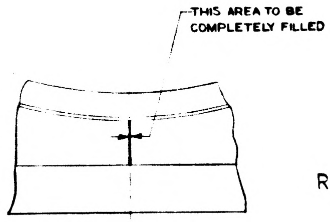

SEE NOTE 5
1
BRAZE-SEE NOTES 3 & 4
2 PLACES
10
BRAZE-SEE NOTES 3 & 4
7°0'-4 PLACES
30°0'-4 PLACES
55°0'-4 PLACES
H
3.990
4.010 R
4 PLACES
.000
.010
6
SEE NOTE 2
12 PLACES
8
BRAZE-SEE NOTES 3 & 4
4 PLACES
.490
.510
4 PLACES
.490
.510
4 PLACES


14.480 REF
7.245 REF
SEE DETAIL D
5
BRAZE-SEE NOTES 3 & 4
2 PLACES
SEE DETAIL E
SEE DETAIL F
C
C
6
SEE NOTE 2
4 PLACES

SECTION **A-A**



DETAIL **F**
SCALE: 2/1


THIS AREA TO BE
COMPLETELY FILLED

VIEW **C-C**
SCALE: 2/1
4 PLACES

REPLACES REV E WITH CHANGES

(G)

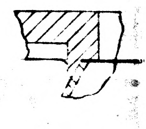
MASTER

2	ADF	
2	HYD	
2		
4		
1		
16	N	
2	FLG	
1		
8		
2		
QTY REQD		

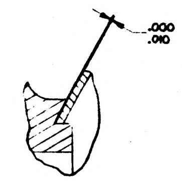
		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ——— ——— 0°30'
	DL1000201	DO NOT SCALE THIS DRAWING
1000085	DL1000001	MATERIAL
NEXT ASSY	USED ON	
APPLICATION		

APPROVED
CHECKED
DRAWN

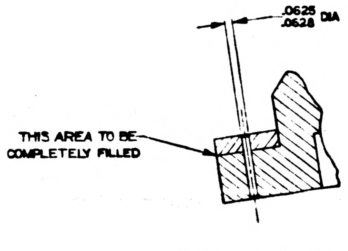
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY



DETAIL **D**
SCALE: 2/1



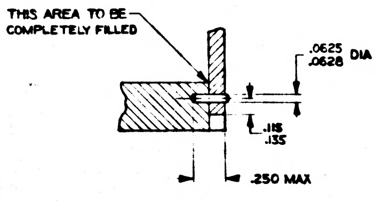
DETAIL **E**
SCALE: 2/1


.0625
.0628 DIA
THIS AREA TO BE COMPLETELY FILLED

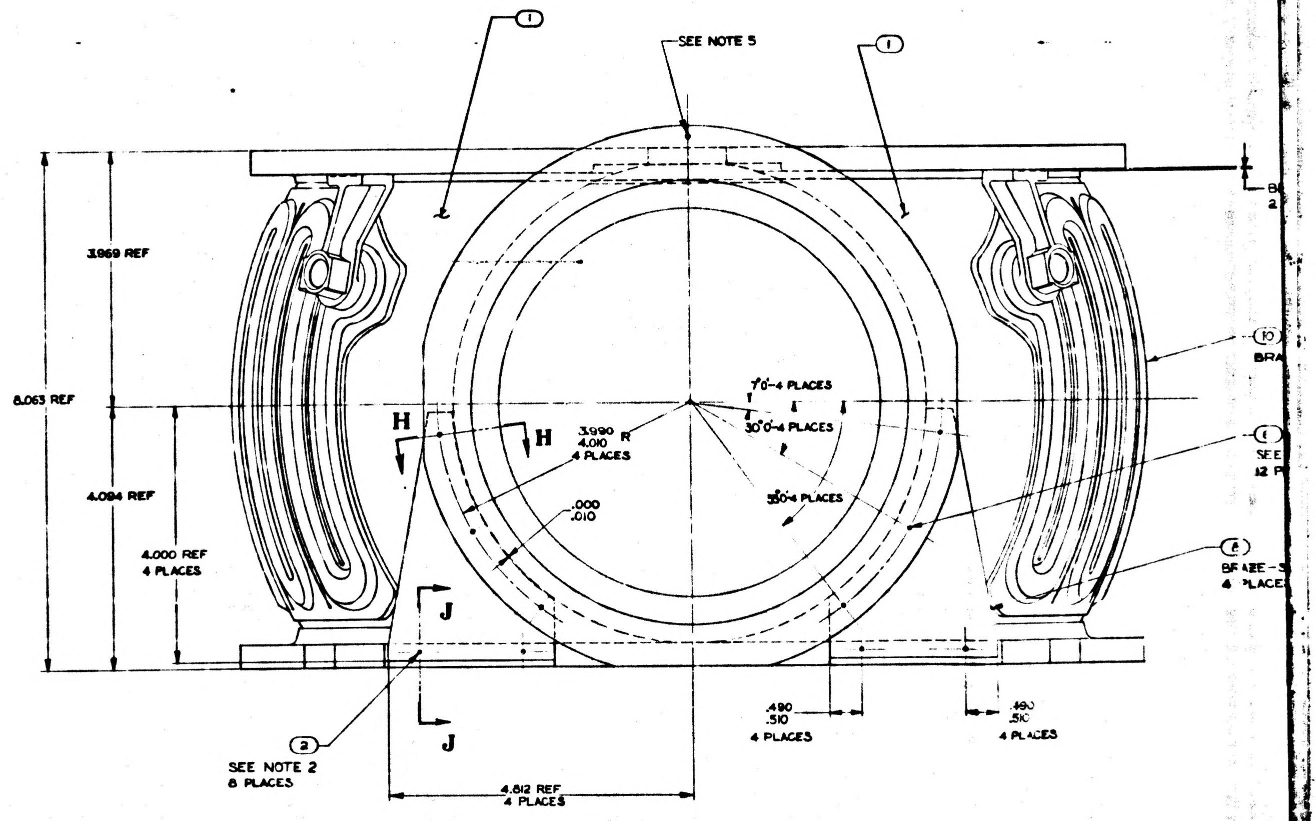
SECTION **H-H**
SCALE: 2/1
12 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEMS (2) & (6) ARE OPTIONAL, BUT WHEN USED THEY MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING
3. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
4. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN HARDNESS TO BE CHECKED AT INDICATED AREAS ONLY
    A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES – AIR BLAST QUENCH
    B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. Ⓖ PRESSURE TEST CASE: 30 PSI AIR AT 68°F ± 5°F. LEAKAGE NOT TO EXCEED 1.0×10^{-5} CC/SEC
8. HYDROSTATIC PROOF TEST HEAT EXCHANGER PASSAGES AND FITTINGS AT 60 PSI. NO LEAKAGE PERMISSABLE


THIS AREA TO BE COMPLETELY FILLED
.0625
.0628 DIA
.115
.135
.250 MAX

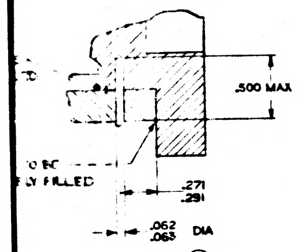
SECTION **J-J**
SCALE: 2/1
8 PLACES


1
SEE NOTE 5
1
3.969 REF
8.063 REF
4.094 REF
4.000 REF
4 PLACES
H
H
3.990
4.010 R
4 PLACES
.000
.010
7°0'-4 PLACES
30°0'-4 PLACES
35°0'-4 PLACES
J
J
2
SEE NOTE 2
8 PLACES
4.812 REF
4 PLACES
.490
.510
4 PLACES
.490
.510
4 PLACES
10
BRA
6
SEE
12 P
8
BRAZE-S
4 PLACE
B
2

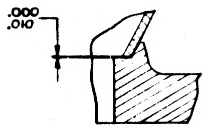
1000083	REV G	SHEET 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

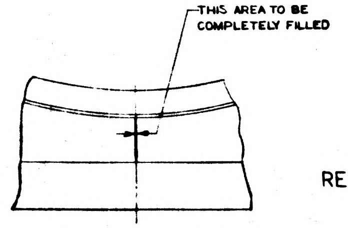
SYM	DESCRIPTION	DATE	APPROVAL	
F	REPLACES REV E WITH CHANGES TDRR 00332	2-6-63		WK
G	TDRR 00610	3-20-63		WK
H	TDRR 01015	4-30-63		WK



ECTION B-B
SCALE: 2/1
4 PLACES



DETAIL F
SCALE: 2/1



VIEW C-C
SCALE: 2/1
4 PLACES

REPLACES REV E WITH CHANGES

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	ADPT, ELL., CROSSOVER TUBE	1000178			11
2	HYDROFORMED HEAT EXCH	1000128			10
2	BRKT, CONN HEAT EXCH	1000212			9
4	GUSSET PLATE, CASE	1000072			8
1	TUBING, CROSS OVER	1000183			7
16	PIN, STRAIGHT, HEADLESS	1000054-2			6
2	FLG, CASE, HSG BRG	1000113			5
1	FLANGE, CASE, CENTER	1000114			4
1	FLG, CASE, CTR MTG	1000111			3
8	PIN, STRAIGHT, HEADLESS	1000054-1			2
2	HEMISPHERE, CASE	1000127			1

(G)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000086	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED — DATE 2/6/63
CHECKED
DRAWN D.M. WHITE
APPROVED FOR MSC
BY DIRECTION
M.I.T.

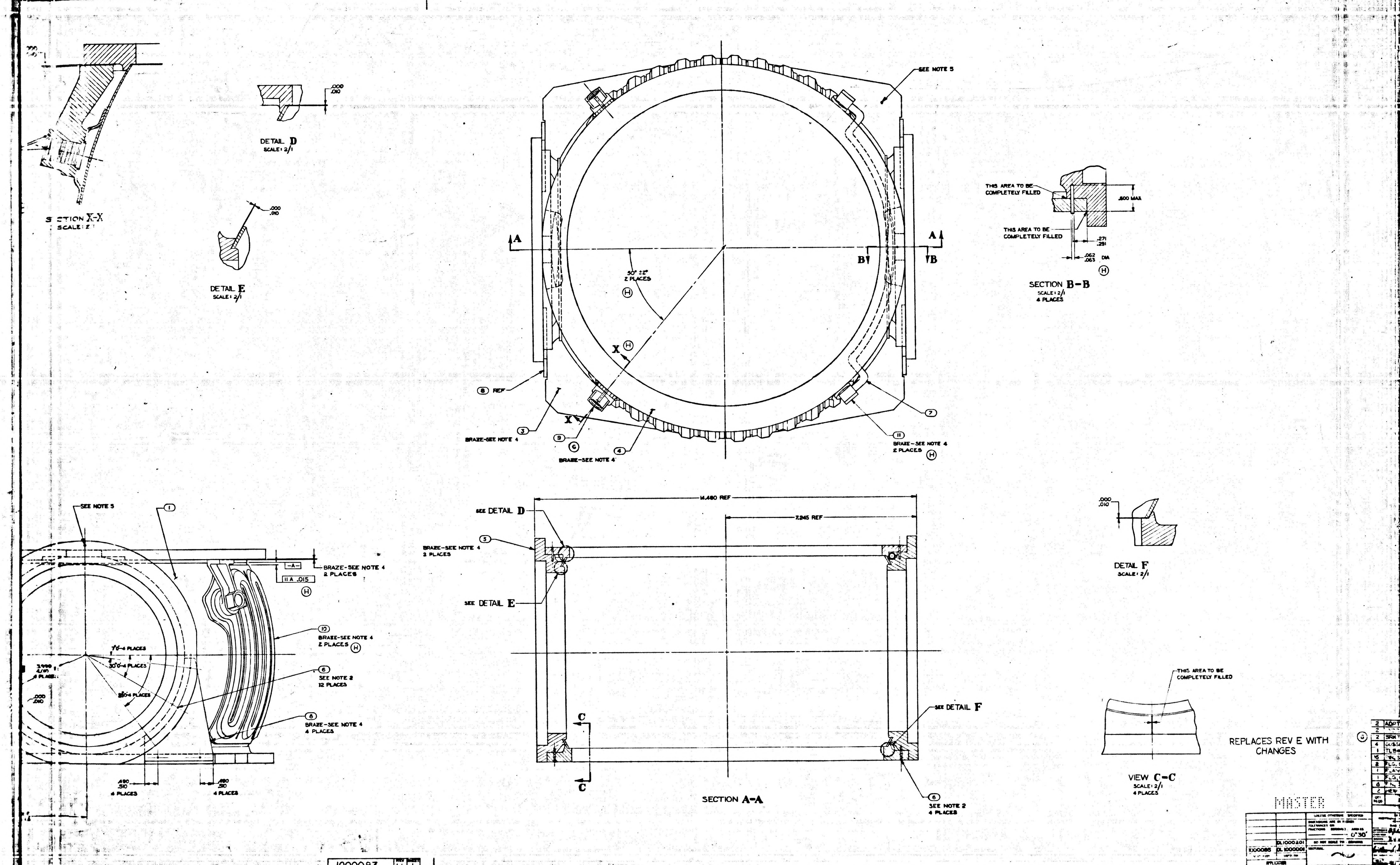
CASE CENTER
BRAZING ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000083
SHEET 1 OF 1

H
1000083

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY



5
4
3
2
SECTION X-X
SCALE: 2/1
.000
.010
DETAIL D
SCALE: 2/1
DETAIL E
SCALE: 2/1
SEE NOTE 5
A
A
B
B
50° ±2°
2 PLACES
(H)
X (H)
X
8 REF
3
BRAZE-SEE NOTE 4
9
(G)
4
BRAZE-SEE NOTE 4
7
11
BRAZE-SEE NOTE 4
2 PLACES (H)
THIS AREA TO BE COMPLETELY FILLED
.500 MAX
THIS AREA TO BE COMPLETELY FILLED
.271
.291
.062
.063 DIA
(H)
SECTION B-B
SCALE: 2/1
4 PLACES
SEE NOTE 5
1
-A-
11 A .015
BRAZE-SEE NOTE 4
2 PLACES
(H)
7½°-4 PLACES
30°-4 PLACES
50°-4 PLACES
3.990
4.010
4 PLACES
.000
.010
10
BRAZE-SEE NOTE 4
2 PLACES (H)
6
SEE NOTE 2
12 PLACES
8
BRAZE-SEE NOTE 4
4 PLACES
.490
.510
4 PLACES
.490
.510
4 PLACES
14.480 REF
7.245 REF
SEE DETAIL D
5
BRAZE-SEE NOTE 4
2 PLACES
SEE DETAIL E
C
C
SEE DETAIL F
6
SEE NOTE 2
4 PLACES
SECTION A-A
.000
.010
DETAIL F
SCALE: 2/1
THIS AREA TO BE COMPLETELY FILLED
VIEW C-C
SCALE: 2/1
4 PLACES

REPLACES REV E WITH CHANGES

(G)

2	ADPT
2	
2	BRKT
4	GUSS
1	TLEM
16	PIN, S
2	FLG,
1	FLAN
1	FLG,
8	PIN,
2	HEW
QTY REQD	

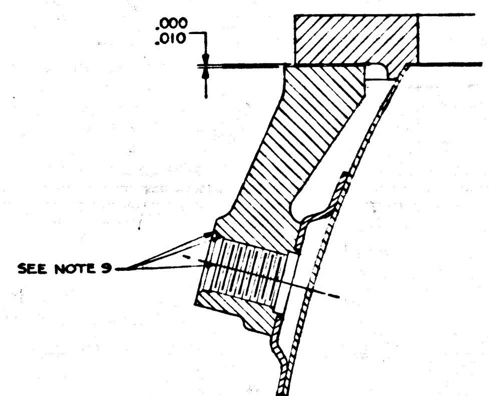
MASTER

	DL1000201
1000085	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

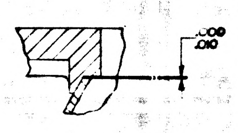
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
——— ——— 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
~

1000083 | H | 1

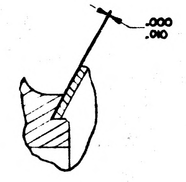
INCHES
PHOTOGRAPHIC SCALE ONLY


.000
.010
SEE NOTE 9

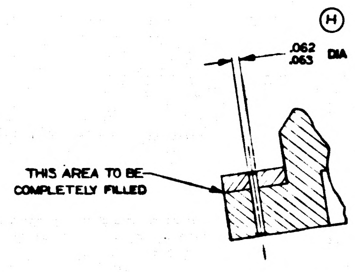
Ⓗ SECTION X-X
SCALE: 2/1



DETAIL D
SCALE: 2/1



DETAIL E
SCALE: 2/1


Ⓗ
.062
.063 DIA
THIS AREA TO BE COMPLETELY FILLED

SECTION H-H
SCALE: 2/1
12 PLACES

NOTES:

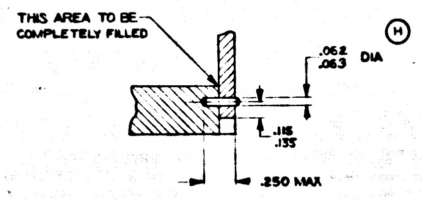
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ITEMS ② & ⑥ ARE OPTIONAL, BUT WHEN USED THEY MUST BE ASSEMBLED BEFORE BRAZING AND MACHINED FLUSH WITHIN .001 MAX AFTER BRAZING

Ⓗ [illegible]

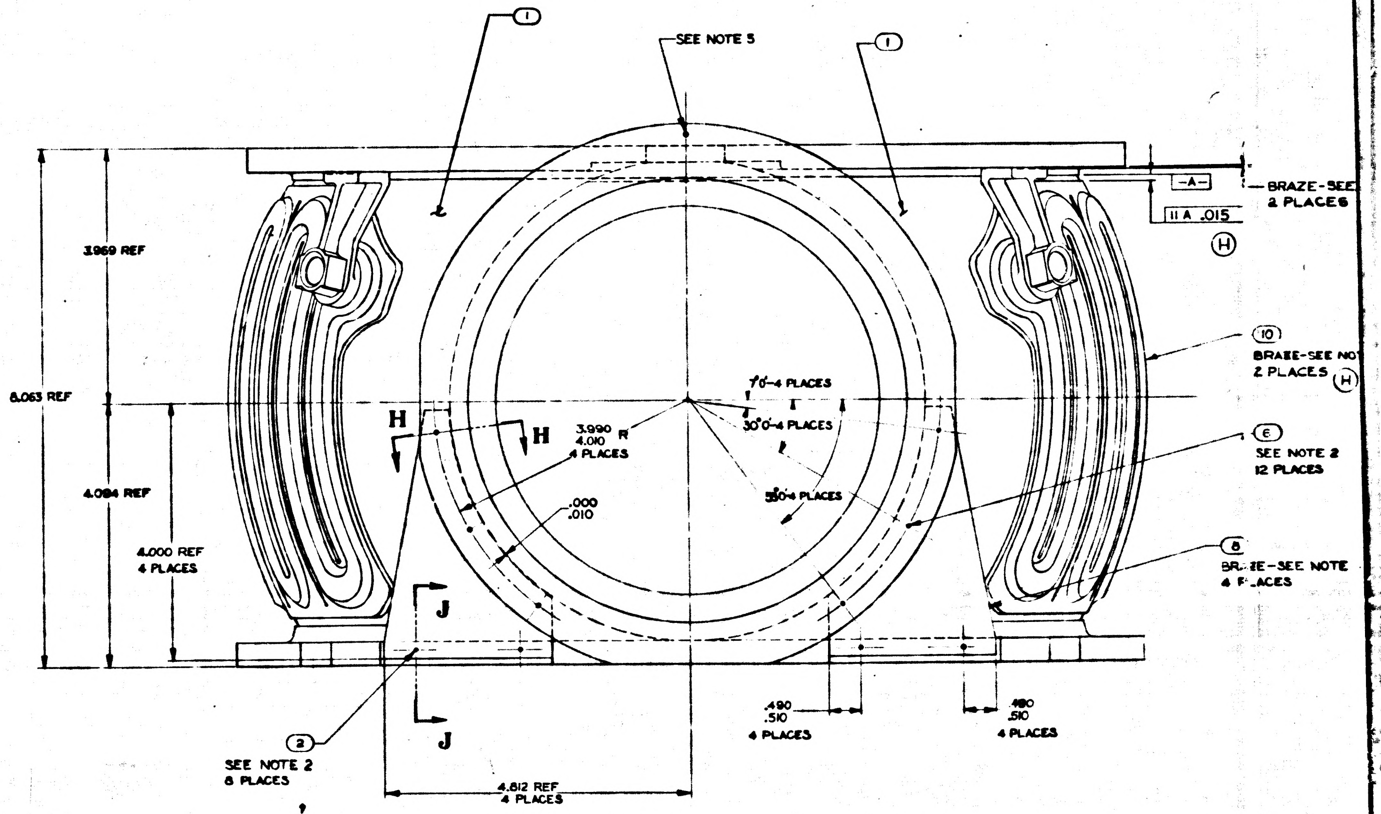
Ⓗ 4. DIP BRAZE PER ND 1002073
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MIN HARDNESS TO BE CHECKED AT INDICATED AREAS ONLY
   A. SOLUTION HEAT TREAT AT 970°F ± 10°F FOR 2 HOURS ± 5 MINUTES—AIR BLAST QUENCH
   B. AGE AT 350°F ± 10°F FOR 6 HOURS ± 5 MINUTES
6. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130

Ⓖ 7. PRESSURE TEST CASE: 30 PSI AIR AT 68°F ± 5°F. LEAKAGE NOT TO EXCEED 1.0×10^{-5} CC/SEC
8. HYDROSTATIC PROOF TEST HEAT EXCHANGER PASSAGES AND FITTINGS AT 60 PSI. NO LEAKAGE PERMISSIBLE

Ⓗ 9. CONICAL SURFACE & THREADS MUST BE COATED WITH PROTECTIVE COMPOUND PRIOR TO BRAZING OPERATION - CONICAL SURFACE & THREADS MUST NOT BE DAMAGED DURING CLEANING OPERATION


THIS AREA TO BE COMPLETELY FILLED
Ⓗ
.062
.063 DIA
.115
.135
.250 MAX

SECTION J-J
SCALE: 2/1
8 PLACES


①
SEE NOTE 5
①
-A-
BRAZE-SEE
2 PLACES
II A .015
Ⓗ
3.969 REF
8.063 REF
4.094 REF
4.000 REF
4 PLACES
H
H
3.990
4.010 R
4 PLACES
.000
.010
10°-4 PLACES
30°0'-4 PLACES
30°0'-4 PLACES
⑩
BRAZE-SEE NO
2 PLACES Ⓗ
⑥
SEE NOTE 2
12 PLACES
⑧
BRAZE-SEE NOTE
4 PLACES
J
J
②
SEE NOTE 2
8 PLACES
4.812 REF
4 PLACES
.490
.510
4 PLACES
.490
.510
4 PLACES

DWG NO.	REV	SHEET
1000083	H	1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000083		

REVISIONS TDRR 00079

SYM	DESCRIPTION	DATE	APPROVAL

PART NUMBER	DESCRIPTION	REQUIRED
1000127	Hemisphere Case	2
1000072	Gusset Plate, Case	4
1000111	Flange, Case Center, Mounting	1
1000113	Flange, Case, Housing, Bearing	2
1000114	Flange, Case Center	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Bayer	10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC

BY DIRECTION MIT APPROVAL

CASE, CENTER BRAZED

ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000083

SHEET 1 OF 1

	1000085

REVISIONS TDRR 00079

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00095	8Nov62	ajB	WK

PART NUMBER	DESCRIPTION	REQUIRED
1000083	CASE CENTER BRAZED ASSEMBLY	1
1000130	Pad, Case Mounting IX Right Hand	1
1000131	Pad, Case Mounting IX Left Hand	1
1000132	Pad, Case Mounting 15X Right Hand	1
1000133	Pad, Case Mounting 15X Left Hand	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED A J Boyce 10/31/62
CHECKED
DRAWN
APPROVED FOR MSC
BY DIRECTION MIT APPROVAL

CASE, CENTER MACHINED
ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

1000085

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDRR 00079			
Ⓜ A	TDR 00095	8Nov62	ajB	WK
Ⓜ B	TDR 00240	7JAN63	gjb	WK.

PART NUMBER	DESCRIPTION	REQUIRED
1000083	CASE CENTER BRAZED ASSEMBLY	1
1000130	Pad, Case Mounting IX Right Hand	1
1000131	Pad, Case Mounting IX Left Hand	1
1000132	Pad, Case Mounting 15X Right Hand	1
1000133	Pad, Case Mounting 15X Left Hand	1
1000146	Insert Self Locking	34
1006783-45	Screw But. Hd.	12
NAS607-4-4	Dowel Pin Locating	8
1000088-2	Pin, Locating, Straight, Headless	2
1000076-2	Nut Flush Mt. Clinch	24
1000140	Insert Self Locking	12

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC

BY DIRECTION MIT APPROVAL
W Kupfer 8Nov62

CASE, CENTER MACHINED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000085

SHEET 1 OF 1

	1000085

REVISIONS TDRR 00079

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00095	8Nov62	ajB	WK
B	TDR 00240	7JAN63		WK.
C	REPLACED BY REV D WITH CHANGES TDRR 00456	2/26/63	ajB	WK.

PART NUMBER	DESCRIPTION	REQUIRED
1000083	CASE CENTER BRAZED ASSEMBLY	1
1000130	Pad, Case Mounting IX Right Hand	1
1000131	Pad, Case Mounting IX Left Hand	1
1000132	Pad, Case Mounting 15X Right Hand	1
1000133	Pad, Case Mounting 15X Left Hand	1
1000146	Insert Self Locking	34
1006783-45	Screw But. Hd.	12
NAS607-4-4	Dowel Pin Locating	8
1000088-2	Pin, Locating, Straight, Headless	2
1000076-2	Nut Flush Mt. Clinch	24
1000140	Insert Self Locking	12

REPLACED BY REVISION D WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL1000201
1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 2-27-63
BY DIRECTION MIT APPROVAL
8Nov62

CASE, CENTER MACHINED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

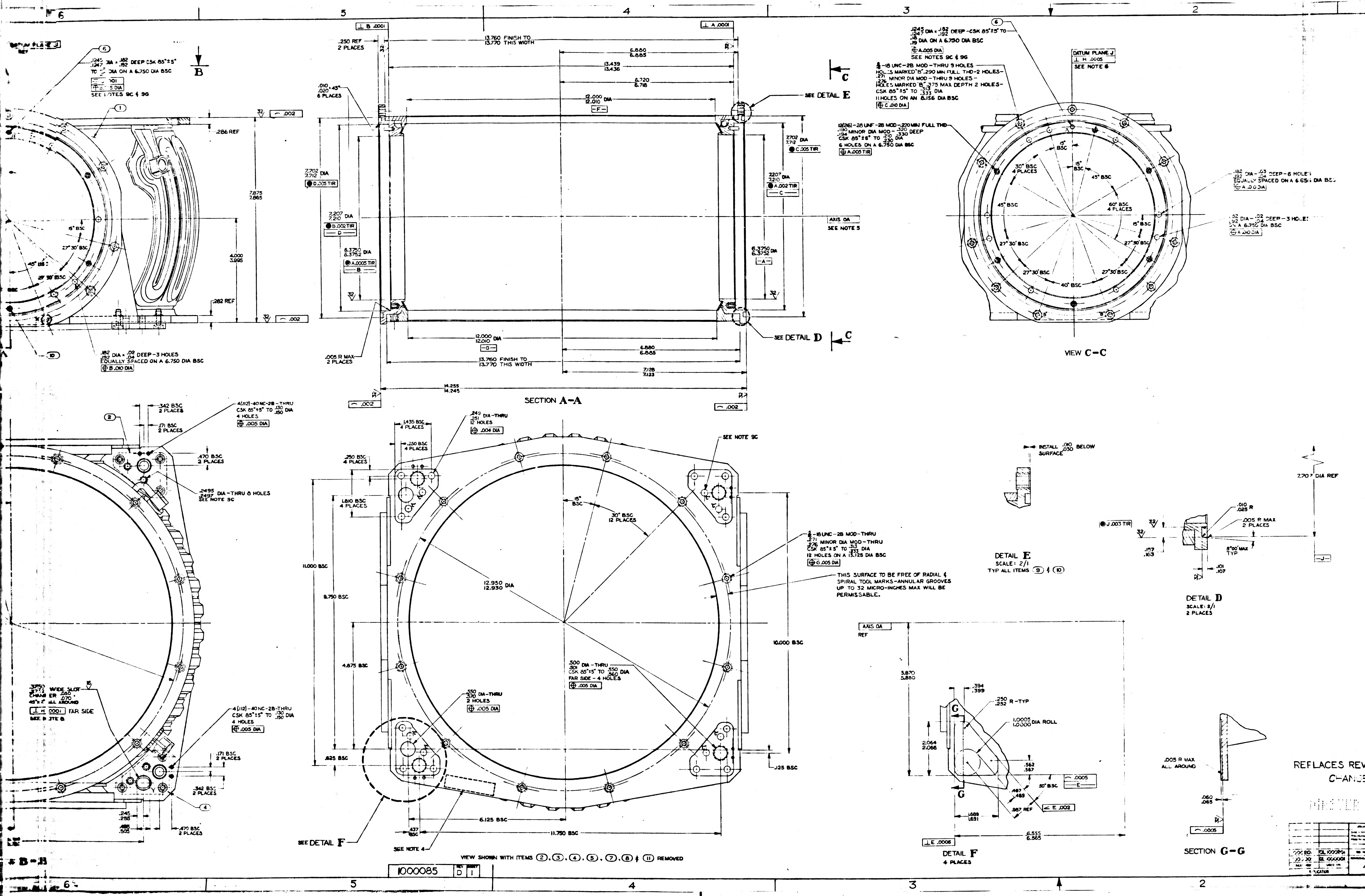
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000085

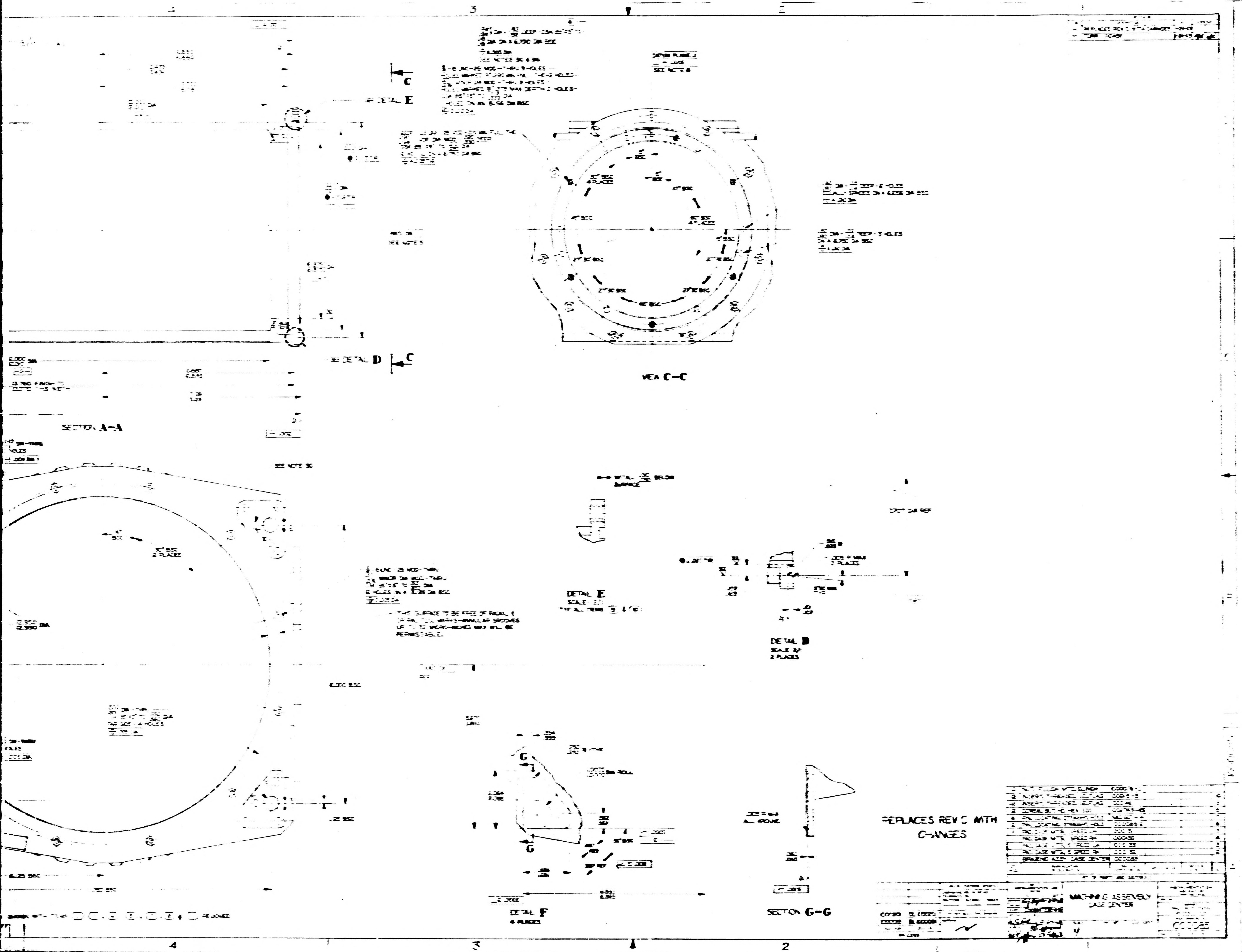
SHEET 1 OF 1

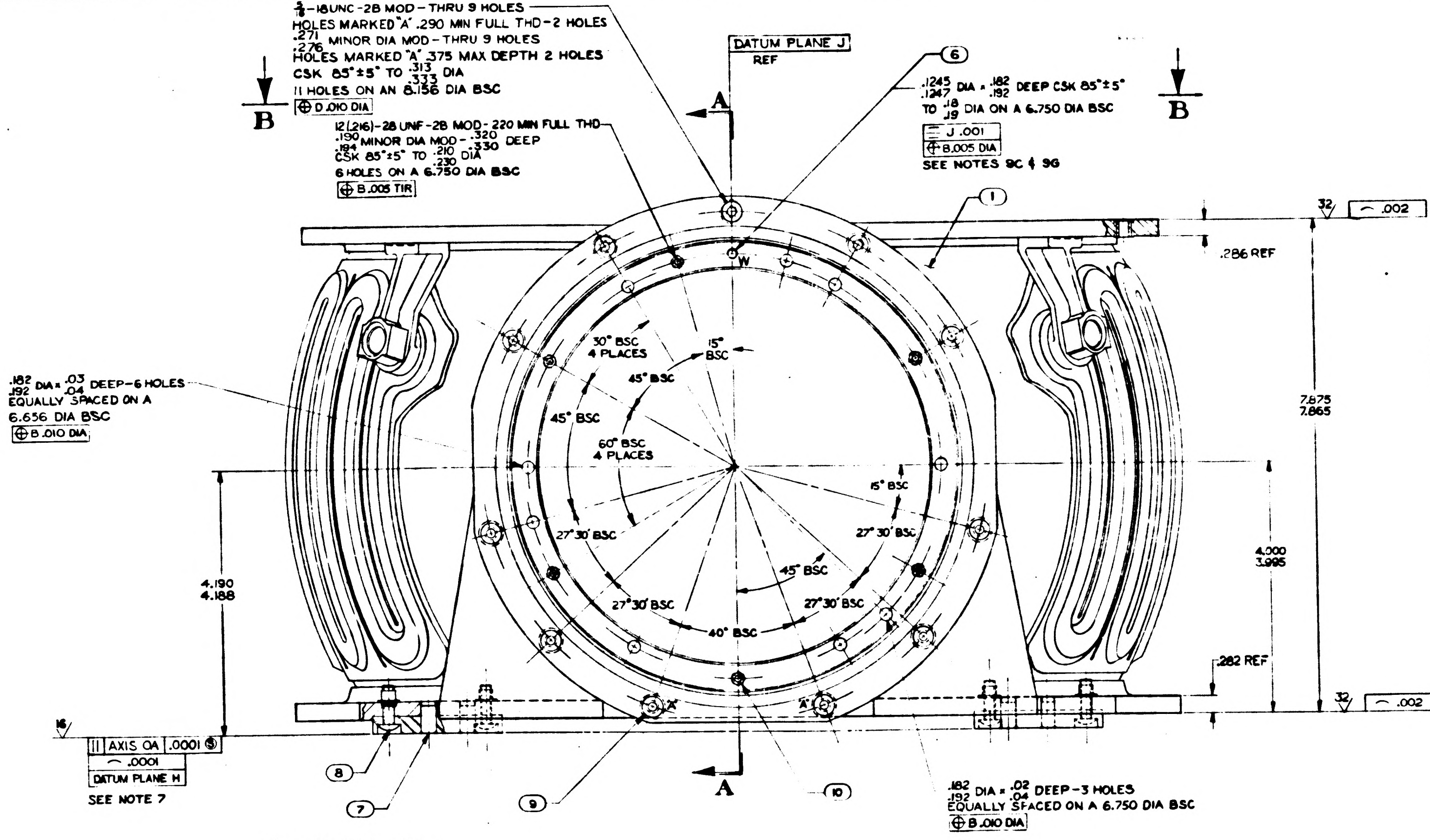
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

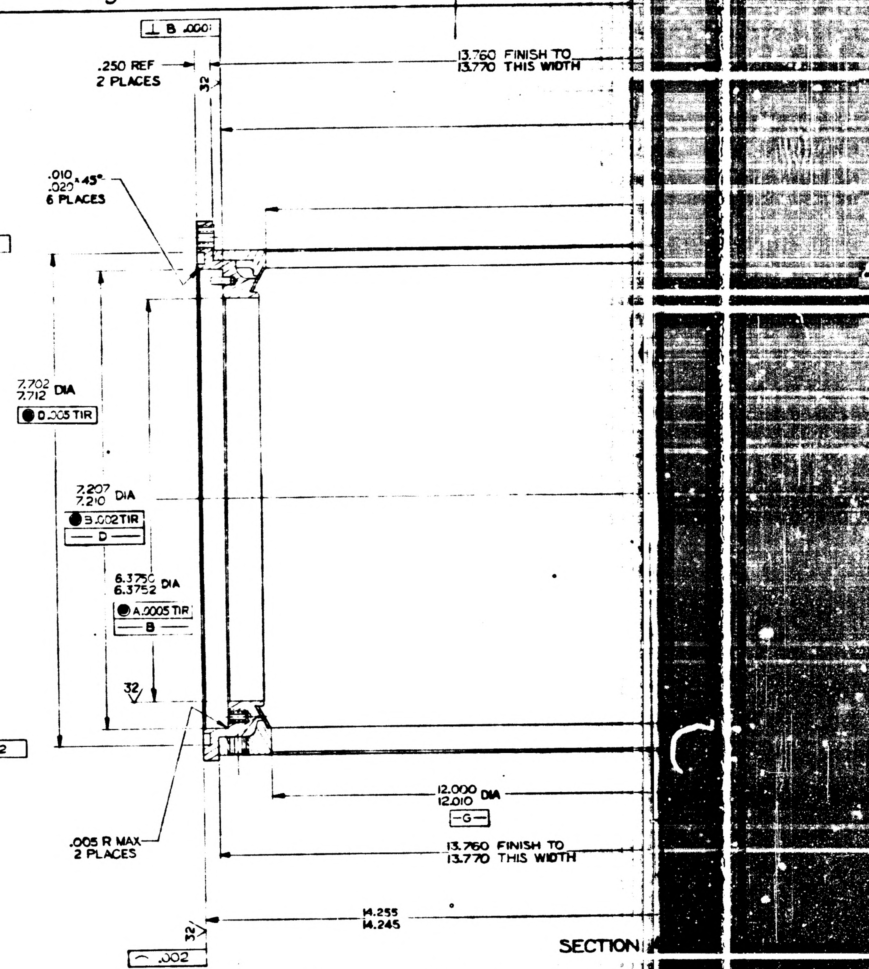


6
5
4
3
2
SECTION A-A
VIEW C-C
DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨ & ⑩
DETAIL D
SCALE: 2/1
2 PLACES
DETAIL F
4 PLACES
SECTION G-G
SEE DETAIL E
SEE DETAIL D
SEE DETAIL F
SEE NOTE 4
SEE NOTE 9C
AXIS OA
SEE NOTE 5
DATUM PLANE J
SEE NOTE 6
13.760 FINISH TO 13.770 THIS WIDTH
12.000 12.010 DIA
14.255 14.245
12.950 12.930 DIA
11.750 BSC
6.125 BSC
10.000 BSC
11.000 BSC
9.750 BSC
4.875 BSC
.625 BSC
.125 BSC
30° BSC 12 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
.500 .501 DIA-THRU CSK 85°±5° TO .550 .560 DIA FAR SIDE-4 HOLES
1.0005 1.0000 DIA ROLL
.005 R MAX ALL AROUND
INSTALL .010 .030 BELOW SURFACE
7.707 DIA REF
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧ & ⑪ REMOVED
REPLACES REV
CHANGE
B-B

1000085 D 1

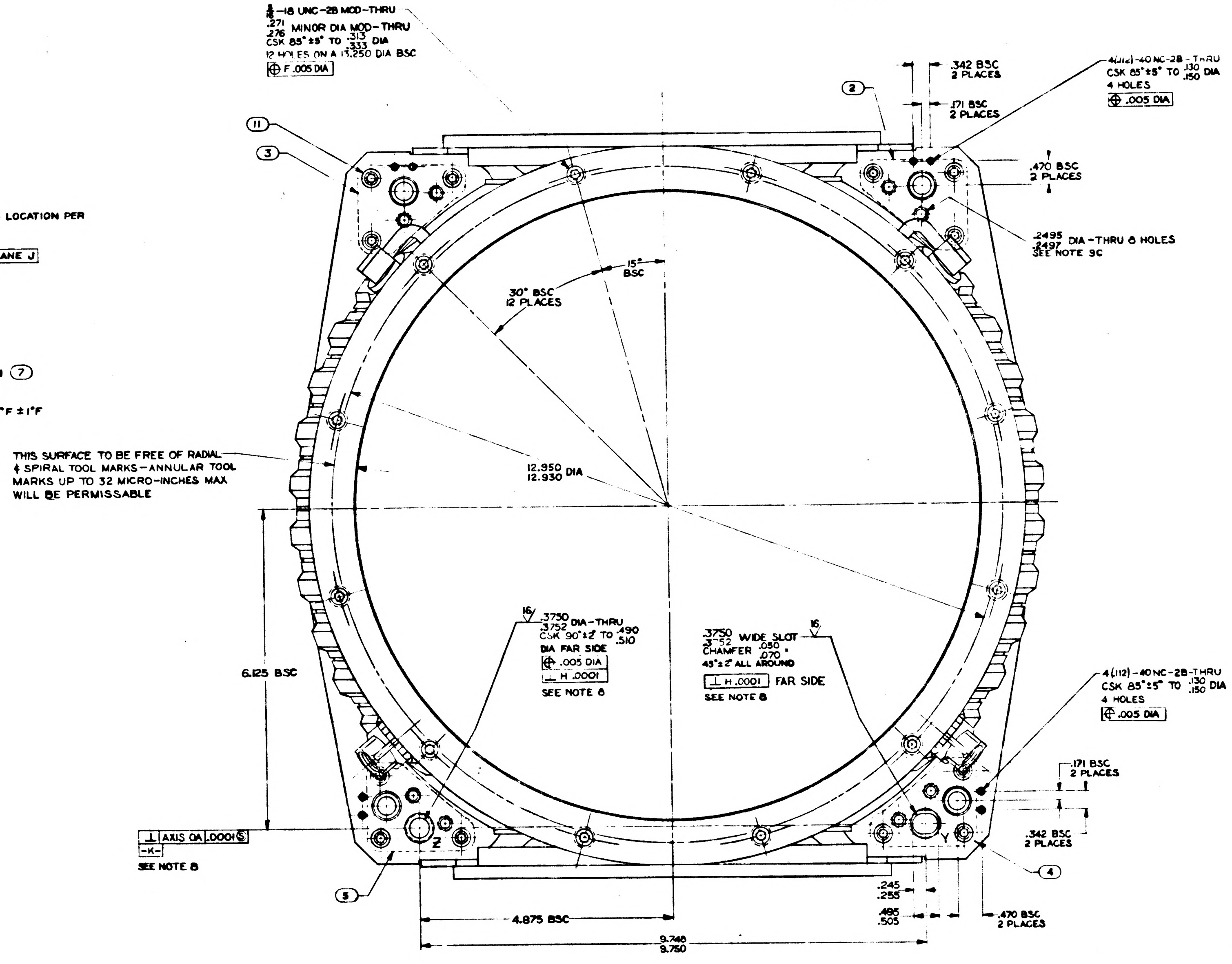

SEE DETAIL E
C
SEE DETAIL D
C
VIEW C—C
SECTION A—A
SEE NOTE 5
SEE NOTE 6
DETAIL E
DETAIL D
SCALE 8/1
2 PLACES
6.000 BSC
G
G
6.25 BSC
DETAIL F
4 PLACES
SECTION G—G
REPLACES REV C WITH CHANGES
BRAZING ASSY CASE CENTER
MACHINING ASSEMBLY
CASE CENTER


5/16-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
B
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .194 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
DATUM PLANE J
REF
A
⑥
.1245 .1247 DIA × .182 .192 DEEP CSK 85°±5°
TO .18 .19 DIA ON A 6.750 DIA BSC
═ J .001
⊕ B .005 DIA
SEE NOTES 9C & 9G
B
①
W
32 ⌒ .002
.286 REF
.182 .192 DIA × .03 .04 DEEP-6 HOLES
EQUALLY SPACED ON A
6.656 DIA BSC
⊕ B .010 DIA
30° BSC 4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC 4 PLACES
15° BSC
27°30' BSC
27°30' BSC
45° BSC
27°30' BSC
27°30' BSC
40° BSC
7.675 7.665
4.000 3.995
4.190 4.188
.282 REF
32 ⌒ .002
16
// AXIS OA .0001 Ⓢ
⌒ .0001
DATUM PLANE H
SEE NOTE 7
⑧
⑦
⑨
A
⑩
.182 .192 DIA × .02 .04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA

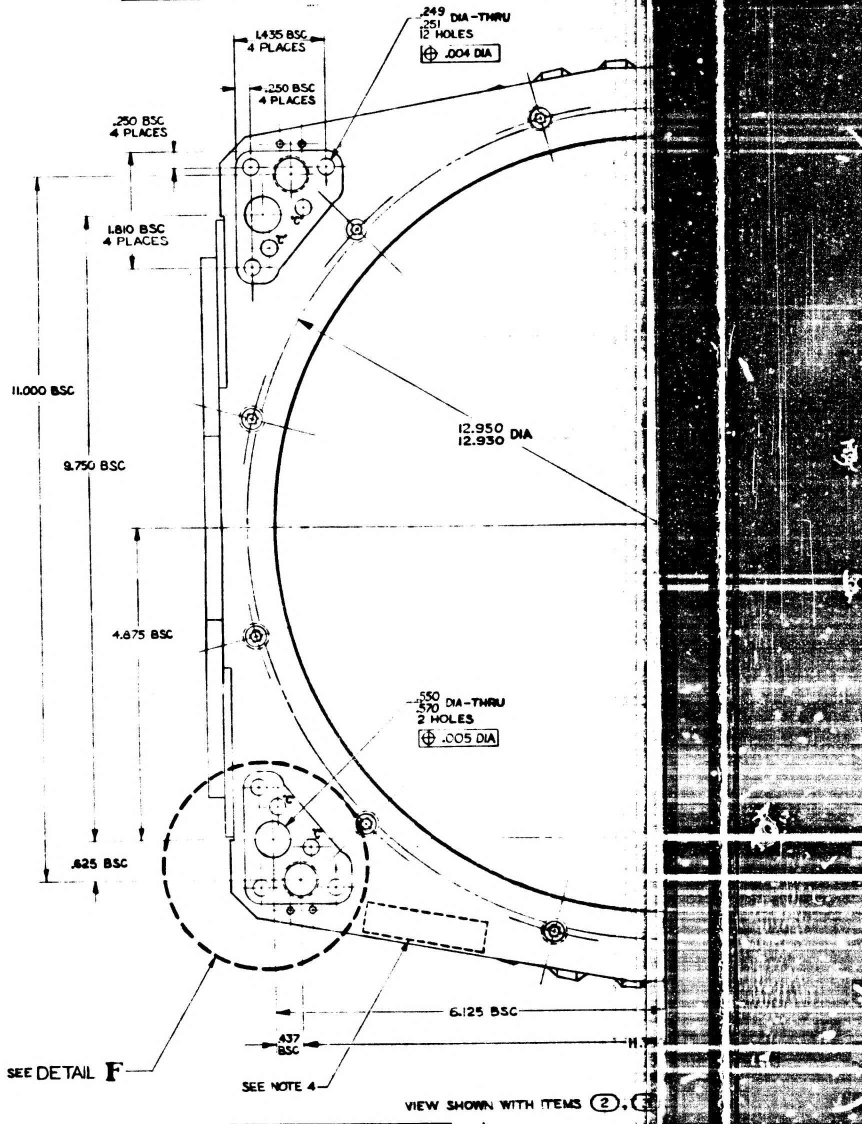

⊥ B .0001
.250 REF 2 PLACES
32
13.760 FINISH TO
13.770 THIS WIDTH
.010 .020 × 45°
6 PLACES
7.702 7.712 DIA
◉ D .005 TIR
7.207 7.210 DIA
◉ B .002 TIR
— D —
6.3750 6.3752 DIA
◉ A .0005 TIR
— B —
32
.005 R MAX
2 PLACES
12.000 12.010 DIA
— G —
13.760 FINISH TO
13.770 THIS WIDTH
14.255 14.245
32
⌒ .002
SECTION

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
3. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM ⑥ MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS ②, ③, ④ & ⑤
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - D. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
   - E. INSTALL ITEMS ②, ③, ④, ⑤, ⑧, ⑨, ⑩, & ⑪
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS ②, ③, ④ & ⑤ & INSTALL ITEM ⑦
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM ⑥
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F


5/16-18 UNC-2B MOD-THRU
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.250 DIA BSC
⊕ F .005 DIA
②
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
⑪
③
.470 BSC 2 PLACES
.2495 .2497 DIA-THRU 8 HOLES
SEE NOTE 9C
15° BSC
30° BSC 12 PLACES
THIS SURFACE TO BE FREE OF RADIAL
& SPIRAL TOOL MARKS-ANNULAR TOOL
MARKS UP TO 32 MICRO-INCHES MAX
WILL BE PERMISSABLE
12.950 12.930 DIA
16
.3750 .3752 DIA-THRU
CSK 90°±2° TO .490 .510
DIA FAR SIDE
⊕ .005 DIA
⊥ H .0001
SEE NOTE 8
.3750 .3752 WIDE SLOT
CHAMFER .050 .070
45°±2° ALL AROUND
⊥ H .0001 FAR SIDE
SEE NOTE 8
16
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
.171 BSC 2 PLACES
.342 BSC 2 PLACES
6.125 BSC
⊥ AXIS OA .0001 Ⓢ
-K-
SEE NOTE 8
Z
Y
⑤
④
.245 .255
.495 .505
.470 BSC 2 PLACES
4.875 BSC
9.748 9.750

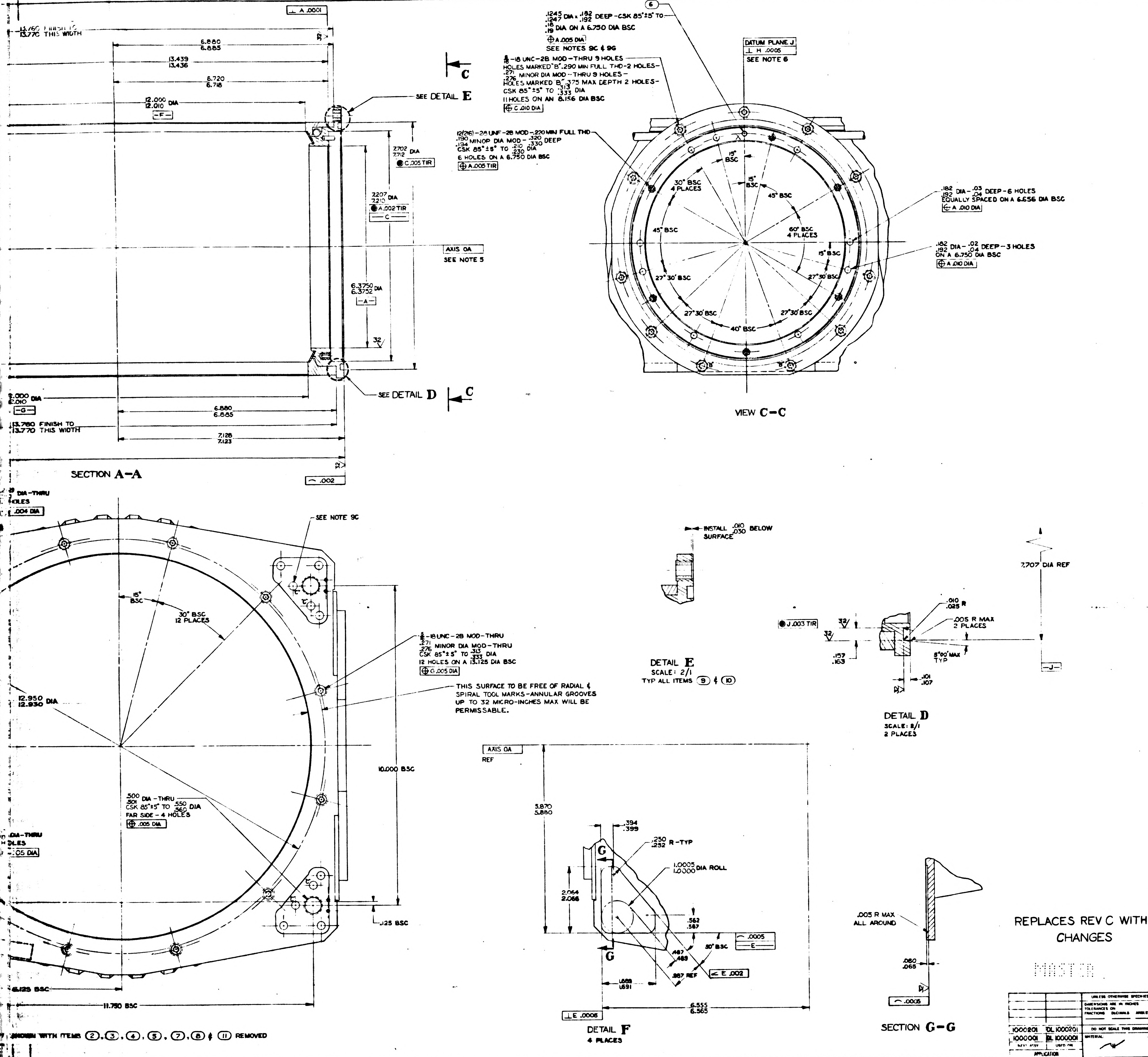
VIEW B-B


1.435 BSC 4 PLACES
.250 BSC 4 PLACES
.249 .251 DIA-THRU
12 HOLES
⊕ .004 DIA
.250 BSC 4 PLACES
1.810 BSC 4 PLACES
11.000 BSC
9.750 BSC
12.950 12.930 DIA
4.875 BSC
.550 .570 DIA-THRU
2 HOLES
⊕ .005 DIA
.625 BSC
6.125 BSC
.437 BSC
SEE NOTE 4
SEE DETAIL F

VIEW SHOWN WITH ITEMS ②,

	REV	SHEET
1000085	D	1

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63		



4
3
2
1
⊥ A .0001
13.760 FINISH TO
13.770 THIS WIDTH
6.880
6.885
13.439
13.436
8.720
8.718
12.000 DIA
12.010
-F-
SEE DETAIL E
C
7.702 DIA
7.712
◉ C .005 TIR
7.207 DIA
7.210
◉ A .002 TIR
-C-
AXIS OA
SEE NOTE 5
6.3750 DIA
6.3752
-A-
32
SEE DETAIL D
12.000 DIA
12.010
-G-
6.880
6.885
13.780 FINISH TO
13.770 THIS WIDTH
7.126
7.123
SECTION A-A
⌒ .002
⑥
.1245 DIA x .182 DEEP -CSK 85°±5° TO
.1247 .192
.18 DIA ON A 6.750 DIA BSC
.19
⊕ A .005 DIA
SEE NOTES 9C & 9G
5/16-18 UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD-2 HOLES-
.271 MINOR DIA MOD--THRU 9 HOLES-
.276
HOLES MARKED "B" .375 MAX DEPTH 2 HOLES-
CSK 85°±5° TO .313 DIA
.333
11 HOLES ON AN 8.156 DIA BSC
⊕ C .010 DIA
12(216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 MINOR DIA MOD - .320 DEEP
.194 .330
CSK 85°±5° TO .210 DIA
.230
6 HOLES ON A 6.750 DIA BSC
⊕ A .005 TIR
DATUM PLANE J
⊥ H .0005
SEE NOTE 6
15° BSC
15° BSC
30° BSC
4 PLACES
45° BSC
45° BSC
60° BSC
4 PLACES
15° BSC
27°30' BSC
27°30' BSC
27°30' BSC
27°30' BSC
40° BSC
.182 DIA - .03 DEEP - 6 HOLES
.192 .04
EQUALLY SPACED ON A 6.656 DIA BSC
⊕ A .010 DIA
.182 DIA - .02 DEEP - 3 HOLES
.192 .04
ON A 6.750 DIA BSC
⊕ A .010 DIA
VIEW C-C
SEE NOTE 9C
15° BSC
30° BSC
12 PLACES
12.950 DIA
12.930
5/16-18 UNC-2B MOD-THRU
.271 MINOR DIA MOD-THRU
.276
CSK 85°±5° TO .313 DIA
.333
12 HOLES ON A 13.125 DIA BSC
⊕ G .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
10.000 BSC
.500 DIA-THRU
.501
CSK 85°±5° TO .550 DIA
.560
FAR SIDE - 4 HOLES
⊕ .005 DIA
.125 BSC
6.125 BSC
11.750 BSC
.004 DIA
.005 DIA
SHOWN WITH ITEMS ②,③,④,⑤,⑦,⑧ & ⑪ REMOVED
INSTALL .010 .030 BELOW SURFACE
DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨ & ⑩
◉ J .003 TIR
32
32
.157
.163
.010 R
.025
.005 R MAX
2 PLACES
5°00' MAX
TYP
.101
.107
7.707 DIA REF
-J-
DETAIL D
SCALE: 8/1
2 PLACES
AXIS OA
REF
3.870
3.880
.394
.399
.250 R-TYP
.252
1.0005 DIA ROLL
1.0000
G
G
2.064
2.066
.562
.587
.487
.483
.987 REF
30° BSC
⌒ .0005
-E-
∠ E .002
1.689
1.691
6.555
6.565
⊥ E .0005
DETAIL F
4 PLACES
.005 R MAX
ALL AROUND
.060
.065
⌒ .0005
SECTION G-G
D
C
B
A

REPLACES REV C WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
12	NUT, FLUSH MTD, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED, SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000131			5
1	PAD, CASE MTG, 1 SPEED RH	1000130			4
1	PAD, CASE MTG, 15 SPEED LH	1000133			3
1	PAD, CASE MTG, 15 SPEED RH	1000132			2
1	BRAZING ASSY, CASE CENTER	1000083			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED G.J. Bryant DATE 2-27-63
CHECKED
DRAWN D.M. WHITE 2-4-63
APPROVED FOR MSC
W.J. Rhine 2-27-63
M.T. Cappucci
W. Kaffer 27 Feb 63

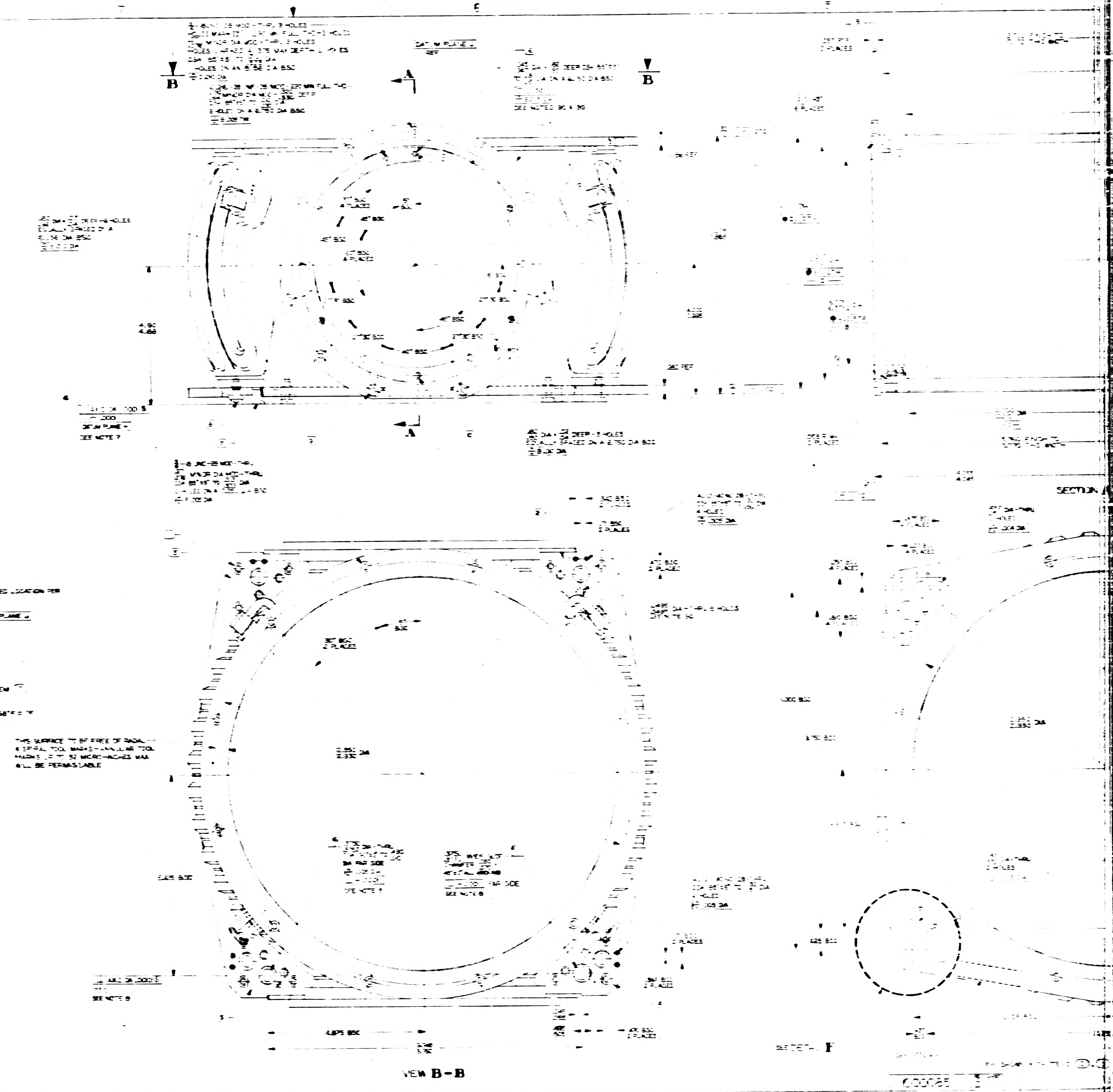
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000085
SHEET 1 OF 1

1000085 D

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-[illegible]
2. BREAK ALL SHARP EDGES [illegible]
3. [illegible] MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURER'S SYMBOL & SERIAL NO. AT INDICATED LOCATION PER MIL-STD-[illegible]
5. A LINE PASSING THRU THE CENTER OF BORE [illegible] & BORE [illegible] ESTABLISHES [illegible]
6. A PLANE CONTAINING [illegible] AND CENTER OF ITEM [illegible] MARKED [illegible] ESTABLISHES DATUM PLANE [illegible]
7. DATUM PLANE [illegible] IS DEFINED BY THE SURFACES OF ITEMS [illegible]
8. DATUM [illegible] IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS IS MANDATORY
   - A. ROUGH MACHINE WITHIN [illegible] OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT [illegible] FOR 6 HRS [illegible] MIN
   - C. FINISH MACHINE, DRILL & TAP ALL HOLES EXCEPT HOLES MARKED [illegible]
   - D. [illegible] PER MIL-[illegible] TYPE [illegible] CLEAR
   - E. INSTALL ITEMS [illegible]
   - F. [illegible] MACHINE [illegible] WITH ITEMS [illegible] & INSTALL ITEM [illegible]
   - G. MACHINE DATUM PLANE [illegible] & DATUM [illegible]
   - H. MACHINE HOLES MARKED "A" [illegible] & INSTALL ITEM [illegible]
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ± [illegible]

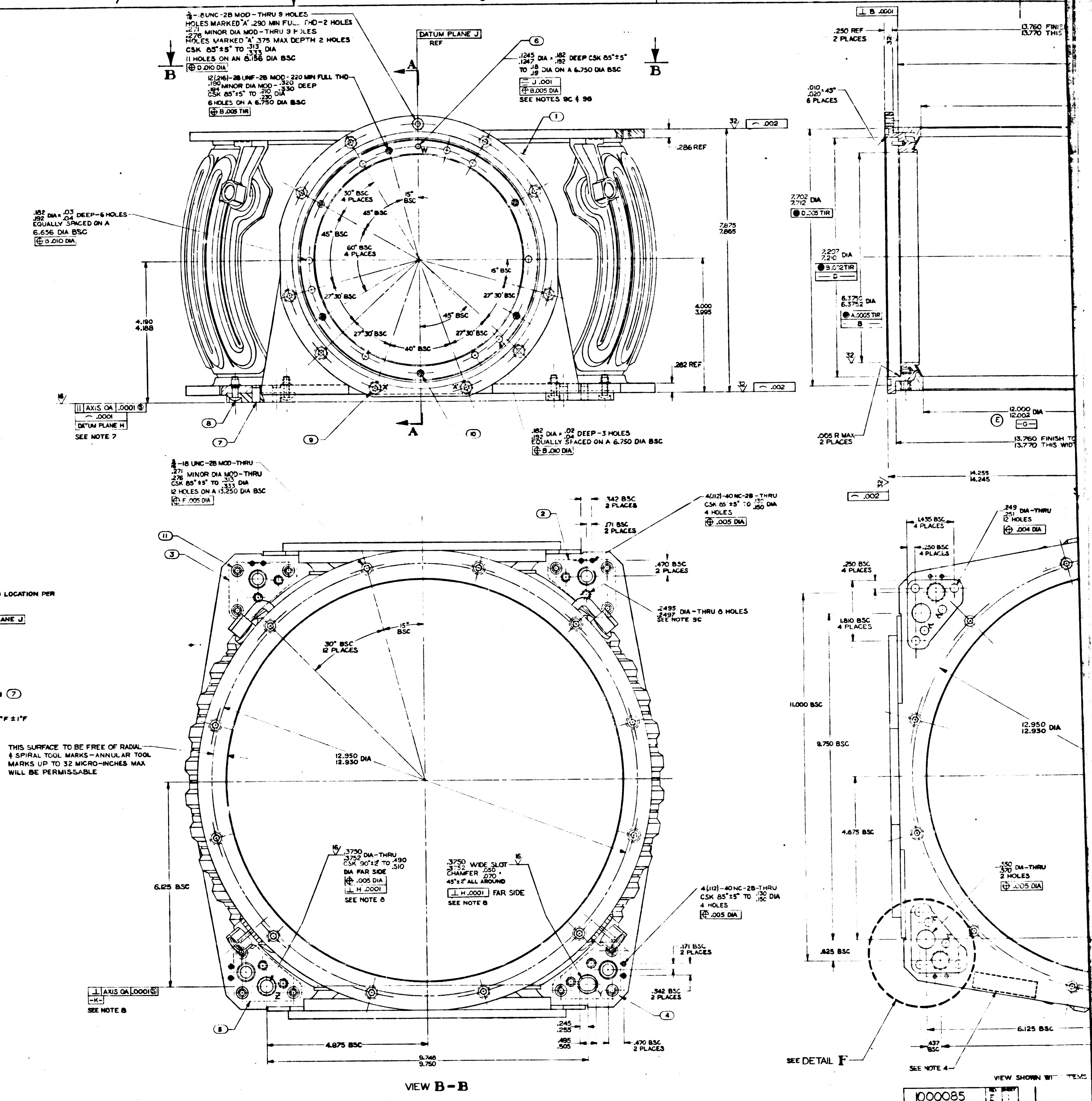


B
A
B
DATUM PLANE
HOLES ON A [illegible] DIA BSC
SEE NOTES [illegible]
4.50
4.68
DATUM PLANE
SEE NOTE 7
A
EQUALLY SPACED ON A [illegible] DIA BSC
SECTION A
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS; ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
11.850 DIA
11.830
SEE NOTE 8
SEE NOTE 8
4.875 BSC
2 PLACES
SEE DETAIL F
VIEW B-B

600065

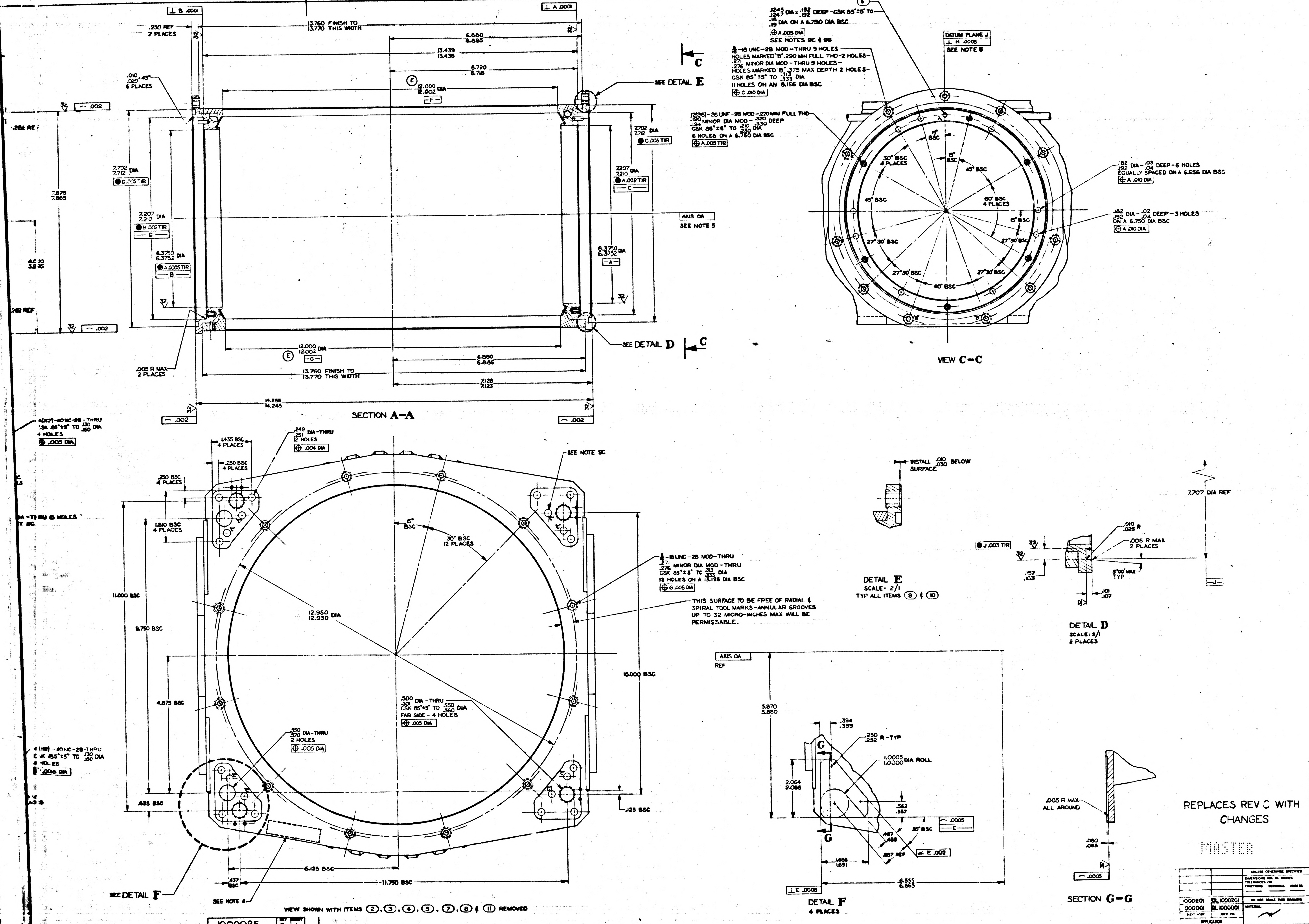
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM (6) MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS (2), (3), (4) & (5)
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - D. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
   - E. INSTALL ITEMS (2), (3), (4), (5), (8), (9), (10), & (11)
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS (2), (3), (4) & (5) & INSTALL ITEM (7)
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM (6)
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F


5/16-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .184 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
DATUM PLANE J
REF
.1245 .1247 DIA × .182 .192 DEEP CSK 85°±5°
TO .18 .19 DIA ON A 6.750 DIA BSC
J .001
⊕ B .005 DIA
SEE NOTES 9C & 9G
B
B
A
A
W
.182 .192 DIA × .03 .04 DEEP-6 HOLES
EQUALLY SPACED ON A
6.656 DIA BSC
⊕ B .010 DIA
30° BSC
4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC
4 PLACES
15° BSC
27°30' BSC
27°30' BSC
45° BSC
27°30' BSC
27°30' BSC
40° BSC
.286 REF
7.875 7.865
4.000 3.995
4.190 4.188
.282 REF
32/ ⌒ .002
32/ ⌒ .002
16/
∥ AXIS OA .0001 Ⓢ
⌒ .0001
DATUM PLANE H
SEE NOTE 7
(1)
(6)
(7)
(8)
(9)
(10)
"A"
"A"
.182 .192 DIA × .02 .04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA
5/16-18 UNC-2B MOD-THRU
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.250 DIA BSC
⊕ F .005 DIA
⊥ B .0001
.250 REF
2 PLACES
13.760 FINIS
13.770 THIS
.010 .020 × 45°
6 PLACES
7.702 7.712 DIA
D .005 TIR
7.207 7.210 DIA
B .002 TIR
-D-
6.3750 6.3752 DIA
A .0005 TIR
-B-
32/
.005 R MAX
2 PLACES
12.000 12.002 DIA
(E)
-G-
13.760 FINISH T
13.770 THIS WID
14.255 14.245
32/
⌒ .002
.342 BSC
2 PLACES
.171 BSC
2 PLACES
(2)
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
.470 BSC
2 PLACES
.2495 .2497 DIA-THRU 8 HOLES
SEE NOTE 9C
(11)
(3)
30° BSC
12 PLACES
15° BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
12.950 12.930 DIA
6.125 BSC
16/ .3750 .3752 DIA-THRU
CSK 90°±2° TO .490 .510
DIA FAR SIDE
⊕ .005 DIA
⊥ H .0001
SEE NOTE 8
.3750 .3752 WIDE SLOT 16/
CHAMFER .050 .070 ×
45°±2° ALL AROUND
⊥ H .0001 FAR SIDE
SEE NOTE 8
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
.171 BSC
2 PLACES
.342 BSC
2 PLACES
⊥ AXIS OA .0001 Ⓢ
-K-
SEE NOTE 8
Z
Y
(5)
(4)
.245 .255
.495 .505
.470 BSC
2 PLACES
4.875 BSC
9.748 9.750
VIEW B-B
1.435 BSC
4 PLACES
.250 BSC
4 PLACES
.249 .251 DIA-THRU
12 HOLES
⊕ .004 DIA
.250 BSC
4 PLACES
1.810 BSC
4 PLACES
11.000 BSC
9.750 BSC
12.950 12.930 DIA
4.875 BSC
.550 .570 DIA-THRU
2 HOLES
⊕ .005 DIA
.625 BSC
6.125 BSC
.437 BSC
SEE DETAIL F
SEE NOTE 4
VIEW SHOWN WI TEMS
1000085
REV E
SHEET 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION
D	REPLACES REV C WITH CHANGES TDRR 00456
C	TDRR 00589



SECTION A–A
VIEW C–C
DETAIL E
SCALE: 2/1
TYP ALL ITEMS (9) & (10)
DETAIL D
SCALE: 8/1
2 PLACES
DETAIL F
4 PLACES
SECTION G–G
SEE DETAIL E
SEE DETAIL D
SEE DETAIL F
13.760 FINISH TO 13.770 THIS WIDTH
12.000 12.002 DIA
12.950 12.930 DIA
11.000 BSC
10.000 BSC
11.750 BSC
6.125 BSC
14.255 14.245
AXIS OA
SEE NOTE 5
DATUM PLANE J
SEE NOTE 8
SEE NOTE 9C
SEE NOTE 4
INSTALL .010 .030 BELOW SURFACE
7.707 DIA REF
1.0005 1.0000 DIA ROLL
.005 R MAX ALL AROUND
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS–ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
VIEW SHOWN WITH ITEMS (2),(3),(4),(5),(7),(8) & (11) REMOVED

REPLACES REV C WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO
12	NUT, FLUSH MTD, CLINCH	1000076-2
12	INSERT, THREADED, SELFLK G	1000115-3
46	INSERT, THREADED, SELFLK G	1000146
12	SCREW, BUT. HD, HEX SOC	1006783-45
8	PIN, LOCATING, STRAIGHT, HD S	NAS 607-4-4
2	PIN, LOCATING, STRAIGHT, HD S	1000068-2
1	PAD, CASE MTG, 1 SPEED LH	1000131
1	PAD, CASE MTG, 1 SPEED RH	1000130
1	PAD, CASE MTG, 5 SPEED LH	1000133
1	PAD, CASE MTG, 5 SPEED RH	1000132
1	BRAZING ASSY, CASE CENTER	1000083

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153

APPROVED
CHECKED
DRAWN D. WHITE
APPROVED FOR MSC
2-27-

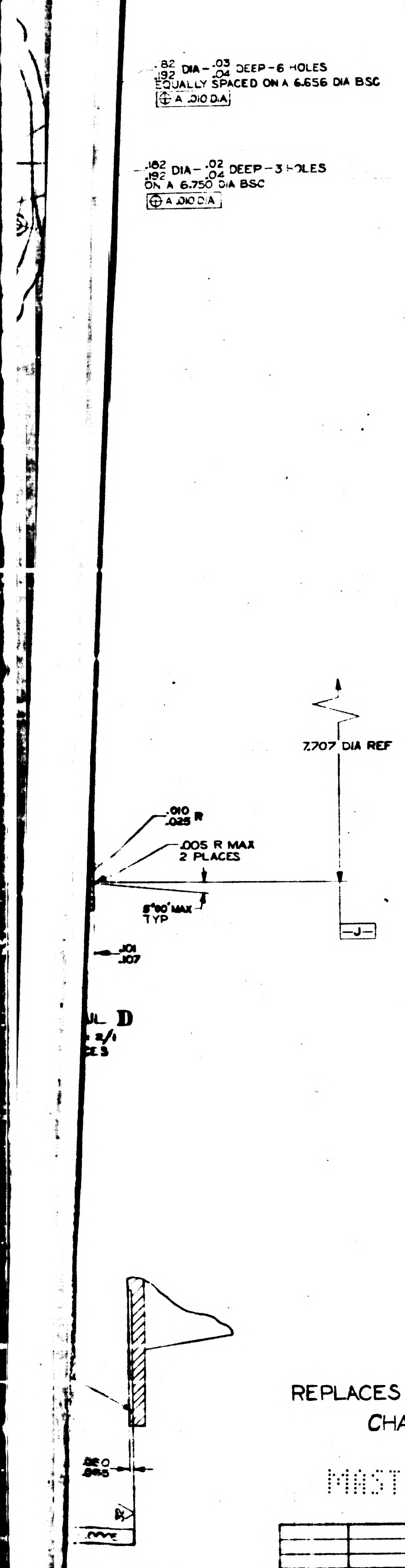
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1

1000085 REV E SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS			
(D) D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63		UK
E	TDRR 00589	3-19-63	ajb	UK



.182 / .192 DIA - .03 / .04 DEEP-6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
⊕ A .010 DIA
.182 / .192 DIA - .02 / .04 DEEP-3 HOLES
ON A 6.750 DIA BSC
⊕ A .010 DIA
7.707 DIA REF
.010 / .025 R
.005 R MAX
2 PLACES
5°00' MAX
TYP
-J-
.101 / .107
UL D
2/1
CES
.080 / .085
32

TION G-G

D

C

B

A

REPLACES REV C WITH
CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
12	NUT, FLUSH MTD, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED, SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000131			5
1	PAD, CASE MTG, 1 SPEED RH	1000130			4
1	PAD, CASE MTG, 15 SPEED LH	1000133			3
1	PAD, CASE MTG, 15 SPEED RH	1000132			2
1	BRAZING ASSY, CASE CENTER	1000083			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: —

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN DMWHITE
APPROVED FOR MSC

MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE IDENT

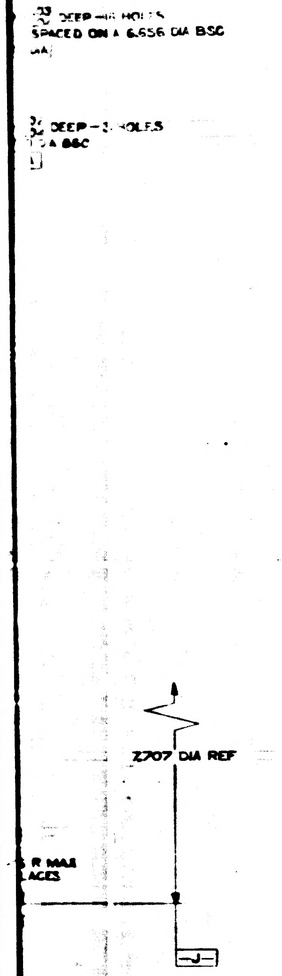
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

1000085 E

1000082 E

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63	ajb	vK
E	TDRR 00589	3-19-63	ajb	vK
F	TDRR 01056	4-30-63	ajb	vK



REPLACES REV C WITH CHANGES

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
8	SCEW, BUT. HD, HEY SOC	1000083-14			13
4	RETAINER, FASTENER	1000186			12
12	NUT, FLUSH MTD, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED, SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000216			5
1	PAD, CASE MTG, 1 SPEED RH	1000215			4
1	PAD, CASE MTG, 16 SPEED LH	1000218			3
1	PAD, CASE MTG, 16 SPEED RH	1000217			2
1	BRAZING ASSY, CASE CENTER	1000083			1

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
1000001	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED | DATE
CHECKED
DRAWN D.M.WHITE
APPROVED FOR MSC
W.J. Bohen 2-27-63
W.K. Caffery

MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE IDENT

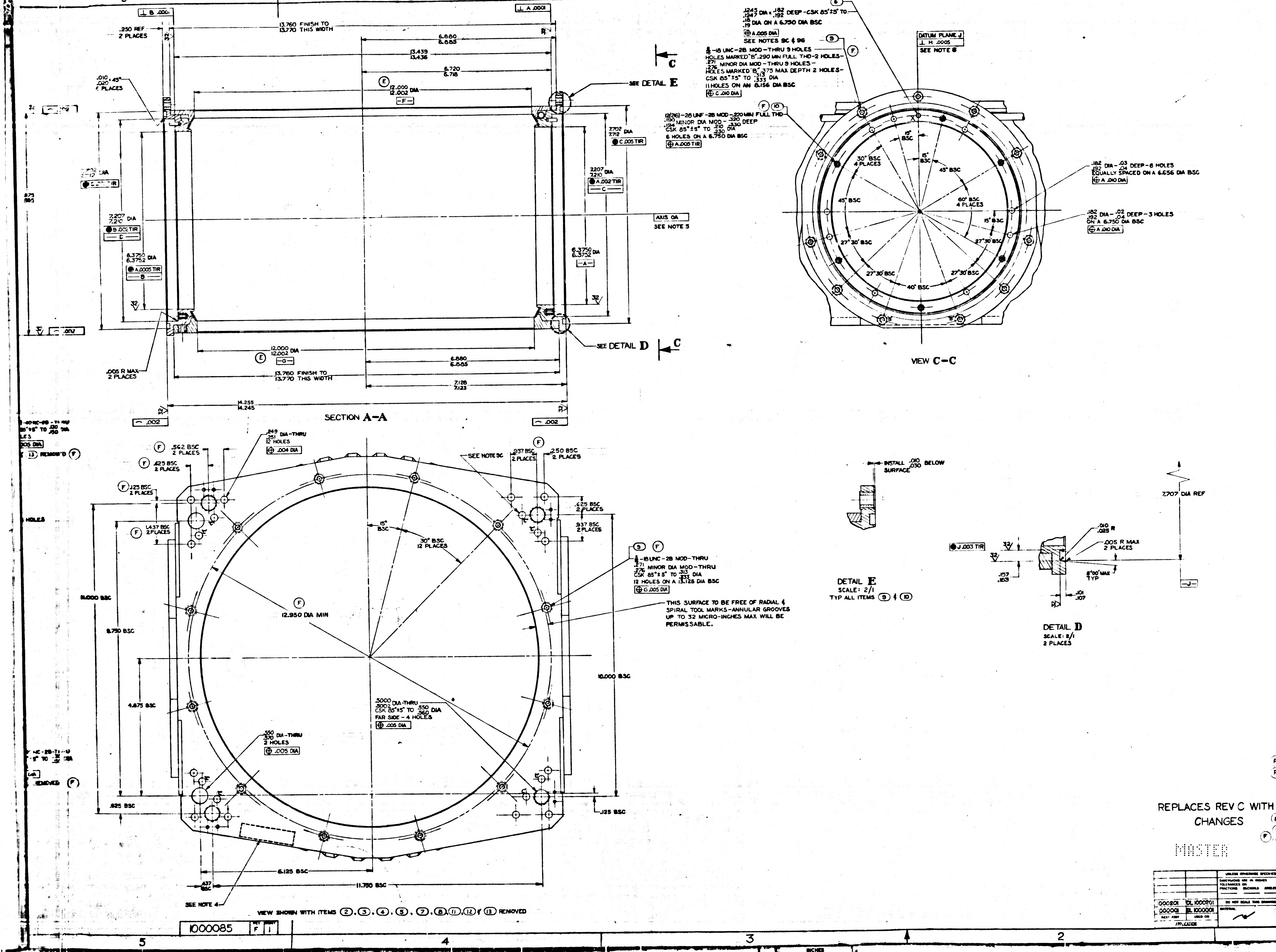
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

1000085 F

1000082

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE
D	REPLACES REV C WITH CHANGES	-24-63
	TDRR 00456	-24-63
E	TDRR 00589	-15-63
F	TDRR 01056	



SECTION A–A
VIEW C–C
DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨ & ⑩
DETAIL D
SCALE: 2/1
2 PLACES
SEE DETAIL E
SEE DETAIL D
13.760 FINISH TO 13.770 THIS WIDTH
.250 REF 2 PLACES
.010 .020 × 45° 6 PLACES
.005 R MAX 2 PLACES
12.000 12.002 DIA
6.880 6.885
13.439 13.436
6.720 6.718
7.128 7.123
14.255 14.245
7.702 7.712 DIA
7.207 7.210 DIA
6.3750 6.3752 DIA
AXIS OA SEE NOTE 5
DATUM PLANE J
SEE NOTE 6
SEE NOTES 9C & 9G
.1245 .1247 DIA × .182 .192 DEEP-CSK 85°±5° TO .18 .19 DIA ON A 6.750 DIA BSC
8-18 UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD-2 HOLES-
.271 .276 MINOR DIA MOD-THRU 9 HOLES-
HOLES MARKED "B" .375 MAX DEPTH 2 HOLES-
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
12(26)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .194 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
.182 .192 DIA-.03 .04 DEEP-6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
.182 .192 DIA-.02 .04 DEEP-3 HOLES ON A 6.750 DIA BSC
INSTALL .010 .030 BELOW SURFACE
7.707 DIA REF
.010 .025 R
.005 R MAX 2 PLACES
.157 .163
.101 .107
5°00' MAX TYP
.249 .251 DIA-THRU 12 HOLES
SEE NOTE 9C
12.950 DIA MIN
8-18 UNC-2B MOD-THRU
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.125 DIA BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
.5000 .5002 DIA-THRU
CSK 85°±5° TO .550 .560 DIA
FAR SIDE - 4 HOLES
.550 .570 DIA-THRU 2 HOLES
11.000 BSC
8.750 BSC
4.875 BSC
.625 BSC
10.000 BSC
6.125 BSC
11.750 BSC
.437 BSC
.125 BSC
SEE NOTE 4
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED

REPLACES REV C WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL
8	SCEW, BUT. HD, HEX SOC	1000083-14		
4	RETAINER, FASTENER	1000186		
12	NUT, FLUSH MTD, CLINCH	1000076-2		
12	INSERT, THREADED, SELFLKG	1000115-3		
46	INSERT, THREADED, SELFLKG	1000146		
12	SCREW, BUT. HD, HEX SOC	1006783-45		
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4		
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2		
1	PAD, CASE MTG, 1 SPEED LH	10002 [illegible]		
1	PAD, CASE MTG, 1 SPEED RH	10002 8		
1	PAD, CASE MTG, 16 SPEED LH	10002 9		
1	PAD, CASE MTG, 16 SPEED RH	10002 7		
1	BRAZING ASSY, CASE CENTER	1000083		

LIST OF PARTS AND MATERIAL

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN D.M.WHITE
APPROVED FOR MSC

MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE

MIT INSTRUMENTATION LABORATORY
SPACECRAFT CENTER
1000085

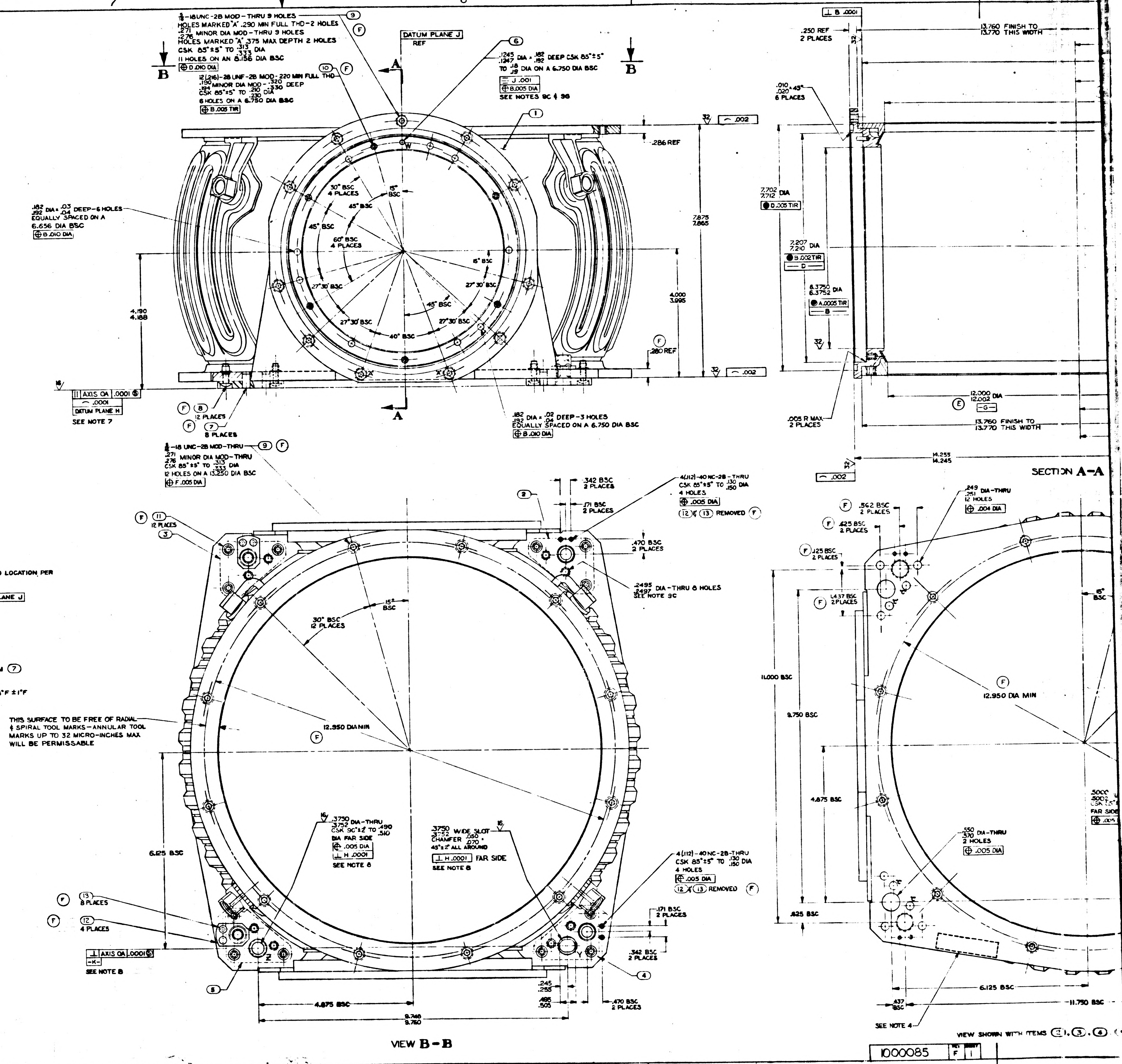
1000085 REV F SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
3. $\sqrt{63}$ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL ¢ SERIAL NO. AT INDICATED LOCATION PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE [-A-] ¢ BORE [-B-] ESTABLISHES [AXIS OA]
6. A PLANE CONTAINING [AXIS OA] AND CENTER OF ITEM (6) MARKED "X" ESTABLISHES [DATUM PLANE J]
7. DATUM PLANE [-H-] IS DEFINED BY THE SURFACES OF ITEMS (2), (3), (4) ¢ (5)
8. DATUM [-K-] IS DEFINED BY THE CENTER OF HOLE MARKED "Z" ¢ SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANCATORY)
    - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
    - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
    - C. FINISH MACHINE (DRILL ¢ TAP ALL HOLES EXCEPT HOLES MARKED "C", W ¢ X)
    - (F) D. ANODIC COAT PER NOTE 11
    - (F) E. INSTALL ITEMS (2), (3), (4), (5), (8), (9), (10), (11), (12) ¢ (13)
    - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS (2), (3), (4) ¢ (5) ¢ INSTALL ITEM (7)
    - G. MACHINE [DATUM PLANE H] ¢ DATUM [-K-]
    - H. MACHINE HOLES MARKED "W" ¢ "X" ¢ INSTALL ITEM (6)
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

(F) 11. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

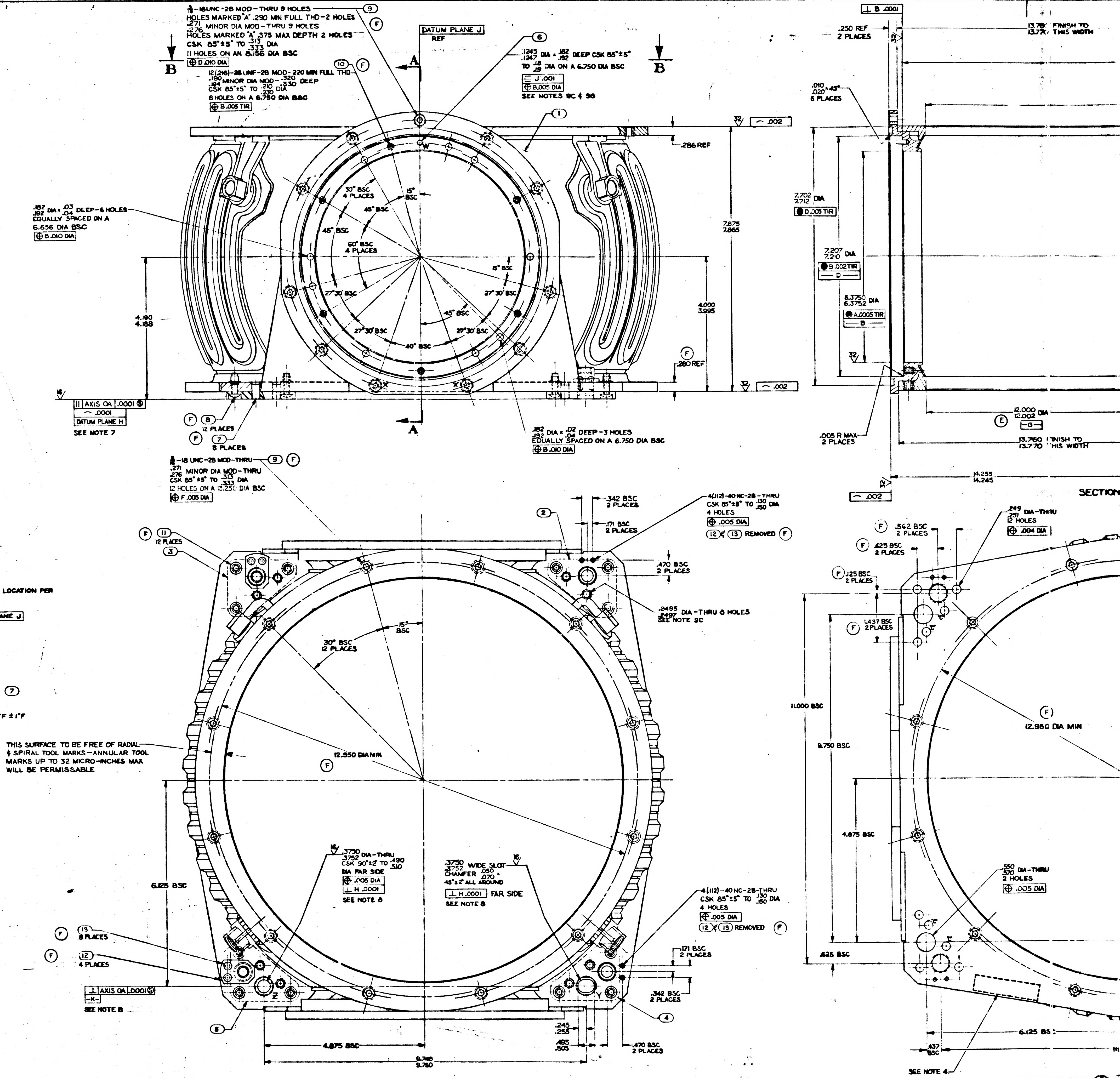

8
7
6
5
D
C
B
A
5/16-18UNC-2B MOD-THRU 9 HOLES (9) (F)
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271/.276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313/.333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
B
B
A
A
DATUM PLANE J REF
(10) (F)
12(216)-28 UNF-2B MOD-.220 MIN FULL THD
.190/.194 MINOR DIA MOD-.320/.330 DEEP
CSK 85°±5° TO .210/.230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
(6)
.1245/.1247 DIA × .182/.192 DEEP CSK 85°±5° TO .18/.19 DIA ON A 6.750 DIA BSC
= J .001
⊕ B .005 DIA
SEE NOTES 9C ¢ 9G
(1)
32 ⌒ .002
.286 REF
W
30° BSC 4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC 4 PLACES
15° BSC
27°30' BSC
27°30' BSC
45° BSC
27°30' BSC
27°30' BSC
40° BSC
.182/.192 DIA × .03/.04 DEEP-6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
⊕ B .010 DIA
7.875/7.865
4.000/3.995
4.190/4.188
(F) .280 REF
32 ⌒ .002
16
‖ AXIS OA .0001 Ⓢ
⌒ .0001
DATUM PLANE H
SEE NOTE 7
(F) (8) 12 PLACES
(F) (7) 8 PLACES
"A"
"A"
.182/.192 DIA × .02/.04 DEEP-3 HOLES EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA
5/16-18 UNC-2B MOD-THRU (9) (F)
.271/.276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313/.333 DIA
12 HOLES ON A 13.250 DIA BSC
⊕ F .005 DIA
(2)
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES
⊕ .005 DIA
(12) ¢ (13) REMOVED (F)
(F) (11) 12 PLACES
(3)
.470 BSC 2 PLACES
.2495/.2497 DIA-THRU 8 HOLES
SEE NOTE 9C
30° BSC 12 PLACES
15° BSC
THIS SURFACE TO BE FREE OF RADIAL ¢ SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
12.950 DIA MIN
(F)
6.125 BSC
16 .3750/.3752 DIA-THRU
CSK 90°±2° TO .490/.510
DIA FAR SIDE
⊕ .005 DIA
⊥ H .0001
SEE NOTE 8
.3750/.3752 WIDE SLOT 16
CHAMFER .050/.070 × 45°±2° ALL AROUND
⊥ H .0001 FAR SIDE
SEE NOTE 8
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES
⊕ .005 DIA
(12) ¢ (13) REMOVED (F)
(F) (13) 8 PLACES
(F) (12) 4 PLACES
⊥ AXIS OA .0001 Ⓢ
-K-
SEE NOTE 8
Z
Y
(5)
(4)
.171 BSC 2 PLACES
.342 BSC 2 PLACES
.245/.255
.495/.505
.470 BSC 2 PLACES
4.875 BSC
9.748/9.760
VIEW B-B
⊥ B .0001
.250 REF 2 PLACES
32
13.760 FINISH TO 13.770 THIS WIDTH
.010/.020 × 45° 6 PLACES
7.702/7.712 DIA
● D .005 TIR
7.207/7.210 DIA
● B .002 TIR
-D-
6.3750/6.3752 DIA
● A .0005 TIR
-B-
32
.005 R MAX 2 PLACES
12.000/12.002 DIA
(E)
-G-
13.760 FINISH TO 13.770 THIS WIDTH
14.255/14.245
32
⌒ .002
SECTION A-A
.249/.251 DIA-THRU 12 HOLES
⊕ .004 DIA
(F) .562 BSC 2 PLACES
(F) .625 BSC 2 PLACES
(F) .125 BSC 2 PLACES
(F) 1.437 BSC 2 PLACES
15° BSC
11.000 BSC
9.750 BSC
(F)
12.950 DIA MIN
4.875 BSC
.5000/.5002
CSK
FAR SIDE
⊕ .005
.550/.570 DIA-THRU 2 HOLES
⊕ .005 DIA
.625 BSC
6.125 BSC
.437 BSC
11.750 BSC
SEE NOTE 4
VIEW SHOWN WITH ITEMS (2), (3), (4)
"C"
"C"
"C"
"C"

1000085 REV F SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. $\overset{63}{\surd}$ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE $\boxed{-A-}$ & BORE $\boxed{-B-}$ ESTABLISHES $\boxed{\text{AXIS OA}}$
6. A PLANE CONTAINING $\boxed{\text{AXIS OA}}$ AND CENTER OF ITEM ⑥ MARKED "X" ESTABLISHES $\boxed{\text{DATUM PLANE J}}$
7. DATUM PLANE $\boxed{-H-}$ IS DEFINED BY THE SURFACES OF ITEMS ②, ③, ④ & ⑤
8. DATUM $\boxed{-K-}$ IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - Ⓕ D. ANODIC COAT PER NOTE 11
   - Ⓕ E. INSTALL ITEMS ②, ③, ④, ⑤, ⑧, ⑨, ⑩, ⑪, ⑫ & ⑬
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS ②, ③, ④ & ⑤ & INSTALL ITEM ⑦
   - G. MACHINE $\boxed{\text{DATUM PLANE H}}$ & DATUM $\boxed{-K-}$
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM ⑥
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ± 1°F
11. Ⓕ ANODIC COAT PER MIL-A-8625 TYPE I CLEAR



8
7
6
5
D
C
B
A
5/16-18UNC-2B MOD-THRU 9 HOLES ⑨ Ⓕ
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
B
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD ⑩ Ⓕ
.190 .194 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
DATUM PLANE J
REF
A
⑥
.1245 .1247 DIA × .182 .192 DEEP CSK 85°±5°
TO .18 .19 DIA ON A 6.750 DIA BSC
≡ J .001
⊕ B .005 DIA
SEE NOTES 9C & 9G
①
32
⌒ .002
.286 REF
W
.182 .192 DIA × .03 .04 DEEP-6 HOLES
EQUALLY SPACED ON A
6.656 DIA BSC
⊕ B .010 DIA
30° BSC 4 PLACES
15° BSC
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
7.875 7.865
4.190 4.188
4.000 3.995
Ⓕ
.280 REF
⌒ .002
AXIS OA .0001 Ⓢ
⌒ .0001
DATUM PLANE H
SEE NOTE 7
Ⓕ ⑧ 12 PLACES
Ⓕ ⑦ 8 PLACES
.182 .192 DIA × .02 .04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA
5/16-18 UNC-2B MOD-THRU ⑨ Ⓕ
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.250 DIA BSC
⊕ F .005 DIA
②
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
⑫ & ⑬ REMOVED Ⓕ
Ⓕ ⑪ 12 PLACES
③
.470 BSC 2 PLACES
.2495 .2497 DIA-THRU 8 HOLES
SEE NOTE 9C
30° BSC 12 PLACES
15° BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
12.950 DIA MIN
Ⓕ
6.125 BSC
16
.3750 .3752 DIA-THRU
CSK 90°±2° TO .490 .510
DIA FAR SIDE
⊕ .005 DIA
⊥ H .0001
SEE NOTE 8
.3750 .3752 WIDE SLOT
CHAMFER .050 .070 ×
45°±2° ALL AROUND
⊥ H .0001 FAR SIDE
SEE NOTE 8
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
⑫ & ⑬ REMOVED Ⓕ
Ⓕ ⑬ 8 PLACES
Ⓕ ⑫ 4 PLACES
⊥ AXIS OA .0001 Ⓢ
-K-
SEE NOTE 8
Z
Y
⑤
④
.171 BSC 2 PLACES
.342 BSC 2 PLACES
.245 .255
.495 .505
.470 BSC 2 PLACES
4.875 BSC
9.748 9.750
⊥ B .0001
.250 REF 2 PLACES
13.780 13.770 FINISH TO THIS WIDTH
.010 .020 × 45° 6 PLACES
7.702 7.712 DIA
● D .005 TIR
7.207 7.210 DIA
● B .002 TIR
-D-
6.3750 6.3752 DIA
● A .0005 TIR
-B-
.005 R MAX 2 PLACES
12.000 12.002 DIA
Ⓔ
-G-
13.760 13.770 FINISH TO THIS WIDTH
14.255 14.245
⌒ .002
SECTION
.249 .251 DIA-THRU
12 HOLES
⊕ .004 DIA
Ⓕ .562 BSC 2 PLACES
Ⓕ .625 BSC 2 PLACES
Ⓕ .125 BSC 2 PLACES
Ⓕ 1.437 BSC 2 PLACES
11.000 BSC
9.750 BSC
4.875 BSC
.625 BSC
Ⓕ
12.950 DIA MIN
.550 .570 DIA-THRU
2 HOLES
⊕ .005 DIA
6.125 BSC
.437 BSC
SEE NOTE 4

VIEW B-B

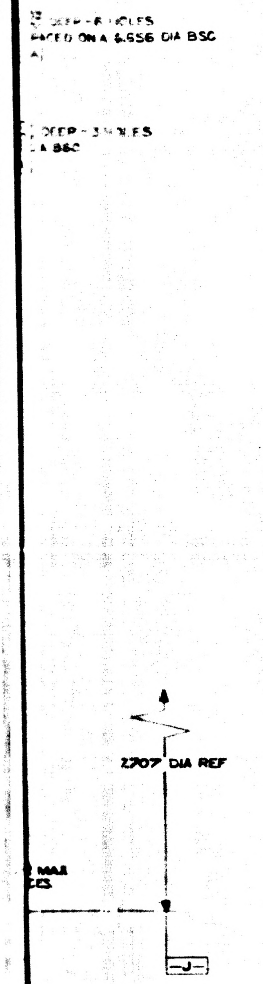
VIEW SHOWN WITH ITEMS

	REV	SHEET
1000085	G	1

INCHES

PHOTOGRAPHIC SCALE ONLY

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63	ajb	uk
E	TDRR 00589	3-19-63	ajb	uk
F	TDRR 01056	4-30-63	ajb	uk
G	TDRR 01442	6-5-63	ajb	AKB



D

C

B

A

1000085 F

REPLACES REV C WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
8	SCEW, BUT. HD, HEX SOC	1000093-14			13
4	RETAINER, FASTENER	1000186			12
12	NUT, FLUSH MTD, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED. SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000216			5
1	PAD, CASE MTG, 1 SPEED RH	1000215			4
1	PAD, CASE MTG, 16 SPEED LH	1000218			3
1	PAD, CASE MTG, 16 SPEED RH	1000217			2
1	BRAZING ASSY, CASE CENTER	1000083			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	1000201
1000001	1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153

		DATE
APPROVED		
CHECKED		
DRAWN	D.M. WINTER	
APPROVED FOR MSC	A.J. Robins	2-27-63

MACHINING ASSEMBLY
CASE CENTER

SCALE	UNIT WT.	CODE IDENT
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS

DWG NO

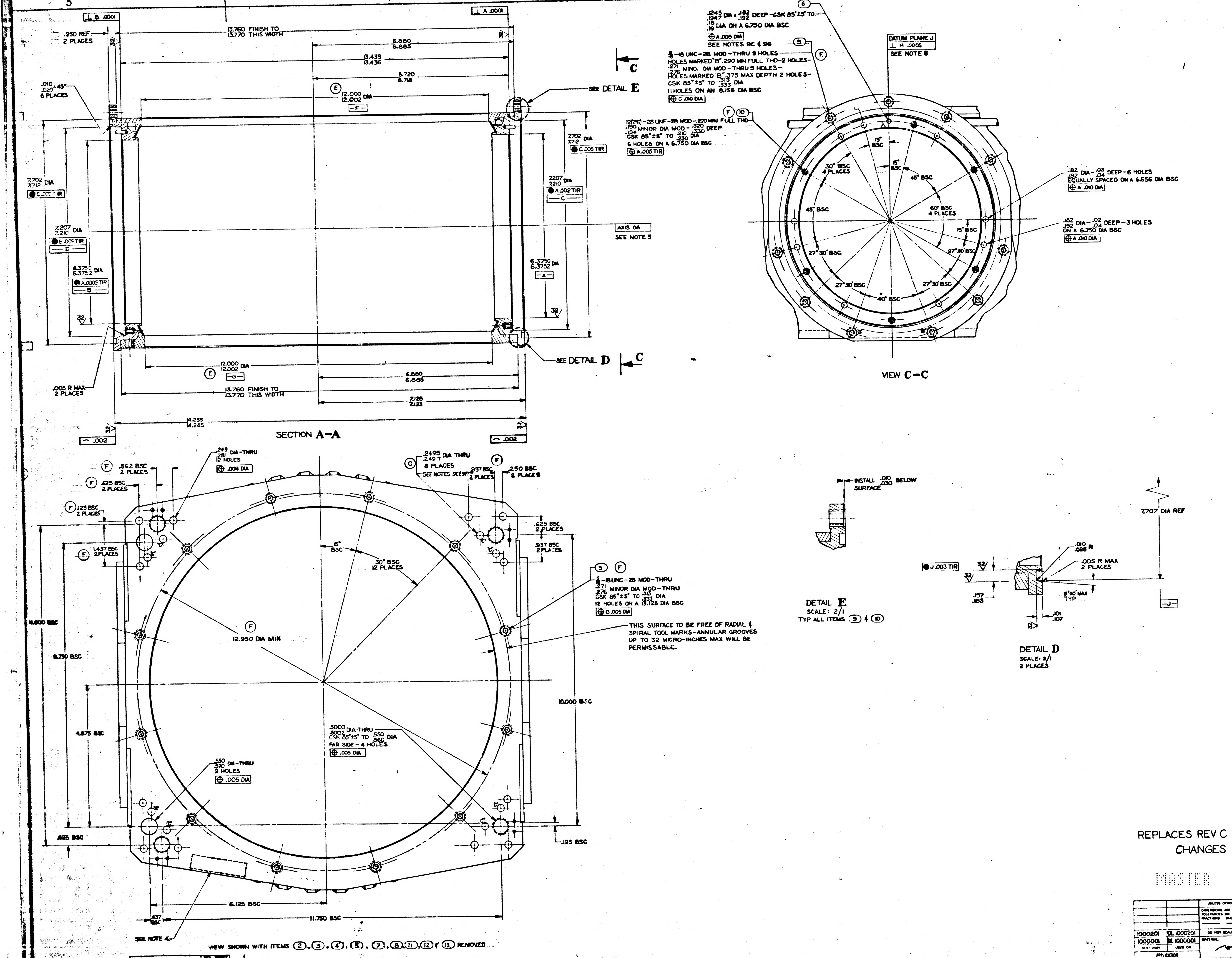
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO
1000085

SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION
D	REPLACES REV . WITH CHANGES TDRR 0C456
E	TDRR 0C589
F	TDRR 01056
G	TDRR C144



SECTION A-A
VIEW C-C
DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨ & ⑩
DETAIL D
SCALE: 2/1
2 PLACES
SEE DETAIL E
SEE DETAIL D
13.760 FINISH TO 13.770 THIS WIDTH
.250 REF 2 PLACES
.010 x 45° .020 6 PLACES
6.880 6.885
13.439 13.436
6.720 6.718
12.000 12.002 DIA
-F-
-G-
7.702 7.712 DIA
7.207 7.210 DIA
6.3750 6.3752 DIA
-A-
-B-
-C-
-D-
AXIS OA
SEE NOTE 5
.005 R MAX 2 PLACES
7.128 7.123
14.255 14.245
.1245 .1247 DIA x .182 .192 DEEP-CSK 85°±5° TO .18 .19 DIA ON A 6.750 DIA BSC
SEE NOTES 9C & 9E
DATUM PLANE J
SEE NOTE 8
6 HOLES ON A 6.750 DIA BSC
11 HOLES ON AN 8.156 DIA BSC
.182 .192 DIA - .03 .04 DEEP - 6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
.182 .192 DIA - .02 .04 DEEP - 3 HOLES ON A 6.750 DIA BSC
30° BSC 4 PLACES
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
15° BSC
INSTALL .010 .030 BELOW SURFACE
7.707 DIA REF
.010 .025 R
.005 R MAX 2 PLACES
5°00' MAX TYP
.157 .163
.101 .107
-J-
.562 BSC 2 PLACES
.625 BSC 2 PLACES
.125 BSC 2 PLACES
1.437 BSC 2 PLACES
.249 .251 DIA-THRU 12 HOLES
.2495 .2497 DIA THRU 8 PLACES
SEE NOTES 9C & 9F
.937 BSC 2 PLACES
.250 BSC 8 PLACES
12.950 DIA MIN
15° BSC
30° BSC 12 PLACES
12 HOLES ON A 13.125 DIA BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
11.000 BSC
8.750 BSC
4.875 BSC
.625 BSC
10.000 BSC
.125 BSC
.5000 .5002 DIA-THRU CSK 85°±5° TO .550 .560 DIA FAR SIDE - 4 HOLES
.550 .570 DIA-THRU 2 HOLES
6.125 BSC
11.750 BSC
.437 BSC
SEE NOTE 4
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED

REPLACES REV C WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION
8	SCEW, BUT. HD, HEX SOC	100 0083-14	
4	RETAINER, FASTENER	100 0186	
12	NUT, FLUSH MTD, CLINCH	100 0076-2	
12	INSERT, THREADED, SELFLKG	100 0115-3	
46	INSERT, THREADED, SELFLKG	100 0146	
12	SCREW, BUT. HD, HEX SOC	100 6783-45	
8	PIN, LOCATING, STRAIGHT, HDLS	NA CC7 4-4	
2	PIN, LOCATING, STRAIGHT, HDLS	100 0088-2	
1	PAD, CASE MTG, 1 SPEED LH	100 0216	
1	PAD, CASE MTG, 1 SPEED RH	100 0215	
1	PAD, CASE MTG, 16 SPEED LH	100 0218	
1	PAD, CASE MTG, 16 SPEED RH	100 0217	
1	BRAZING ASSY, CASE CENTER	100 0083	

LIST OF PARTS AND MATERIALS

1000201	CL 1000201
1000001	BL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN D.M. WHITE
APPROVED FOR MSC

MACHINING ASSEMBLY
CASE CENTER

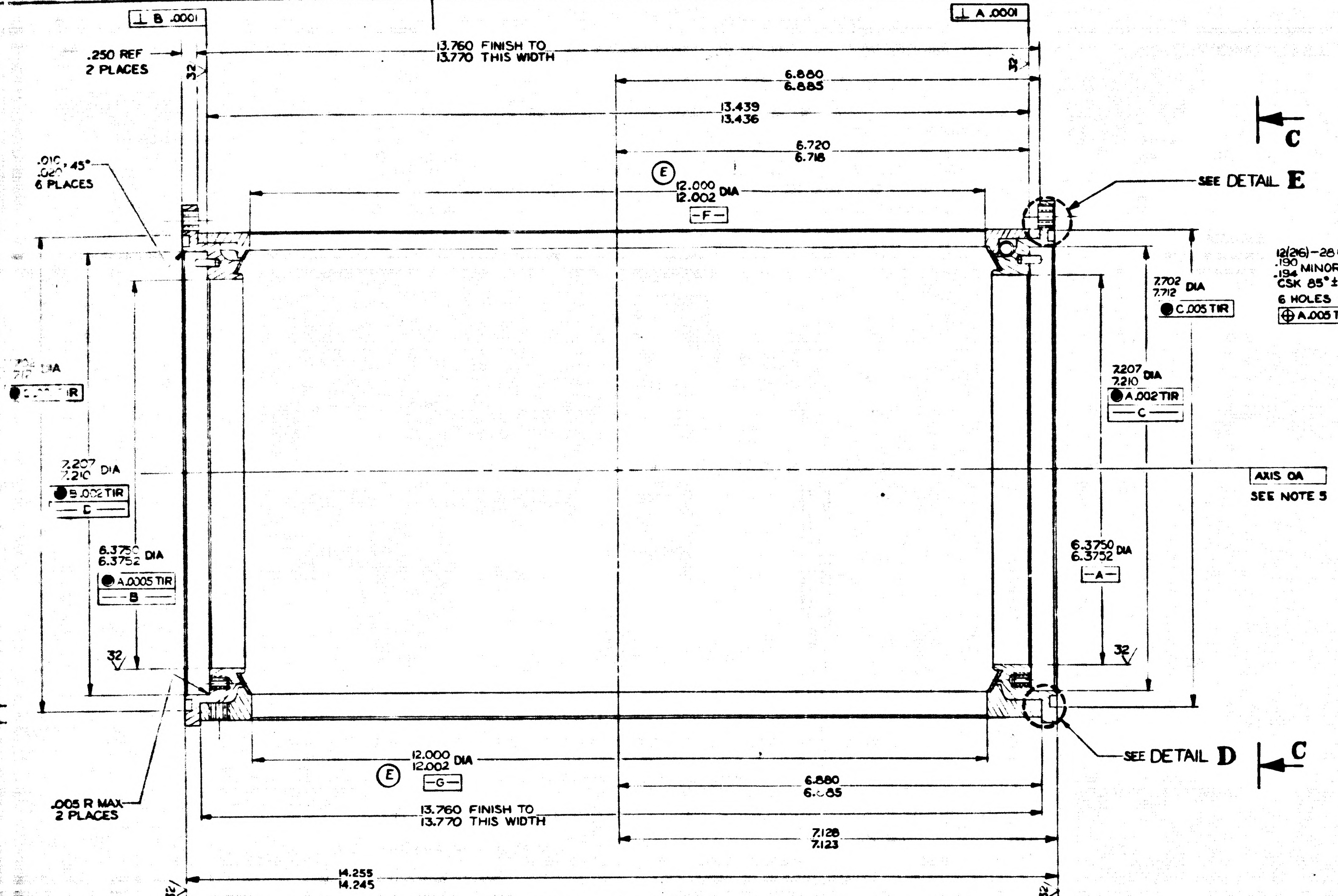
SCALE 1/1
UNIT WT.
CODE IDENT

1000085 REV G SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

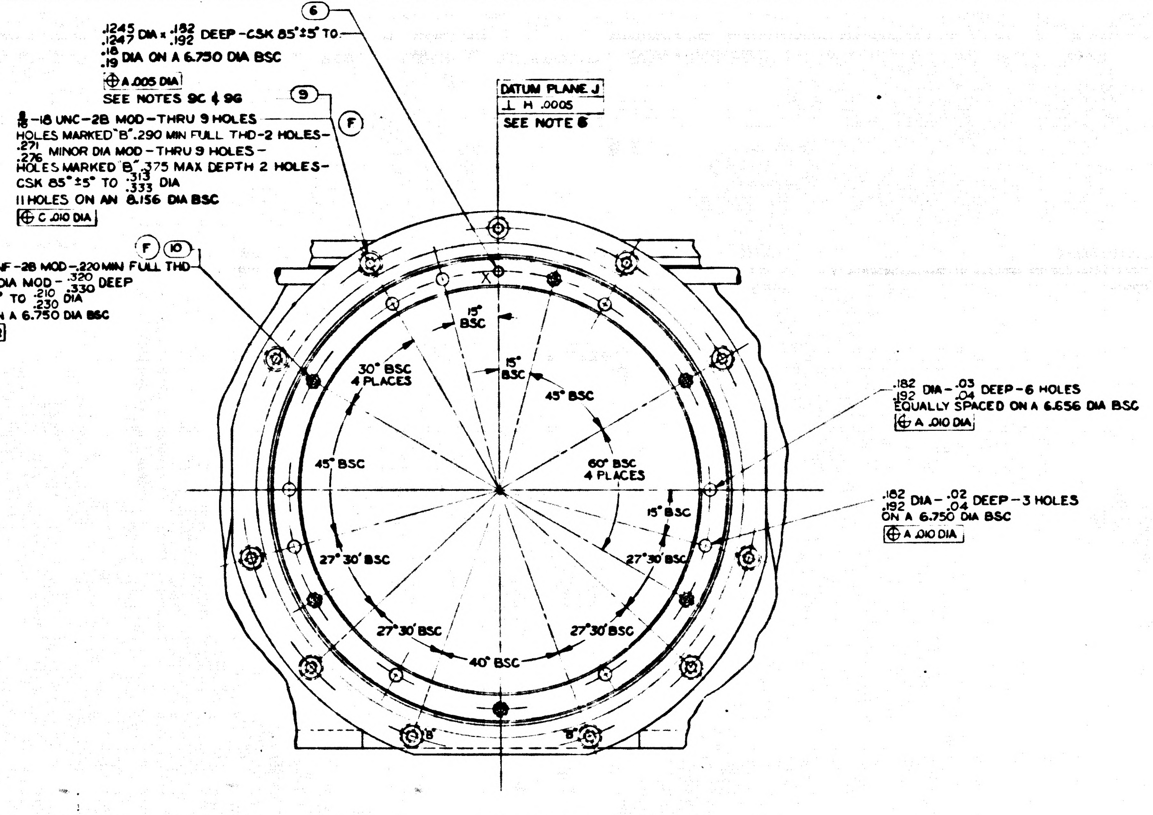
F-2

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63		
E	TDRR 00589	2-15-63	ajb	
F	TDRR 01056	4-30-63	ajb	
G	TDRR 01442	6-5-63	ajb	



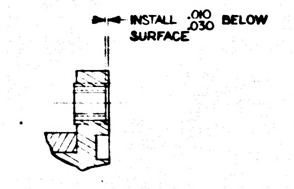
13.760 FINISH TO
13.770 THIS WIDTH
.250 REF
2 PLACES
.010 x 45°
6 PLACES
6.880
6.885
13.439
13.436
6.720
6.718
12.000 DIA
12.002
SEE DETAIL E
2.702 DIA
2.712
C .005 TIR
2.207 DIA
2.210
A .002 TIR
AXIS OA
SEE NOTE 5
6.3750 DIA
6.3752
A .0005 TIR
SEE DETAIL D
.005 R MAX
2 PLACES
7.128
7.123
14.255
14.245

SECTION A-A



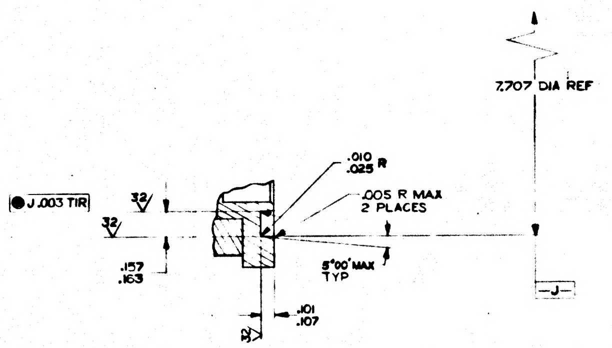
.1245 DIA x .182 DEEP - CSK 85°±5° TO
.247 .192
.18
.19 DIA ON A 6.750 DIA BSC
A .005 DIA
SEE NOTES 9C & 9G
5/8 -18 UNC-2B MOD - THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD - 2 HOLES
.271
.276 MINOR DIA MOD - THRU 9 HOLES
HOLES MARKED "B" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313
.333 DIA
11 HOLES ON AN 8.156 DIA BSC
C .010 DIA
DATUM PLANE J
H .0005
SEE NOTE 6
12(26)-28 UNF-2B MOD - .220 MIN FULL THD
.190 MINOR DIA MOD - .320 DEEP
.194 .330
CSK 85°±5° TO .210
.220 DIA
6 HOLES ON A 6.750 DIA BSC
A .005 TIR
15° BSC
30° BSC
4 PLACES
45° BSC
60° BSC
4 PLACES
27°30' BSC
40° BSC
.182 DIA - .03
.192 .04 DEEP - 6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
A .010 DIA
.182 DIA - .02
.192 .04 DEEP - 3 HOLES
ON A 6.750 DIA BSC
A .010 DIA

VIEW C-C



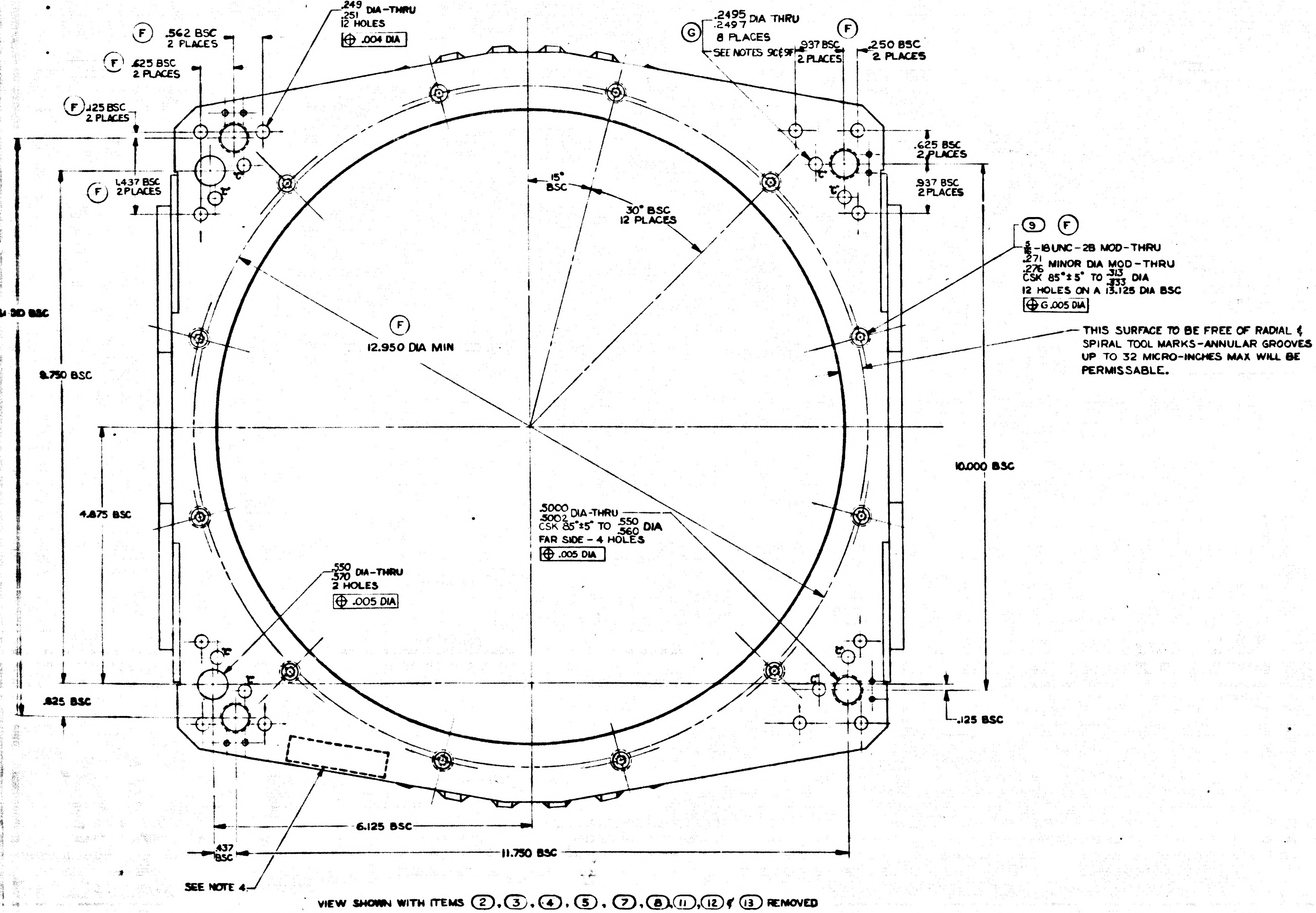
INSTALL .010
.030 BELOW
SURFACE

DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨ & ⑩



7.707 DIA REF
.010
.025 R
.005 R MAX
2 PLACES
J .003 TIR
.157
.163
5°00' MAX
TYP
.101
.107
J

DETAIL D
SCALE: 2/1
2 PLACES



.249
.251 DIA - THRU
12 HOLES
.004 DIA
.562 BSC
2 PLACES
.625 BSC
2 PLACES
.125 BSC
2 PLACES
1.437 BSC
2 PLACES
.2495
.2497 DIA THRU
8 PLACES
SEE NOTES 9C & 9F
.937 BSC
2 PLACES
.250 BSC
2 PLACES
.625 BSC
2 PLACES
.937 BSC
2 PLACES
15° BSC
30° BSC
12 PLACES
5/8 -18 UNC-2B MOD - THRU
.271
.276 MINOR DIA MOD - THRU
CSK 85°±5° TO .313
.333 DIA
12 HOLES ON A 13.125 DIA BSC
G .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS - ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
12.950 DIA MIN
9.750 BSC
10.000 BSC
4.875 BSC
.5000
.5002 DIA - THRU
CSK 85°±5° TO .550
.560 DIA
FAR SIDE - 4 HOLES
.005 DIA
.550
.570 DIA - THRU
2 HOLES
.005 DIA
.625 BSC
.125 BSC
.437 BSC
6.125 BSC
11.750 BSC
SEE NOTE 4

VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED

REPLACES REV C WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
8	SCREW, BUT. HD, HEX SOC	1000093-14			13
4	RETAINER, FASTENER	1000186			12
12	NUT, FLUSH MTG, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED, SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607 4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000216			5
1	PAD, CASE MTG, 1 SPEED RH	1000215			4
1	PAD, CASE MTG, 16 SPEED LH	1000218			3
1	PAD, CASE MTG, 16 SPEED RH	1000217			2
1	BRAZING ASSY, CASE CENTER	1000083			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN D.M. WHITE 12-4-62
APPROVED FOR MSC
W.J. Rohm 2-27-63
W. Kaffer 27 Feb 63

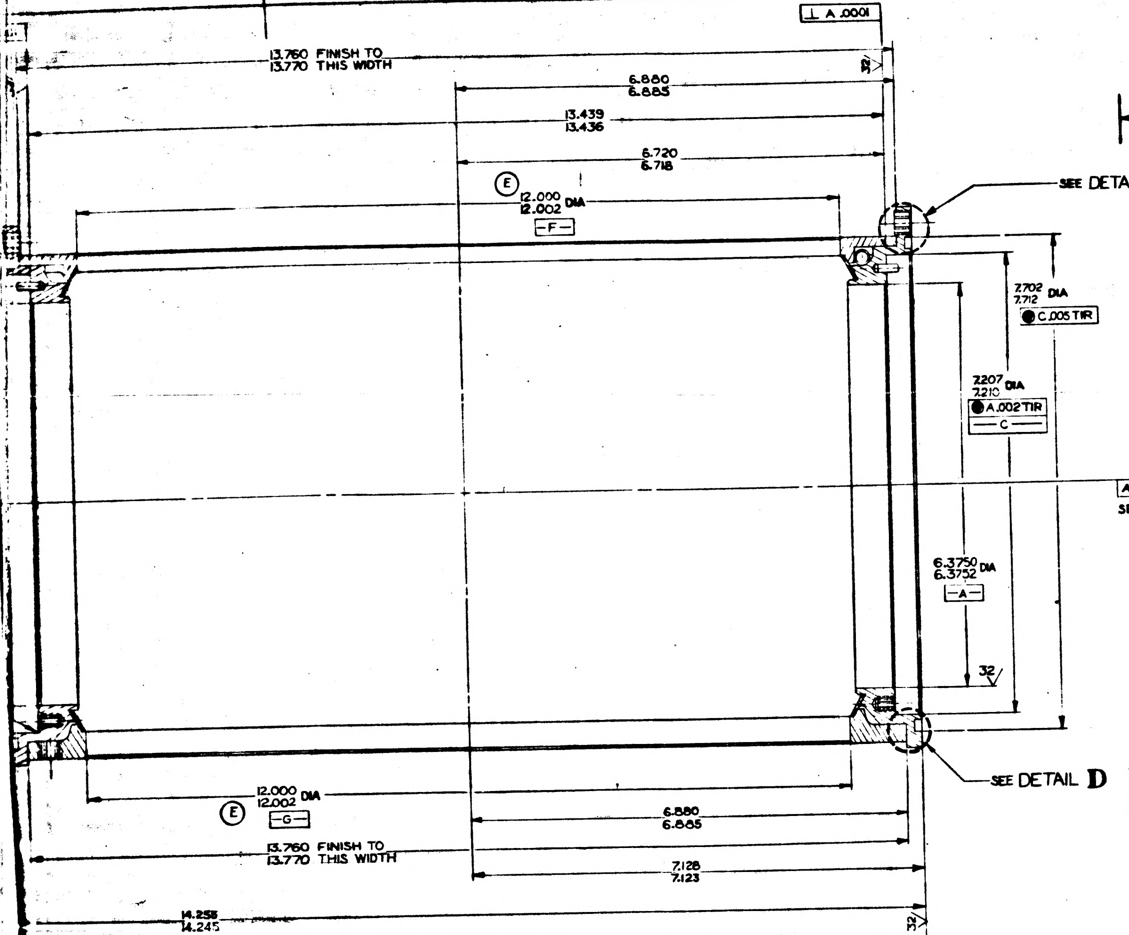
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000085
SHEET 1 OF 1

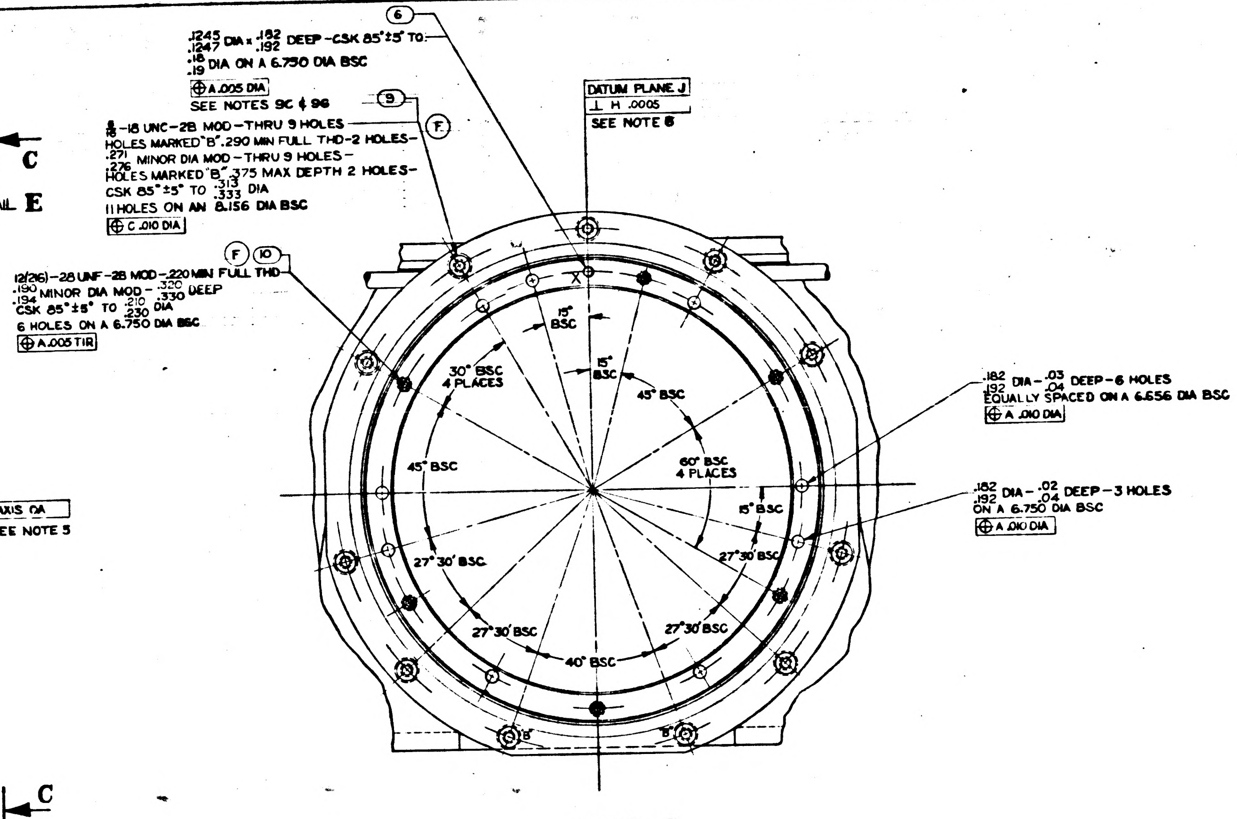
1000085 REV G SHEET 1

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63		WK
E	TDRR 00589	3-19-63		WK
F	TDRR 01056	4-30-63		WK
G	TDRR 01442	6-5-63		



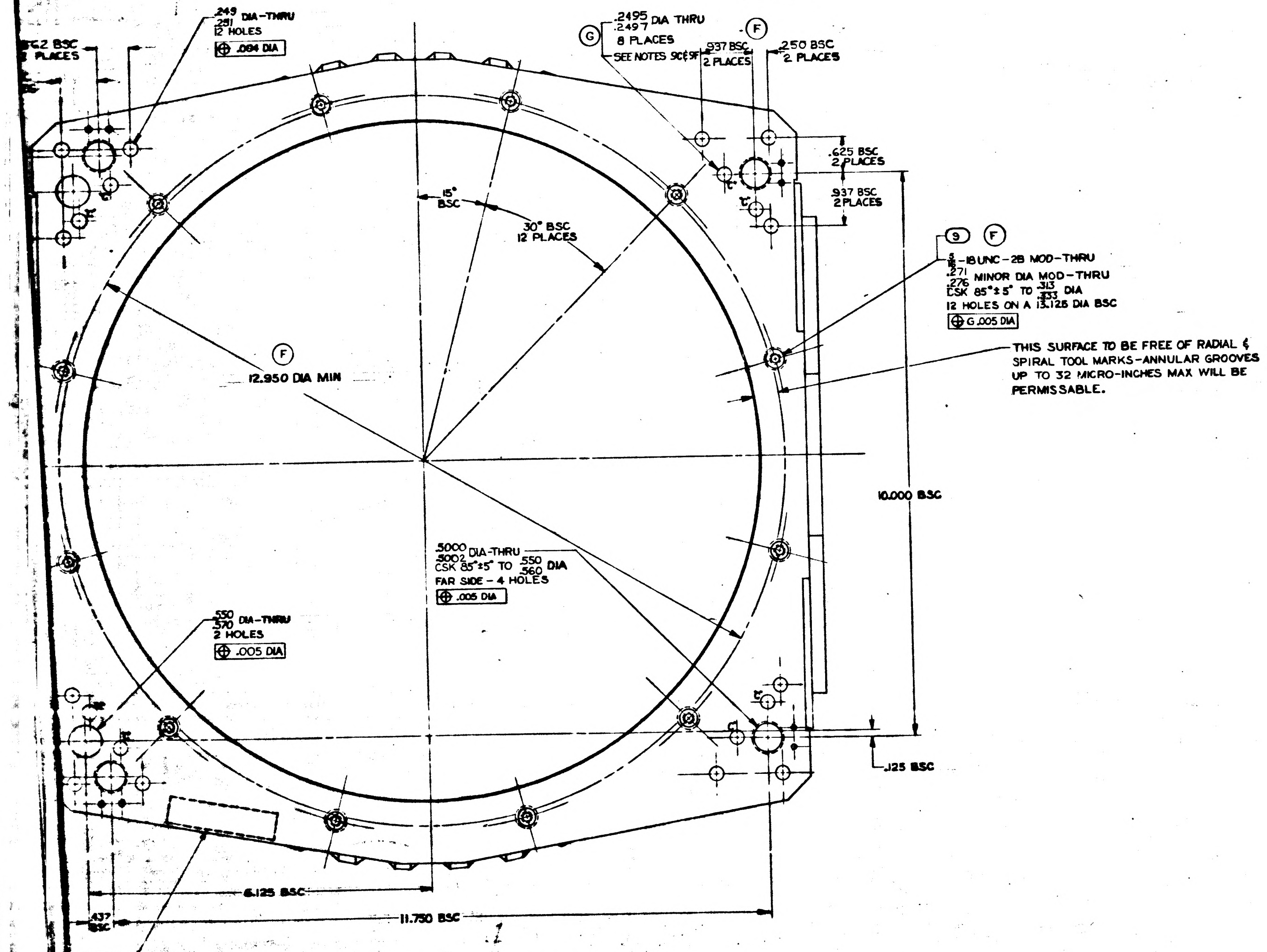
⊥ A .0001
13.760 FINISH TO
13.770 THIS WIDTH
6.880
6.885
13.439
13.436
6.720
6.718
E
12.000
12.002 DIA
-F-
SEE DETAIL E
SEE DETAIL D
C
7.702
7.712 DIA
● C .005 TIR
7.207
7.210 DIA
● A .002 TIR
— C —
AXIS OA
SEE NOTE 5
6.3750
6.3752 DIA
-A-
32
12.000
12.002 DIA
-G-
6.880
6.885
13.760 FINISH TO
13.770 THIS WIDTH
7.128
7.123
14.255
14.245
32
⌒ .002

SECTION A-A



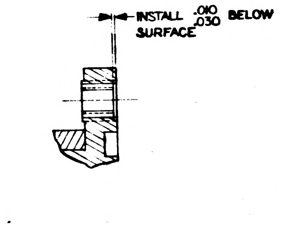
6
.1245
.1247 DIA x .182
.192 DEEP-CSK 85°±5° TO
.18
.19 DIA ON A 6.750 DIA BSC
⊕ A .005 DIA
SEE NOTES 9C & 9E
9
F
5/16-18 UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD-2 HOLES-
.271
.276 MINOR DIA MOD-THRU 9 HOLES-
HOLES MARKED "B" .375 MAX DEPTH 2 HOLES-
CSK 85°±5° TO .313
.333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ C .010 DIA
F
10
12(216)-28 UNF-2B MOD-.220 MIN FULL THD
.190
.194 MINOR DIA MOD - .320
.330 DEEP
CSK 85°±5° TO .210
.230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ A .005 TIR
C
DATUM PLANE J
⊥ H .0005
SEE NOTE 8
X
15° BSC
15° BSC
30° BSC
4 PLACES
45° BSC
45° BSC
60° BSC
4 PLACES
15° BSC
27°30' BSC
27°30' BSC
27°30' BSC
27°30' BSC
40° BSC
"B"
"B"
.182
.192 DIA - .03
.04 DEEP-6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
⊕ A .010 DIA
.182
.192 DIA - .02
.04 DEEP-3 HOLES
ON A 6.750 DIA BSC
⊕ A .010 DIA

VIEW C-C



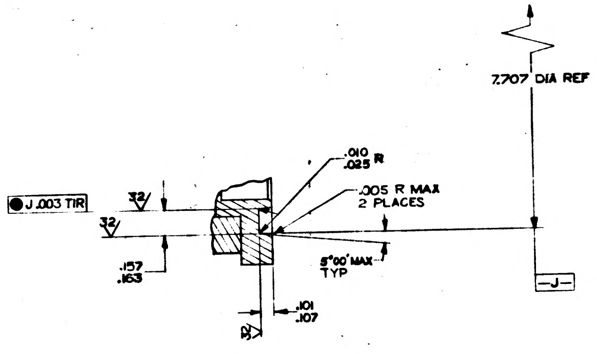
.562 BSC
2 PLACES
.249
.251 DIA-THRU
12 HOLES
⊕ .014 DIA
G
.2495
.2497 DIA THRU
8 PLACES
SEE NOTES 9C & 9F
F
.937 BSC
2 PLACES
.250 BSC
2 PLACES
.625 BSC
2 PLACES
.937 BSC
2 PLACES
15° BSC
30° BSC
12 PLACES
9
F
5/16-18 UNC-2B MOD-THRU
.271
.276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313
.333 DIA
12 HOLES ON A 13.125 DIA BSC
⊕ G .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
F
12.950 DIA MIN
10.000 BSC
.5000
.5002 DIA-THRU
CSK 85°±5° TO .550
.560 DIA
FAR SIDE - 4 HOLES
⊕ .005 DIA
.550
.570 DIA-THRU
2 HOLES
⊕ .005 DIA
.125 BSC
6.125 BSC
.437 BSC
11.750 BSC
SEE NOTE 4

VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED



INSTALL .010
.030 BELOW SURFACE

DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨ & ⑩



7.707 DIA REF
.010
.025 R
.005 R MAX
2 PLACES
● J .003 TIR
32
32
.157
.163
5°00' MAX
TYP
.101
.107
32
-J-

DETAIL D
SCALE: 2/1
2 PLACES

REPLACES REV C WITH CHANGES

MASTER

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
						13
F	8	SCEW, BUT. HD, HEX SOC	1000093-14			12
	4	RETAINER, FASTENER	1000186			11
F	12	NUT, FLUSH MTD, CLINCH	1000076-2			10
	12	INSERT, THREADED, SELFLKG	1000115-3			9
	46	INSERT, THREADED. SELFLKG	1000146			8
	12	SCREW, BUT. HD, HEX SOC	1006783-45			7
	8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			6
	2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			5
F	1	PAD, CASE MTG, 1 SPEED LH	1000216			4
F	1	PAD, CASE MTG, 1 SPEED RH	1000215			3
F	1	PAD, CASE MTG, 16 SPEED LH	1000218			2
F	1	PAD, CASE MTG, 16 SPEED RH	1000217			1
	1	BRAZING ASSY, CASE CENTER	1000083			

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
1000001	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D.M. WHITE
APPROVED FOR MSC
SYSTEM/DESIGN

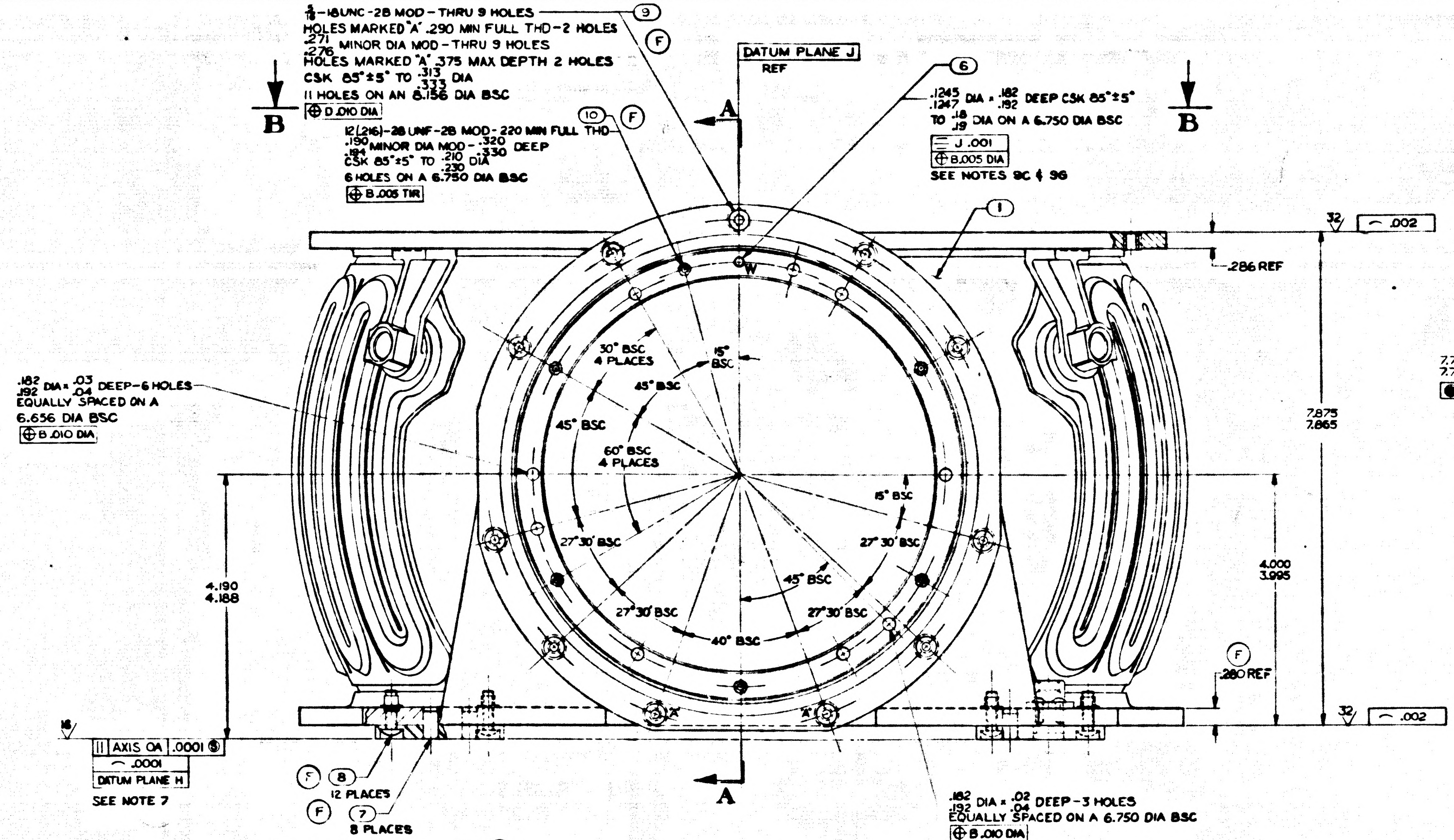
MACHINING ASSEMBLY
CASE CENTER

SCALE	UNIT WT.	CODE IDENT
1/1		

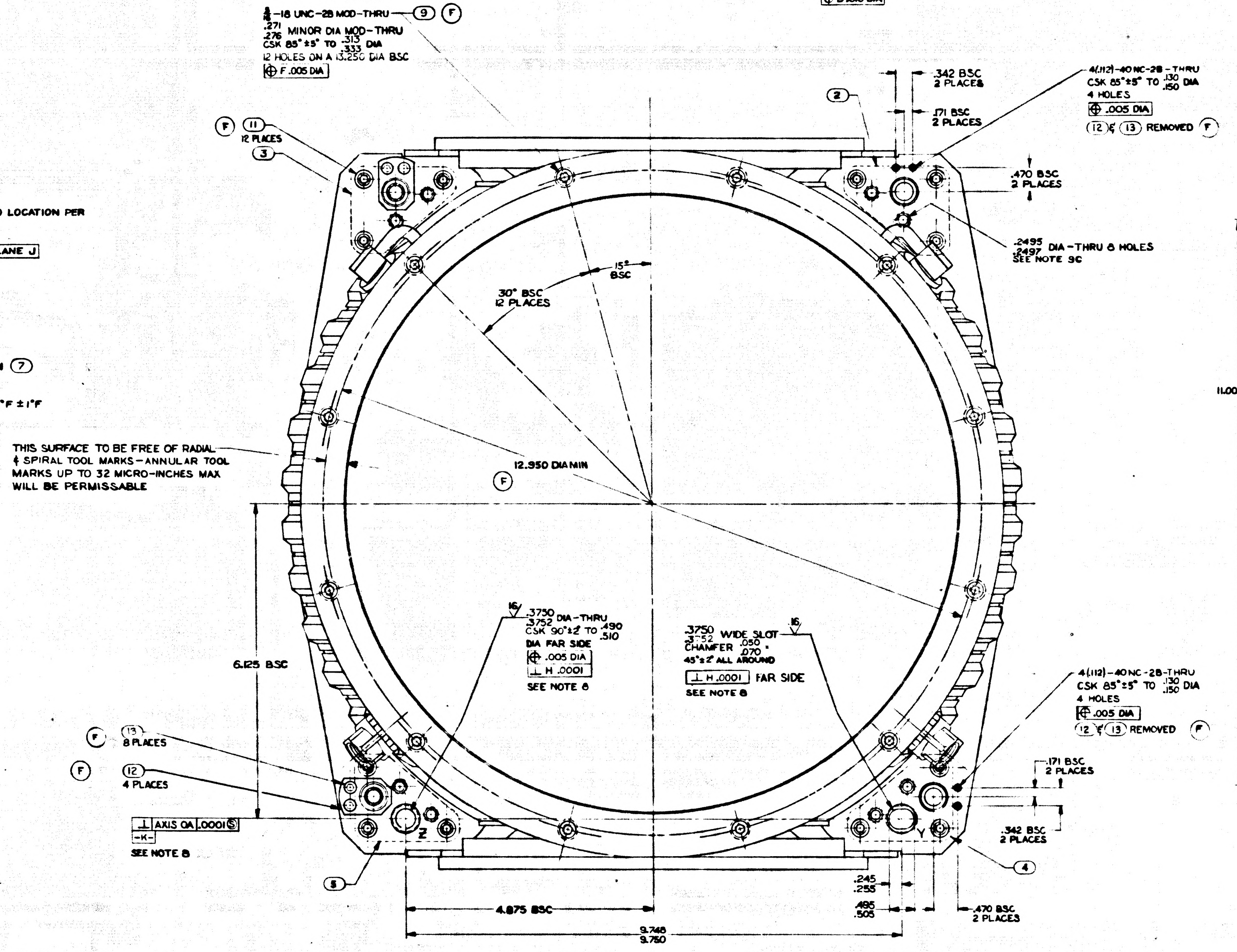
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

PHOTOGRAPHIC SCALE ONLY

F3

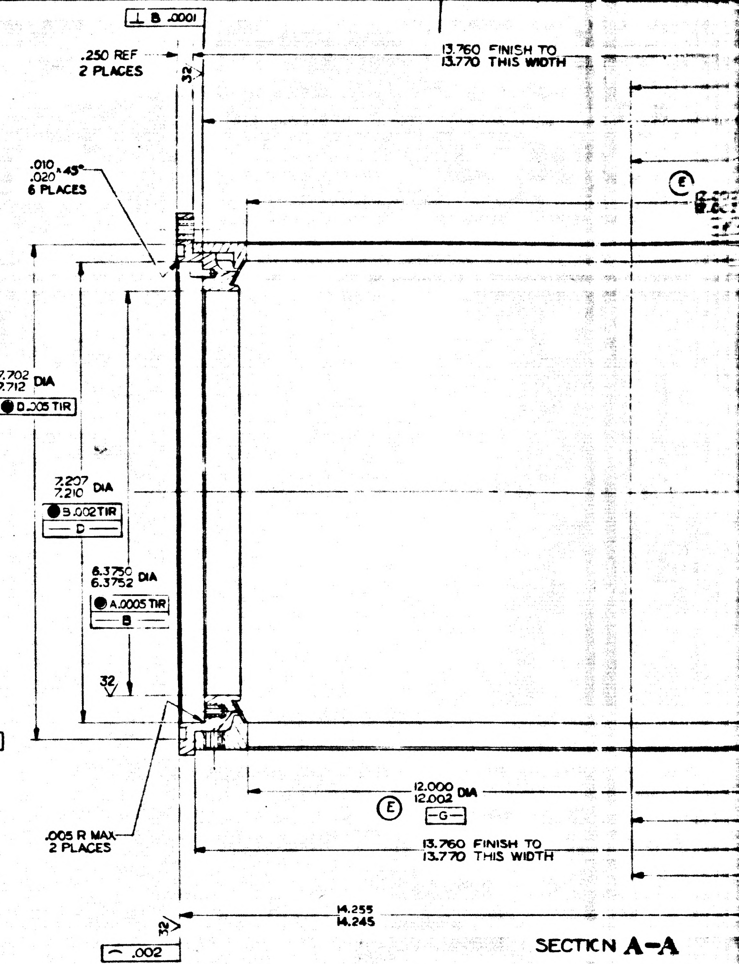


5/16-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271/.276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313/.333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
9
F
B
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190/.194 MINOR DIA MOD-.320/.330 DEEP
CSK 85°±5° TO .210/.230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
10
F
DATUM PLANE J
REF
A
6
.1245/.1247 DIA × .182/.192 DEEP CSK 85°±5° TO .18/.19 DIA ON A 6.750 DIA BSC
J .001
⊕ B .005 DIA
SEE NOTES 9C & 9G
B
1
32
.002
.286 REF
.182/.192 DIA × .03/.04 DEEP-6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
⊕ B .010 DIA
W
30° BSC 4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC 4 PLACES
15° BSC
27°30' BSC
27°30' BSC
27°30' BSC
27°30' BSC
45° BSC
40° BSC
X
7.875/7.865
4.190/4.188
4.000/3.995
F
.280 REF
32
.002
16
AXIS OA .0001 S
.0001
DATUM PLANE H
SEE NOTE 7
F 8
12 PLACES
F 7
8 PLACES
A
.182/.192 DIA × .02/.04 DEEP-3 HOLES EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA



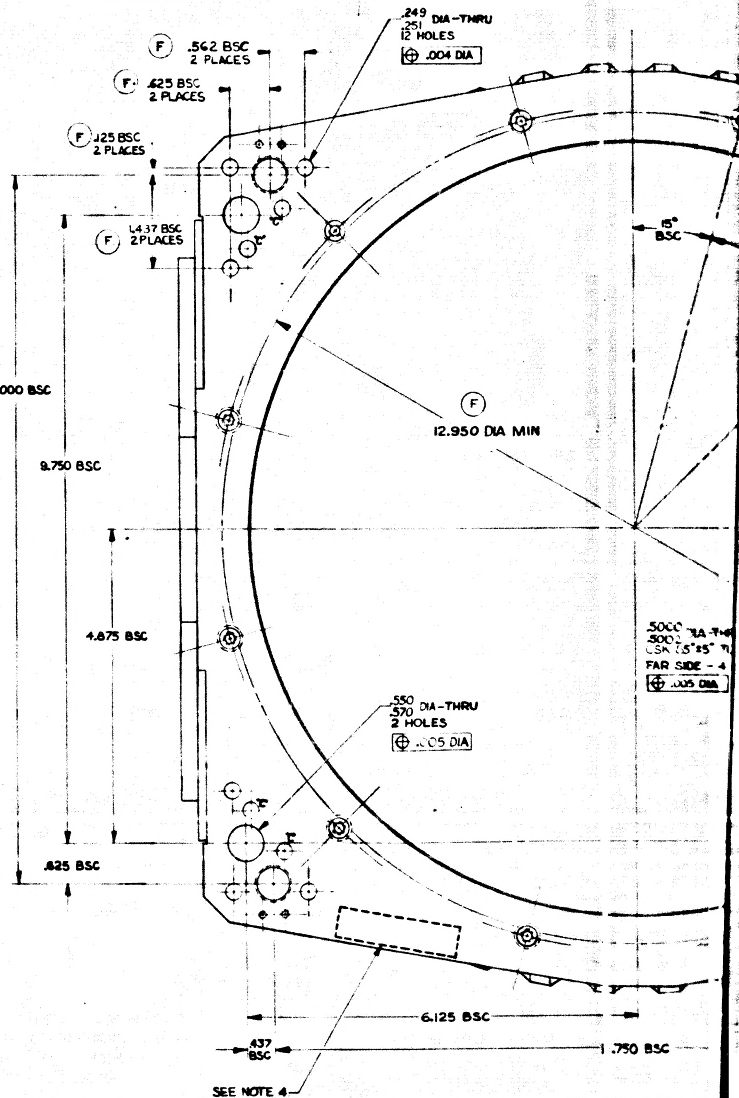
5/16-18 UNC-2B MOD-THRU 9 F
.271/.276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313/.333 DIA
12 HOLES ON A 13.250 DIA BSC
⊕ F .005 DIA
2
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES
⊕ .005 DIA
12 & 13 REMOVED F
F 11
12 PLACES
3
.470 BSC 2 PLACES
.2495/.2497 DIA-THRU 8 HOLES
SEE NOTE 9C
30° BSC 12 PLACES
15° BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
12.950 DIA MIN
F
16
.3750/.3752 DIA-THRU
CSK 90°±2° TO .490/.510
DIA FAR SIDE
⊕ .005 DIA
⊥ H .0001
SEE NOTE 8
.3750/.3752 WIDE SLOT
CHAMFER .050/.070 × 45°±2° ALL AROUND
16
⊥ H .0001 FAR SIDE
SEE NOTE 8
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES
⊕ .005 DIA
12 & 13 REMOVED F
6.125 BSC
F 13
8 PLACES
F 12
4 PLACES
AXIS OA .0001 S
-K-
SEE NOTE 8
Z
Y
.171 BSC 2 PLACES
.342 BSC 2 PLACES
4
5
.245/.255
.495/.505
.470 BSC 2 PLACES
4.875 BSC
9.748/9.750

VIEW **B - B**



⊥ B .0001
.250 REF 2 PLACES
32
13.760 FINISH TO 13.770 THIS WIDTH
.010/.020 × 45° 6 PLACES
E
7.702/7.712 DIA
● D .005 TIR
7.207/7.210 DIA
● B .002 TIR
-D-
6.3750/6.3752 DIA
● A .0005 TIR
-B-
32
.005 R MAX 2 PLACES
12.000/12.002 DIA
E
-G-
13.760 FINISH TO 13.770 THIS WIDTH
14.255/14.245
32
.002

SECTION **A-A**



F .562 BSC 2 PLACES
F .625 BSC 2 PLACES
F .125 BSC 2 PLACES
F 1.437 BSC 2 PLACES
.249/.251 DIA-THRU
12 HOLES
⊕ .004 DIA
15° BSC
C
C
11.000 BSC
9.750 BSC
F
12.950 DIA MIN
4.875 BSC
.5000/.5002 DIA-THRU
CSK 85°±5°
FAR SIDE - 4
⊕ .005 DIA
.550/.570 DIA-THRU
2 HOLES
⊕ .005 DIA
C
C
.625 BSC
6.125 BSC
.437 BSC
1.750 BSC
SEE NOTE 4

VIEW SHOWN WITH ITEMS ②, ③, ④

NOTES:

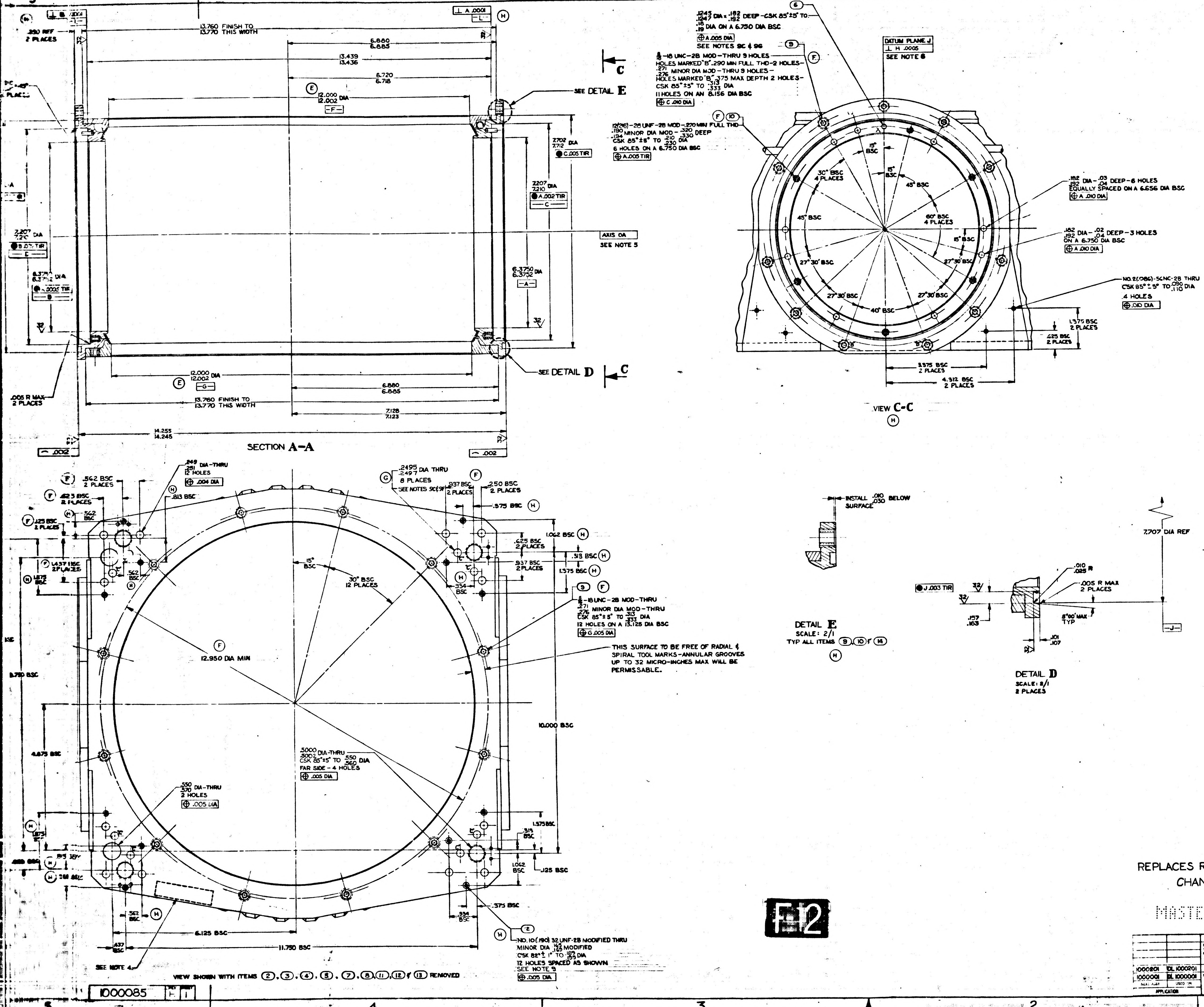
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005/.015
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM ⑥ MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS ②, ③, ④ & ⑤
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - Ⓕ D. ANODIC COAT PER NOTE 11
   - Ⓕ E. INSTALL ITEMS ②, ③, ④, ⑤, ⑧, ⑨, ⑩, ⑪, ⑫ & ⑬
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS ②, ③, ④ & ⑤ & INSTALL ITEM ⑦
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM ⑥
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F

Ⓕ 11. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

INCHES
PHOTOGRAPHIC SCALE ONLY

1000085	REV	SHEET
	G	1

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63		VK
E	TDRR 00589	3-19-63		VK
F	TDRR 01056	4-30-63		VK
G	TDRR 01442	6-5-63		
H	TDRR 04557	12-3-63		


SECTION A-A
VIEW C-C
DETAIL E
SCALE: 2/1
TYP ALL ITEMS 9, 10 & 14
DETAIL D
SCALE: 8/1
2 PLACES
SEE DETAIL E
SEE DETAIL D
AXIS OA
SEE NOTE 5
DATUM PLANE J
SEE NOTE 6
13.760 FINISH TO 13.770 THIS WIDTH
12.000 / 12.002 DIA
6.880 / 6.885
13.439 / 13.436
6.720 / 6.718
7.128 / 7.123
14.255 / 14.245
.005 R MAX 2 PLACES
12.950 DIA MIN
10.000 BSC
11.750 BSC
6.125 BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
.5000 / .5002 DIA-THRU CSK 85°±5° TO .550 / .560 DIA FAR SIDE - 4 HOLES
.550 / .570 DIA-THRU 2 HOLES
NO.10(.190) 32 UNF-2B MODIFIED THRU MINOR DIA .162 / .165 MODIFIED CSK 82°±1° TO .183 / .193 DIA 12 HOLES SPACED AS SHOWN SEE NOTE 9
8-18 UNC-2B MOD-THRU 12 HOLES ON A 13.125 DIA BSC
INSTALL .010 / .030 BELOW SURFACE
7.707 DIA REF
SEE NOTE 4
VIEW SHOWN WITH ITEMS 2, 3, 4, 5, 7, 8, 11, 12 & 13 REMOVED
REPLACES REV C WITH CHANGES
MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
12	INSERT, THREADED, SELF LKG	1000115-2			4
8	SCEW, BUT.HD., HEX SOC	1000083-14			13
4	RETAINER, FASTENER	1000186			12
12	NUT, FLUSH MTD, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED, SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000216			5
1	PAD, CASE MTG, 1 SPEED RH	1000215			4
1	PAD, CASE MTG, 16 SPEED LH	1000218			3
1	PAD, CASE MTG, 16 SPEED RH	1000217			2
1	BRAZING ASSY, CASE CENTER	1000083			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN D.M.WHITE
APPROVED FOR MSC
W.J. Rhine 2-27-63

MACHINING ASSEMBLY
CASE CENTER

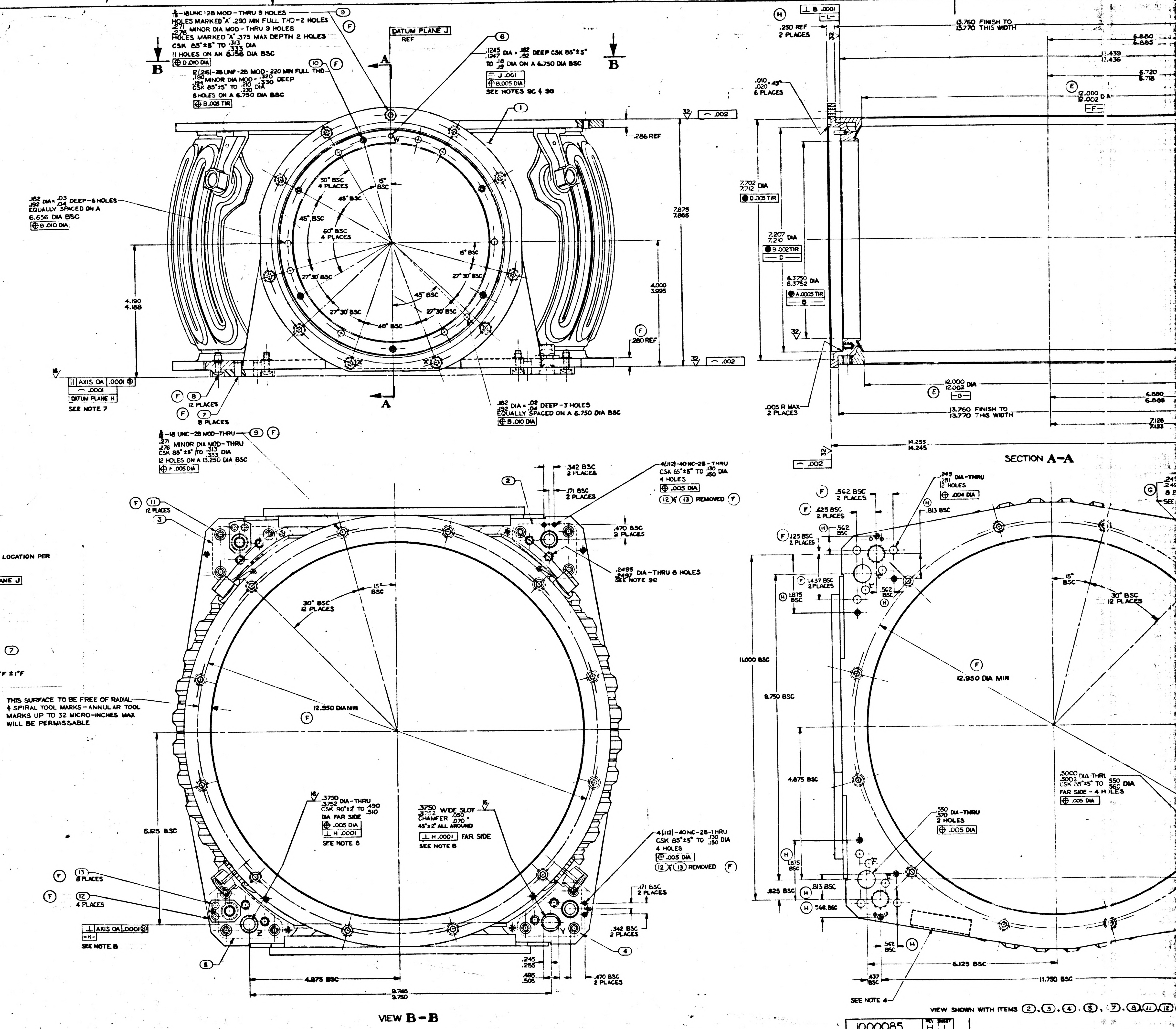
SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

1000085 H 1

E-12

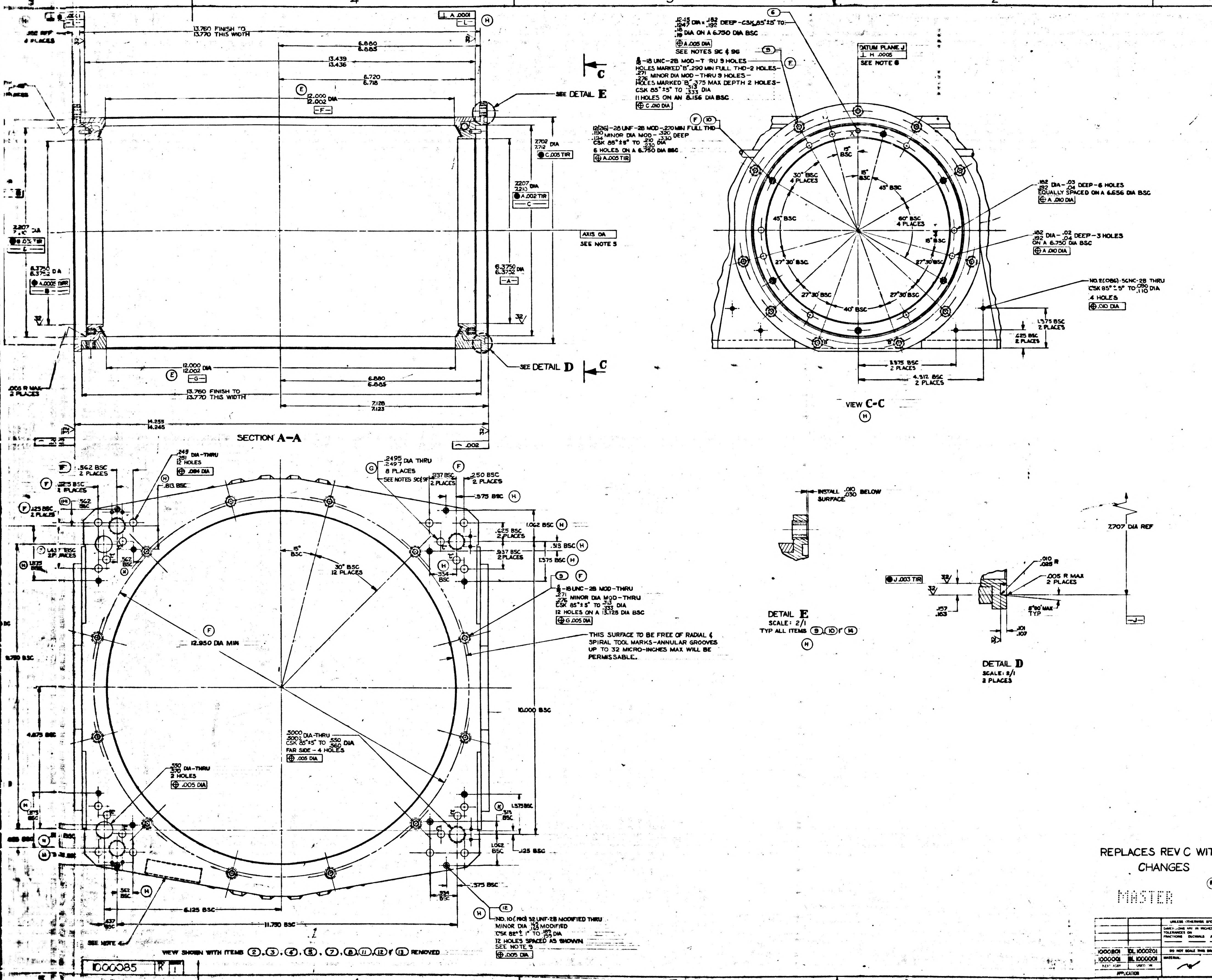
INCHES
PHOTOGRAPHIC SCALE ONLY


5/8-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
DATUM PLANE J REF
.1245 .1247 DIA × .182 .192 DEEP CSK 85°±5° TO .18 .19 DIA ON A 6.750 DIA BSC
SEE NOTES 9C & 9G
12(216)-28 UNF-2B MOD-.220 MIN FULL THD
.150 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
.182 .192 DIA × .03 .04 DEEP-6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
30° BSC 4 PLACES
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
.286 REF
.280 REF
7.875 7.865
4.000 3.995
4.190 4.188
AXIS OA .0001 DATUM PLANE H
SEE NOTE 7
12 PLACES
8 PLACES
.182 .192 DIA × .02 .04 DEEP-3 HOLES EQUALLY SPACED ON A 6.750 DIA BSC
5/8-18 UNC-2B MOD-THRU
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.250 DIA BSC
.250 REF 2 PLACES
13.760 FINISH TO 13.770 THIS WIDTH
6.880 6.885
.439 .436
6.720 6.718
12.000 12.002 DIA
.010 .020 × 45° 6 PLACES
7.702 7.712 DIA
7.207 7.210 DIA
6.3750 6.3752 DIA
.005 R MAX 2 PLACES
12.000 12.002 DIA
13.760 FINISH TO 13.770 THIS WIDTH
14.255 14.245
7.128 7.123
SECTION A-A
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40NC-2B-THRU CSK 85°±5° TO .130 .150 DIA 4 HOLES
12 & 13 REMOVED
.470 BSC 2 PLACES
.2495 .2497 DIA-THRU 8 HOLES SEE NOTE 9C
15° BSC
30° BSC 12 PLACES
12.950 DIA MIN
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
.3750 .3752 DIA-THRU CSK 90°±2° TO .490 .510 DIA FAR SIDE
SEE NOTE 8
.3750 .3752 WIDE SLOT CHAMFER .050 .070 × 45°±2° ALL AROUND
H .0001 FAR SIDE
SEE NOTE 8
6.125 BSC
8 PLACES
4 PLACES
AXIS OA .0001 -K-
SEE NOTE 8
4.875 BSC
9.748 9.750
.245 .255
.495 .505
VIEW B-B
.249 .251 DIA-THRU 12 HOLES
.562 BSC 2 PLACES
.625 BSC 2 PLACES
.813 BSC
.125 BSC 2 PLACES
1.437 BSC 2 PLACES
1.875 BSC
11.000 BSC
9.750 BSC
4.875 BSC
12.950 DIA MIN
.5000 .5002 DIA-THRU CSK 85°±5° TO .550 .560 DIA FAR SIDE-4 HOLES
.550 .570 DIA-THRU 2 HOLES
.625 BSC
6.125 BSC
11.750 BSC
.437 BSC
SEE NOTE 4
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫
1000085 REV H SHEET 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. (H) IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER ND 1002019
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM ⑥ MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS ②, ③, ④ & ⑤
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS.
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - (F) D. ANODIC COAT PER NOTE 11
   - (H)(F) E. INSTALL ITEMS ②, ③, ④, ⑤, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬ & ⑭
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS ②, ③, ④ & ⑤ & INSTALL ITEM ⑦
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM ⑥
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
11. (F) ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
12. DIAMETERS -A- & -B- AND SURFACES -L- MAY BE CHEMICAL FINISHED PER MIL-C-5541
13. (H) INSTALL PROTECTIVE PADS, NASA DWG NO. 1001460, 1001461, 1001464 & 1001465, WITH SCREWS (H) NASA DWG NO. 1000110-3 OR EQUIVALENT AFTER MACHINING MOUNTING PADS. PROTECTIVE PADS TO BE REMOVED FOR INSPECTION ONLY

INCHES
PHOTOGRAPHIC SCALE ONLY


SECTION A-A
13.760 FINISH TO 13.770 THIS WIDTH
6.880 6.885
13.439 13.436
6.720 6.718
12.000 12.002 DIA
SEE DETAIL E
SEE DETAIL D
7.702 7.712 DIA
C .005 TIR
2.207 2.210 DIA
A .002 TIR
AXIS OA
SEE NOTE 5
6.3750 6.3752 DIA
7.128 7.123
14.255 14.245
.005 R MAX 2 PLACES
VIEW C-C
DATUM PLANE J
H .0005
SEE NOTE 6
6 HOLES ON A 6.750 DIA BSC
11 HOLES ON AN 8.156 DIA BSC
30° BSC 4 PLACES
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
.182 .192 DIA - .03 .04 DEEP - 6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
.182 .192 DIA - .02 .04 DEEP - 3 HOLES ON A 6.750 DIA BSC
NO.2(.086)-56NC-2B THRU CSK 85° ± 5° TO .080 .110 DIA 4 HOLES
1.375 BSC 2 PLACES
.625 BSC 2 PLACES
3.375 BSC 2 PLACES
4.312 BSC 2 PLACES
12.950 DIA MIN
30° BSC 12 PLACES
15° BSC
10.000 BSC
12 HOLES ON A 13.125 DIA BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
.5000 .5002 DIA-THRU CSK 85° ± 5° TO .550 .560 DIA FAR SIDE - 4 HOLES
.550 .570 DIA-THRU 2 HOLES
.249 .251 DIA-THRU 12 HOLES
.2495 .2497 DIA THRU 8 PLACES SEE NOTES 9C & 9F
NO. 10(.190) 32 UNF-2B MODIFIED THRU MINOR DIA .162 .165 MODIFIED CSK 82° ± 1° TO .183 .193 DIA 12 HOLES SPACED AS SHOWN SEE NOTE 9
6.125 BSC
11.750 BSC
SEE NOTE 4
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED
INSTALL .010 .030 BELOW SURFACE
DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨, ⑩ & ⑭
7.707 DIA REF
.010 .025 R
.005 R MAX 2 PLACES
J .003 TIR
5°30' MAX TYP
.157 .163
.101 .107
DETAIL D
SCALE: 8/1
2 PLACES
1000085 K 1

REPLACES REV C WITH CHANGES

MASTER

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	3-24-63		
E	TDRR 00589	3-19-63		
F	TDRR 01056	4-30-63	ajB	
G	TDRR 01442	6-5-63	ajB	RcB
H	TDRR 04557	8-3-63		
J	TDRR 05614	1-7-64		
K	TDRR 05745	1-14-64		

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
12	INSERT, THREADED, SELF LKG	1000115-2			14
8	SCEW, BUT. HD, HEX SOC	1000093-14			13
4	RETAINER, FASTENER	1000186			12
12	NUT, FLUSH MTD, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED, SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000216			5
1	PAD, CASE MTG, 1 SPEED RH	1000215			4
1	PAD, CASE MTG, 16 SPEED LH	1000218			3
1	PAD, CASE MTG, 16 SPEED RH	1000217			2
1	BRAZING ASSY, CASE CENTER	1000083			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	BL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D.M.WHITE
APPROVED FOR MSC

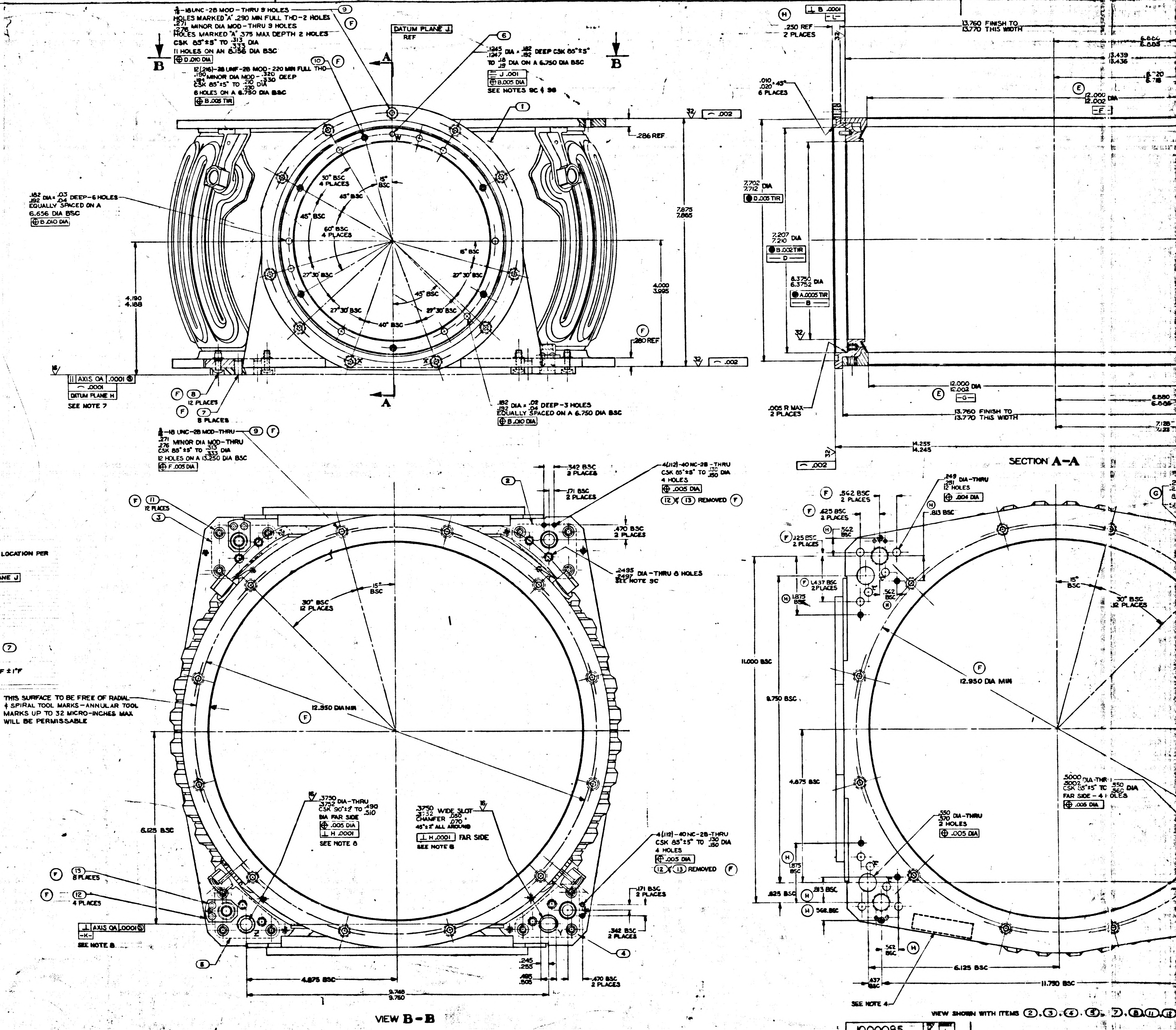
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

NOTES:

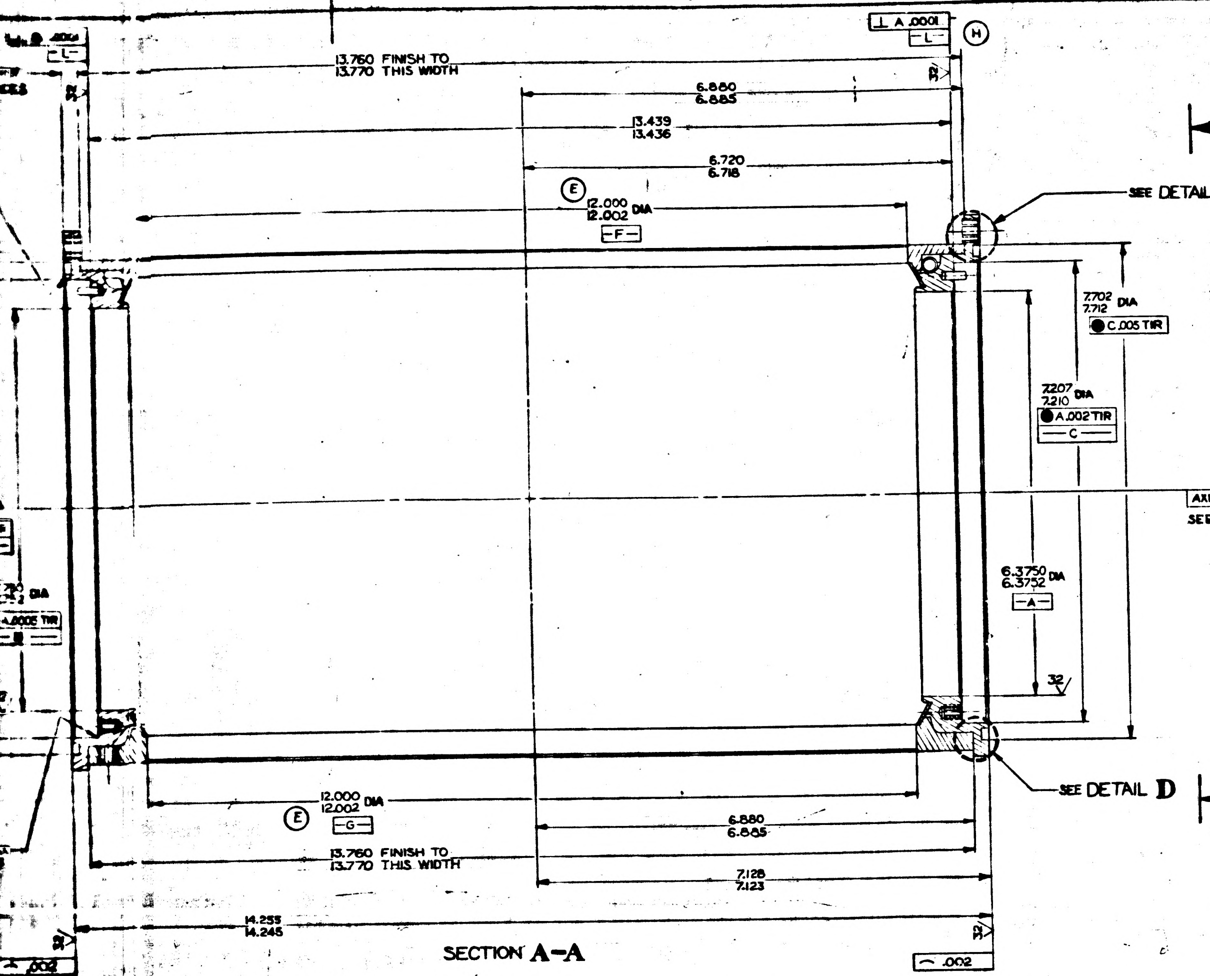
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. Ⓗ IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER ND 1002019
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM ⑥ MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS ②, ③, ④ & ⑤
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - Ⓕ D. ANODIC COAT PER NOTE 11
   - Ⓗ Ⓕ E. INSTALL ITEMS ②, ③, ④, ⑤, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬ & ⑭
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS ②, ③, ④ & ⑤ & INSTALL ITEM ⑦
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM ⑥
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
11. Ⓕ ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
12. DIAMETERS -A- & -B- AND SURFACES -L- MAY BE CHEMICAL FINISHED PER MIL-C-5541
13. Ⓗ INSTALL PROTECTIVE PADS, NASA DWG NO. 1001460, 1001461, 1001464 & 1001465, WITH SCREWS Ⓗ NASA DWG NO. 1000110-3 OR EQUIVALENT AFTER MACHINING MOUNTING PADS. PROTECTIVE PADS TO BE REMOVED FOR INSPECTION ONLY
14. Ⓙ INTERIOR HEAT EXCHANGE PASSAGES TO BE CHEMICALLY FINISHED PER MIL-C-5541



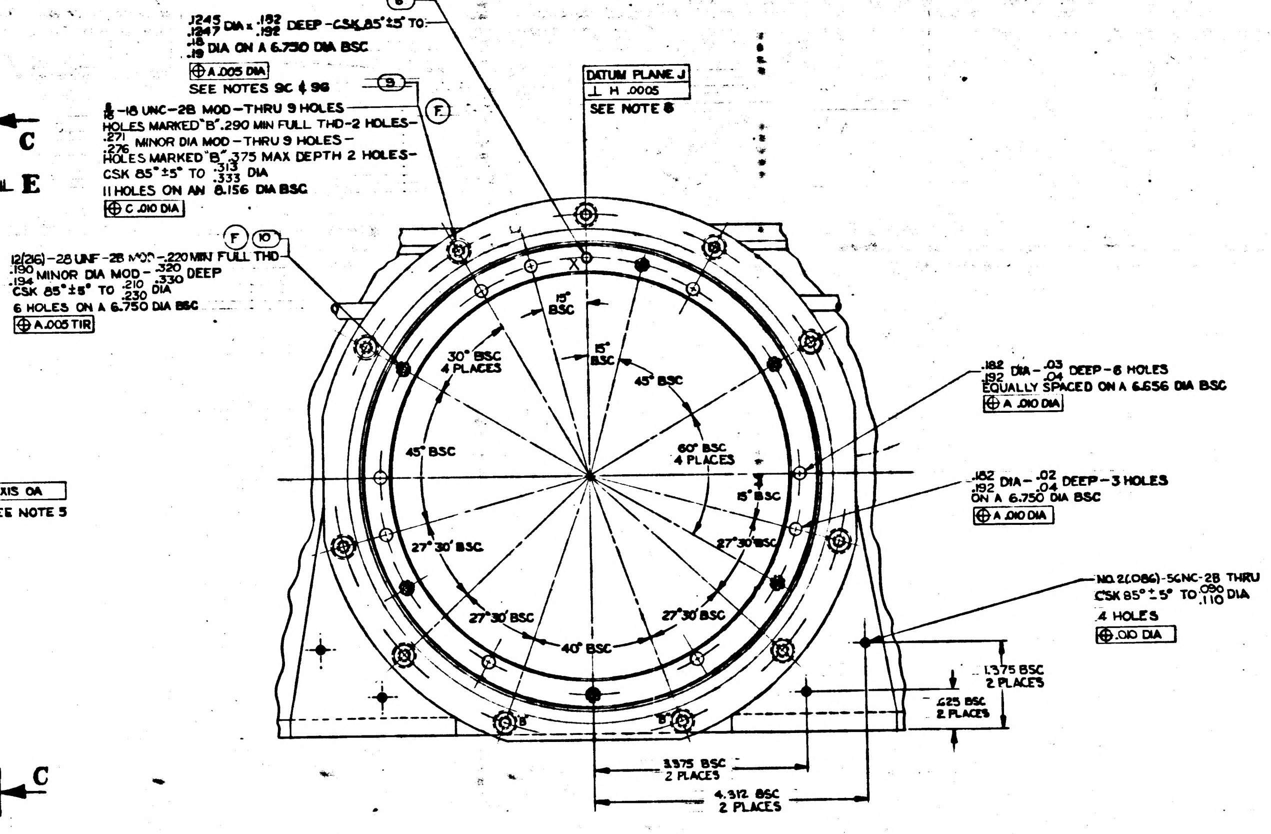
B
A
VIEW B-B
SECTION A-A
DATUM PLANE J
REF
5/16-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
12(216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .181 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
.1245 .1267 DIA x .182 .192 DEEP CSK 85°±5° TO .18 .19 DIA ON A 6.750 DIA BSC
SEE NOTES 9C & 9B
.182 .192 DIA x .03 .04 DEEP-6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
.182 .192 DIA x .02 .04 DEEP-3 HOLES EQUALLY SPACED ON A 6.750 DIA BSC
30° BSC 4 PLACES
15° BSC
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
.286 REF
.280 REF
7.875 7.865
4.000 3.995
4.190 4.188
AXIS OA .0001
DATUM PLANE H
SEE NOTE 7
12 PLACES
8 PLACES
5/16-18 UNC-2B MOD-THRU
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.250 DIA BSC
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(112)-40NC-2B-THRU CSK 85°±5° TO .130 .150 DIA 4 HOLES
12 & 13 REMOVED
.470 BSC 2 PLACES
.2495 .2497 DIA-THRU 8 HOLES SEE NOTE 9C
30° BSC 12 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
12.950 DIA MIN
6.125 BSC
.3750 .3752 DIA-THRU CSK 90°±2° TO .490 .510 DIA FAR SIDE
SEE NOTE 8
.3750 WIDE SLOT CHAMFER .050 .070 45°±2° ALL AROUND
H .0001 FAR SIDE
SEE NOTE 8
4.875 BSC
9.748 9.750
.245 .255
.495 .505
SEE NOTE 8
.250 REF 2 PLACES
.010 .020 x 45° 6 PLACES
7.702 7.712 DIA
7.207 7.210 DIA
6.3750 6.3752 DIA
13.760 FINISH TO 13.770 THIS WIDTH
12.000 12.002 DIA
.005 R MAX 2 PLACES
14.255 14.245
.249 .251 DIA-THRU 12 HOLES
.562 BSC 2 PLACES
.625 BSC 2 PLACES
.125 BSC 2 PLACES
1.437 BSC 2 PLACES
.813 BSC
11.000 BSC
8.750 BSC
4.875 BSC
12.950 DIA MIN
.5000 .5002 DIA-THRU CSK 85°±5° TO .550 .560 DIA FAR SIDE-4 HOLES
.550 .570 DIA-THRU 2 HOLES
6.125 BSC
11.750 BSC
SEE NOTE 4
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫

1000085

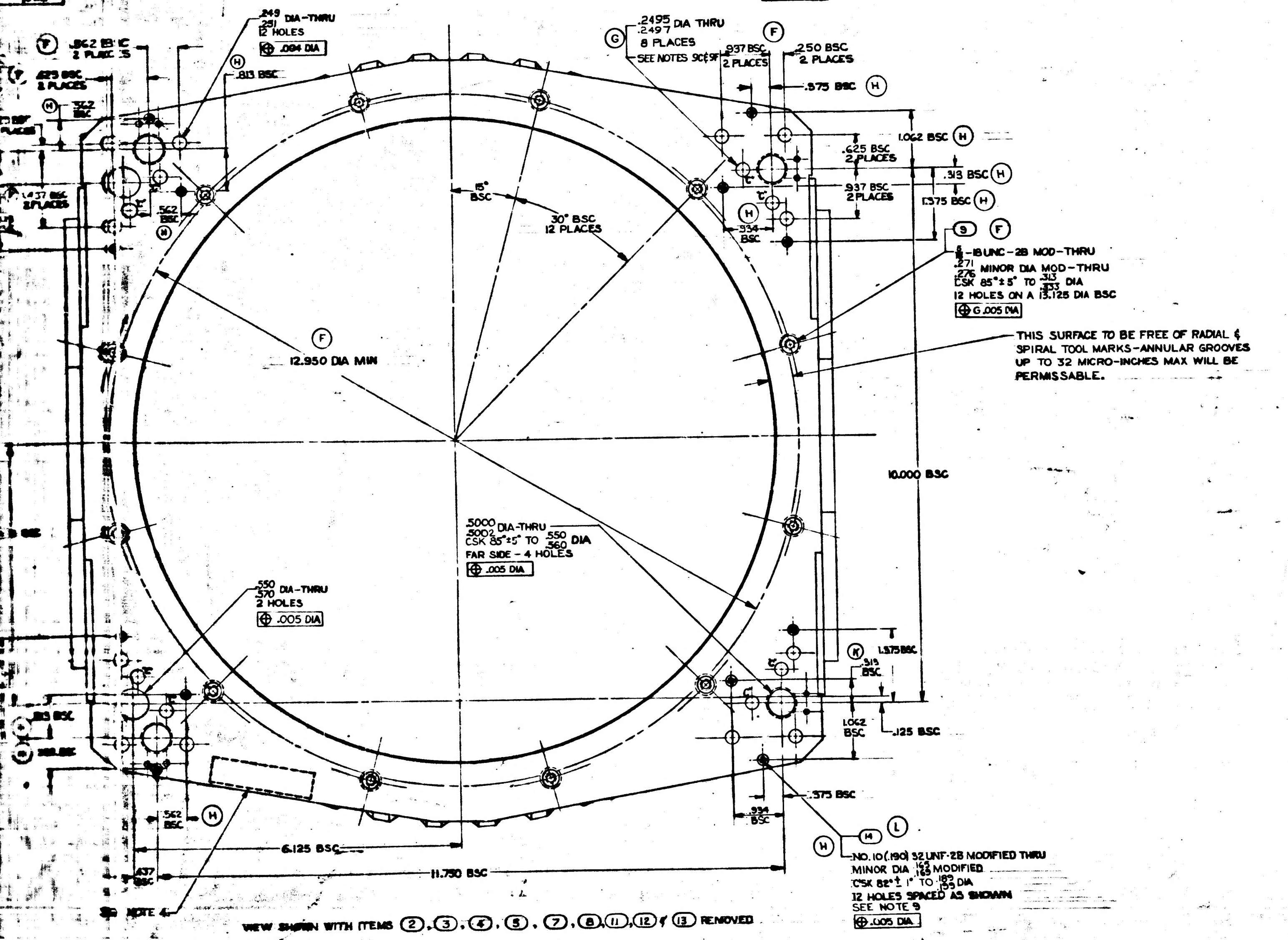
REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	3-26-63		
E	TDRR 00589	5-13-63		
F	TDRR 01056	4-30-63		
G	TDRR 01442	6-5-63		
H	TDRR 04557	8-3-63		
J	TDRR 05614	1-7-64		
K	TDRR 05745	1-1-64		
L	TDRR 07080	4-7-64		


13.760 FINISH TO
13.770 THIS WIDTH
6.880
6.885
13.439
13.436
6.720
6.718
12.000
12.002 DIA
-F-
SEE DETAIL E
7.702
7.712 DIA
C .005 TIR
2.207
2.210 DIA
A .002 TIR
-C-
AXIS OA
SEE NOTE 5
6.3750
6.3752 DIA
-A-
32
12.000
12.002 DIA
-G-
SEE DETAIL D
13.760 FINISH TO
13.770 THIS WIDTH
6.880
6.885
7.128
7.123
14.255
14.245
.002
.002

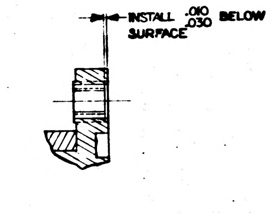
SECTION A-A


.1245
.1247 DIA x .182
.192 DEEP-CSK 85°±5° TO
.18
.19 DIA ON A 6.750 DIA BSC
A .005 DIA
SEE NOTES 9C & 9G
6
9
F
5/16-18 UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD-2 HOLES-
.271
.276 MINOR DIA MOD-THRU 9 HOLES-
HOLES MARKED "B" .375 MAX DEPTH 2 HOLES-
CSK 85°±5° TO .313
.333 DIA
11 HOLES ON AN 8.156 DIA BSC
C .010 DIA
F
10
12(216)-28 UNF-2B MOD-.220 MIN FULL THD
.190
.194 MINOR DIA MOD-.320
.330 DEEP
CSK 85°±5° TO .210
.230 DIA
6 HOLES ON A 6.750 DIA BSC
A .005 TIR
DATUM PLANE J
⊥ H .0005
SEE NOTE 8
15° BSC
15° BSC
30° BSC
4 PLACES
45° BSC
60° BSC
4 PLACES
15° BSC
27°30' BSC
27°30' BSC
27°30' BSC
27°30' BSC
40° BSC
.182
.192 DIA-.03
.04 DEEP-6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
A .010 DIA
.182
.192 DIA-.02
.04 DEEP-3 HOLES
ON A 6.750 DIA BSC
A .010 DIA
NO. 2(.086)-56NC-2B THRU
CSK 85°±5° TO .090
.110 DIA
4 HOLES
.010 DIA
1.375 BSC
2 PLACES
.625 BSC
2 PLACES
3.375 BSC
2 PLACES
4.312 BSC
2 PLACES

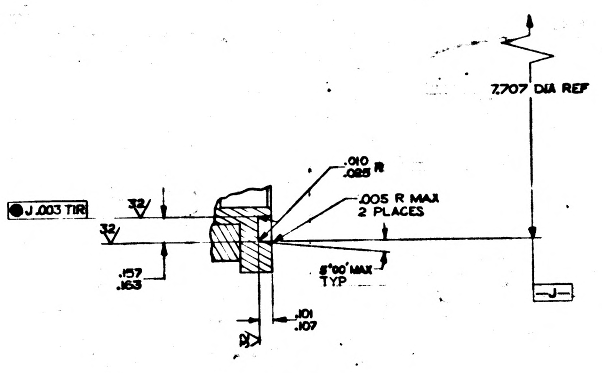
VIEW C-C
(H)


.249
.251 DIA-THRU
12 HOLES
.004 DIA
.1562 BSC
2 PLACES
.913 BSC
.2495
.2497 DIA THRU
8 PLACES
SEE NOTES 9C & 9F
.937 BSC
2 PLACES
.250 BSC
2 PLACES
.575 BSC
1.062 BSC
.625 BSC
2 PLACES
.313 BSC
.937 BSC
2 PLACES
1.375 BSC
.334
BSC
15° BSC
30° BSC
12 PLACES
.562 BSC
5/16-18 UNC-2B MOD-THRU
.271
.276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313
.333 DIA
12 HOLES ON A 13.125 DIA BSC
G .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
12.950 DIA MIN
10.000 BSC
.5000
.5002 DIA-THRU
CSK 85°±5° TO .550
.560 DIA
FAR SIDE-4 HOLES
.005 DIA
.550
.570 DIA-THRU
2 HOLES
.005 DIA
1.575 BSC
.313 BSC
1.062 BSC
.125 BSC
.575 BSC
.334 BSC
.562 BSC
6.125 BSC
11.750 BSC
SEE NOTE 4
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .163
.165 MODIFIED
CSK 82°±1° TO .189
.199 DIA
12 HOLES SPACED AS SHOWN
SEE NOTE 9
.005 DIA

VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED


INSTALL .010
.030 BELOW
SURFACE

DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨, ⑩ & ⑭
(H)


7.707 DIA REF
.010
.025 R
.005 R MAX
2 PLACES
J .003 TIR
32
32
.157
.163
8°00' MAX
TYP
.101
.107
-J-

DETAIL D
SCALE: 8/1
2 PLACES

REPLACES REV C WITH CHANGES

MASTER

12	INSERT, THREADED, SELF LKG	1000115-2			14
8	SCEW, BUT. HD, HEX SOC	1000088-14			13
4	RETAINER, FASTENER	1000186			12
12	NUT, FLUSH MTD, CLINCH	1000076-2			11
12	INSERT, THREADED, SELFLKG	1000115-3			10
46	INSERT, THREADED, SELFLKG	1000146			9
12	SCREW, BUT. HD, HEX SOC	1006783-45			8
8	PIN, LOCATING, STRAIGHT, HDLS	NAS 607-4-4			7
2	PIN, LOCATING, STRAIGHT, HDLS	1000088-2			6
1	PAD, CASE MTG, 1 SPEED LH	1000216			5
1	PAD, CASE MTG, 1 SPEED RH	1000215			4
1	PAD, CASE MTG, 16 SPEED LH	1000218			3
1	PAD, CASE MTG, 16 SPEED RH	1000217			2
1	BRAZING ASSY, CASE CENTER	1000083			1
QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000801	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN
APPROVED FOR NSC
2-27-63

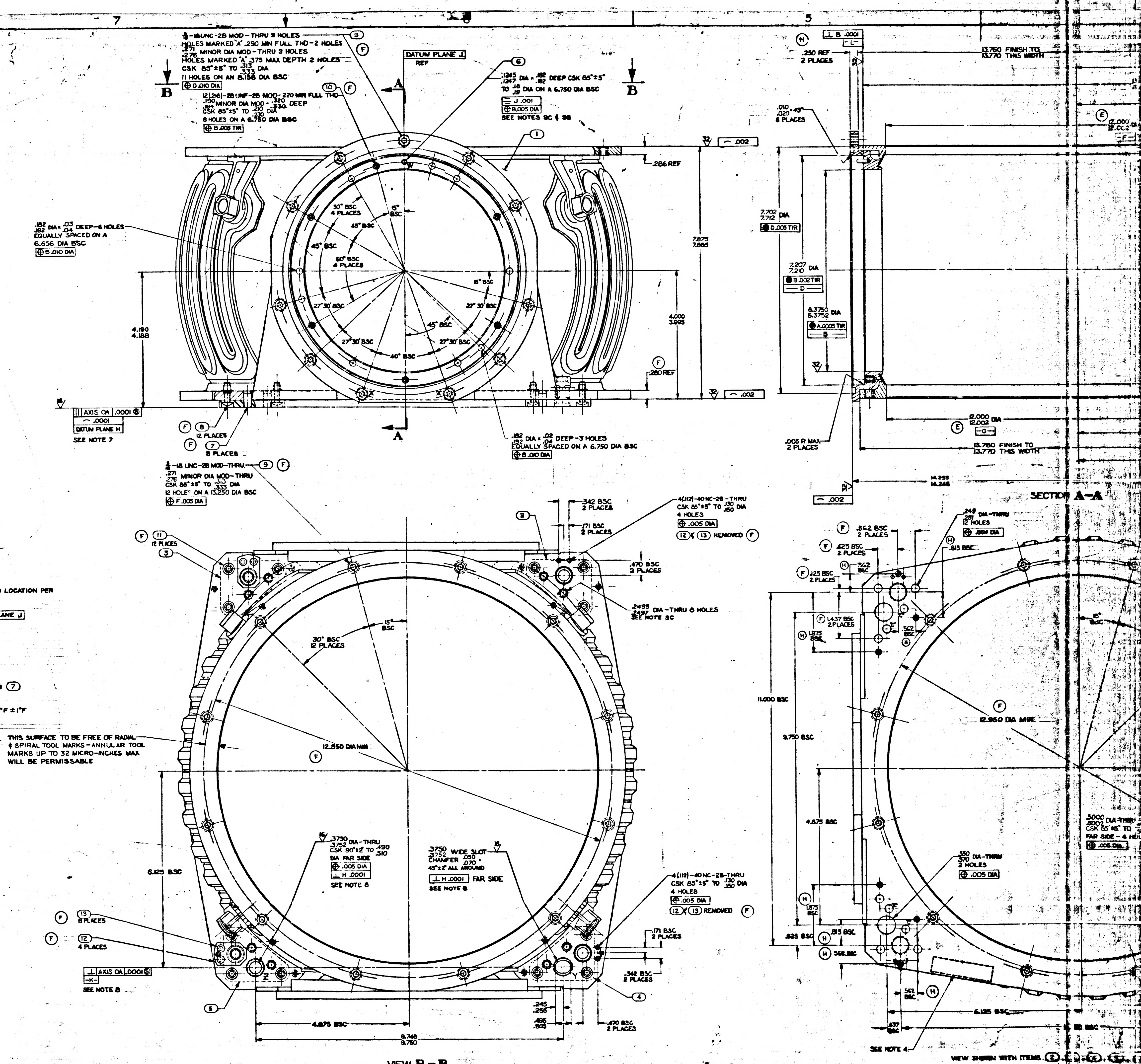
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

1000085 K

INCHES
PHOTOGRAPHIC SCALE ONLY

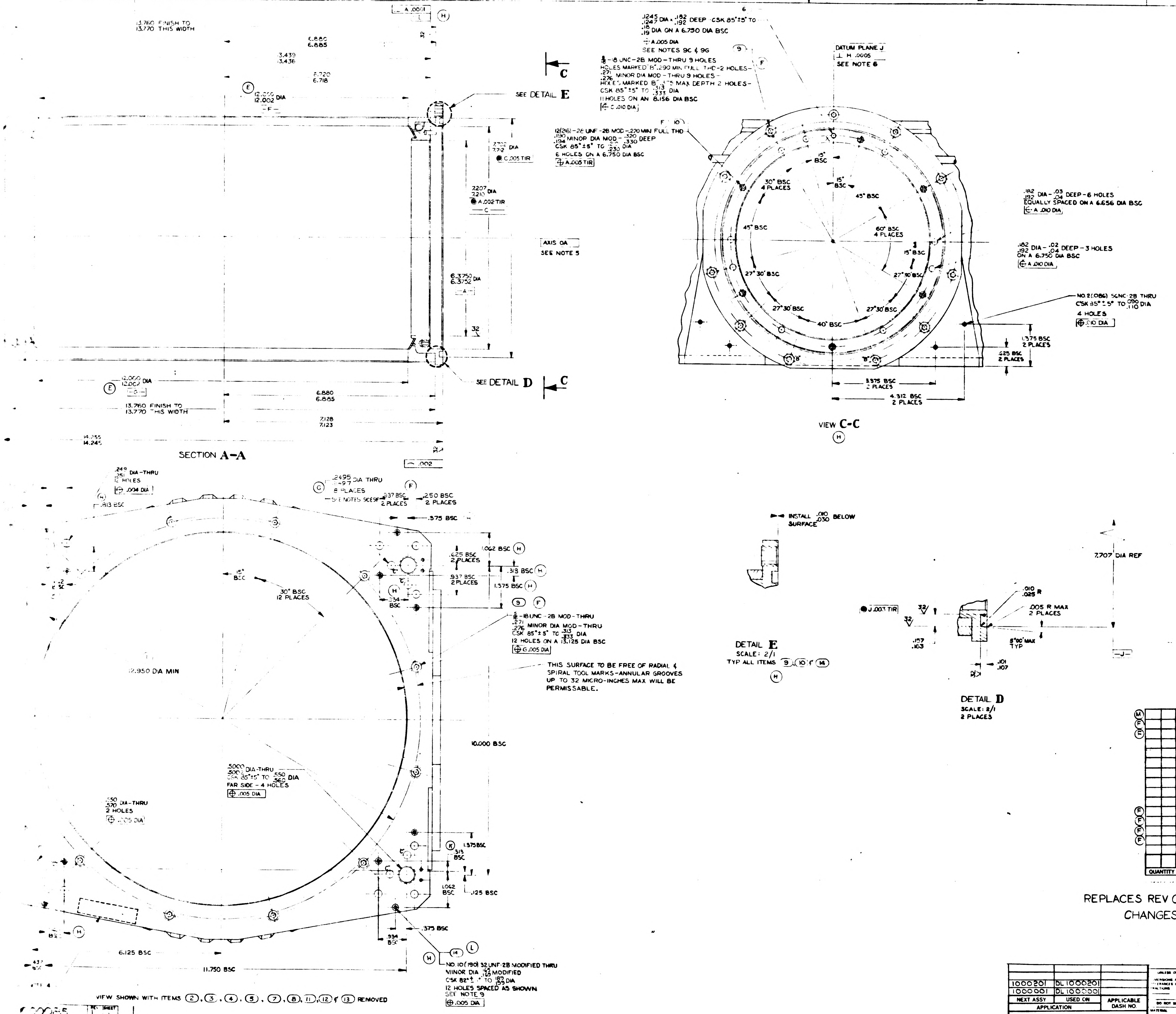


5/16-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271/.276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313/.333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190/.194 MINOR DIA MOD-.320/.330 DEEP
CSK 85°±5° TO .210/.230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
DATUM PLANE J
REF
.1245/.1247 DIA × .182/.192 DEEP CSK 85°±5°
TO .18/.19 DIA ON A 6.750 DIA BSC
J .001
⊕ B .005 DIA
SEE NOTES 9C & 9G
.286 REF
.182/.192 DIA × .03/.04 DEEP-6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
⊕ B .010 DIA
30° BSC 4 PLACES
15° BSC
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
4.190/4.188
7.875/7.865
4.000/3.995
.280 REF
AXIS OA .0001 Ⓢ
DATUM PLANE H
SEE NOTE 7
12 PLACES
8 PLACES
.182/.192 DIA × .02/.04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA
5/16-18 UNC-2B MOD-THRU
.271/.276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313/.333 DIA
12 HOLES ON A 13.250 DIA BSC
⊕ F .005 DIA
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES
⊕ .005 DIA
⑫ & ⑬ REMOVED
.470 BSC 2 PLACES
.2495/.2497 DIA-THRU 8 HOLES
SEE NOTE 9C
30° BSC 12 PLACES
12.950 DIA MIN
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
6.125 BSC
.3750/.3752 DIA-THRU
CSK 90°±2° TO .490/.510 DIA FAR SIDE
⊕ .005 DIA
⊥ H .0001
SEE NOTE 8
.3750/.3752 WIDE SLOT
CHAMFER .050/.070 × 45°±2° ALL AROUND
⊥ H .0001 FAR SIDE
SEE NOTE 8
8 PLACES
4 PLACES
⊥ AXIS OA .0001 Ⓢ
-K-
SEE NOTE 8
.245/.255
.495/.505
4.875 BSC
9.748/9.750
VIEW B-B
13.760 FINISH TO 13.770 THIS WIDTH
.250 REF 2 PLACES
.010/.020 × 45° 6 PLACES
7.702/7.712 DIA
⊕ D .005 TIR
7.207/7.210 DIA
⊕ B .002 TIR
-D-
8.3750/8.3752 DIA
⊕ A .0005 TIR
-B-
12.000/12.002 DIA
-G-
.005 R MAX 2 PLACES
14.255/14.245
SECTION A-A
.249/.251 DIA-THRU 12 HOLES
⊕ .004 DIA
.562 BSC 2 PLACES
.625 BSC 2 PLACES
1.125 BSC 2 PLACES
1.437 BSC 2 PLACES
.813 BSC
11.000 BSC
9.750 BSC
4.875 BSC
12.950 DIA MIN
.5000/.5002 DIA-THRU
CSK 85°±5° TO
FAR SIDE-4 HOLES
⊕ .005 DIA
.550/.570 DIA-THRU 2 HOLES
⊕ .005 DIA
.825 BSC
6.125 BSC
SEE NOTE 4
VIEW SHOWN WITH ITEMS ②
1000085

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
3. $\sqrt[63]{}$ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. (H) IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER ND 1002019
5. A LINE PASSING THRU THE CENTER OF BORE $\boxed{-A-}$ & BORE $\boxed{-B-}$ ESTABLISHES $\boxed{\text{AXIS OA}}$
6. A PLANE CONTAINING $\boxed{\text{AXIS OA}}$ AND CENTER OF ITEM ⑥ MARKED "X" ESTABLISHES $\boxed{\text{DATUM PLANE J}}$
7. DATUM PLANE $\boxed{-H-}$ IS DEFINED BY THE SURFACES OF ITEMS ②, ③, ④ & ⑤
8. DATUM $\boxed{-K-}$ IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - (F) D. ANODIC COAT PER NOTE 11
   - (H) (F) E. INSTALL ITEMS ②, ③, ④, ⑤, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬ & ⑭
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS ②, ③, ④ & ⑤ & INSTALL ITEM ⑦
   - G. MACHINE $\boxed{\text{DATUM PLANE H}}$ & DATUM $\boxed{-K-}$
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM ⑥
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ± 1°F
11. (F) ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
12. DIAMETERS $\boxed{-A-}$ & $\boxed{-B-}$ AND SURFACES $\boxed{-L-}$ MAY BE CHEMICAL FINISHED PER MIL-C-5541
13. (H) INSTALL PROTECTIVE PADS, NASA DWG NO. 1001460, 1001461, 1001464 & 1001465, WITH SCREWS NASA DWG NO. 1000110-3 OR EQUIVALENT AFTER MACHINING MOUNTING PADS. (H) PROTECTIVE PADS TO BE REMOVED FOR INSPECTION ONLY
14. (J) INTERIOR HEAT EXCHANGE PASSAGES TO BE CHEMICALLY FINISHED PER MIL-C-5541

SYM	DESCRIPTION	DATE	APPROVAL
D	REPLACES REV C WITH CHANGES	1-24-63	
	TDRR 00456	1-24-63	
E	TDRR 00589	3-15-63	
F	TDRR 01056	4-30-63	
G	TDRR 01442	[illegible] 5-63	
H	TDRR 04557	12-3-63	
J	TDRR [illegible]56 4	1-7-64	
K	TDRR 05745	1-14-64	
L	TDRR [illegible]708[illegible]	[illegible]-64	
M	REVISED PER TDRR 07863	12 MAY 64	



SECTION A-A
13.760 FINISH TO 13.770 THIS WIDTH
6.880 6.885
3.439 3.436
7.720 7.718
12.000 12.002 DIA
SEE DETAIL E
SEE DETAIL D
C
7.702 7.712 DIA
⊚ C .005 TIR
7.207 7.210 DIA
⊚ A .002 TIR
AXIS OA SEE NOTE 5
6.3752 6.3752 DIA
12.000 12.002 DIA
6.880 6.865
7.128 7.123
14.255 14.245
.002
.1245 .1247 DIA x .182 .192 DEEP CSK 85° ±5° TO .16 .19 DIA ON A 6.750 DIA BSC
⊕ A .005 DIA
SEE NOTES 9C & 9G
5/16-18 UNC-2B MOD-THRU 9 HOLES
HOLES MARKED B .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED B .375 MAX DEPTH 2 HOLES
CSK 85° ±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ C .010 DIA
DATUM PLANE J
⊥ H .0005
SEE NOTE 6
12(26)-28 UNF-2B MOD-.220 MIN FULL THD
.130 .134 MINOR DIA MOD-.320 .330 DEEP
CSK 85° ±5° TO .230 .235 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ A .005 TIR
15° BSC
30° BSC 4 PLACES
45° BSC
60° BSC 4 PLACES
27° 30' BSC
40° BSC
.182 .192 DIA -.03 .04 DEEP-6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
⊕ A .010 DIA
.182 .192 DIA -.02 .04 DEEP-3 HOLES
ON A 6.750 DIA BSC
⊕ A .010 DIA
NO.2(.086) 56NC-2B THRU
CSK 85° ±5° TO .090 .110 DIA
4 HOLES
⊕ .010 DIA
1.375 BSC 2 PLACES
.625 BSC 2 PLACES
3.375 BSC 2 PLACES
4.312 BSC 2 PLACES
VIEW C-C
.249 .251 DIA-THRU 12 HOLES
⊕ .004 DIA
.2495 .2497 DIA THRU 8 PLACES
SEE NOTES 9C & 9F
.937 BSC 2 PLACES
.250 BSC 2 PLACES
.375 BSC
1.062 BSC
.625 BSC 2 PLACES
.313 BSC
.937 BSC 2 PLACES
1.375 BSC
.234 BSC
15° BSC
30° BSC 12 PLACES
5/16-18 UNC-2B MOD-THRU
.271 .276 MINOR DIA MOD-THRU
CSK 85° ±5° TO .313 .333 DIA
12 HOLES ON A 13.125 DIA BSC
⊕ G .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
12.950 DIA MIN
10.000 BSC
.5000 .5005 DIA-THRU
CSK 85° ±5° TO .550 .560 DIA
FAR SIDE-4 HOLES
⊕ .005 DIA
.550 .570 DIA-THRU 2 HOLES
⊕ .005 DIA
1.375 BSC
.313 BSC
1.062 BSC
.125 BSC
.375 BSC
.934 BSC
6.125 BSC
11.750 BSC
NO 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .152 .156 MODIFIED
CSK 82° ±2° TO .183 .193 DIA
12 HOLES SPACED AS SHOWN
SEE NOTE 9
⊕ .005 DIA
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED
INSTALL .010 .030 BELOW SURFACE
DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨, ⑩ & ⑭
⊚ J .003 TIR
.010 .025 R
.005 R MAX 2 PLACES
5°00' MAX TYP
.157 .163
.101 .107
7.707 DIA REF
DETAIL D
SCALE: 2/1
2 PLACES

					ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
ⓜ		1	-		15	1001553	BRAZING ASSY, CASE CENTER
Ⓕ		12	12		14	1000115-2	INSERT, THREADED, SELF LKG
Ⓕ		8	8		13	1000093-14	SCREW, BUT. HD, HEX SOC.
		4	4		12	1000186	RETAINER, FASTENER
		12	12		11	1000076-2	NUT, FLUSH MTD, CLINCH
		12	12		10	1000115-3	INSERT, THREADED, SELF LKG
		46	46		9	1000146	INSERT, THREADED, SELF LKG
		12	12		8	1006783-45	SCREW, BUT. HD, HEX SOC.
		8	8		7	NAS 607-4-4	PIN, LOCATING, STRAIGHT, HDLS
		2	2		6	1000088-2	PIN, LOCATING, STRAIGHT, HDLS
Ⓕ		1	1		5	1000216	PAD, CASE MTG, 1 SPEED LH
Ⓕ		1	1		4	1000215	PAD, CASE MTG, 1 SPEED RH
Ⓕ		1	1		3	1000218	PAD, CASE MTG, 16 SPEED LH
Ⓕ		1	1		2	1000217	PAD, CASE MTG, 16 SPEED RH
		-	1		1	1000083	BRAZING ASSY, CASE CENTER
		021	011	EFFECTIVITY			
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

1000085 M

REPLACES REV C WITH CHANGES

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1000201	DL 1000201	
1000001	DL 1000001	
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

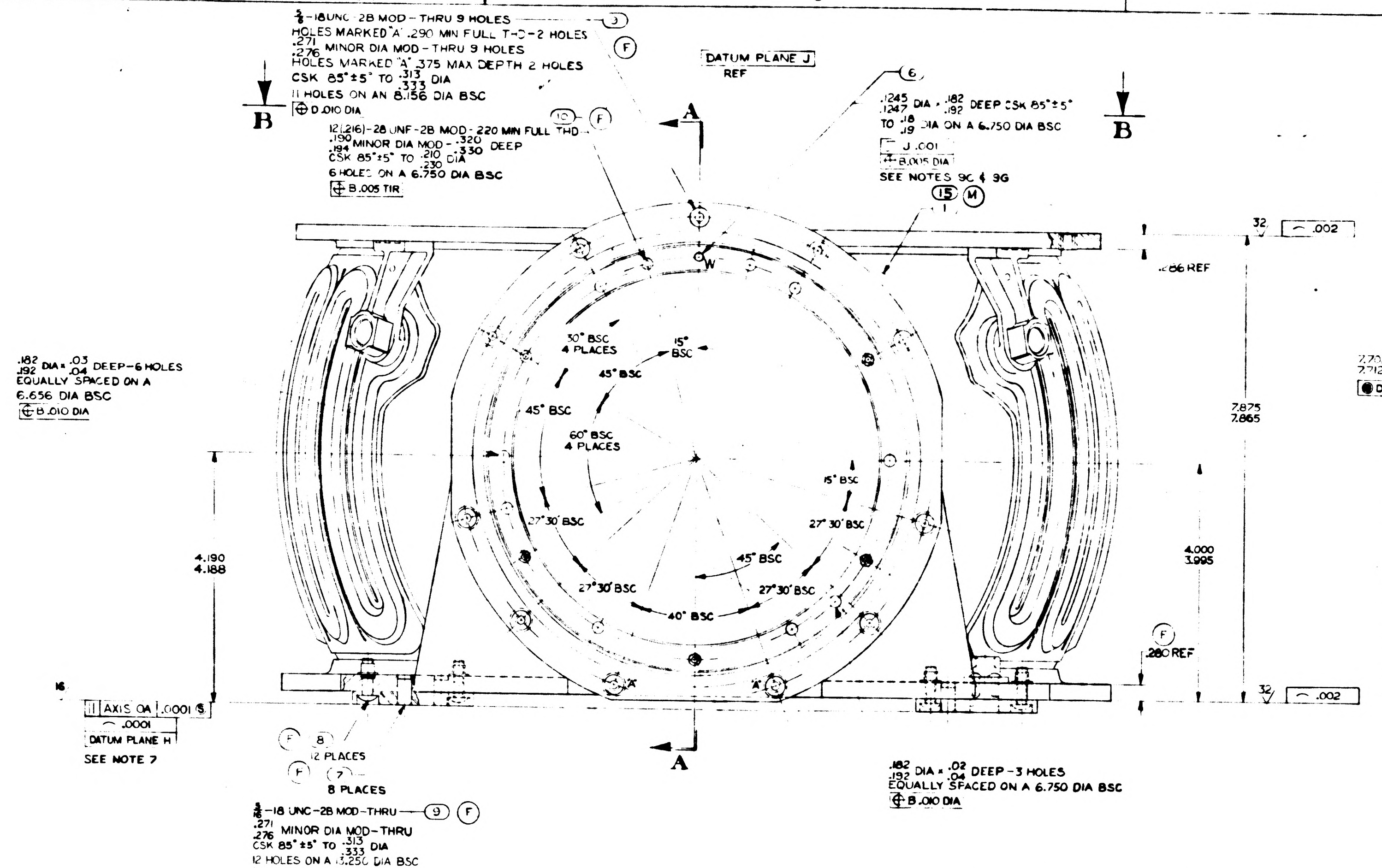
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D.M.WHITE 12-4-62
APPROVED FOR MSC

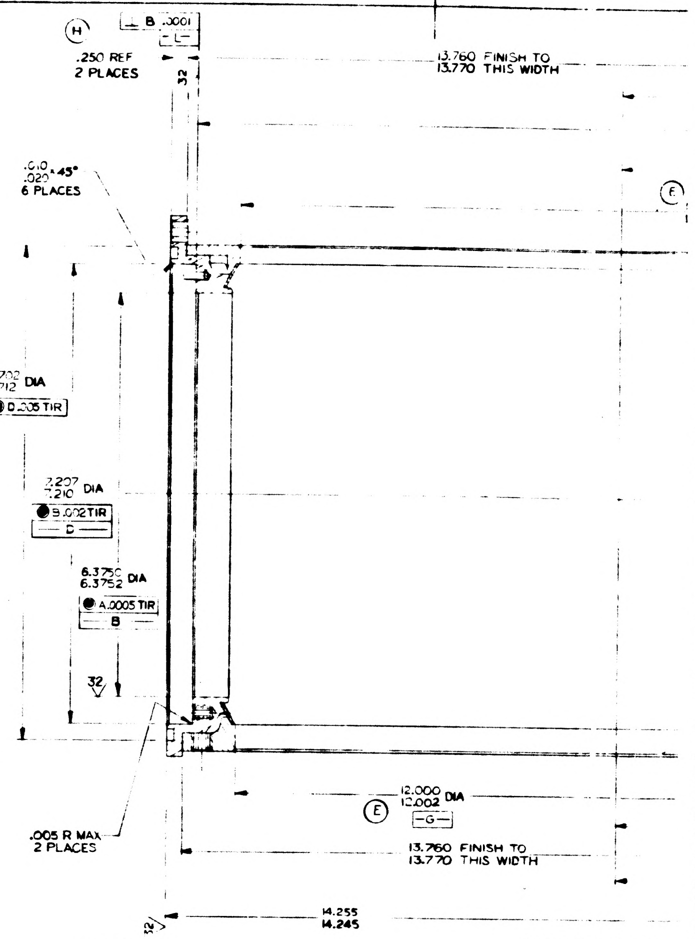
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000085
SHEET 1 OF 1

2/1000085

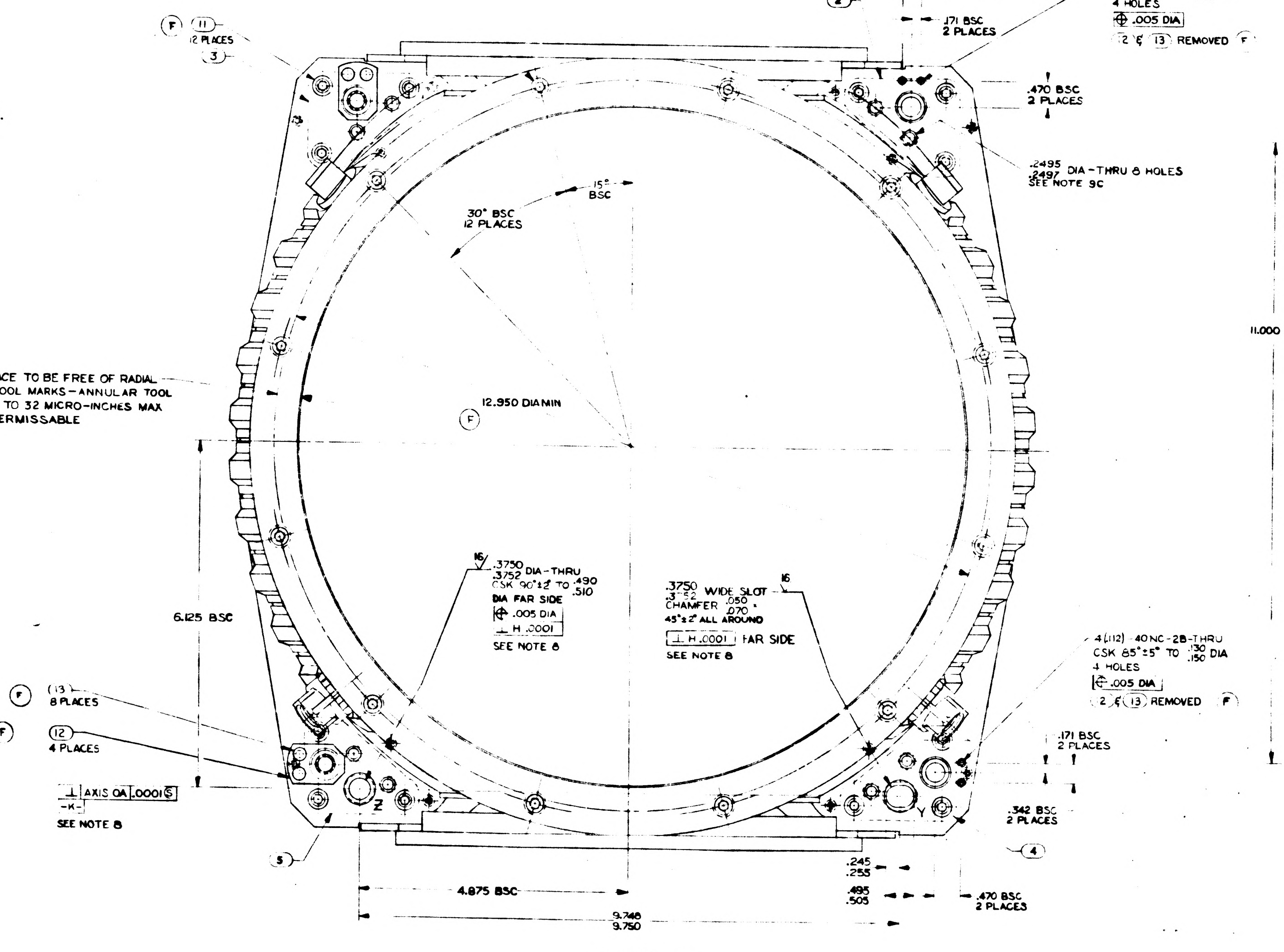

5/8-18UNC-2B MOD-THRU 9 HOLES (9)
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES (F)
.271/.276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313/.333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
B
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD (10) (F)
.190/.194 MINOR DIA MOD-.320/.330 DEEP
CSK 85°±5° TO .210/.230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
A
DATUM PLANE J
REF
(6)
.1245/.1247 DIA × .182/.192 DEEP CSK 85°±5°
TO .18/.19 DIA ON A 6.750 DIA BSC
J .001
⊕ B .005 DIA
SEE NOTES 9C & 9G
(15) (M)
B
W
.182/.192 DIA × .03/.04 DEEP-6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
⊕ B .010 DIA
30° BSC 4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC 4 PLACES
15° BSC
27°30' BSC
27°30' BSC
45° BSC
27°30' BSC
27°30' BSC
40° BSC
4.190/4.188
.286 REF
32
⌒ .002
7.875/7.865
4.000/3.995
(F)
.280 REF
32
⌒ .002
16
AXIS OA .0001
⌒ .0001
DATUM PLANE H
SEE NOTE 7
(F) (8) 12 PLACES
(F) (7) 8 PLACES
A
.182/.192 DIA × .02/.04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA
3/8-18 UNC-2B MOD-THRU (9) (F)
.271/.276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313/.333 DIA
12 HOLES ON A 11.250 DIA BSC
⊕ F .005 DIA


(H)
⊥ B .0001
-L-
.250 REF
2 PLACES
32
13.760 FINISH TO
13.770 THIS WIDTH
.010/.020 × 45°
6 PLACES
(E)
2.202/2.212 DIA
⊚ D .005 TIR
2.207/2.210 DIA
⊚ B .002 TIR
-C-
6.3752/6.3752 DIA
⊚ A .0005 TIR
-B-
32
.005 R MAX
2 PLACES
(E)
12.000/12.002 DIA
-G-
13.760 FINISH TO
13.770 THIS WIDTH
32
14.255/14.245
⌒ .002

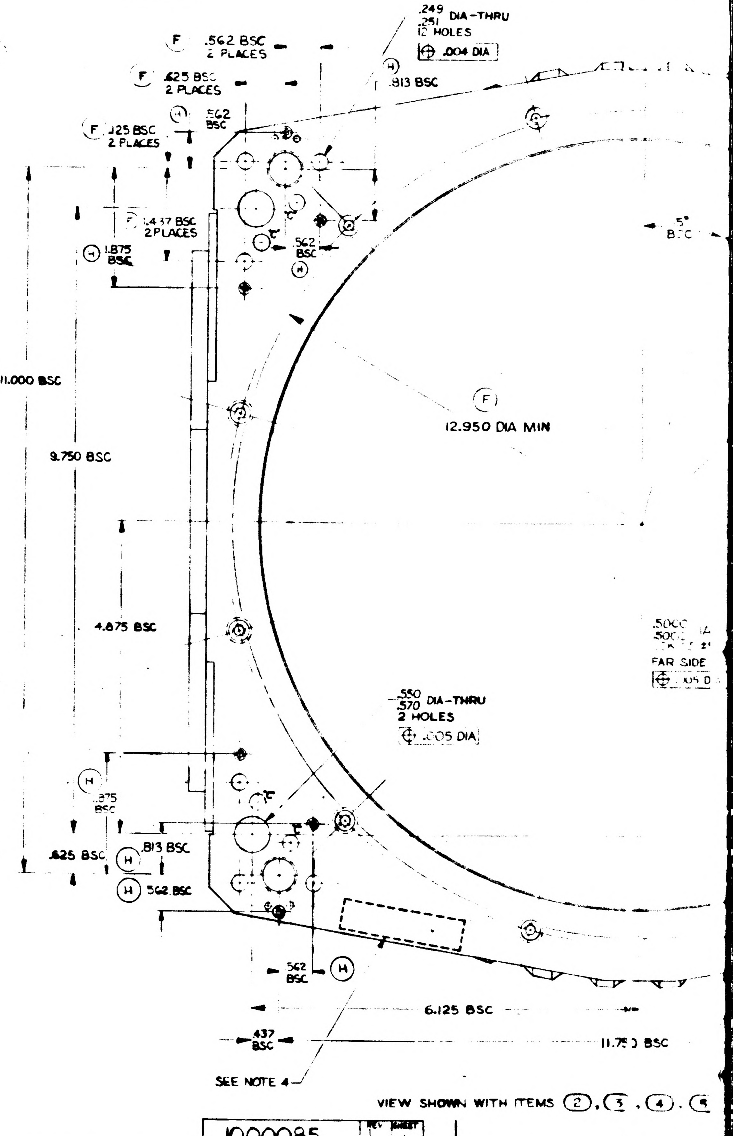
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005/.015
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER ND 1002019. (M) (H)
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM (6) MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS (2), (3), (4) & (5)
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X) (F)
   - D. ANODIC COAT PER NOTE 11
   - E. INSTALL ITEMS (2), (3), (4), (5), (8), (9), (10), (11), (12), (13) & (14) (H) (F)
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS (2), (3), (4) & (5) & INSTALL ITEM (7)
   - G. MACHINE DATUM PLANE H & DATUM -K-.
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM (6)
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
11. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR (F)
12. DIAMETERS -A- & -B- AND SURFACES -L- MAY BE CHEMICAL FINISHED PER MIL-C-5541 (H)
13. INSTALL PROTECTIVE PADS, NASA DWG NO 1001460, 1001461, 1001464 & 1001465, WITH SCREWS NASA DWG NO. 1000110-3 OR EQUIVALENT AFTER MACHINING MOUNTING PADS. PROTECTIVE PADS TO BE REMOVED FOR INSPECTION ONLY (H) (M) (J)


(F) (11) 12 PLACES
(3)
(2)
.342 BSC
2 PLACES
.171 BSC
2 PLACES
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES
⊕ .005 DIA
(2) & (13) REMOVED (F)
.470 BSC
2 PLACES
.2495/.2497 DIA-THRU 8 HOLES
SEE NOTE 9C
15° BSC
30° BSC
12 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
(F)
12.950 DIA MIN
6.125 BSC
16
.3750/.3752 DIA-THRU
CSK 90°±2° TO .490/.510
DIA FAR SIDE
⊕ .005 DIA
⊥ H .0001
SEE NOTE 8
.3750/.3752 WIDE SLOT
CHAMFER .050/.070 ×
45°±2° ALL AROUND
⊥ H .0001 FAR SIDE
SEE NOTE 8
16
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES
⊕ .005 DIA
(2) & (13) REMOVED (F)
.171 BSC
2 PLACES
(F) (13) 8 PLACES
(F) (12) 4 PLACES
⊥ AXIS OA .0001
-K-
SEE NOTE 8
Z
Y
(5)
.342 BSC
2 PLACES
(4)
.245/.255
.495/.505
.470 BSC
2 PLACES
4.875 BSC
9.748/9.750

VIEW B-B

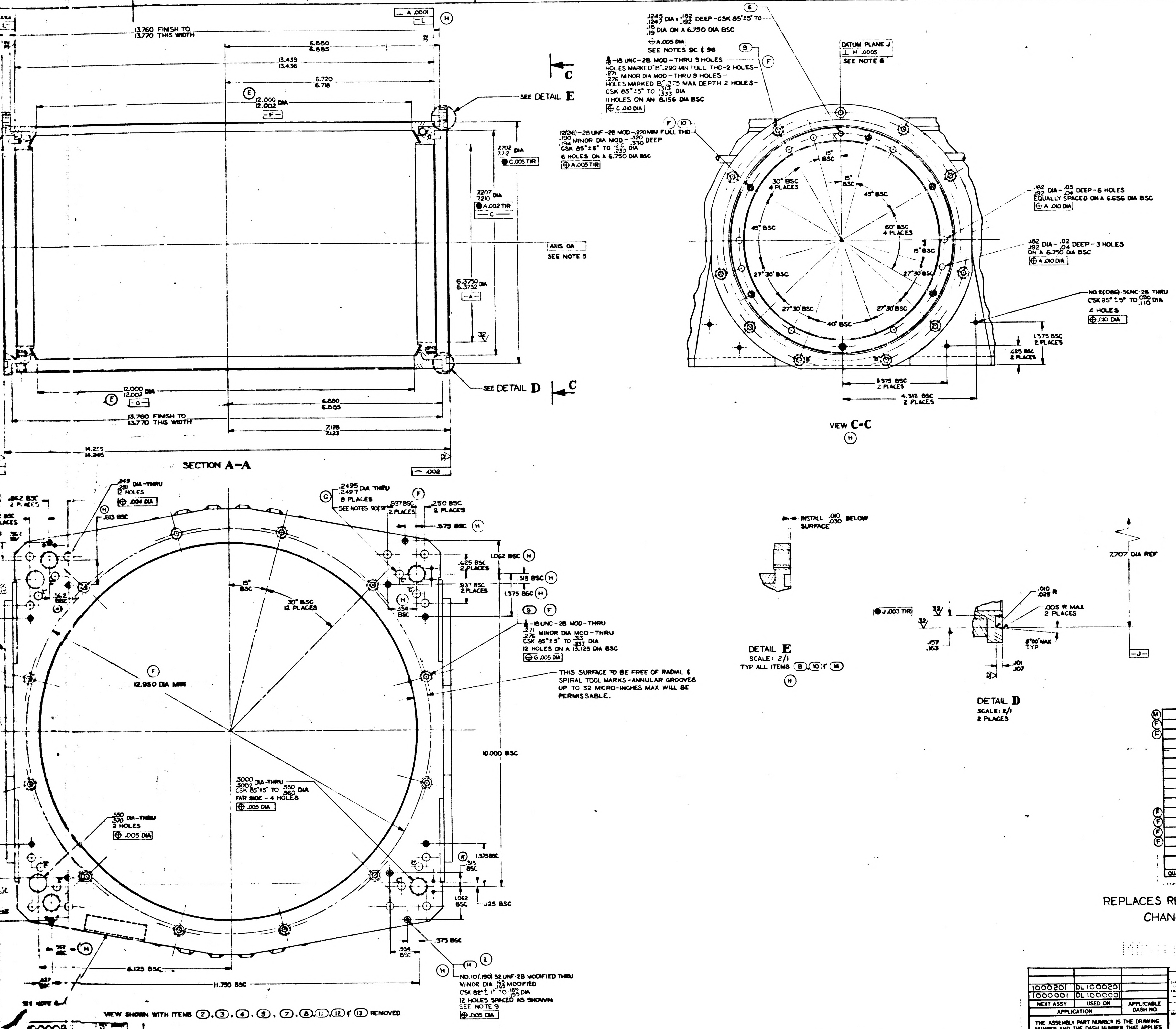

F
.562 BSC
2 PLACES
.249/.251 DIA-THRU
12 HOLES
⊕ .004 DIA
(F) .625 BSC
2 PLACES
(H) .813 BSC
(H) .562 BSC
(F) .125 BSC
2 PLACES
(F) 1.437 BSC
2 PLACES
(H) 1.875 BSC
.562 BSC
(H)
5° BSC
11.000 BSC
9.750 BSC
(F)
12.950 DIA MIN
4.875 BSC
.5000/.500
FAR SIDE
.550/.570 DIA-THRU
2 HOLES
⊕ .005 DIA
(H)
.875 BSC
.625 BSC
(H) .813 BSC
(H) .562 BSC
.562 BSC
(H)
6.125 BSC
.437 BSC
11.750 BSC
SEE NOTE 4

VIEW SHOWN WITH ITEMS (2), (3), (4), (5

	REV	SHEET
1000085	L	1

1/1000085

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63		WK
E	TDRR 00589	3-19-63		WK
F	TDRR 01056	4-30-63		
G	TDRR 01442	6-5-63		
H	TDRR 04557	12-3-63		
J	TDRR 05614	1-7-64		
K	TDRR 05745	1-14-64		
L	TDRR 07080	4-7-64		WK
M	REVISED PER TDRR 07863	12 MAY 64	JJJ	
N	REVISED PER TDRR 08761	[illegible]		EWH



13.760 FINISH TO 13.770 THIS WIDTH
6.880 6.885
13.439 13.436
6.720 6.718
12.000 12.002 DIA
SEE DETAIL E
2.702 2.712 DIA
C .005 TIR
2.207 2.210 DIA
A .002 TIR
AXIS OA
SEE NOTE 5
6.3750 6.3752 DIA
SEE DETAIL D
12.000 12.002 DIA
13.760 FINISH TO 13.770 THIS WIDTH
7.128 7.123
14.255 14.245
SECTION A-A
.1245 .1247 DIA x .182 .192 DEEP - CSK 85° ±5° TO .18 .19 DIA ON A 6.750 DIA BSC
A .005 DIA
SEE NOTES 9C & 9G
1/4-18 UNC-2B MOD - THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD - 2 HOLES
.271 .276 MINOR DIA MOD - THRU 9 HOLES
HOLES MARKED "B" .375 MAX DEPTH 2 HOLES
CSK 85° ±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
C .010 DIA
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .194 MINOR DIA MOD - .320 .330 DEEP
CSK 85° ±5° TO .220 .230 DIA
6 HOLES ON A 6.750 DIA BSC
A .005 TIR
DATUM PLANE J
H .0005
SEE NOTE 6
15° BSC
30° BSC 4 PLACES
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
.182 .192 DIA - .03 .04 DEEP - 6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
A .010 DIA
.182 .192 DIA - .02 .04 DEEP - 3 HOLES
ON A 6.750 DIA BSC
A .010 DIA
NO. 2(.086)-56NC-2B THRU
CSK 85° ±5° TO .090 .110 DIA
4 HOLES
.010 DIA
1.375 BSC 2 PLACES
.625 BSC 2 PLACES
3.375 BSC 2 PLACES
4.312 BSC 2 PLACES
VIEW C-C
.249 .251 DIA - THRU 12 HOLES
.004 DIA
.862 BSC 2 PLACES
.813 BSC
.2495 .2497 DIA THRU 8 PLACES
SEE NOTES 9C & 9F
.937 BSC 2 PLACES
.250 BSC 2 PLACES
.375 BSC
1.062 BSC
.625 BSC 2 PLACES
.313 BSC
.937 BSC 2 PLACES
1.575 BSC
.334 BSC
15° BSC
30° BSC 12 PLACES
1/4-18 UNC-2B MOD - THRU
.271 .276 MINOR DIA MOD - THRU
CSK 85° ±5° TO .313 .333 DIA
12 HOLES ON A 13.125 DIA BSC
G .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS - ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
12.950 DIA MIN
10.000 BSC
.5000 .5002 DIA - THRU
CSK 85° ±5° TO .550 .560 DIA
FAR SIDE - 4 HOLES
.005 DIA
.550 .570 DIA - THRU 2 HOLES
.005 DIA
1.375 BSC
.315 BSC
1.062 BSC
.125 BSC
.375 BSC
.334 BSC
6.125 BSC
11.750 BSC
NO 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .152 .156 MODIFIED
CSK 82° ± 1° TO .183 .193 DIA
12 HOLES SPACED AS SHOWN
SEE NOTE 9
.005 DIA
VIEW SHOWN WITH ITEMS 2, 3, 4, 5, 7, 8, 11, 12 & 13 REMOVED
INSTALL .010 .030 BELOW SURFACE
DETAIL E
SCALE: 2/1
TYP ALL ITEMS 9, 10 & 14
J .003 TIR
.157 .163
.010 .025 R
.005 R MAX 2 PLACES
5°00' MAX TYP
.101 .107
DETAIL D
SCALE: 8/1
2 PLACES
7.707 DIA REF

					ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		1	-		15	1001553	BRAZING ASSY, CASE CENTER
		12	12		14	1000115-2	INSERT, THREADED, SELF LKG
		8	8		13	1000093-14	SCREW, BUT. HD, HEX SOC.
		4	4		12	1000186	RETAINER, FASTENER
		12	12		11	1000076-2	NUT, FLUSH MTD, CLINCH
		12	12		10	1000115-3	INSERT, THREADED, SELF LKG
		46	46		9	1000146	INSERT, THREADED, SELF LKG
		12	12		8	1006783-45	SCREW, BUT. HD, HEX SOC.
		8	8		7	NAS 607-4-4	PIN, LOCATING, STRAIGHT, HDLS
		2	2		6	1000088-2	PIN, LOCATING, STRAIGHT, HDLS
		1	1		5	1000216	PAD, CASE MTG, 1 SPEED LH
		1	1		4	1000215	PAD, CASE MTG, 1 SPEED RH
		1	1		3	1000218	PAD, CASE MTG, 16 SPEED LH
		1	1		2	1000217	PAD, CASE MTG, 16 SPEED RH
		-	1		1	1000083	BRAZING ASSY, CASE CENTER
		021	011	EFFECTIVITY			
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

N

1000085

REPLACES REV C WITH CHANGES

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1000201	DL 1000201	
1000001	DL 1000001	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

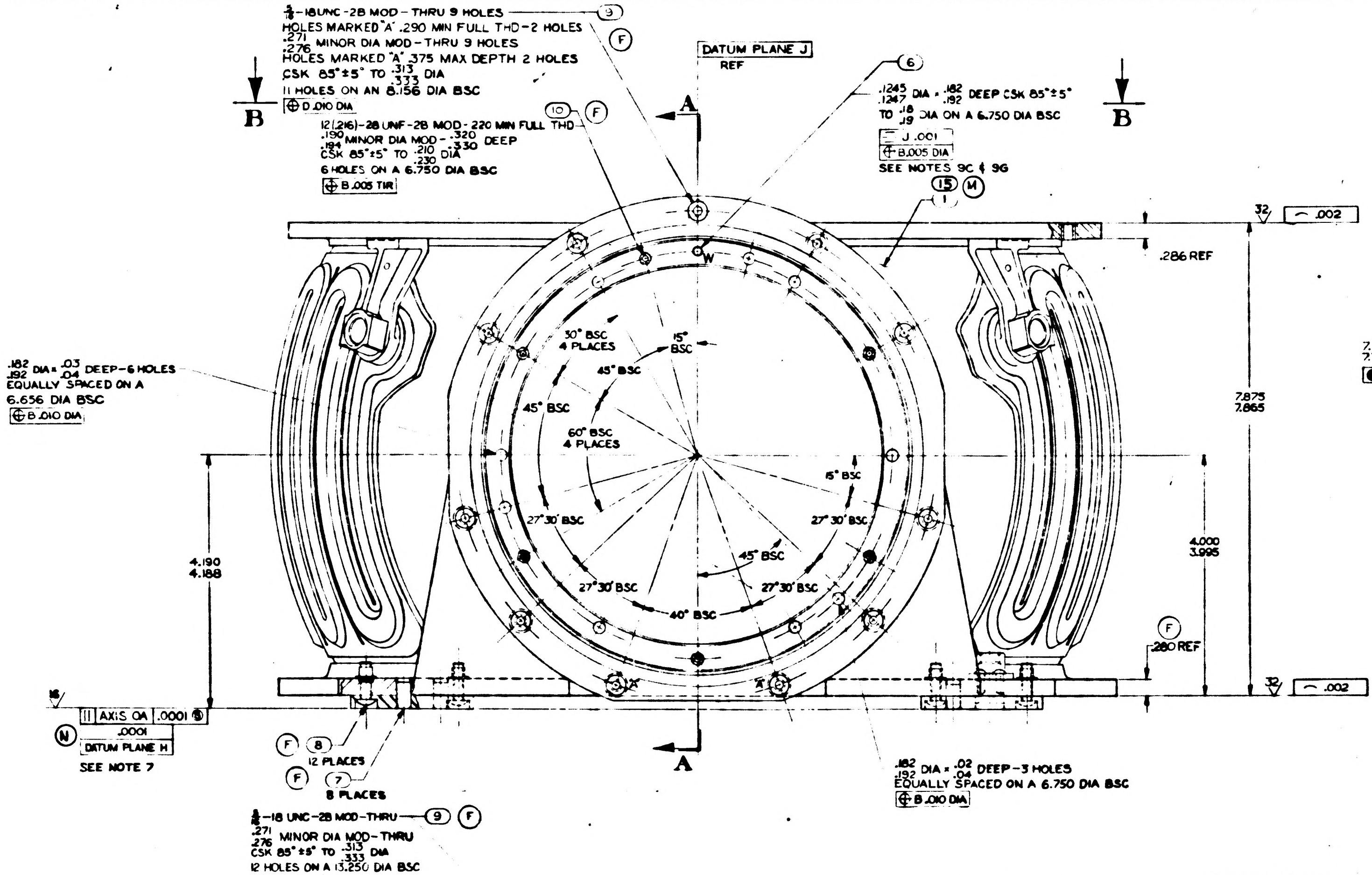
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D.M. WHITE
APPROVED FOR MSC W.J. Robinson 2-27-63

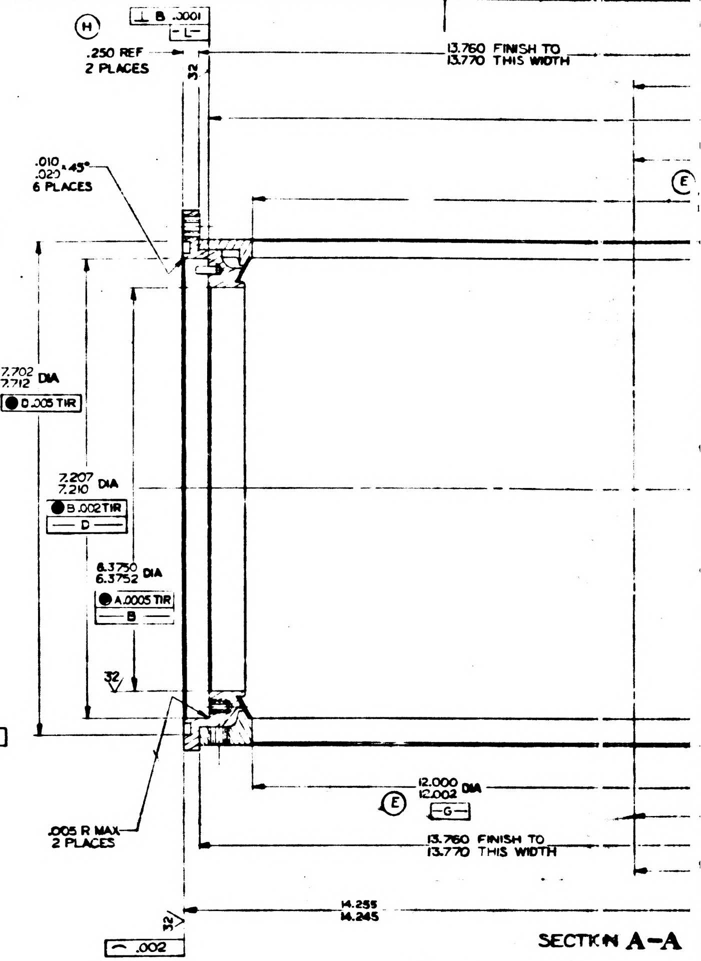
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO 1000085
SHEET 1 OF 1

2/1000085

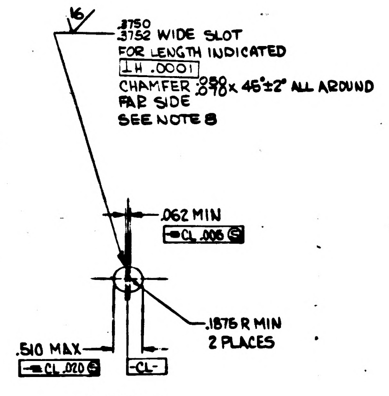

3/8-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
D .010 DIA
B
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .184 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
B .005 TIR
DATUM PLANE J REF
A
.1245 .1247 DIA x .182 .192 DEEP CSK 85°±5° TO .18 .19 DIA ON A 6.750 DIA BSC
J .001
B .005 DIA
SEE NOTES 9C & 9G
15
M
B
.286 REF
.002
W
30° BSC 4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC 4 PLACES
15° BSC
27°30' BSC
27°30' BSC
45° BSC
27°30' BSC
27°30' BSC
40° BSC
.182 .192 DIA x .03 .04 DEEP-6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
B .010 DIA
4.190 4.188
4.000 3.995
7.875 7.865
.280 REF
.002
16
AXIS OA .0001
.0001
DATUM PLANE H
SEE NOTE 7
8
12 PLACES
7
8 PLACES
A
.182 .192 DIA x .02 .04 DEEP-3 HOLES EQUALLY SPACED ON A 6.750 DIA BSC
B .010 DIA
3/8-18 UNC-2B MOD-THRU 9
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.250 DIA BSC
F .005 DIA


B .0001
L
.250 REF 2 PLACES
13.760 FINISH TO 13.770 THIS WIDTH
.010 .020 x 45° 6 PLACES
E
7.702 7.712 DIA
D .005 TIR
7.207 7.210 DIA
B .002 TIR
D
8.3750 8.3752 DIA
A .0005 TIR
B
32
.005 R MAX 2 PLACES
12.000 12.002 DIA
G
13.760 FINISH TO 13.770 THIS WIDTH
14.255 14.245
.002

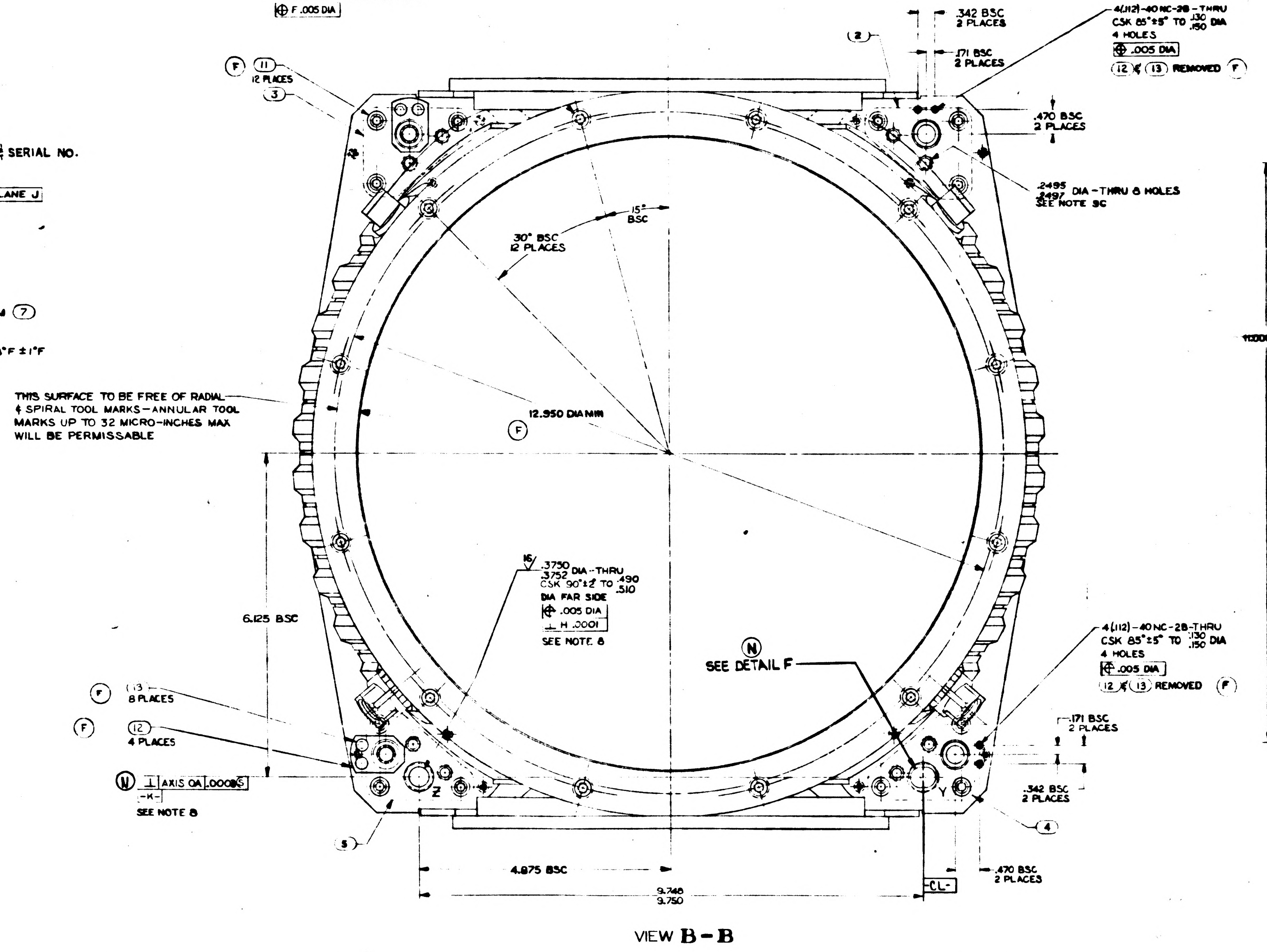
SECTION A-A

NOTES:

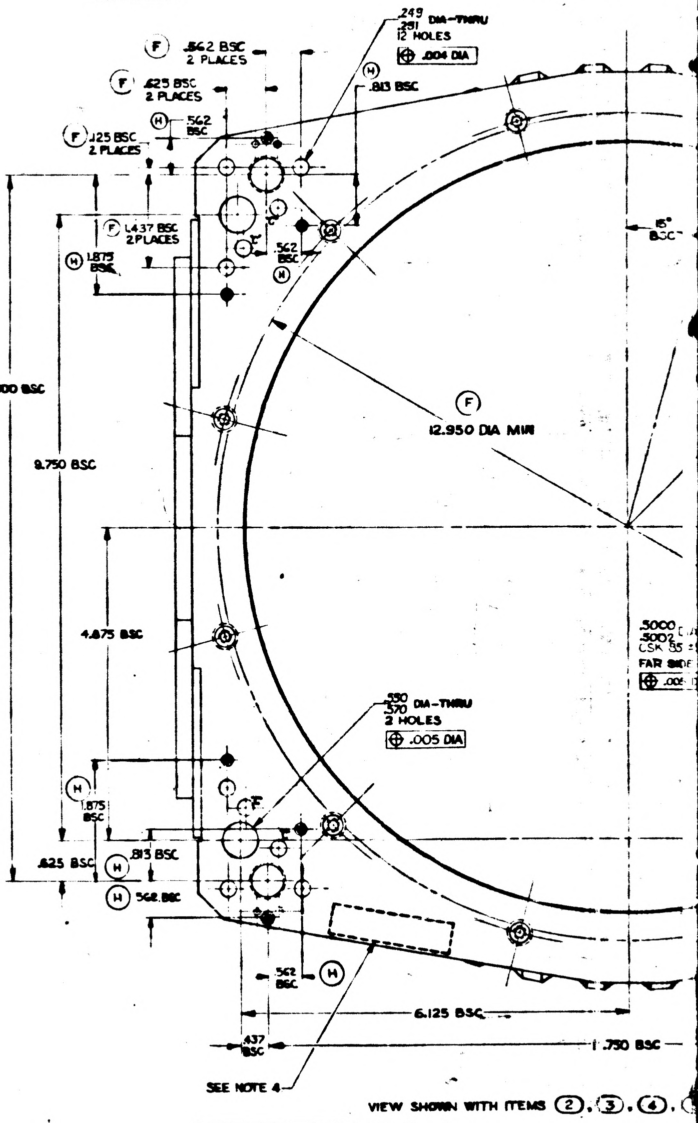
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. (M)(H) IDENTIFY USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER ND 1002019.
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM (6) MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS (2), (3), (4) & (5)
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - (F) D. ANODIC COAT PER NOTE 11
   - (H)(F) E. INSTALL ITEMS (2), (3), (4), (5), (8), (9), (10), (11), (12), (13) & (14)
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS (2), (3), (4) & (5) & INSTALL ITEM (7)
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM (6)
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
11. (F) ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
12. DIAMETERS -A- & -B- AND SURFACES -L- MAY BE CHEMICAL FINISHED PER MIL-C-5541
13. (H) INSTALL PROTECTIVE PADS, NASA DWG NO. 1001460, 1001461, 1001464 & 1001465, WITH SCREWS NASA DWG NO. 1000110-3 OR EQUIVALENT AFTER MACHINING MOUNTING PADS. (H) PROTECTIVE PADS TO BE REMOVED FOR INSPECTION ONLY
(M)(J)


16
.3750 .3752 WIDE SLOT
FOR LENGTH INDICATED
⊥H .0001
CHAMFER .020 .030 x 45°±2° ALL AROUND
FAR SIDE
SEE NOTE 8
.062 MIN
CL .005
.1875 R MIN 2 PLACES
.510 MAX
CL .020
CL

(N) DETAIL F


2
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
.005 DIA
12 & 13 REMOVED
F
11
12 PLACES
3
.470 BSC 2 PLACES
.2495 .2497 DIA-THRU 8 HOLES
SEE NOTE 9C
30° BSC 12 PLACES
15° BSC
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
12.950 DIA MIN
F
6.125 BSC
16
.3750 .3752 DIA-THRU
CSK 90°±2° TO .490 .510
DIA FAR SIDE
.005 DIA
⊥H .0001
SEE NOTE 8
N
SEE DETAIL F
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
.005 DIA
12 & 13 REMOVED
13
8 PLACES
12
4 PLACES
N
⊥ AXIS OA .0005
-K-
SEE NOTE 8
5
Z
Y
.171 BSC 2 PLACES
.342 BSC 2 PLACES
4
.470 BSC 2 PLACES
4.875 BSC
9.748 9.750
CL

VIEW B-B


F
.249 .251 DIA-THRU
12 HOLES
.004 DIA
.342 BSC 2 PLACES
.625 BSC 2 PLACES
H
.813 BSC
H .562 BSC
.125 BSC 2 PLACES
1.437 BSC 2 PLACES
.562 BSC
1.875 BSC
15° BSC
11.000 BSC
F
12.950 DIA MIN
9.750 BSC
4.875 BSC
.5000 .5002
CSK 35
FAR SIDE
.330 .370 DIA-THRU
2 HOLES
.005 DIA
1.875 BSC
.625 BSC
.813 BSC
H .562 BSC
.562 BSC
6.125 BSC
.437 BSC
1.750 BSC
SEE NOTE 4

VIEW SHOWN WITH ITEMS (2), (3), (4)

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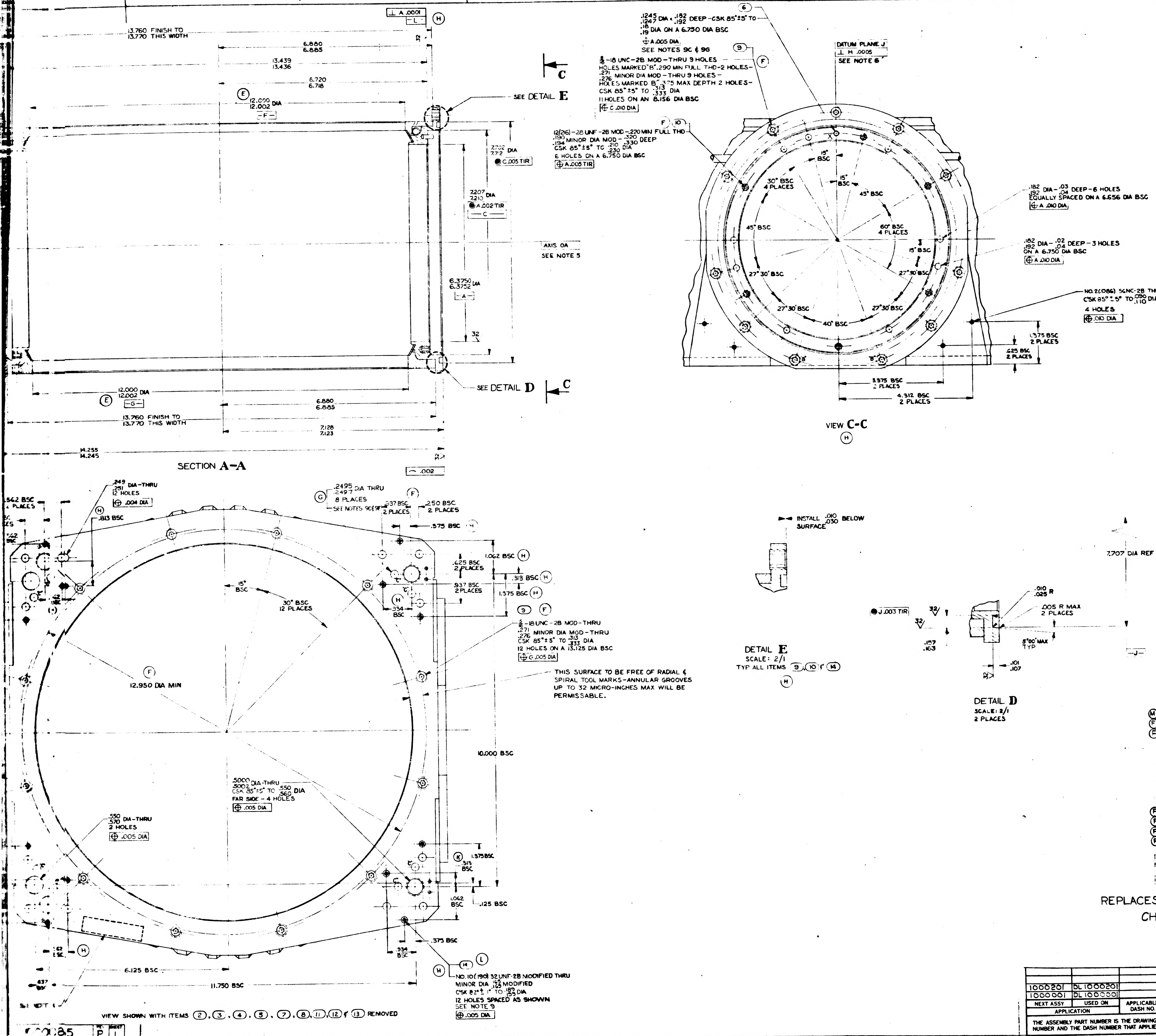
1/1000085


13.760 FINISH TO
13.770 THIS WIDTH
6.880
6.885
13.439
13.436
6.720
6.718
12.000
12.002 DIA
-F-
⊥ A .0001
-L-
SEE DETAIL E
2.722
2.72 DIA
C .005 TIR
2.207
2.210 DIA
A .002 TIR
-C-
AXIS OA
SEE NOTE 5
6.3750
6.3752 DIA
-A-
32
SEE DETAIL D
12.000
12.002 DIA
-G-
6.880
6.885
13.760 FINISH TO
13.770 THIS WIDTH
7.128
7.123
14.255
14.245
SECTION A-A
⌒ .002
.1245
.1247 DIA × .182
.192 DEEP - CSK 85°±5° TO
.18
.19 DIA ON A 6.750 DIA BSC
A .005 DIA
SEE NOTES 9C & 9G
5/16 -18 UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD-2 HOLES-
.271
.276 MINOR DIA MOD-THRU 9 HOLES-
HOLES MARKED "B" .375 MAX DEPTH 2 HOLES-
CSK 85°±5° TO .313
.333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ C .010 DIA
12(216)-28 UNF-2B MOD-.220 MIN FULL THD
.190
.194 MINOR DIA MOD - .320
.330 DEEP
CSK 85°±5° TO .210
.230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ A .005 TIR
DATUM PLANE J
⊥ H .0005
SEE NOTE 6
30° BSC
4 PLACES
15° BSC
15° BSC
45° BSC
45° BSC
60° BSC
4 PLACES
15° BSC
27°30' BSC
27°30' BSC
27°30' BSC
27°30' BSC
40° BSC
.182
.192 DIA - .03
.04 DEEP - 6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
⊕ A .010 DIA
.182
.192 DIA - .02
.04 DEEP - 3 HOLES
ON A 6.750 DIA BSC
⊕ A .010 DIA
NO. 2(.086) 56NC-2B THRU
C'SK 85°±5° TO .090
.110 DIA
4 HOLES
⊕ .010 DIA
1.375 BSC
2 PLACES
.625 BSC
2 PLACES
3.375 BSC
2 PLACES
4.312 BSC
2 PLACES
VIEW C-C
.249
.251 DIA-THRU
12 HOLES
⊕ .004 DIA
.813 BSC
.2495
.2497 DIA THRU
8 PLACES
SEE NOTES 9C & 9F
.937 BSC
2 PLACES
.250 BSC
2 PLACES
.375 BSC
1.062 BSC
.625 BSC
2 PLACES
.313 BSC
.937 BSC
2 PLACES
1.375 BSC
.934 BSC
15° BSC
30° BSC
12 PLACES
5/16 -18 UNC-2B MOD-THRU
.271
.276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313
.333 DIA
12 HOLES ON A 13.125 DIA BSC
⊕ G .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
12.950 DIA MIN
10.000 BSC
.5000
.5002 DIA-THRU
CSK 85°±5° TO .550
.560 DIA
FAR SIDE - 4 HOLES
⊕ .005 DIA
.550
.570 DIA-THRU
2 HOLES
⊕ .005 DIA
1.375 BSC
.315 BSC
1.062 BSC
.125 BSC
.375 BSC
.934 BSC
6.125 BSC
11.750 BSC
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165
.169 MODIFIED
C'SK 82°±1° TO .189
.199 DIA
12 HOLES SPACED AS SHOWN
SEE NOTE 9
⊕ .005 DIA
VIEW SHOWN WITH ITEMS ②, ③, ④, ⑤, ⑦, ⑧, ⑪, ⑫ & ⑬ REMOVED
INSTALL .010
.030 BELOW SURFACE
DETAIL E
SCALE: 2/1
TYP ALL ITEMS ⑨, ⑩ & ⑭
J .003 TIR
32
.157
.163
7.707 DIA REF
.010
.025 R
.005 R MAX
2 PLACES
5°00' MAX
TYP
.101
.107
-J-
DETAIL D
SCALE: 2/1
2 PLACES

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-24-63		WK
E	TDRR 00589	3-19-63		WK
F	TDRR 01056	4-30-63		WK
G	TDRR 01442	6-5-63		
H	TDRR 04557	12-3-63		
J	TDRR 05614	1-7-64		
K	TDRR 05745	1-14-64		
L	TDRR 07083	4-7-64		WK.
M	REVISED PER TDRR 07863	12 MAY 64	JJJ	EF
N	REVISED PER TDRR 08761	8 JUN 64		RWH
P	REVISED PER TDRR 10504	17 ... 64	JJJ	DAS

M			~~1~~	~~–~~		~~15~~	~~1001553~~	~~BRAZING ASSY, CASE CENTER~~
F			~~12~~	12		14	1000115-2	INSERT, THREADED, SELF LKG
F			~~8~~	8		13	1000093-14	SCREW, BUT. HD, HEX SOC.
			~~4~~	4		12	1000186	RETAINER, FASTENER
			~~12~~	12		11	1000076-2	NUT, FLUSH MTD, CLINCH
			~~12~~	12		10	1000115-3	INSERT, THREADED, SELF LKG
			~~48~~	46		9	1000146	INSERT, THREADED, SELF LKG
			~~12~~	12		8	1006783-45	SCREW, BUT. HD, HEX SOC.
			~~8~~	8		7	NAS 607-4-4	PIN, LOCATING, STRAIGHT, HDLS
			~~2~~	2		6	1000088-2	PIN, LOCATING, STRAIGHT, HDLS
F			~~1~~	1		5	1000216	PAD, CASE MTG, 1 SPEED LH
F			~~1~~	1		4	1000215	PAD, CASE MTG, 1 SPEED RH
F			~~1~~	1		3	1000218	PAD, CASE MTG, 16 SPEED LH
F			~~1~~	1		2	1000217	PAD, CASE MTG, 16 SPEED RH
			–	1		1	1001553	BRAZING ASSY, CASE CENTER
			~~021~~	~~011~~	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

P
1000085

REPLACES REV C WITH CHANGES

1000201	DL1000201	
1000001	DL1000001	
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN DM WHITE 2-4-63
APPROVED FOR MSC
W.J. Pohlmann 2-27-63
BY DIRECTION M. Cappagrosso
W. Kaffer 27 Feb 63

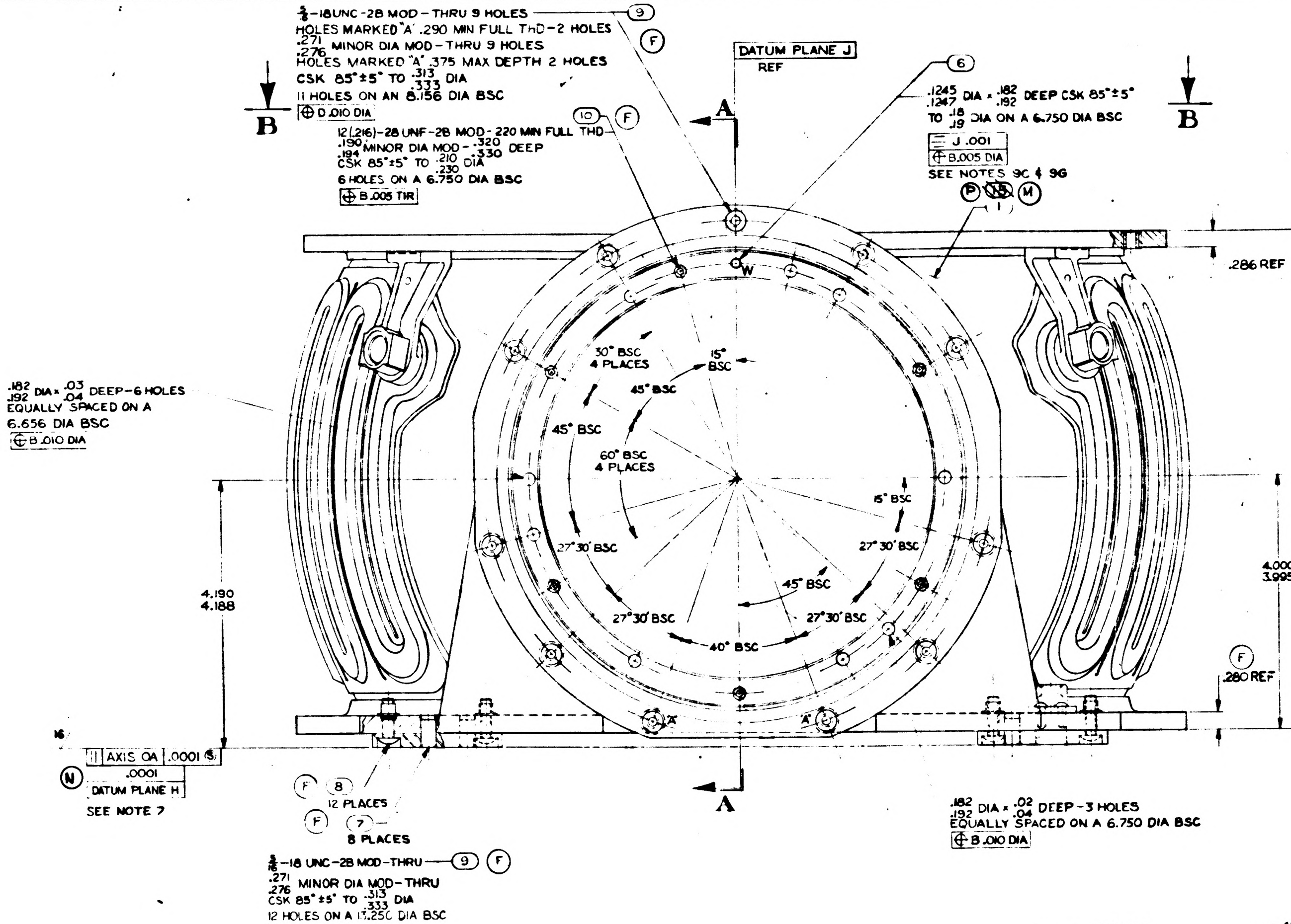
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE IDENT

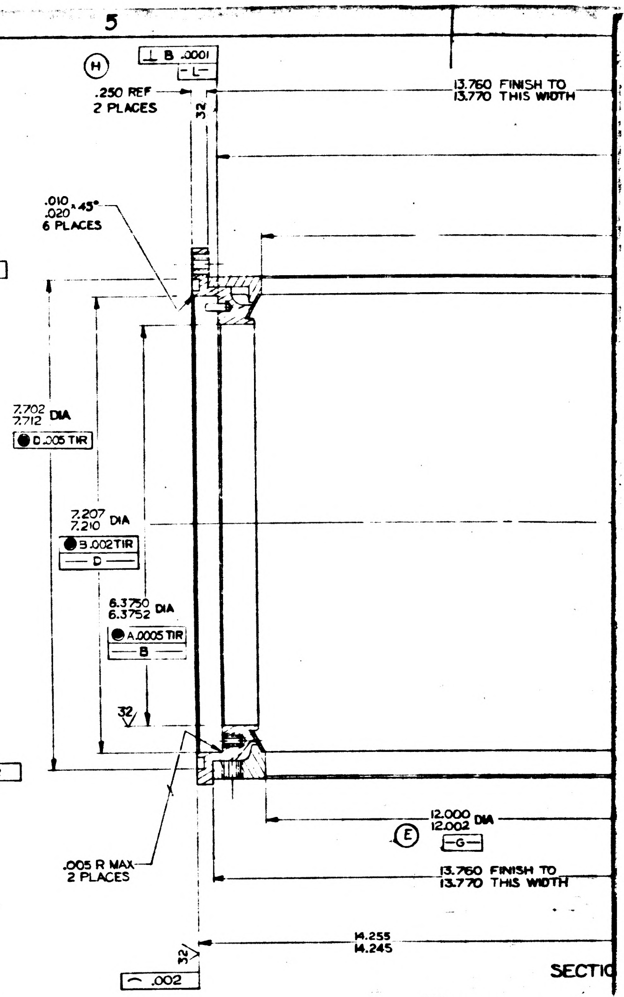
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000085
SHEET 1 OF 1

1000085 P 1

2/1000085



5/16-18UNC-2B MOD-THRU 9 HOLES ⑨ Ⓕ
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
⊕ D .010 DIA
B
B
A
A
⑩ Ⓕ
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .194 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
⊕ B .005 TIR
DATUM PLANE J
REF
⑥
.1245 .1247 DIA x .182 .192 DEEP CSK 85°±5°
TO .18 .19 DIA ON A 6.750 DIA BSC
≡ J .001
⊕ B .005 DIA
SEE NOTES 9C & 9G
Ⓟ ⑮ Ⓜ
①
.286 REF
W
.182 .192 DIA x .03 .04 DEEP-6 HOLES
EQUALLY SPACED ON A
6.656 DIA BSC
⊕ B .010 DIA
30° BSC
4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC
4 PLACES
15° BSC
27°30' BSC
27°30' BSC
45° BSC
27°30' BSC
27°30' BSC
40° BSC
7.875 7.865
4.190 4.188
4.000 3.995
Ⓕ .280 REF
32 ⌒ .002
32 ⌒ .002
16
‖ AXIS OA .0001 Ⓢ
Ⓝ .0001
DATUM PLANE H
SEE NOTE 7
Ⓕ ⑧
12 PLACES
Ⓕ ⑦
8 PLACES
5/16-18 UNC-2B MOD-THRU ⑨ Ⓕ
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.250 DIA BSC
⊕ F .005 DIA
.182 .192 DIA x .02 .04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DIA BSC
⊕ B .010 DIA



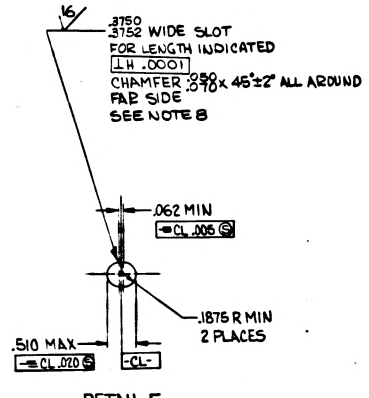
Ⓗ
⊥ B .0001
-L-
.250 REF
2 PLACES
32
13.760 FINISH TO
13.770 THIS WIDTH
.010 .020 x 45°
6 PLACES
7.702 7.712 DIA
● D .005 TIR
7.207 7.210 DIA
● B .002 TIR
-D-
6.3750 6.3752 DIA
● A .0005 TIR
-B-
32
12.000 12.002 DIA
Ⓔ -G-
.005 R MAX
2 PLACES
13.760 FINISH TO
13.770 THIS WIDTH
14.255 14.245
32
⌒ .002
SECTIO

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. $\overset{63}{\checkmark}$ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. Ⓜ Ⓗ IDENTIFY USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER ND 1002019.
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM ⑥ MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS ②, ③, ④ & ⑤
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY)
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - Ⓕ D. ANODIC COAT PER NOTE 11
   - Ⓗ Ⓕ E. INSTALL ITEMS ②, ③, ④, ⑤, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬ & ⑭
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS ②, ③, ④ & ⑤ & INSTALL ITEM ⑦
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM ⑥
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
11. Ⓕ ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
12. DIAMETERS -A- & -B- AND SURFACES -L- MAY BE CHEMICAL FINISHED PER MIL-C-5541
13. Ⓗ Ⓗ INSTALL PROTECTIVE PADS, NASA DWG NO 1001460, 1001461, 1001464 & 1001465, WITH SCREWS NASA DWG NO. 1000110-3 OR EQUIVALENT AFTER MACHINING MOUNTING PADS. PROTECTIVE PADS TO BE REMOVED FOR INSPECTION ONLY

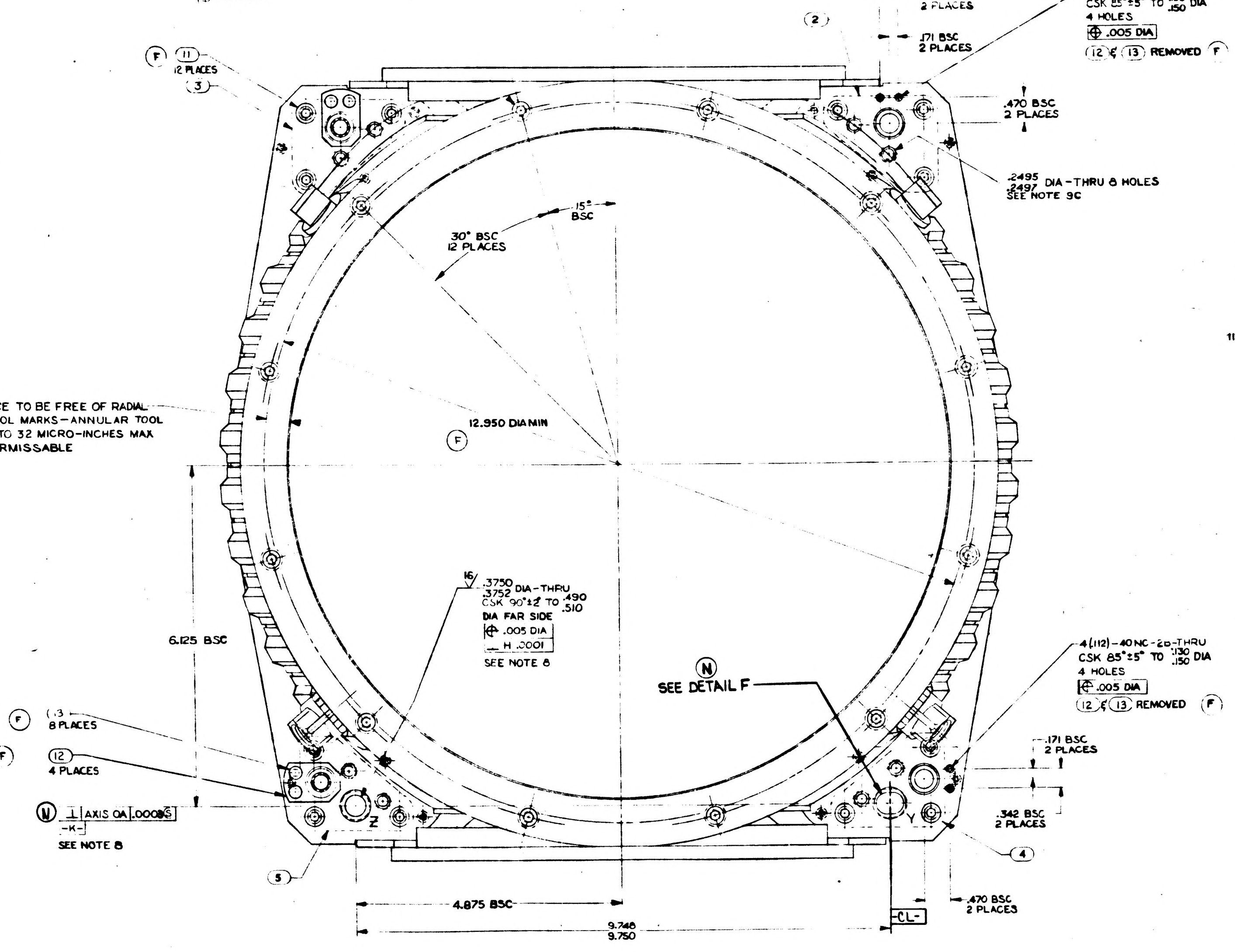
Ⓜ Ⓙ

THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE



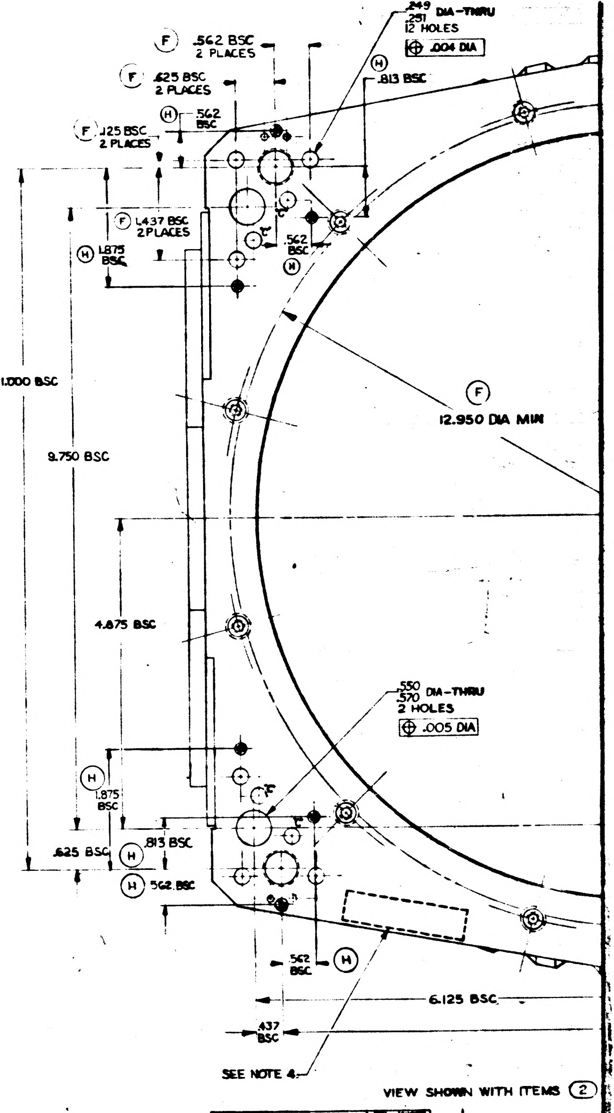
16
.3750 .3752 WIDE SLOT
FOR LENGTH INDICATED
⊥ H .0001
CHAMFER .050 .070 x 45°±2° ALL AROUND
FAR SIDE
SEE NOTE 8
.062 MIN
⌯ CL .005 Ⓢ
.1875 R MIN
2 PLACES
.510 MAX
⌯ CL .020 Ⓢ
-CL-

Ⓝ DETAIL F



Ⓕ ⑪
12 PLACES
③
②
.342 BSC
2 PLACES
.171 BSC
2 PLACES
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
⑫ & ⑬ REMOVED Ⓕ
.470 BSC
2 PLACES
.2495 .2497 DIA-THRU 8 HOLES
SEE NOTE 9C
30° BSC
12 PLACES
15° BSC
12.950 DIA MIN
Ⓕ
16
.3750 .3752 DIA-THRU .490 .510
CSK 90°±2° TO
DIA FAR SIDE
⊕ .005 DIA
-H .0001
SEE NOTE 8
Ⓝ
SEE DETAIL F
6.125 BSC
Ⓕ ⑬
8 PLACES
Ⓕ ⑫
4 PLACES
Ⓝ ⊥ AXIS OA .0008 Ⓢ
-K-
SEE NOTE 8
Z
Y
4(.112)-40 NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
⊕ .005 DIA
⑫ & ⑬ REMOVED Ⓕ
.171 BSC
2 PLACES
.342 BSC
2 PLACES
④
⑤
4.875 BSC
9.748 9.750
.470 BSC
2 PLACES
-CL-

VIEW B-B



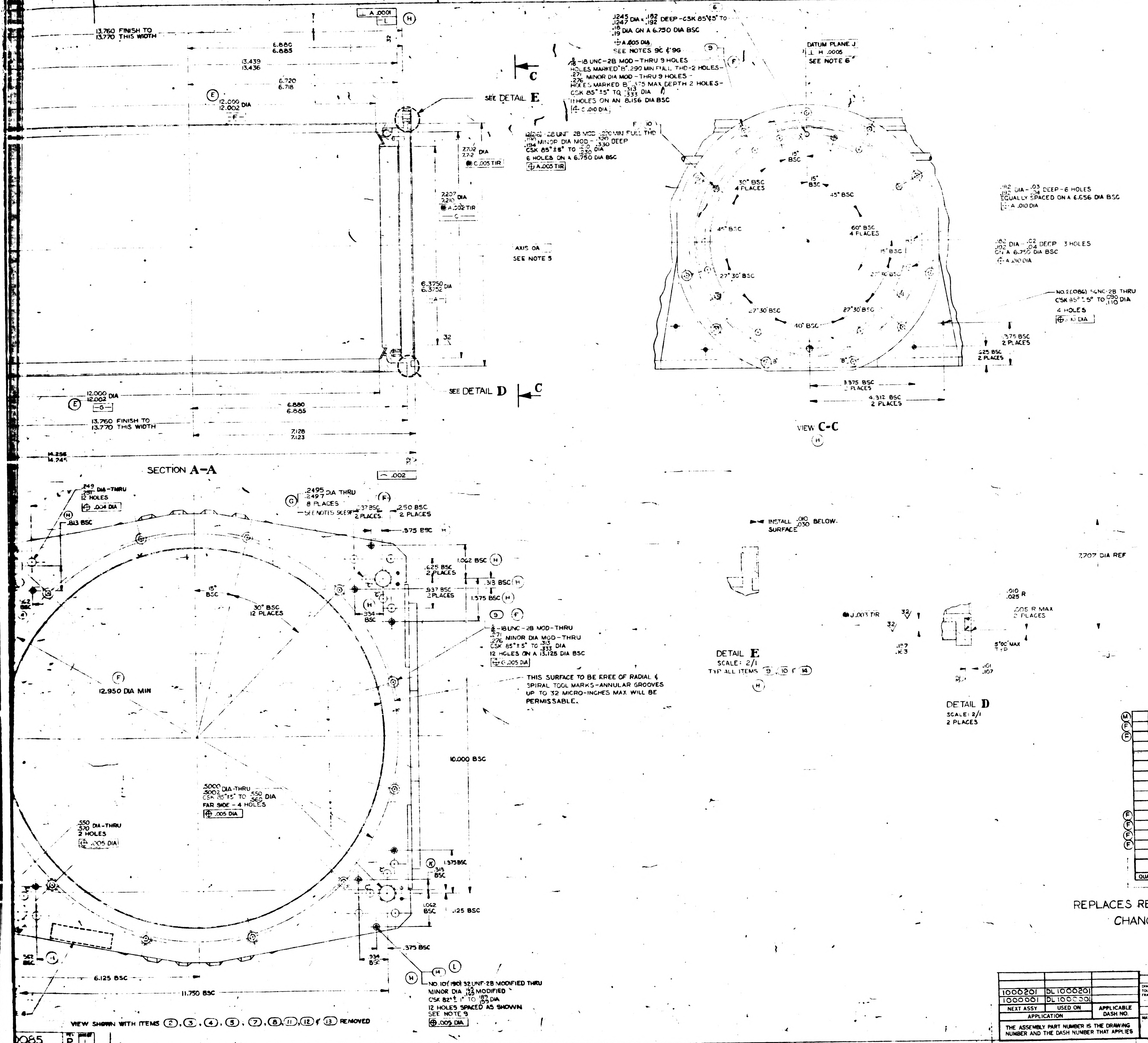
Ⓕ .562 BSC
2 PLACES
Ⓕ .625 BSC
2 PLACES
Ⓕ .125 BSC
2 PLACES
Ⓗ .562 BSC
.249 .251 DIA-THRU
12 HOLES
⊕ .004 DIA
Ⓗ .813 BSC
Ⓕ 1.437 BSC
2 PLACES
Ⓗ 1.875 BSC
.562 BSC
11.000 BSC
9.750 BSC
Ⓕ
12.950 DIA MIN
4.875 BSC
.550 .570 DIA-THRU
2 HOLES
⊕ .005 DIA
Ⓗ 1.875 BSC
.625 BSC
Ⓗ .813 BSC
Ⓗ .562 BSC
.562 BSC Ⓗ
6.125 BSC
.437 BSC
SEE NOTE 4

VIEW SHOWN WITH ITEMS ②

1000085	P	1

1710000085

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES	1-24-63		
	TDRR 00456	1-30-63		WK
E	TDRR 00589	63		WK
F	TDRR 01056	4-30-63		WK
G	TDRR 01442	5-63		
H	TDRR 04557	12-3-63		
J	TDRR 05614	1-7-64		
K	TDRR 05745	1-14-64		
L	TDRR 07080	4-7-64		WK
M	REVISED PER TDRR 07863	12 MAY 64		
N	REVISED PER TDRR 08761	8 JUN 64		
P	REVISED PER TDRR 10804	17 JUL 64	JJJ	DAS
R	REVISED PER TDRR 12142	18 SEP 64	JWP	



13.760 FINISH TO 13.770 THIS WIDTH
6.880 6.885
13.439 13.436
6.720 6.718
12.000 12.002 DIA
SEE DETAIL E
.1245 .1247 DIA x .182 .192 DEEP - CSK 85°±5° TO .18 .19 DIA ON A 6.750 DIA BSC
A .005 DIA
SEE NOTES 9C & 9G
5/16-18 UNC-2B MOD - THRU 9 HOLES
HOLES MARKED "B" .290 MIN FULL THD - 2 HOLES
.271 .276 MINOR DIA MOD - THRU 9 HOLES
HOLES MARKED B .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
C .010 DIA
DATUM PLANE J
H .0005
SEE NOTE 6
C
7.702 7.712 DIA
C .005 TIR
2.207 2.210 DIA
A .002 TIR
AXIS OA
SEE NOTE 5
6.3750 6.3752 DIA
32
SEE DETAIL D
12.000 12.002 DIA
6.880 6.885
13.760 FINISH TO 13.770 THIS WIDTH
7.128 7.123
14.256 14.245
SECTION A-A
.002
15° BSC
30° BSC 4 PLACES
45° BSC
60° BSC 4 PLACES
27°30' BSC
40° BSC
.182 .192 DIA - .03 .04 DEEP - 6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
A .010 DIA
.182 .192 DIA - .02 .03 DEEP - 3 HOLES ON A 6.750 DIA BSC
A .010 DIA
NO.2(.086) 56NC-2B THRU CSK 85°±5° TO .090 .110 DIA
4 HOLES
.375 BSC 2 PLACES
.225 BSC 2 PLACES
3.375 BSC 2 PLACES
4.312 BSC 2 PLACES
VIEW C-C
.249 .251 DIA - THRU 12 HOLES
.004 DIA
.813 BSC
.2495 .2497 DIA THRU 8 PLACES
SEE NOTES 9C & 9F
.37 BSC 2 PLACES
.250 BSC 2 PLACES
.375 BSC
1.062 BSC
.625 BSC 2 PLACES
.313 BSC
.937 BSC 2 PLACES
1.575 BSC
.334 BSC
15° BSC
30° BSC 12 PLACES
5/16-18 UNC-2B MOD - THRU
.271 .276 MINOR DIA MOD - THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 13.125 DIA BSC
C .005 DIA
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS - ANNULAR GROOVES UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE.
12.950 DIA MIN
10.000 BSC
.5000 .5002 DIA - THRU CSK 85°±5° TO .550 .560 DIA FAR SIDE - 4 HOLES
.005 DIA
.550 .570 DIA - THRU 2 HOLES
.005 DIA
1.375 BSC
.315 BSC
1.062 BSC
.125 BSC
.375 BSC
.334 BSC
6.125 BSC
11.750 BSC
NO. 10(.190) 32 UNF-2B MODIFIED THRU MINOR DIA .152 .162 MODIFIED
CSK 82°±1° TO .183 .193 DIA
12 HOLES SPACED AS SHOWN
SEE NOTE 9
.005 DIA
VIEW SHOWN WITH ITEMS 2, 3, 4, 5, 7, 8, 11, 12 & 13 REMOVED
INSTALL .010 .030 BELOW SURFACE
J .003 TIR
32
.010 .025 R
.005 R MAX 2 PLACES
5°00' MAX
.127 .163
.101 .107
DETAIL E
SCALE: 2/1
TYP ALL ITEMS 9, 10 & 14
2.707 DIA REF
DETAIL D
SCALE: 2/1
2 PLACES

	~~1~~	~~-~~		~~15~~	~~1001553~~	~~BRAZING ASSY, CASE CENTER~~
	~~12~~	12		14	1000115-2	INSERT, THREADED, SELF LKG
	~~8~~	8		13	1000093-14	SCREW, BUT. HD, HEX SOC.
	~~4~~	4		12	1000186	RETAINER, FASTENER
	~~12~~	12		11	1000076-2	NUT, FLUSH MTD, CLINCH
	~~12~~	12		10	1000115-3	INSERT, THREADED, SELF LKG
	~~46~~	46		9	1000146	INSERT, THREADED, SELF LKG
	~~12~~	12		8	1006783-45	SCREW, BUT. HD, HEX SOC.
	~~8~~	8		7	NAS 607-4-4	PIN, LOCATING, STRAIGHT, HDLS
	~~2~~	2		6	1000088-2	PIN, LOCATING, STRAIGHT, HDLS
	~~1~~	1		5	1000216	PAD, CASE MTG, 1 SPEED LH
	~~1~~	1		4	1000215	PAD, CASE MTG, 1 SPEED RH
	~~1~~	1		3	1000218	PAD, CASE MTG, 16 SPEED LH
	~~1~~	1		2	1000217	PAD, CASE MTG, 16 SPEED RH
	-	1		1	1001553	BRAZING ASSY, CASE CENTER
	~~C21~~	~~011~~	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS		

1000085 R

REPLACES REV C WITH CHANGES

1000201	DL 1000201	
1000001	DL 1000001	
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 2-27-63
CHECKED
DRAWN D.M.WHITE 2-4-63
APPROVED FOR MSC 2-27-63
BY DIRECTION

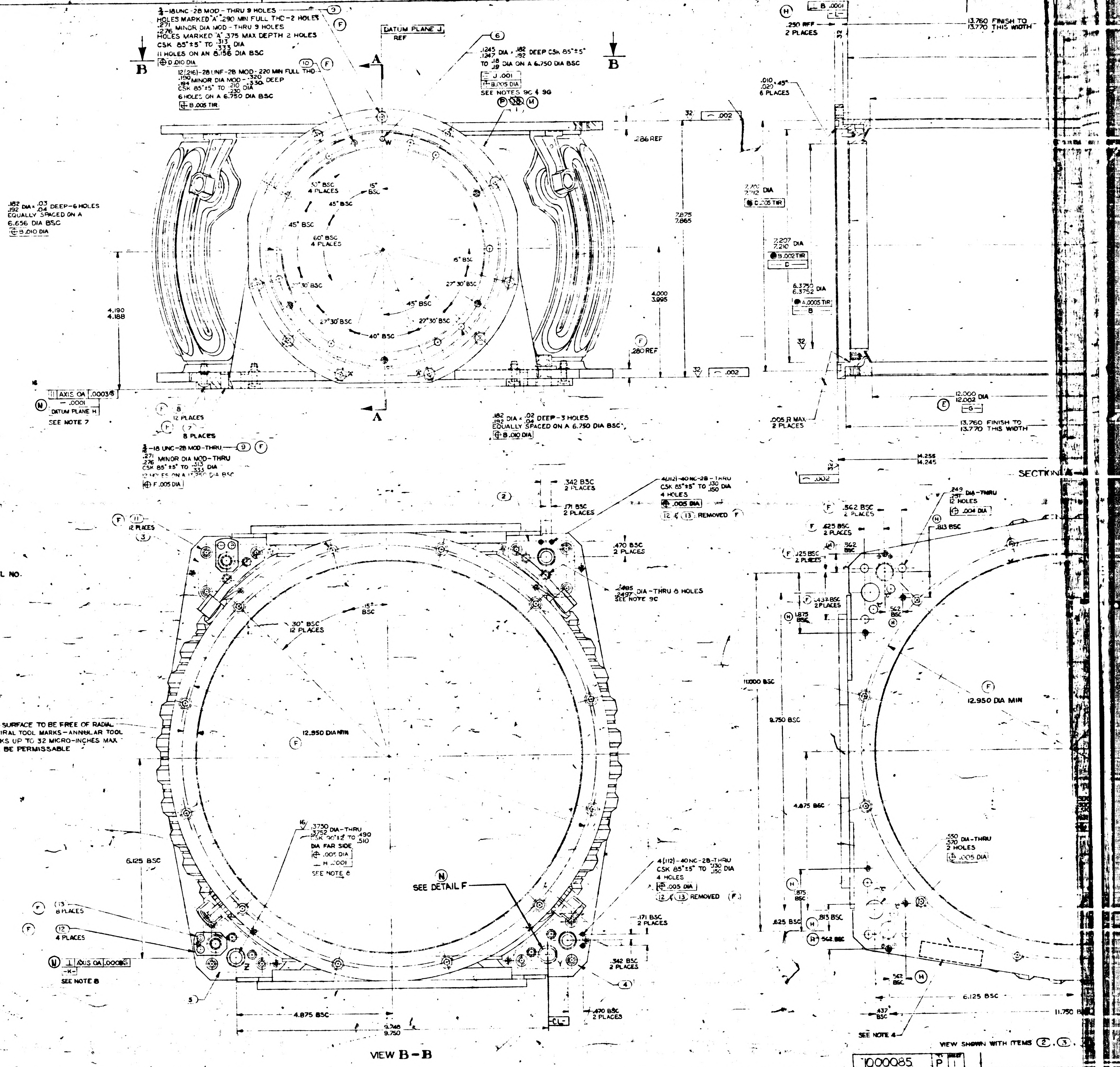
MACHINING ASSEMBLY
CASE CENTER

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000085
SHEET 1 OF 1

1000085 REV P

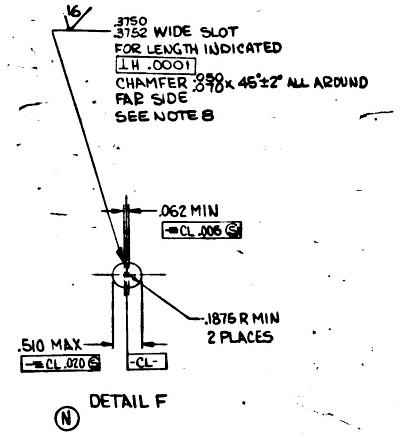
2/1000085



¾-18UNC-2B MOD-THRU 9 HOLES
HOLES MARKED "A" .290 MIN FULL THD-2 HOLES
.271 .276 MINOR DIA MOD-THRU 9 HOLES
HOLES MARKED "A" .375 MAX DEPTH 2 HOLES
CSK 85°±5° TO .313 .333 DIA
11 HOLES ON AN 8.156 DIA BSC
D .010 DIA
12(.216)-28 UNF-2B MOD-.220 MIN FULL THD
.190 .194 MINOR DIA MOD-.320 .330 DEEP
CSK 85°±5° TO .210 .230 DIA
6 HOLES ON A 6.750 DIA BSC
B .005 TIR
DATUM PLANE J
REF
.1245 .1247 DIA-.182 .192 DEEP CSK 85°±5°
TO .18 .19 DIA ON A 6.750 DIA BSC
J .001
B .005 DIA
SEE NOTES 9C & 9G
B
A
B
.182 .192 DIA-.03 .04 DEEP-6 HOLES
EQUALLY SPACED ON A 6.656 DIA BSC
B .010 DIA
30° BSC 4 PLACES
15° BSC
45° BSC
45° BSC
60° BSC 4 PLACES
15° BSC
30° BSC
27°30' BSC
45° BSC
27°30' BSC
27°30' BSC
40° BSC
4.190 4.188
AXIS OA .0003
.0001
DATUM PLANE H
SEE NOTE 7
8
12 PLACES
7
8 PLACES
¾-18 UNC-2B MOD-THRU
.271 .276 MINOR DIA MOD-THRU
CSK 85°±5° TO .313 .333 DIA
12 HOLES ON A 11.250 DIA BSC
F .005 DIA
A
.182 .192 DIA-.02 .04 DEEP-3 HOLES
EQUALLY SPACED ON A 6.750 DIA BSC
B .010 DIA
.286 REF
.280 REF
32
.002
7.875 7.865
4.000 3.995
7.702 7.712 DIA
C .005 TIR
7.207 7.210 DIA
B .002 TIR
C
6.3750 6.3752 DIA
A .0005 TIR
B
.250 REF 2 PLACES
B .0001
L
13.760 FINISH TO 13.770 THIS WIDTH
.010 .020 x 45° 6 PLACES
12.000 12.002 DIA
G
.005 R MAX 2 PLACES
13.760 FINISH TO 13.770 THIS WIDTH
14.255 14.245
.002
SECTION A-A
.342 BSC 2 PLACES
.171 BSC 2 PLACES
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
.005 DIA
12 & 13 REMOVED
11
12 PLACES
3
.470 BSC 2 PLACES
.2485 .2497 DIA-THRU 8 HOLES
SEE NOTE 9C
15° BSC
30° BSC 12 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSABLE
12.950 DIA MIN
.3750 .3752 DIA-THRU
CSK 90°±2° TO .490 .510
DIA FAR SIDE
.005 DIA
H .0001
SEE NOTE 8
SEE DETAIL F
6.125 BSC
4(.112)-40NC-2B-THRU
CSK 85°±5° TO .130 .150 DIA
4 HOLES
.005 DIA
12 & 13 REMOVED
13
8 PLACES
12
4 PLACES
AXIS OA .0005
-K-
SEE NOTE 8
.171 BSC 2 PLACES
.342 BSC 2 PLACES
4
5
Z
Y
4.875 BSC
9.748 9.750
.470 BSC 2 PLACES
CL
VIEW B-B
.249 .251 DIA-THRU
12 HOLES
.004 DIA
.562 BSC 2 PLACES
.813 BSC
.425 BSC 2 PLACES
.125 BSC 2 PLACES
.562 BSC
.437 BSC 2 PLACES
1.875 BSC
.562 BSC
11.000 BSC
9.750 BSC
12.950 DIA MIN
4.875 BSC
.550 .570 DIA-THRU
2 HOLES
.005 DIA
.875 BSC
.625 BSC
.813 BSC
.562 BSC
.562 BSC
.437 BSC
SEE NOTE 4
6.125 BSC
11.750 BSC
VIEW SHOWN WITH ITEMS 2, 3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005 .015
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., MANUFACTURERS SYMBOL & SERIAL NO. AT INDICATED LOCATION PER ND 1002019.
5. A LINE PASSING THRU THE CENTER OF BORE -A- & BORE -B- ESTABLISHES AXIS OA
6. A PLANE CONTAINING AXIS OA AND CENTER OF ITEM (6) MARKED "X" ESTABLISHES DATUM PLANE J
7. DATUM PLANE -H- IS DEFINED BY THE SURFACES OF ITEMS (2), (3), (4) & (5)
8. DATUM -K- IS DEFINED BY THE CENTER OF HOLE MARKED "Z" & SLOT MARKED "Y"
9. ORDER OF OPERATIONS (NON-MANDATORY) -
   - A. ROUGH MACHINE WITHIN .015 OF FINISH DIMENSIONS
   - B. STRESS RELIEVE AT 325°F ±10°F FOR 6 HRS ±5 MIN
   - C. FINISH MACHINE (DRILL & TAP ALL HOLES EXCEPT HOLES MARKED "C", W & X)
   - D. ANODIC COAT PER NOTE 11
   - E. INSTALL ITEMS (2), (3), (4), (5), (8), (9), (10), (11), (12), (13) & (14)
   - F. MATCH MACHINE HOLES MARKED "C" WITH ITEMS (2), (3), (4) & (5) & INSTALL ITEM (7)
   - G. MACHINE DATUM PLANE H & DATUM -K-
   - H. MACHINE HOLES MARKED "W" & "X" & INSTALL ITEM (6)
10. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
11. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
12. DIAMETERS -A- & -B- AND SURFACES -L- MAY BE CHEMICAL FINISHED PER MIL-C-5541
13. INSTALL PROTECTIVE PADS, NASA DWG NO. 1001460, 1001461, 1001464 & 1001465, WITH SCREWS NASA DWG NO. 1000110-3 OR EQUIVALENT AFTER MACHINING MOUNTING PADS. PROTECTIVE PADS TO BE REMOVED FOR INSPECTION ONLY



16
.3750 .3752 WIDE SLOT
FOR LENGTH INDICATED
H .0001
CHAMFER .050 .070 x 45°±2° ALL AROUND
FAR SIDE
SEE NOTE 8
.062 MIN
CL .005
.1875 R MIN 2 PLACES
.510 MAX
CL .020
CL

DETAIL F

1000085 P 1

1/1000085

	1000085	

REVISIONS TDRR 00079

(N) SYM	DESCRIPTION	DATE	APPROVAL

PART NUMBER	DESCRIPTION	REQUIRED
1000083	CASE CENTER BRAZED ASSEMBLY	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/31/62
CHECKED		
DRAWN		

APPROVED FOR MSC

BY DIRECTION MIT APPROVAL

CASE, CENTER MACHINED
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

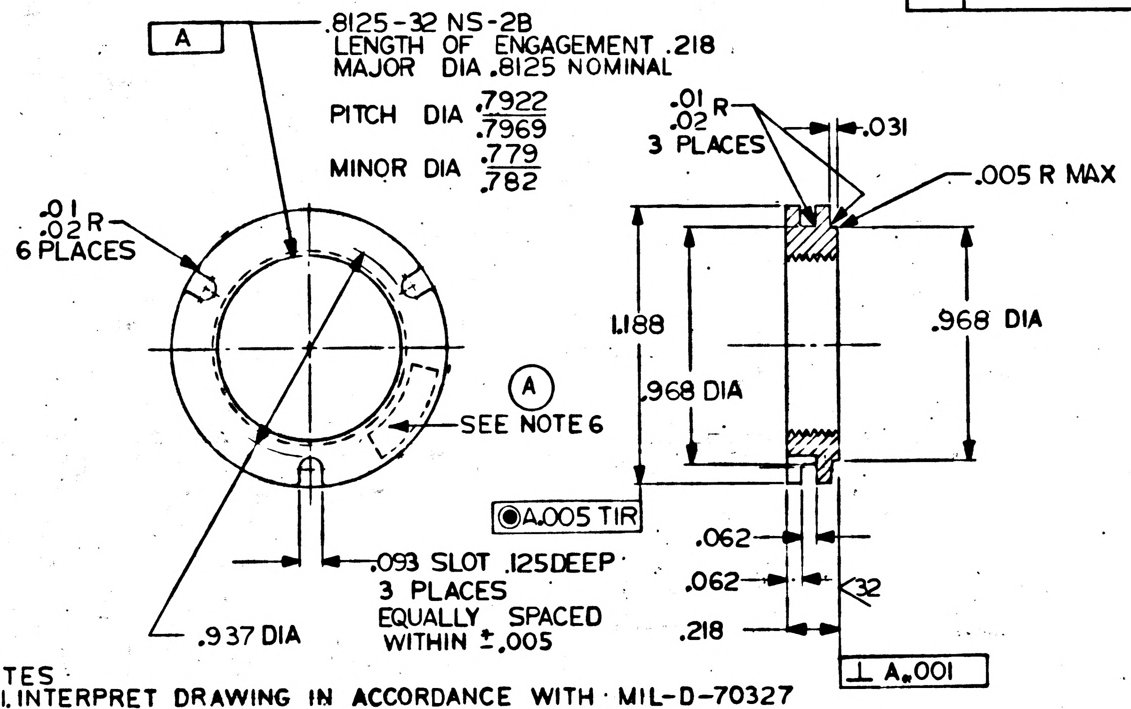
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000085

SHEET 1 OF 1

1000086 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A_2	TDR 00008	8-10-62	ajB
B	TDRR 00348	2-12-63	ajB W



A
.8125-32 NS-2B
LENGTH OF ENGAGEMENT .218
MAJOR DIA .8125 NOMINAL
PITCH DIA .7922 .7969
MINOR DIA .779 .782
.01 .02 R
6 PLACES
Ⓐ
SEE NOTE 6
◉A.005 TIR
.093 SLOT .125DEEP
3 PLACES
EQUALLY SPACED
WITHIN ±.005
.937 DIA
.01 .02 R
3 PLACES
.031
.005 R MAX
1.188
.968 DIA
.968 DIA
.062
.062
32
.218
⊥ A.001

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63 FINISH UNLESS OTHERWISE SPECIFIED
3. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
Ⓑ 4. MATL:
~~CRES AISI 416 ANNEALED~~
CRES, CL 416, COND A, FORM BAR, FIN. COLD SPEC QQ-S-763
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
Ⓐ 6. IDENTIFY USING DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

Ⓐ

NEXT ASSY	USED ON
1000015	
1000014	
1000010	
1000008	
1000006	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	7-31-62
CHECKED		
DRAWN	J GREGORY	5-25-62

APPROVED FOR MSC
Jack Barnard 7-31-62
BY DIRECTION
MIT APPROVAL: W. Kupfer 7/31/62

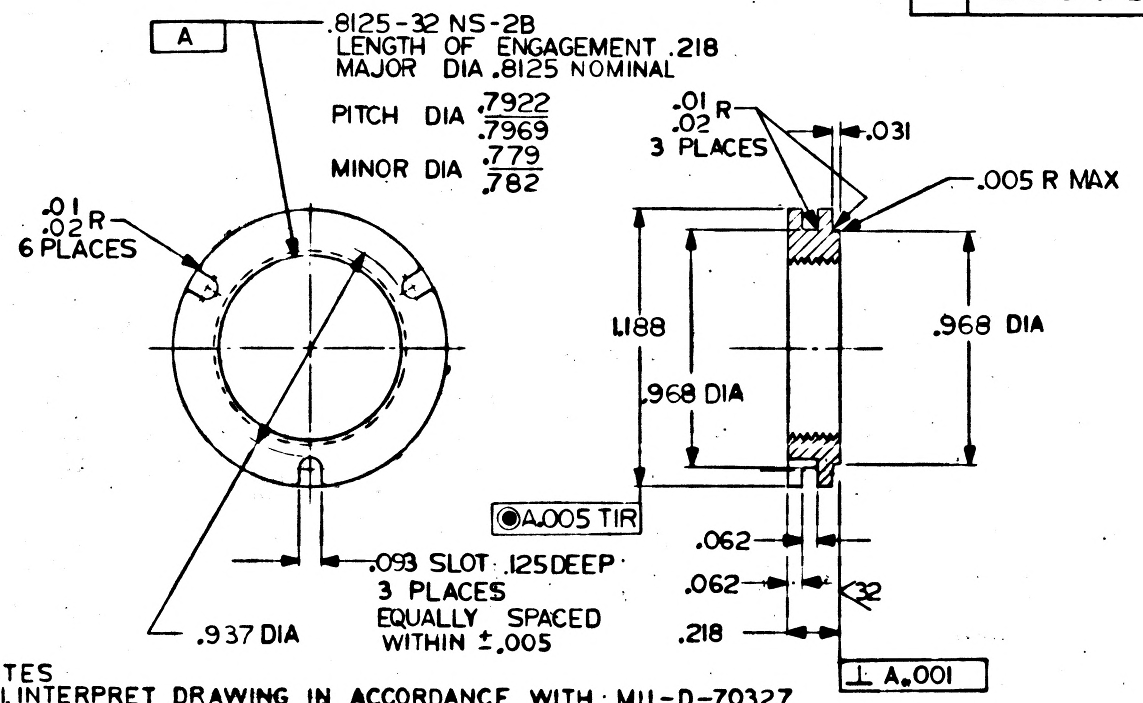
NUT,
BEARING RETAINER

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000086
SHEET 1 OF 1

9800001

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


A
.8125-32 NS-2B
LENGTH OF ENGAGEMENT .218
MAJOR DIA .8125 NOMINAL
PITCH DIA .7922 / .7969
MINOR DIA .779 / .782
.01 / .02 R
6 PLACES
.01 / .02 R
3 PLACES
.031
.005 R MAX
1.188
.968 DIA
.968 DIA
◉ A .005 TIR
.093 SLOT .125 DEEP
3 PLACES
EQUALLY SPACED
WITHIN ±.005
.937 DIA
.062
.062
32
.218
⊥ A .001

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\overset{63}{\vee}$ FINISH UNLESS OTHERWISE SPECIFIED
3. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
4. MATL:
   CRES AISI 416 ANNEALED
   CRES, CL 416, COND A, FORM BAR, FIN. HOT, SPEC QQ-S-763
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	
1000006	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	J. Boyce	7-31-62
CHECKED		
DRAWN	J GREGORY	5-25-62

APPROVED FOR MSC
Jack Barnard 7-31-62
BY DIRECTION
MIT APPROVAL: W. Ragan 7/31/62

NUT,
BEARING RETAINER

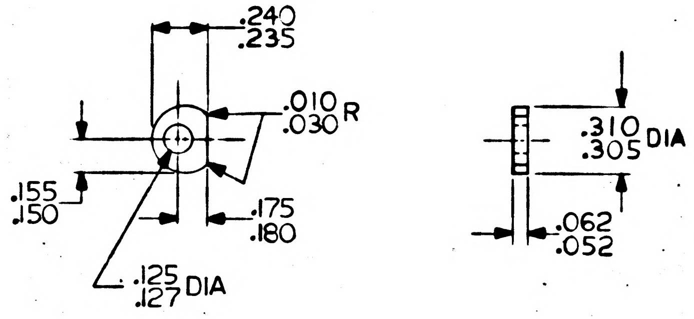
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000086
SHEET 1 OF 1

1000087 A

SYM	DESCRIPTION	DATE	APPROVAL
A,	TDR 00007	8-10-62	agB

REVISIONS



NOTE

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{63}$ FINISH ALL OVER
3. REMOVE BURRS AND SHARP EDGES $\substack{.005 \\ .015}$
4. ANODIC COATING PER MIL-A-8625 TYPE I.
5. Ⓐ IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000011	
1000010	
1000009	
1000008	
1000007	
1000006	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
—	±.005	—

DO NOT SCALE THIS DRAWING

MATERIAL:
AL ALY PL-6061
TEMP T6, ALT SPEC
QQ A-327 TEMP T6

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	7-31-62
CHECKED		
DRAWN	J. GREGORY	6-4-62

APPROVED FOR MSC
Jack Barnard 7/31/62
BY DIRECTION
MIT APPROVAL [illegible] 7/31/62

CLAMP,
TORQUE MOTOR

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

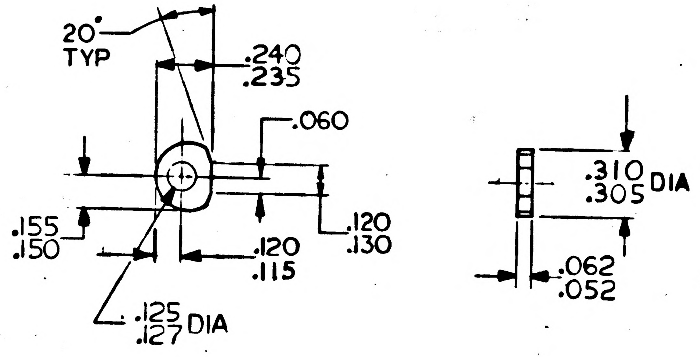
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000087

SHEET 1 OF 1

1000087 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A,	TDR 00007	8-10-62	agB RKF
B	TDR 00087	11-8-62	agB WR



NOTE
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\overset{63}{\surd}$ FINISH ALL OVER
3. REMOVE BURRS AND SHARP EDGES $^{.005}_{.015}$
4. ANODIC COATING PER MIL-A-8625 TYPE I.
Ⓐ 5. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000011	
1000010	
1000009	
1000008	
1000007	
1000006	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL-6061 TEMP T6, ALT SPEC QQ A-327 TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	7-31-62
CHECKED		
DRAWN	J. GREGORY	6-4-62

APPROVED FOR MSC
Jack Barnard 7/31/62
BY DIRECTION
MIT APPROVAL: W Kupfer 7/31/62

CLAMP, TORQUE MOTOR

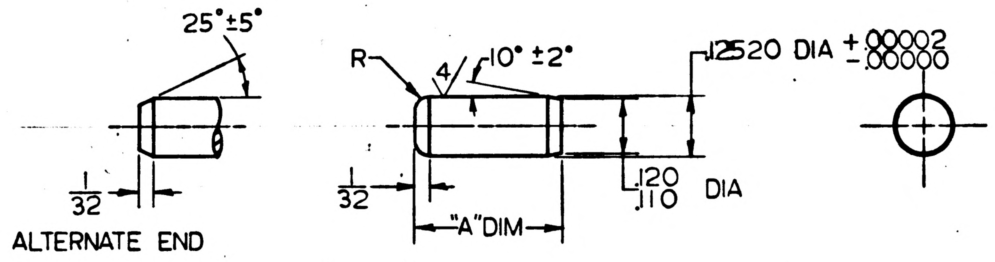
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000087
SHEET 1 OF 1

PART NO	A DIM
1000088-1	.240/.260
1000088-2	.365/.385

A 8800001

REVISIONS	TDRR 00077		
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00463	2-27-63	WC



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. HARDNESS: 36-40 ROCKWELL "C" OR EQUIVALENT
4. FINISH-PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. IDENTIFY USING DRAWING NO. REV. LETTER APPLICABLE DASH NO. AND MANUFACTURERS SYMBOL, PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

Ⓐ

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± 1/64	~	~

DO NOT SCALE THIS DRAWING

MATERIAL:
CRES CL 416
COND A FORM BAR
FIN COLD SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/31/62
CHECKED		
DRAWN	MORSE	9-6-62

APPROVED FOR MSC
W J Rhine 10-31-62
BY DIRECTION
MIT APPROVAL 10/31/62

PIN, LOCATING,
STRAIGHT, HEADLESS

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

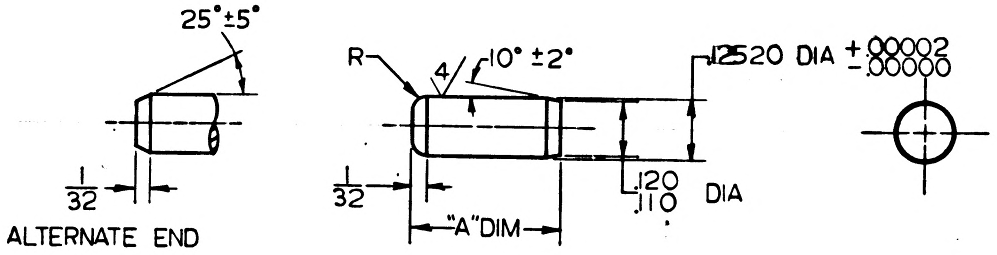
NASA DRAWING NO.
1000088

SHEET 1 OF 1 SHEET

PART NO	A DIM
1000088-1	.240/.260
1000088-2	.365/.385

8800001

REVISIONS TDRR 00077			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. HARDNESS: 36-40 ROCKWELL "C" OR EQUIVALENT
4. FINISH-PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. IDENTIFY USING DRAWING NO, REV. LETTER, APPLICABLE DASH NO, AND MANUFACTURERS SYMBOL, PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
CRES CL 416
COND A FORM BAR
FIN HOT SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/31/62
CHECKED		
DRAWN	MORSE	9-6-62

APPROVED FOR MSC
W J Rhine 10-31-62
BY DIRECTION
MIT APPROVAL 10/31/62

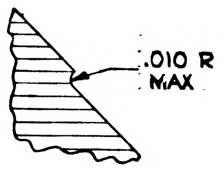
PIN, LOCATING, STRAIGHT, HEADLESS

SCALE	UNIT WT.	CODE IDENT.
4/1		

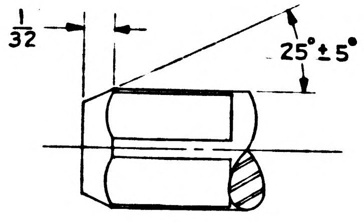
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000088
SHEET 1 OF 1 SHEET

REVISIONS TDRR 00086

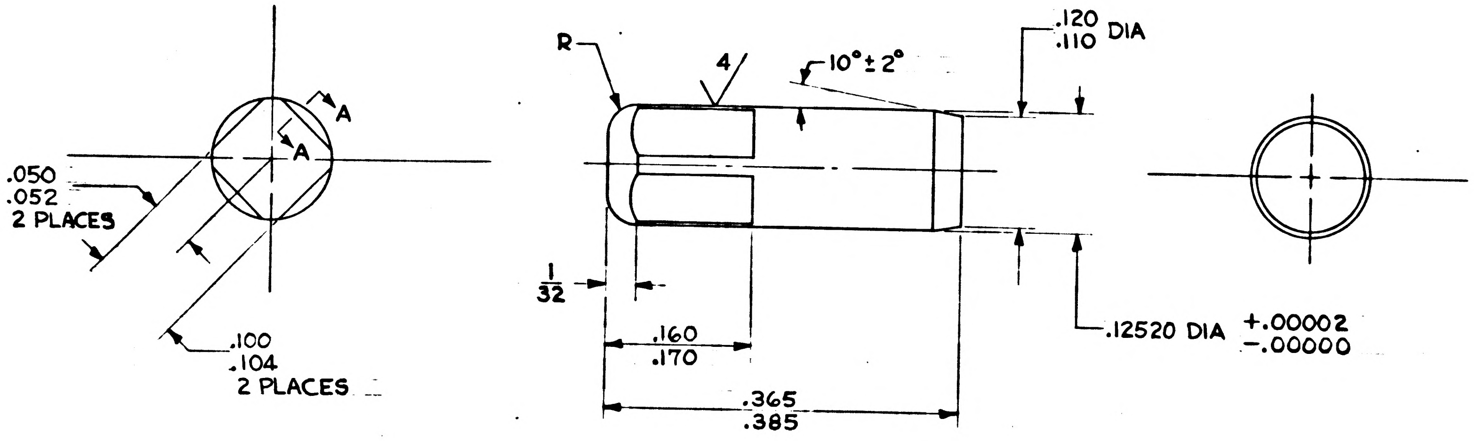
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



SECTION A-A



ALTERNATE END



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. HARDNESS: 36-40 ROCKWELL "C" OR EQUIVALENT
4. FINISH-PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. IDENTIFY USING DRAWING NO., REV. LETTER, APPLICABLE DASH NO., AND MANUFACTURERS SYMBOL, PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° ± 1°

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000025	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: STEEL: CORROSION RESISTING FED. STD. 66 NOS. 410 OR 416

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	RES	10-31-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
WARupp 8 Nov 1962

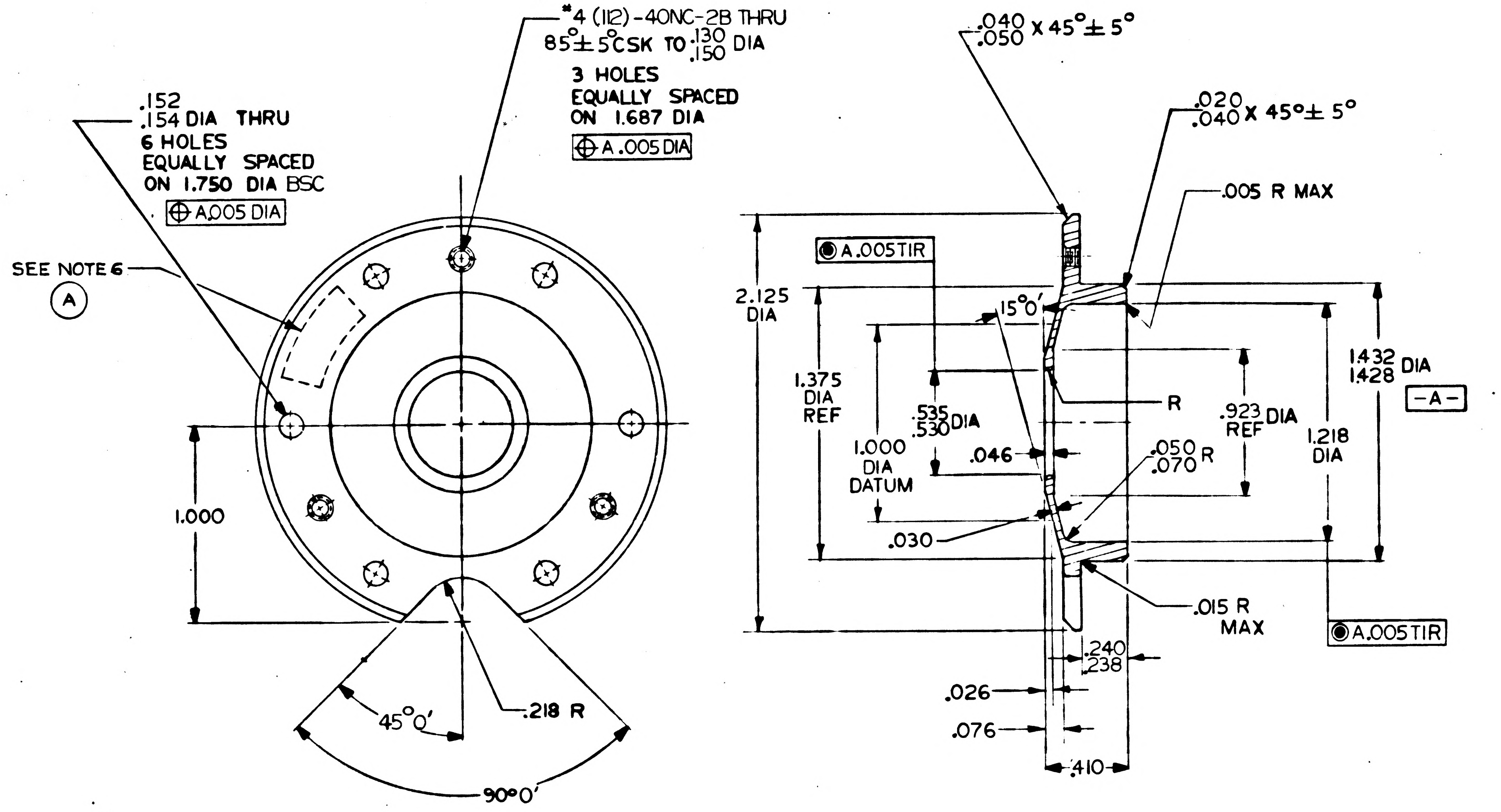
PIN, LOCATING
SQUARE HEAD

SCALE	UNIT WT.	CODE IDENT.
8/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000089
SHEET 1 OF

1000089

REVISIONS				TDRR00021
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	ADDED NOTE 6, CHGD NEXT ASSY	8-20-62	



*4 (112)-40NC-2B THRU
85°±5° CSK TO .130 .150 DIA
3 HOLES
EQUALLY SPACED
ON 1.687 DIA
⊕ A .005 DIA
.152 .154 DIA THRU
6 HOLES
EQUALLY SPACED
ON 1.750 DIA BSC
⊕ A .005 DIA
SEE NOTE 6
A
1.000
45°0′
.218 R
90°0′
.040 .050 X 45° ± 5°
.020 .040 X 45° ± 5°
.005 R MAX
◉ A .005 TIR
2.125 DIA
1.375 DIA REF
15°0′
.535 .530 DIA
1.000 DIA DATUM
.046
.030
R
.050 .070 R
.923 DIA REF
1.432 1.428 DIA
-A-
1.218 DIA
.015 R MAX
◉ A .005 TIR
.240 .238
.026
.076
.410

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{}^{63}$ FINISH UNLESS OTHERWISE SPECIFIED.
3. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
4. MATL:
   ~~CRES AISI 416 ANNEALED~~
   ~~CRES, CL 416, COND A, FORM BAR, FIN HOT,~~
   ~~SPEC QQ-S-763~~
5. BREAK ALL SHARP EDGES $^{.010}_{.020}$ R.
6. (A) IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
7. HARDNESS: 28-32 ROCKWELL C

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

(A) 1000015	
1000010	
1000008	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	8/24/62
CHECKED		
DRAWN	J. GREGORY	5-29-62

APPROVED FOR MSC
Jack Barnard
BY DIRECTION MIT APPROVED
W. Kupfer 8/24/62

RETAINER, BEARING
INNER AND MIDDLE
AXIS

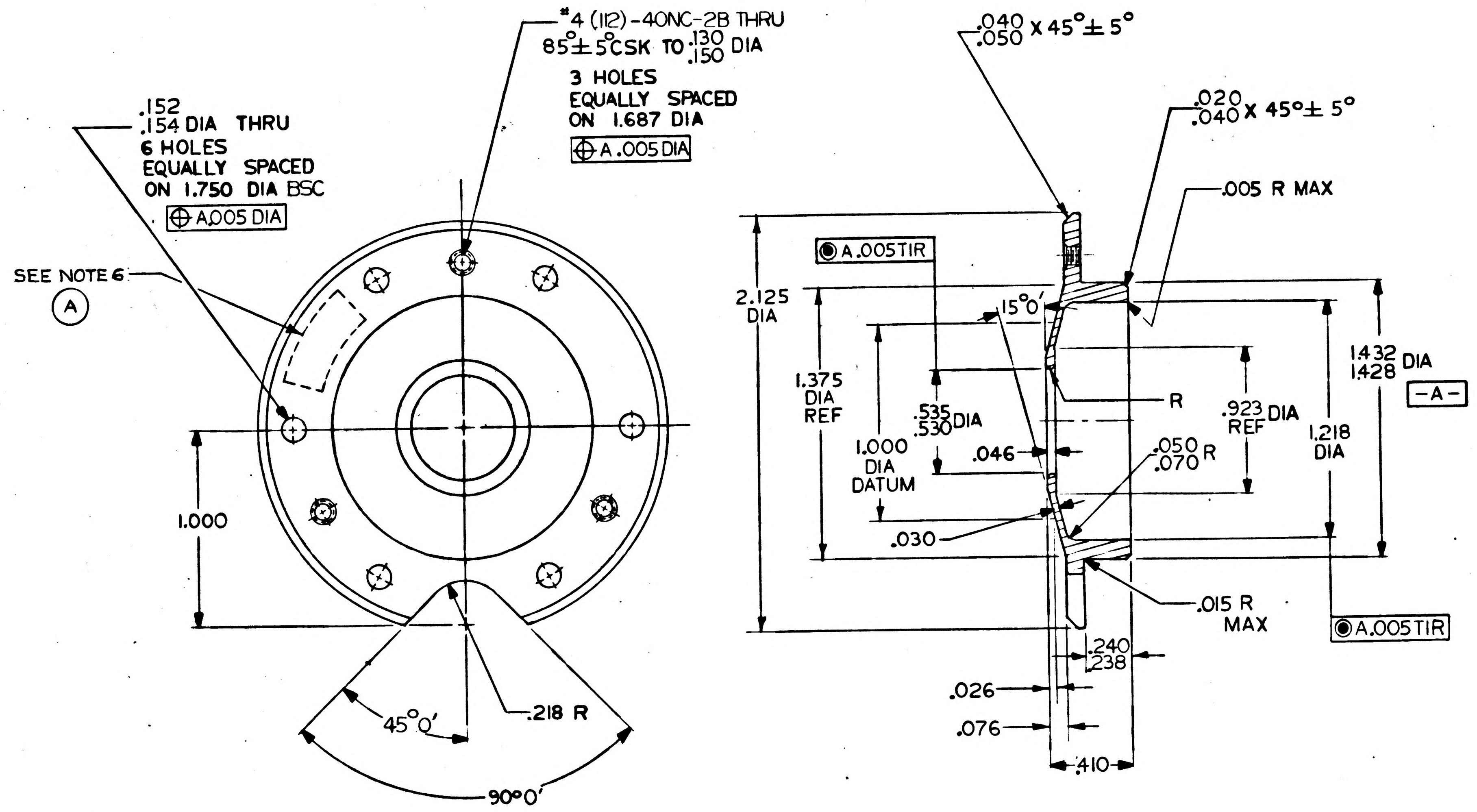
SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000090
SHEET 1 OF 1

1000090 A

REVISIONS				TDRR00021
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	ADDED NOTE 6, CHGD NEXT ASSY	8-20-62	ajB WK
	B	TDRR 00346	2-12-62	ajB WK

Ⓜ



#4 (112)-40NC-2B THRU
85° ± 5° CSK TO .130/.150 DIA
3 HOLES EQUALLY SPACED ON 1.687 DIA
⊕ A .005 DIA
.152/.154 DIA THRU
6 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕ A .005 DIA
SEE NOTE 6
Ⓐ
1.000
45°0'
.218 R
90°0'
.040/.050 X 45° ± 5°
.020/.040 X 45° ± 5°
.005 R MAX
◉ A .005 TIR
2.125 DIA
15°0'
1.375 DIA REF
.535/.530 DIA
1.000 DIA DATUM
.046
.030
R
.923 DIA REF
.050/.070 R
1.432/1.428 DIA
-A-
1.218 DIA
.015 R MAX
◉ A .005 TIR
.240/.238
.026
.076
.410

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{}^{63}$ FINISH UNLESS OTHERWISE SPECIFIED.
3. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
4. MATL:
   ~~CRES AISI 416 ANNEALED~~
   CRES, CL 416, COND A, FORM BAR, FIN COLD,
   SPEC QQ-S-763
5. BREAK ALL SHARP EDGES .010/.020 R
6. Ⓐ IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
7. HARDNESS: 28-32 ROCKWELL C

MASTER

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

APPLICATION	
NEXT ASSY	USED ON
Ⓐ 1000015	
1000010	
1000008	DL1000001

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	8/24/62
CHECKED		
DRAWN	J. GREGORY	5-29-62

APPROVED FOR MSC
Jack Barnard
BY DIRECTION MIT APPROVED
W. Kupfer 8/24/62

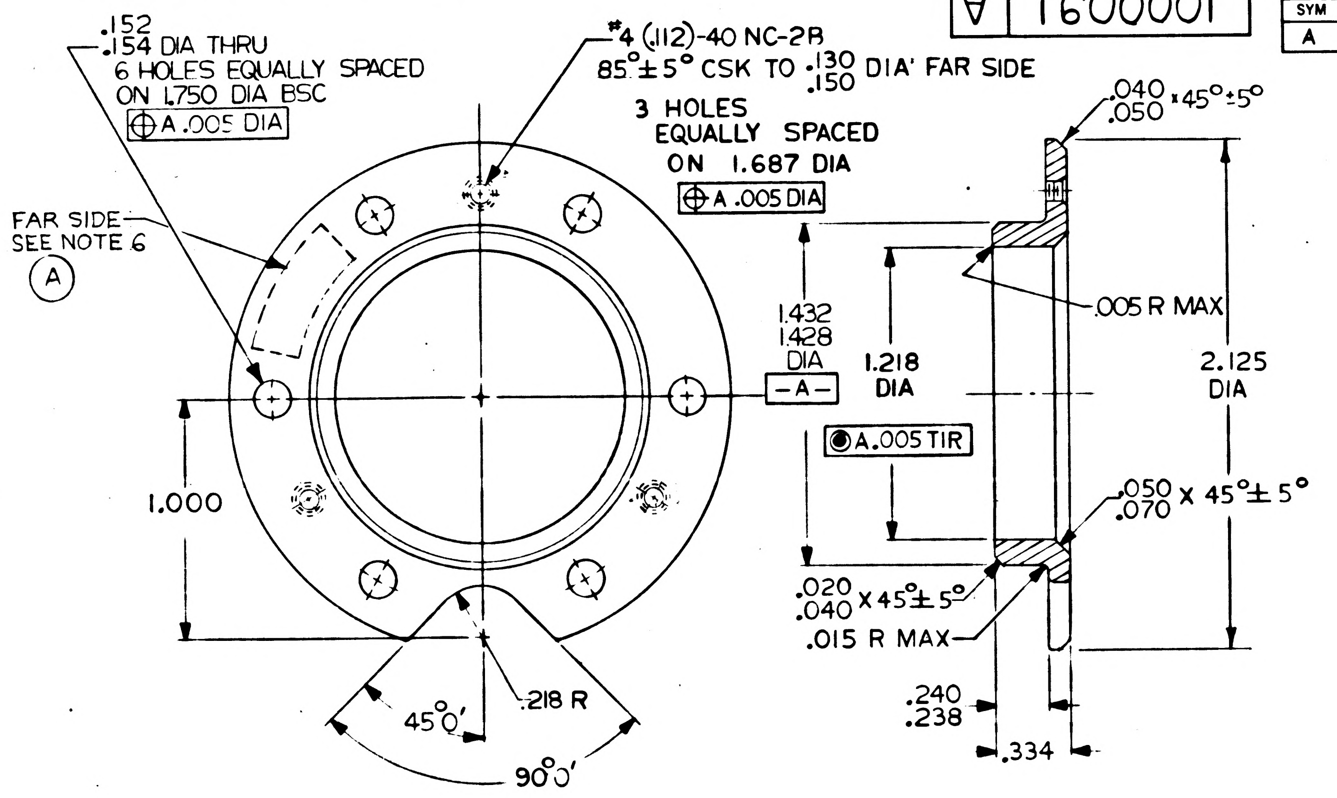
RETAINER, BEARING
INNER AND MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

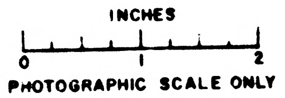
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000090
SHEET 1 OF 1

A 1600001

REVISIONS			T DRR00021
SYM	DESCRIPTION	DATE	APPROVAL
A	ADDED NOTE 6, CHANGED NEXT ASSY	8-20-62	ajb



.152
.154 DIA THRU
6 HOLES EQUALLY SPACED
ON 1.750 DIA BSC
⊕ A .005 DIA
#4 (.112)-40 NC-2B
85°±5° CSK TO .130 .150 DIA' FAR SIDE
3 HOLES
EQUALLY SPACED
ON 1.687 DIA
⊕ A .005 DIA
FAR SIDE
SEE NOTE 6
A
1.432
1.428
DIA
-A-
1.218
DIA
◉ A .005 TIR
1.000
45°0'
.218 R
90°0'
.040
.050 x 45°±5°
.005 R MAX
2.125
DIA
.050
.070 X 45°± 5°
.020
.040 X 45°± 5°
.015 R MAX
.240
.238
.334



INCHES
0
1
2
PHOTOGRAPHIC SCALE ONLY

NOTE

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{}^{63}$ FINISH ALL OVER
3. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
4. MATL:
   CRES AISI 416 ANNEALED
   CRES, CL 416, COND A,
   FORM BAR, FIN HOT,
   SPEC QQ-S-763
5. BREAK ALL SHARP
   EDGES $^{.010}_{.020}$ R
6. Ⓐ IDENTIFY USING DWG. NO., REV. LTR. AND MFR. SYM. AT THE IND. LOCATION PER MIL-STD-130
7. HARDNESS: 28-32 ROCKWELL C

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000014 Ⓐ	
1000006	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
—	±.005	±0°30'

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	8/24/62
CHECKED		
DRAWN	J. GREGORY	6-6-62

APPROVED FOR MSC
Jack Barnard
BY DIRECTION MIT APPROVED
W. Kupfer 8/24/62

RETAINER, BEARING
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.
2—1	—	—

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

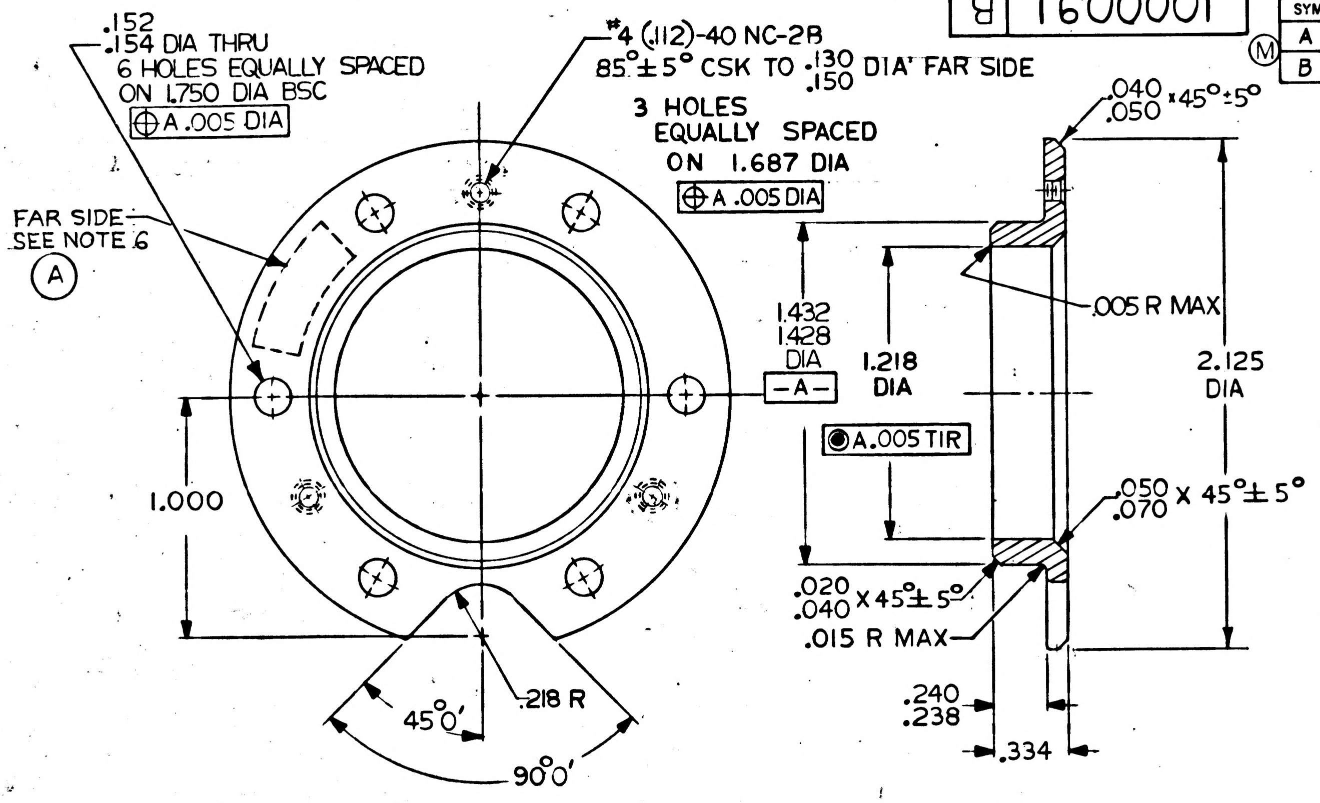
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000091

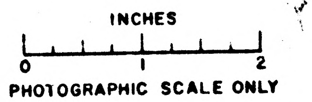
SHEET 1 OF 1

B 1600001

REVISIONS				TDRR0002
SYM	DESCRIPTION	DATE	APPROVAL	
A	ADDED NOTE 6, CHANGED NEXT ASSY	8-20-62	agb	
B	TDRR 00345	2-12-63	agb	W(



.152
.154 DIA THRU
6 HOLES EQUALLY SPACED
ON 1.750 DIA BSC
⊕ A .005 DIA
#4 (.112)-40 NC-2B
85° ± 5° CSK TO .130 / .150 DIA FAR SIDE
3 HOLES
EQUALLY SPACED
ON 1.687 DIA
⊕ A .005 DIA
FAR SIDE
SEE NOTE 6
(A)
1.432
1.428
DIA
-A-
1.218
DIA
◎ A .005 TIR
1.000
.218 R
45° 0'
90° 0'
.040
.050 × 45° ± 5°
.005 R MAX
2.125
DIA
.050
.070 × 45° ± 5°
.020
.040 × 45° ± 5°
.015 R MAX
.240
.238
.334
(M)



INCHES
0
1
2
PHOTOGRAPHIC SCALE ONLY

NOTE
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{}^{63}$ FINISH ALL OVER
3. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
(B) 4. MATL:
CRES CL 416,
COND, A
FORM BAR, FIN COLD
SPEC QQ-S-763
5. BREAK ALL SHARP
EDGES .010 / .020 R
(A) 6. IDENTIFY USING DWG. NO., REV. LTR. AND MFR. SYM. AT THE IND. LOCATION PER MIL-STD-130
7. HARDNESS: 28-32 ROCKWELL C

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

(A)	1000014	
	1000006	DL1000001
	NEXT ASSY	USED ON
	APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
—	±.005	±0°30'

DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	8/24/62
CHECKED		
DRAWN	J. GREGORY	6-6-62

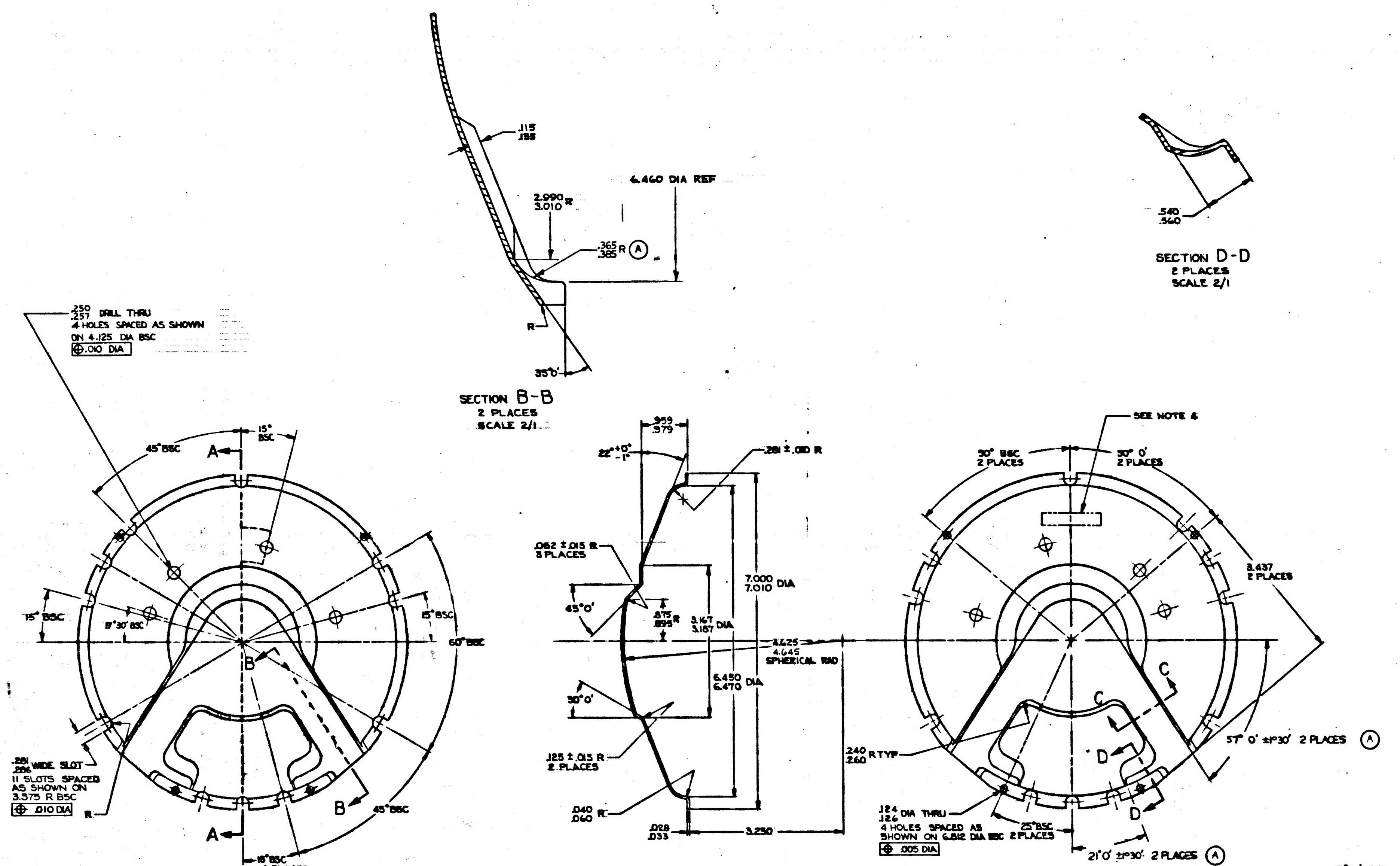
APPROVED FOR MSC
Jack Barnard
BY DIRECTION MIT APPROVED
W. Kupfer 8/24/62

RETAINER, BEARING
OUTER AXIS

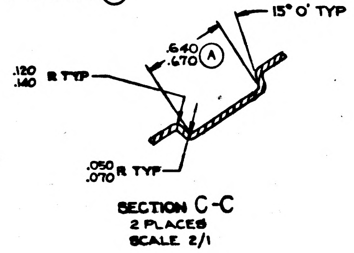
SCALE	UNIT WT.	CODE IDENT.
2-1	—	—

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000091
SHEET 1 OF 1

REVISIONS	TDRR 01808			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01987	7-16-65	916 WK.


.115
.135
2.990
3.010 R
.365
.385 R (A)
6.460 DIA REF
R
35°0'
SECTION B-B
2 PLACES
SCALE 2/1
.540
.560
SECTION D-D
2 PLACES
SCALE 2/1
.250
.257 DRILL THRU
4 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
⌖ .010 DIA
15° BSC
45° BSC
A
15° BSC
17°30' BSC
15° BSC
60° BSC
B
.281
.286 WIDE SLOT
11 SLOTS SPACED
AS SHOWN ON
3.375 R BSC
⌖ .010 DIA
R
B
45° BSC
A
15° BSC
2 PLACES
.959
.979
22° +0° -1°
.281 ± .010 R
.062 ± .015 R
3 PLACES
45°0'
.875
.895 R
3.167
3.187 DIA
7.000
7.010 DIA
4.625
4.645
SPHERICAL RAD
6.450
6.470 DIA
30°0'
.125 ± .015 R
2 PLACES
.040
.060 R
.028
.033
3.250
SEE NOTE 4
30° BSC
2 PLACES
30° 0'
2 PLACES
3.437
2 PLACES
C
C
57° 0' ±1°30' 2 PLACES (A)
.240
.260 R TYP
D
D
.124
.126 DIA THRU
4 HOLES SPACED AS
SHOWN ON 6.812 DIA BSC
⌖ .005 DIA
25° BSC
2 PLACES
21°0' ±1°30' 2 PLACES (A)

SECTION A-A


15° 0' TYP
.640
.670 (A)
.120
.140 R TYP
.050
.070 R TYP
SECTION C-C
2 PLACES
SCALE 2/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DIMENSIONS APPLY BEFORE TEFLON COAT

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000206	DL1000201
1000008	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY SH 3003-0
ALT SPEC QQ-A-3590

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJBogue	7-1-63
CHECKED		
DRAWN	WJP	6-26-63

APPROVAL FOR MSC
BY DIRECTION ALT APPROVAL
W.K. 2 Jul 63

GUIDE, WIRE
BEARING HOUSING
MIDDLE AXIS

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000092

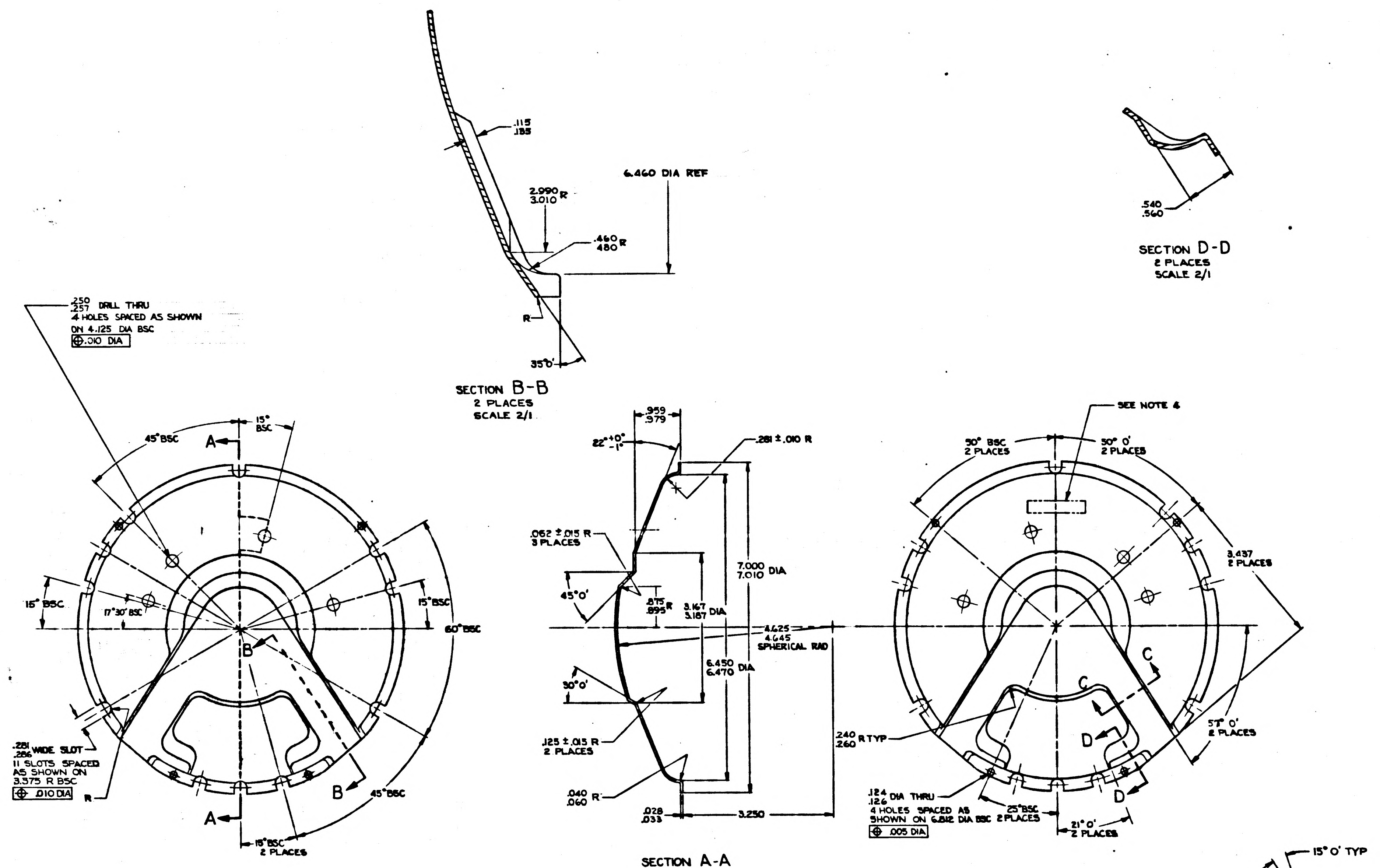
SCALE	UNIT WT.	CODE IDENT.	SHEET 1 OF 1
1/1			

1000092 A

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01808

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

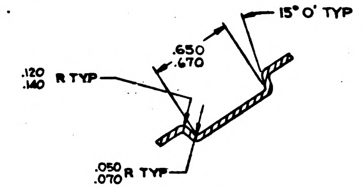


.115
.135
6.460 DIA REF
2.990
3.010 R
.460
.480 R
R
35°0'
.250
.257 DRILL THRU
4 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
⊕ .010 DIA
15° BSC
45° BSC
A
A
B
B
15° BSC
17°30' BSC
15° BSC
60° BSC
.281
.286 WIDE SLOT
11 SLOTS SPACED
AS SHOWN ON
3.375 R BSC
⊕ .010 DIA
R
45° BSC
15° BSC
2 PLACES
.959
.979
22° +0° -1°
.281 ± .010 R
.062 ± .015 R
3 PLACES
45°0'
.875
.895 R
3.167
3.187 DIA
7.000
7.010 DIA
4.625
4.645
SPHERICAL RAD
6.450
6.470 DIA
30°0'
.125 ± .015 R
2 PLACES
.040
.060 R
.028
.033
3.250
SEE NOTE 4
50° BSC
2 PLACES
50° 0'
2 PLACES
3.437
2 PLACES
.240
.260 R TYP
C
C
D
D
57° 0'
2 PLACES
.124
.126 DIA THRU
4 HOLES SPACED AS
SHOWN ON 6.812 DIA BSC
⊕ .005 DIA
25° BSC
2 PLACES
21° 0'
2 PLACES
.540
.560

SECTION B-B
2 PLACES
SCALE 2/1

SECTION A-A

SECTION D-D
2 PLACES
SCALE 2/1



15° 0' TYP
.650
.670
.120
.140 R TYP
.050
.070 R TYP

SECTION C-C
2 PLACES
SCALE 2/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES $\frac{.005}{.015}$
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DIMENSIONS APPLY BEFORE TEFLON COAT

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000206	DL1000201
1000008	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY SH 3003-O
ALT SPEC QQ-A-359D

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Bogus	7-7-63
CHECKED		
DRAWN	VJP	6-26

APPROVED FOR MSC
W. Vost
BY DIRECTION M.I.T. APPROVAL
W Kuff 2 Aug 63

GUIDE, WIRE
BEARING HOUSING
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.
1/1		

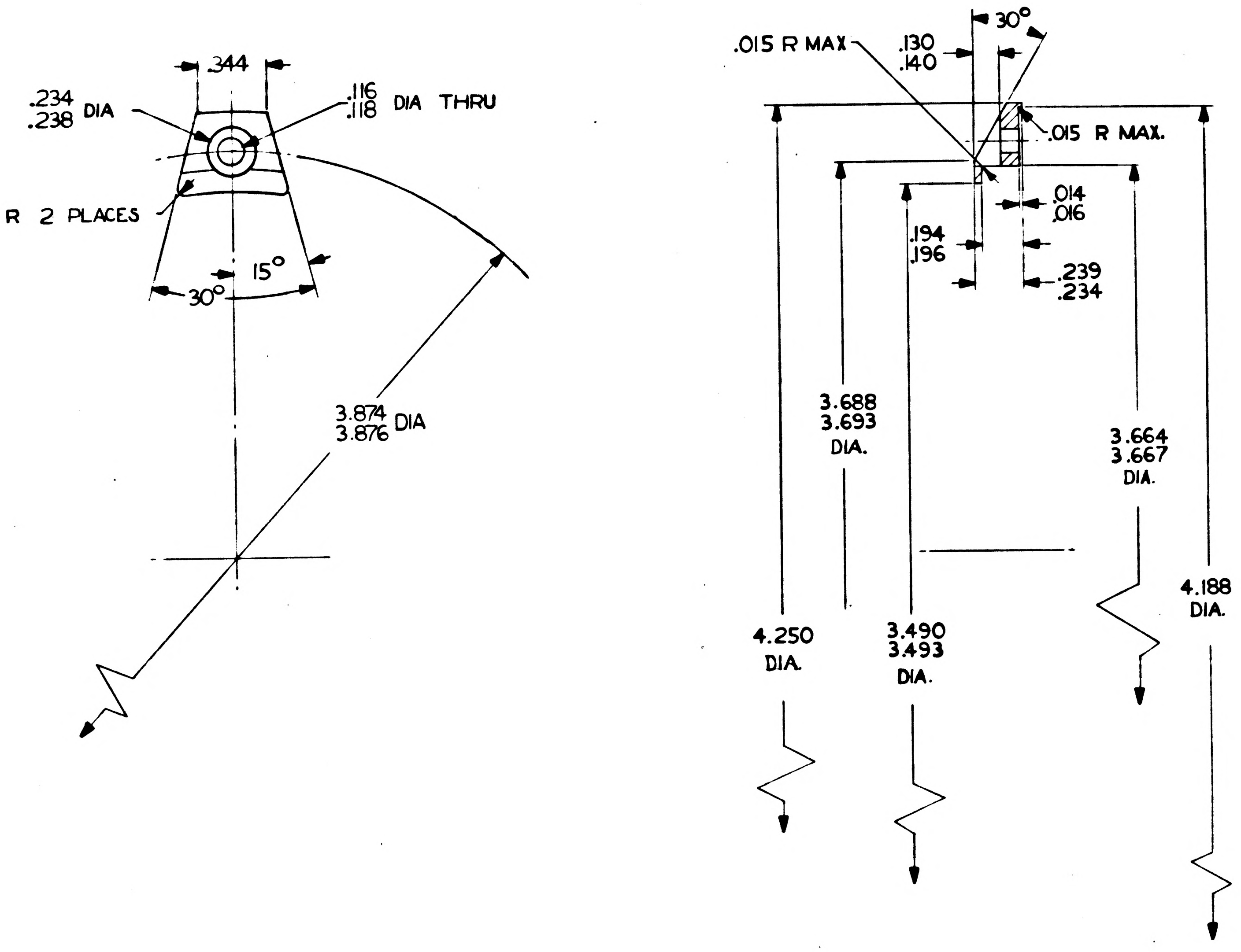
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000092
SHEET 1 OF 1

1000092

INCHES
PHOTOGRAPHIC SCALE ONLY

TDRR 00021

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REVISED AND REDRAWN	8-21-62	



.344
.234 .238 DIA
.116 .118 DIA THRU
.031 R 2 PLACES
15°
30°
3.874 3.876 DIA
.015 R MAX
.130 .140
30°
.015 R MAX.
.014 .016
.194 .196
.239 .234
3.688 3.693 DIA.
3.664 3.667 DIA.
4.188 DIA.
4.250 DIA.
3.490 3.493 DIA.

NOTES:

1- INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2- $^{63}\surd$ ALL OVER
3- BREAK ALL SHARP CORNERS $^{.005}_{.015}$ R.
4- ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°.
5- IDENTIFY USING DRAWING NO., REVISION LETTER, AND MFR SYMBOL PER MIL-STD-130.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000033	
1000032	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY PL 6061
TEMP T6 ALT SPEC
QQ-A-327 TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED A J Boyce 8/24/62
CHECKED
DRAWN PALERMO 8-6-62
APPROVED FOR MSC
Jack Barnard
BY DIRECTION MIT APPROVED
W. Kupfer 8/24/62

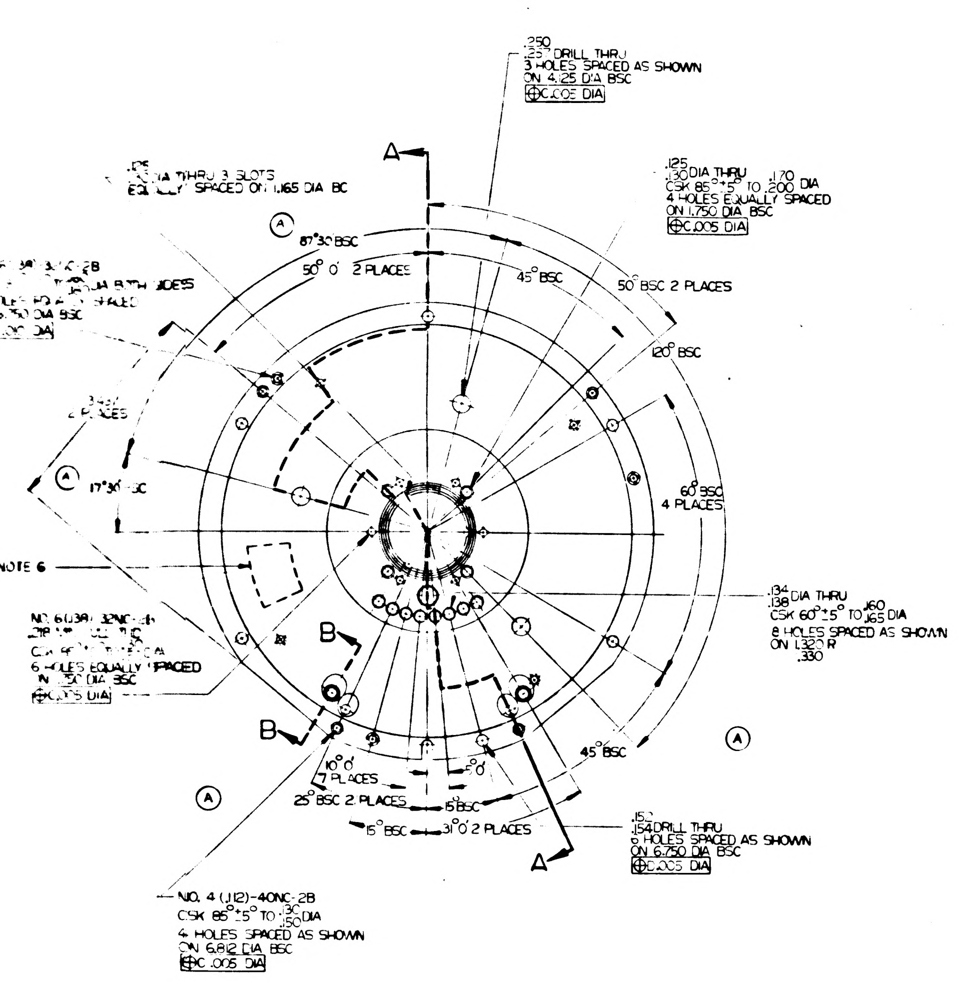
CLAMP, RESOLVER
ONE SPEED

SCALE 2/1
UNIT WT.
CODE IDENT.

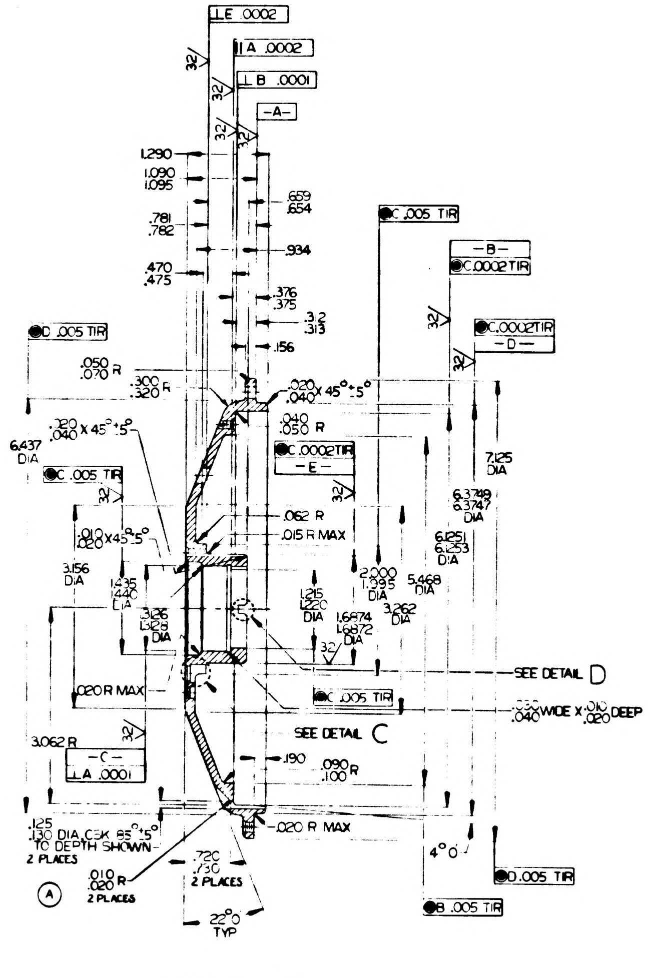
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000094
SHEET OF

1000094 A

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00026			
A	TDR 00041	10-5-62	

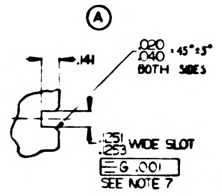


.250 .253 DRILL THRU 3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕C.005 DIA
.125 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.125 .130 DIA THRU CSK 85°±5° TO .170 .200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
A
87°30' BSC
50° 0' 2 PLACES
45° BSC
50° BSC 2 PLACES
120° BSC
60° BSC 4 PLACES
17°30' BSC
NOTE 6
.134 DIA THRU .138 CSK 60°±5° TO .160 .165 DIA 8 HOLES SPACED AS SHOWN ON 1.320 R .330
B
45° BSC
10° 0' 2 PLACES
25° BSC 2 PLACES
15° BSC
15° BSC
31° 0' 2 PLACES
.152 .154 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕C.005 DIA
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC ⊕C.005 DIA



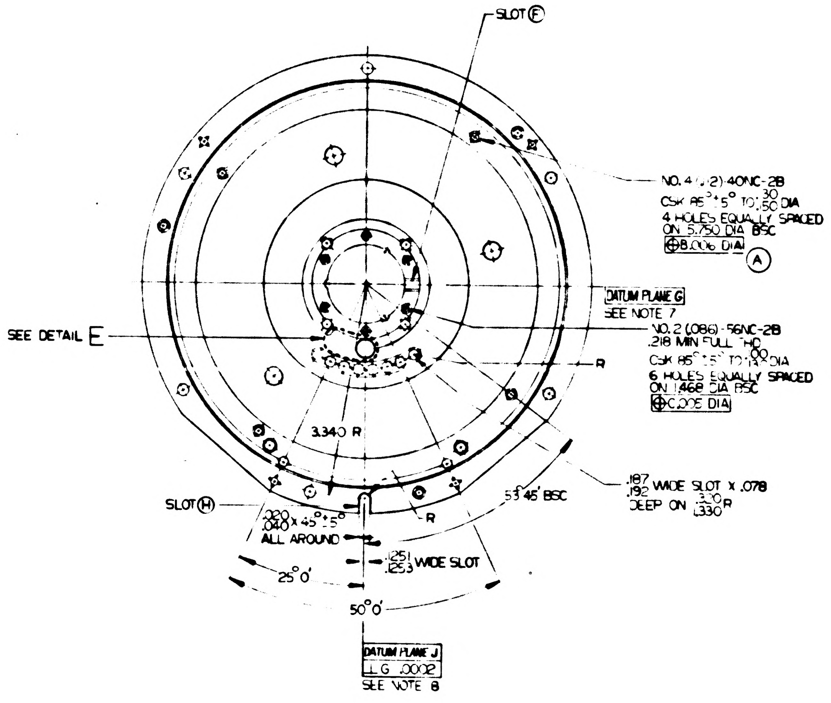
⊥E .0002
∥A .0002
⊥B .0001
-A-
1.290
1.090 1.095
.781 .782
.470 .475
.659 .654
.934
.376 .375
.312 .313
.156
◉C .005 TIR
-B-
◉C .0002 TIR
◉C .0002 TIR
-D-
◉C .005 TIR
.050 .070 R
.300 .320 R
.020 .040 X 45°±5°
.040 .050 R
◉C .0002 TIR
-E-
6.437 DIA
.020 .040 X 45°±5°
◉C .005 TIR
.010 .020 X 45°±5°
.062 R
.015 R MAX
7.125 DIA
6.3748 6.3747 DIA
6.1251 6.1253 DIA
5.468 DIA
2.000 1.995 DIA
3.156 DIA
1.435 1.440 DIA
3.126 3.125 DIA
1.26 1.220 DIA
1.6874 1.6872 DIA
3.262 DIA
.020 R MAX
SEE DETAIL D
◉C .005 TIR
SEE DETAIL C
.010 .040 WIDE X .010 .020 DEEP
3.062 R
-C-
⊥A .0001
.190
.090 .100 R
.020 R MAX
4° 0'
◉D .005 TIR
◉B .005 TIR
.125 .130 DIA CSK 85°±5° TO DEPTH SHOWN 2 PLACES
.010 .020 R 2 PLACES
.720 .750 2 PLACES
22° 0' TYP

SECTION A-A

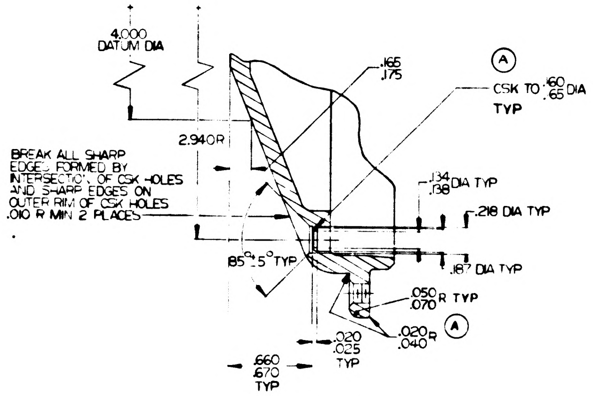


.020 .040 X 45°±5° BOTH SIDES
.141
.251 .253 WIDE SLOT
⊥G .001
SEE NOTE 7

DETAIL D
SCALE 2/1

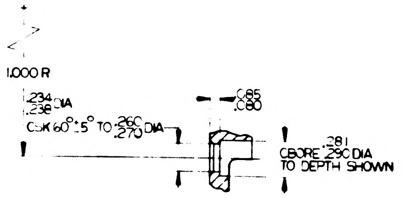


SLOT F
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC ⊕B.005 DIA
DATUM PLANE G
SEE NOTE 7
NO. 2 (.086)-56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .110 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC ⊕C.005 DIA
SEE DETAIL E
R
3.340 R
SLOT H
.020 .040 X 45°±5° ALL AROUND
.187 .195 WIDE SLOT X .078 DEEP ON .320 .330 R
53°45' BSC
R
.251 .253 WIDE SLOT
25° 0'
50° 0'
DATUM PLANE J
⊥G .0002
SEE NOTE 8



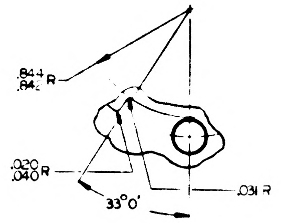
4.000 DATUM DIA
.165 .175
CSK TO .160 .165 DIA TYP
2.940 R
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
.134 .138 DIA TYP
.218 DIA TYP
85°±5° TYP
.187 DIA TYP
.050 .070 R TYP
.020 .025 TYP
.020 .040 R
.660 .670 TYP

SECTION B-B
SCALE 2/1



1.000 R
.234 .238 DIA
CSK 60°±5° TO .265 .270 DIA
.085 .080
.281 CBORE .290 DIA TO DEPTH SHOWN

DETAIL C
SCALE 2/1



.844 .842 R
.020 .040 R
33° 0'
.031 R

DETAIL E
SCALE 2/1

IN ACCORDANCE WITH MIL ID-70327.
UNLESS OTHERWISE SPECIFIED.
BREAK ALL SHARP EDGES .005 .015.
UNLESS OTHERWISE
...BE AT THE SPECIFIED LIMITS ...68° F ± ...° F.
...IN LETTER AND ...AT THE INDICATED LOCATION
...-C- AND CENTER OF DATUM PLANE G.
...-C- AND CENTER OF DATUM PLANE J.

2/26

INCHES
PHOTOGRAPHIC SCALE ONLY

MIT PROD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000010	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

M I T
INSTRUMENTATION LAB
DRAWN K. MILLS 10-1-62

HOUSING, BEARING
ONE SPEED
INNER AXIS

SCALE 1-1
UNIT WT —
CODE IDENT —

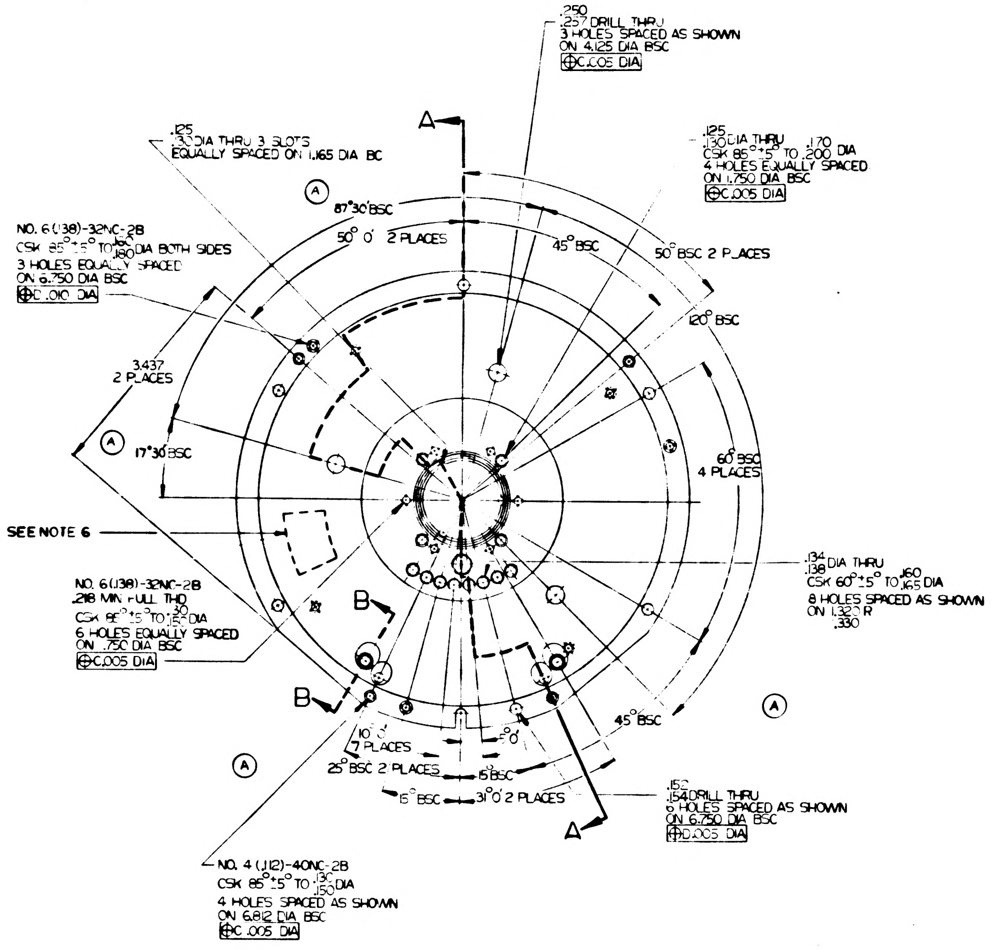
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

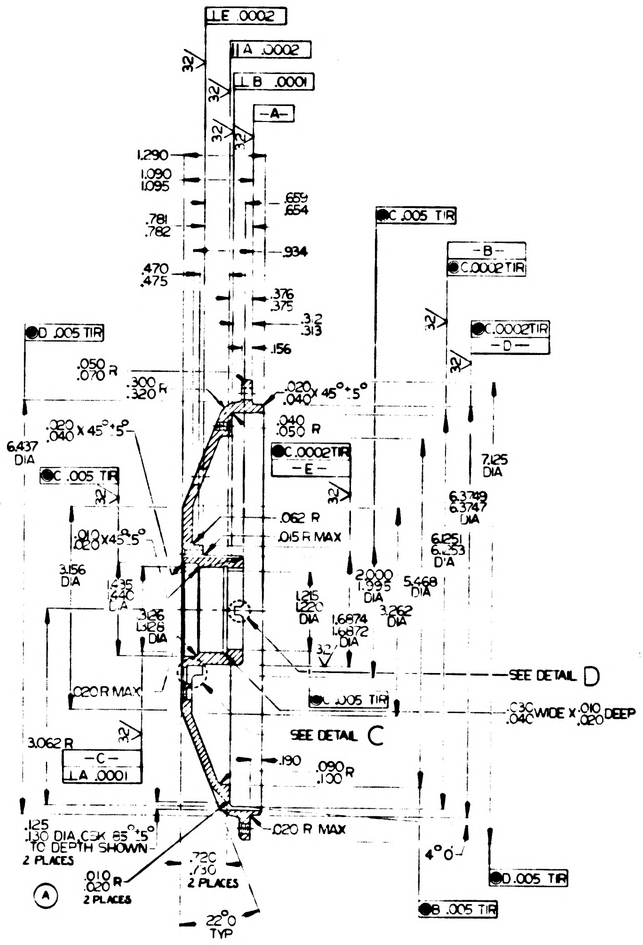
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NASA DRAWING NO
1000095
SHEET 1 OF 1

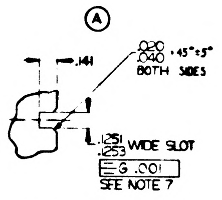
1000095 REV A SHEET 1

SYM	
A	TOB 00041

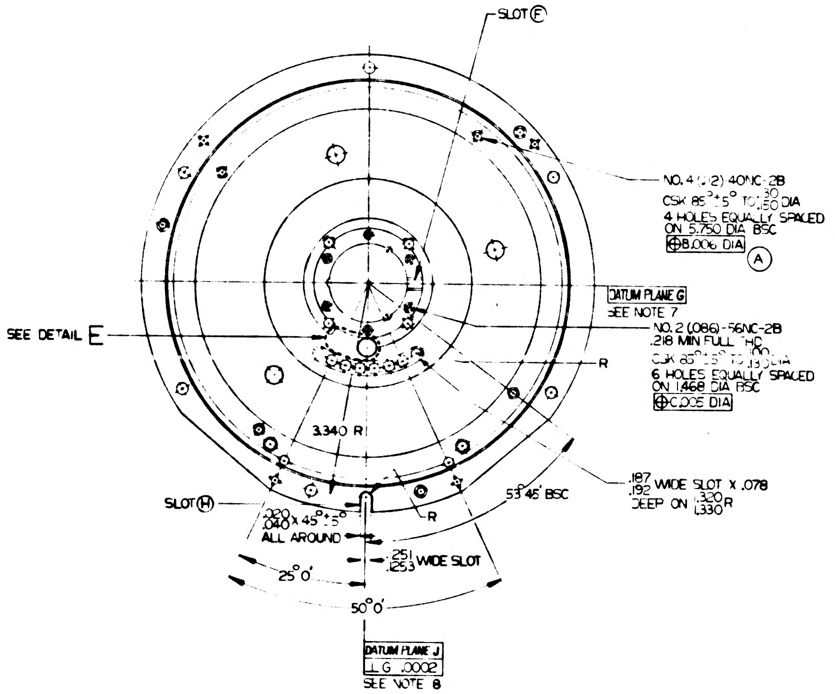

A
B
SEE NOTE 6
NO. 6 (.138)-32NC-2B
NO. 4 (.112)-40NC-2B
87°30' BSC
50° 0' 2 PLACES
45° BSC
120° BSC
60° BSC 4 PLACES
17°30' BSC
.134 .138 DIA THRU CSK 60° ±5° TO .160 .165 DIA 8 HOLES SPACED AS SHOWN
.152 .154 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC


SEE DETAIL D
SEE DETAIL C
22° 0' TYP

SECTION A-A

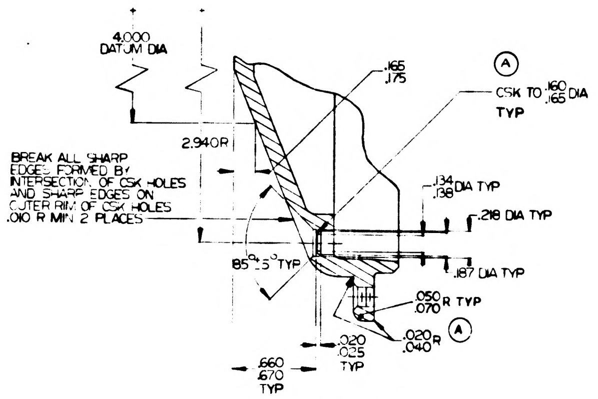

.251 .253 WIDE SLOT
SEE NOTE 7

DETAIL D
SCALE 2/1

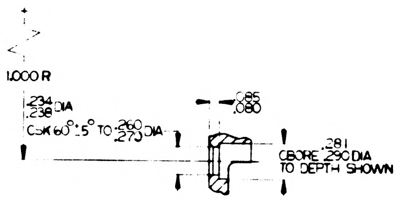

SLOT Ⓔ
SLOT Ⓗ
SEE DETAIL E
DATUM PLANE G
SEE NOTE 7
DATUM PLANE J
SEE NOTE 8
53°46' BSC
25° 0'
50° 0'

NOTES:

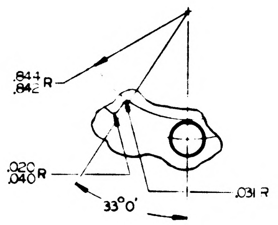
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/√ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. REMOVE BURRS AND BREAK SHARP EDGES $\frac{.005}{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F.
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
7. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓔ ESTABLISHES DATUM PLANE G.
8. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓗ ESTABLISHES DATUM PLANE J.


4.000 DATUM DIA
2.940 R
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
85° ±5° TYP
.218 DIA TYP
.187 DIA TYP

SECTION B-B
SCALE 2/1


1.000 R
CBORE .281 .290 DIA TO DEPTH SHOWN

DETAIL C
SCALE 2/1


.844 .842 R
.020 .040 R
33° 0'
.031 R

DETAIL E
SCALE 4/1

1/26

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000010	DL 1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
AJ SPEC MIL-B-21531

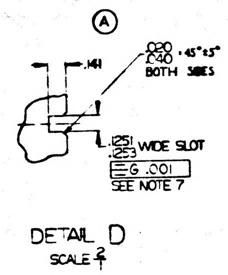
MIT
INSTRUMENTATION LAB
CONTRACT
L. MILLS
W J Rhine 9-12-62

QTY REQD | NOMENCLATURE OR DESCRIPTION
LIST OF PARTS AND

HOUSIN
ONE
INNE
SCALE
1

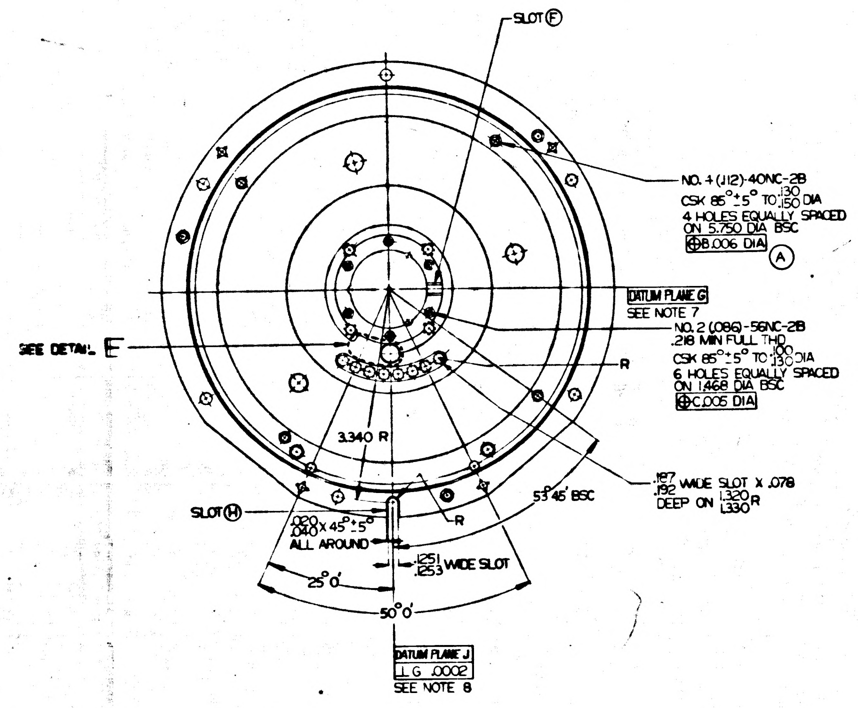
REVISIONS TDRR 00026

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00041	10-5-62	[illegible]	WK
B	TDRR 00608	3-27-63	[illegible]	WK



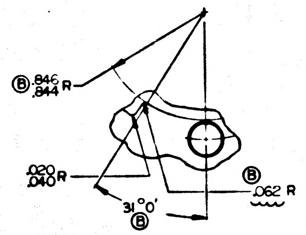
(A)
.020
.040 × 45° ± 5°
BOTH SIDES
.141
.1251
.1253 WIDE SLOT
G .001
SEE NOTE 7

DETAIL D
SCALE 2/1



SLOT (F)
NO. 4 (.112)-40NC-2B
CSK 85° ± 5° TO .130/.150 DIA
4 HOLES EQUALLY SPACED
ON 5.750 DIA BSC
⊕B.006 DIA
(A)
DATUM PLANE G
SEE NOTE 7
NO. 2 (.086)-56NC-2B
.218 MIN FULL THD
CSK 85° ± 5° TO .100/.130 DIA
6 HOLES EQUALLY SPACED
ON 1.468 DIA BSC
⊕C.005 DIA
R
SEE DETAIL E
3.340 R
.187
.192 WIDE SLOT X .078
DEEP ON 1.320/1.330 R
53°45' BSC
SLOT (H)
.020
.040 X 45° ± 5°
ALL AROUND
R
.1251
.1253 WIDE SLOT
25°0'
50°0'
DATUM PLANE J
⊥G .0002
SEE NOTE 8

.281
CBORE .290 DIA
TO DEPTH SHOWN



(B) .846/.844 R
.020
.040 R
(B)
.062 R
31°0'
(B)

DETAIL E
SCALE 2/1

INCHES
PHOTOGRAPHIC SCALE ONLY

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

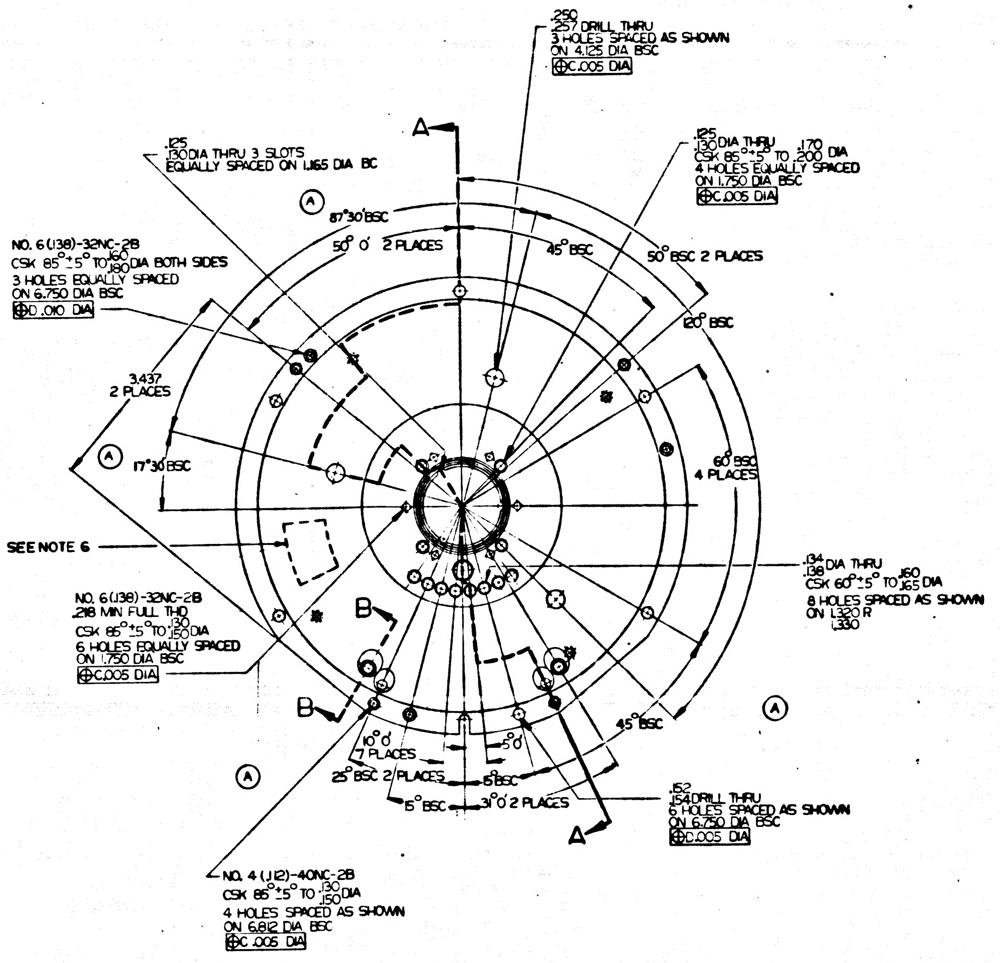
LIST OF PARTS AND MATERIALS

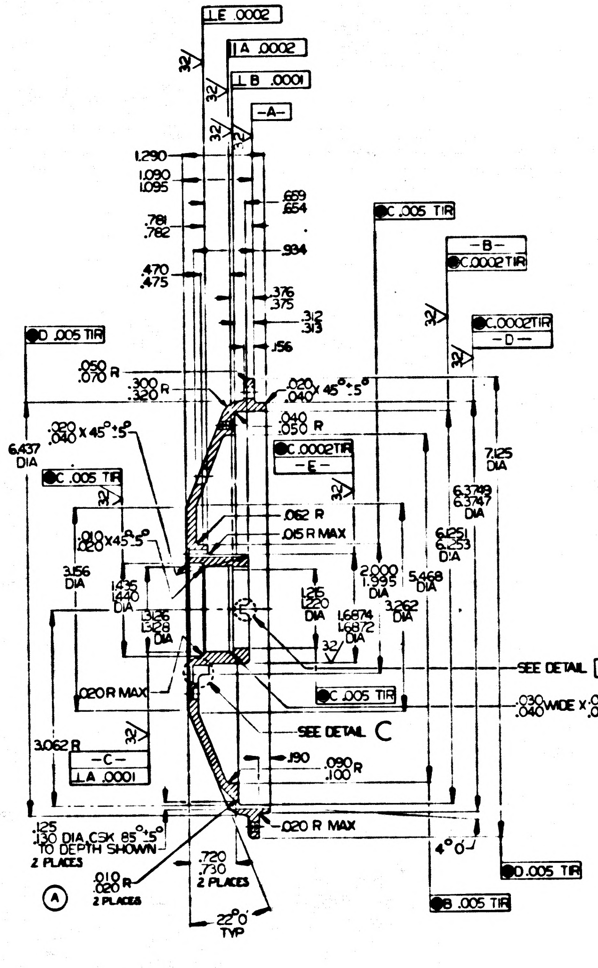
1000010 NEXT ASSY	DL 1000001 USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.005 ANGLES ±0°30' DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153 V. MILLS APPROVED W G [illegible] 9-10-62 MIT APPROVED W [illegible]	HOUSING, BEARING ONE SPEED INNER AXIS
APPLICATION		MATERIAL BERYLLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531		SCALE 1-1 / UNIT WT — / CODE IDENT —

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000095
SHEET 1 OF 1

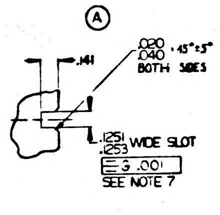
1000095 B

1000095

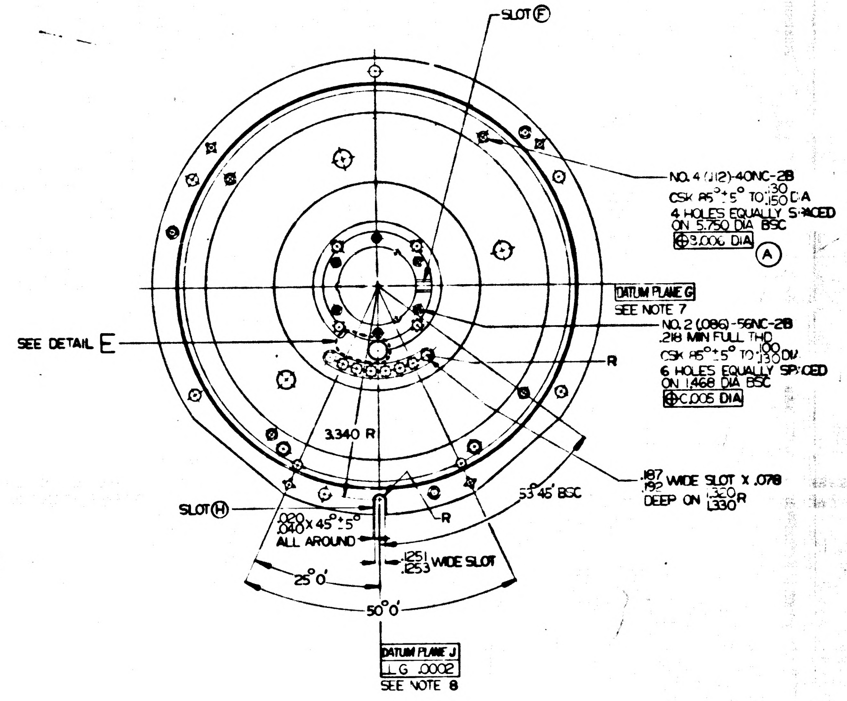

.250 .257 DRILL THRU 3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕C.005 DIA
A
.125 .130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.125 .130 DIA THRU CSK 85°±5° TO .170 .200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
87°30' BSC
50°0' 2 PLACES
45° BSC
50° BSC 2 PLACES
120° BSC
NO. 6 (.138)-32NC-2B CSK 85°±5° TO .160 .190 DIA BOTH SIDES 3 HOLES EQUALLY SPACED ON 6.750 DIA BSC ⊕D.010 DIA
3.437 2 PLACES
17°30' BSC
60° BSC 4 PLACES
SEE NOTE 6
.134 .138 DIA THRU CSK 60°±5° TO .160 .165 DIA 8 HOLES SPACED AS SHOWN ON 1.320 1.330 R
NO. 6 (.138)-32NC-2B .218 MIN FULL THD CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
B
B
45° BSC
10°0'
7 PLACES
25° BSC 2 PLACES
5° BSC
5° BSC
3°0' 2 PLACES
5°0'
.152 .154 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕C.005 DIA
A
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC ⊕C.005 DIA


⊥E .0002
⊥A .0002
⊥B .0001
-A-
1.290
1.090 1.095
.781 .782
.470 .475
.659 .654
.934
.376 .375
.312 .313
.156
⊚C.005 TIR
-B-
⊚C.0002 TIR
⊚C.0002 TIR
-D-
⊚D.005 TIR
.050 .070 R
.300 .320 R
.020 .040 X 45°±5°
.040 .050 R
6.437 DIA
.020 .040 X 45°±5°
⊚C.005 TIR
⊚C.0002 TIR
-E-
.062 R
.015 R MAX
7.125 DIA
6.3749 6.3747 DIA
6.251 6.253 DIA
.010 .020 X 45°±5°
3.156 DIA
1.435 1.440 DIA
1.326 1.328 DIA
1.125 1.220 DIA
2.000 1.995 DIA
1.6874 1.6872 DIA
3.262 DIA
5.468 DIA
.020 R MAX
SEE DETAIL D
⊚C.005 TIR
.030 .040 WIDE X .010 .020 DEEP
SEE DETAIL C
3.062 R
-C-
⊥A .0001
.190
.090 .100 R
.020 R MAX
4°0'
⊚D.005 TIR
⊚B.005 TIR
.125 .130 DIA CSK 85°±5° TO DEPTH SHOWN 2 PLACES
.010 .020 R 2 PLACES
.720 .730 2 PLACES
22°0' TYP
32

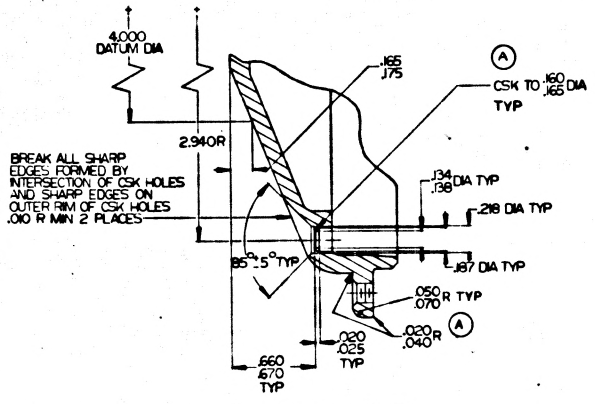
SECTION A-A


.141
.020 .040 × 45°±5° BOTH SIDES
.1251 .1253 WIDE SLOT
⊥G .001
SEE NOTE 7

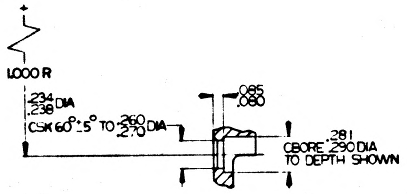
DETAIL D
SCALE $\frac{2}{1}$


SLOT Ⓕ
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC ⊕D.006 DIA
DATUM PLANE G
SEE NOTE 7
NO. 2 (.086)-56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .130 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC ⊕C.005 DIA
SEE DETAIL E
R
3.340 R
.187 .192 WIDE SLOT X .078 DEEP ON .320 .330 R
SLOT Ⓗ
.020 .040 X 45°±5° ALL AROUND
R
.1251 .1253 WIDE SLOT
53°45' BSC
25°0'
50°0'
DATUM PLANE J
⊥G .0002
SEE NOTE 8

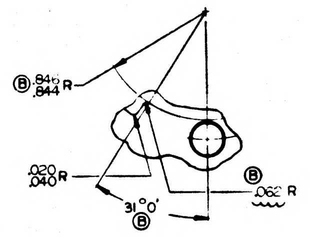
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. REMOVE BURRS AND BREAK SHARP EDGES $\frac{.005}{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F.
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
7. LINE PASSING THRU CENTER OF BORE $\boxed{-C-}$ AND CENTER OF SLOT Ⓕ ESTABLISHES $\boxed{\text{DATUM PLANE G}}$.
8. LINE PASSING THRU CENTER OF BORE $\boxed{-C-}$ AND CENTER OF SLOT Ⓗ ESTABLISHES $\boxed{\text{DATUM PLANE J}}$.


4.000 DATUM DIA
.165 .175
CSK TO .160 .165 DIA TYP
2.940 R
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
.134 .138 DIA TYP
.218 DIA TYP
85°±5° TYP
.187 DIA TYP
.050 .070 R TYP
.020 .040 R
.020 .025 TYP
.660 .670 TYP

SECTION B-B
SCALE $\frac{2}{1}$


1.000 R
.234 .238 DIA
CSK 60°±5° TO .260 .270 DIA
.085 .080
CBORE .281 .290 DIA TO DEPTH SHOWN

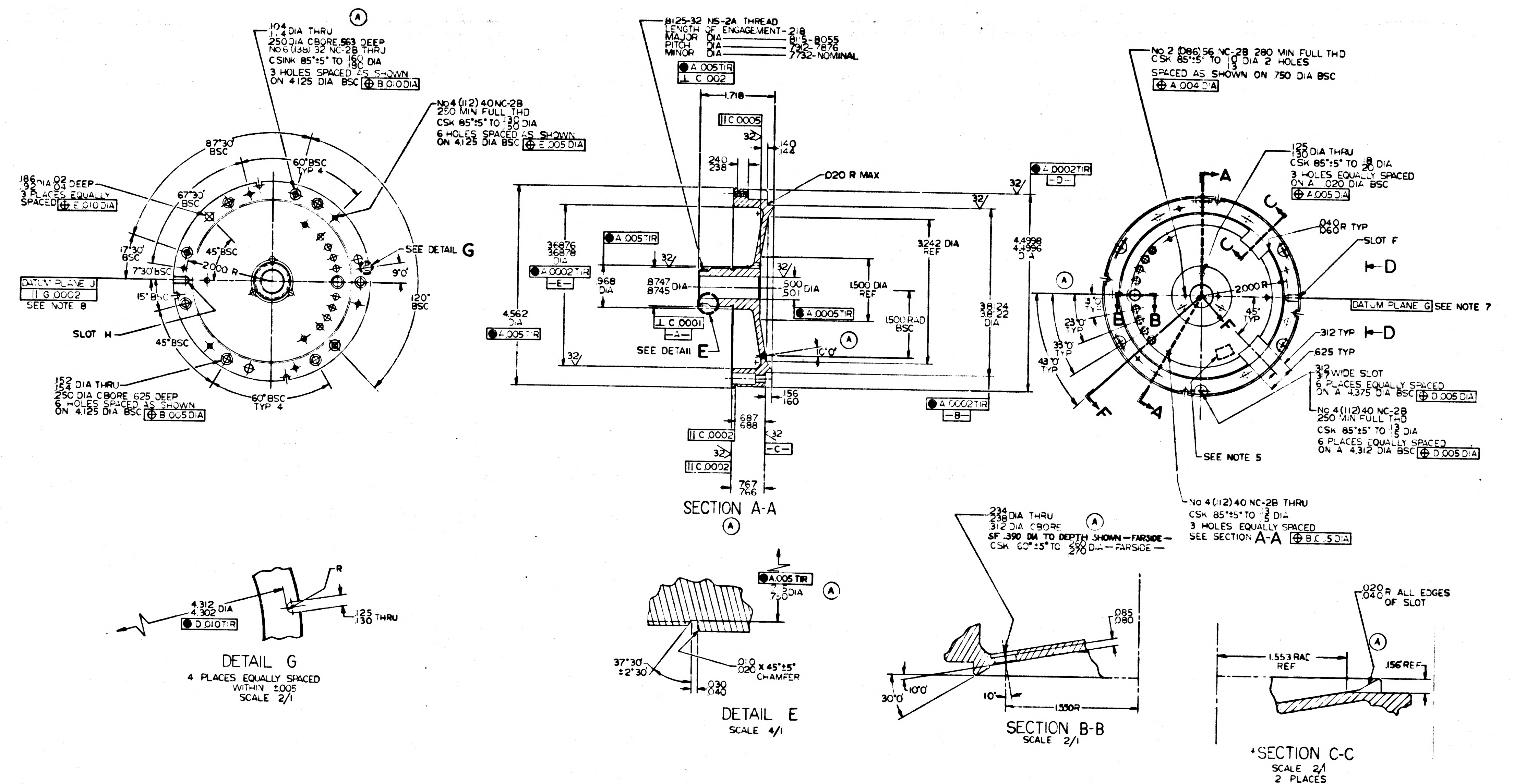
DETAIL C
SCALE $\frac{2}{1}$


Ⓑ .843 .844 R
.020 .040 R
31°0' Ⓑ
Ⓑ .062 R

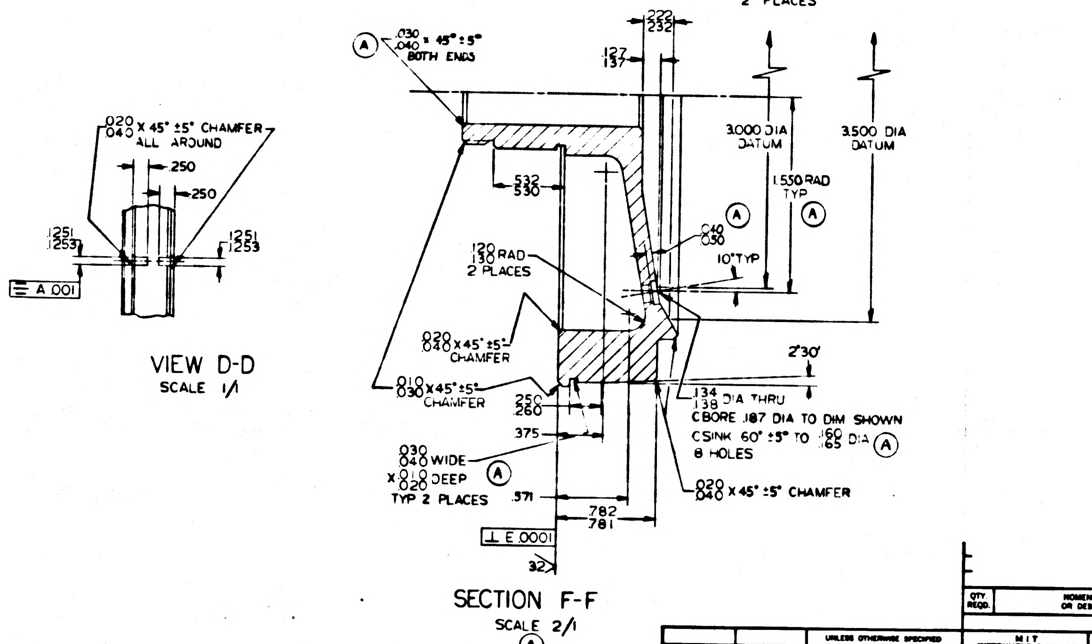
DETAIL E
SCALE $\frac{2}{1}$

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDR 00C26				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00040	10-4-62	2/6



.104 .114 DIA THRU
.250 DIA CBORE .563 DEEP
No 6 (138) 32 NC-2B THRU
CSINK 85°±5° TO .160 .180 DIA
3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕ B .010 DIA
No 4 (112) 40 NC-2B .250 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕ E .005 DIA
87°30' BSC
60° BSC TYP 4
67°30' BSC
.186 DIA .02 .04 DEEP
3 PLACES EQUALLY SPACED ⊕ E .010 DIA
17°30' BSC
7°30' BSC
45° BSC
2.000 R
9°0'
120° BSC
SEE DETAIL G
DATUM PLANE J
∥ G .0002
SEE NOTE 8
15° BSC
SLOT H
.152 .154 DIA THRU
.250 DIA CBORE .625 DEEP
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕ B .005 DIA
.8125-32 NS-2A THREAD
LENGTH OF ENGAGEMENT - .218
MAJOR DIA - .8115-.8055
PITCH DIA - .7912-.7876
MINOR DIA - .7732-NOMINAL
A .005 TIR
⊥ C .002
1.718
∥ C .0005
.140 .144
.240 .238
.020 R MAX
A .0002 TIR
-D-
4.4998 4.4996 DIA
3.242 DIA REF
3.6876 3.6878 DIA
A .005 TIR
A .0002 TIR
-E-
.968 DIA
.8747 .8745 DIA
.500 .501 DIA
A .0005 TIR
1.500 DIA REF
1.500 RAD BSC
3.8124 3.8122 DIA
4.562 DIA
A .005 TIR
⊥ C .0001
-A-
SEE DETAIL E
10°0'
.156 .160
A .0002 TIR
-B-
.687 .688
∥ C .0002
-C-
∥ C .0002
.767 .766
SECTION A-A
No 2 (.086) 56 NC-2B .280 MIN FULL THD
CSK 85°±5° TO .10 .12 DIA 2 HOLES
SPACED AS SHOWN ON .750 DIA BSC
A .004 DIA
.125 .130 DIA THRU
CSK 85°±5° TO .18 .20 DIA
3 HOLES EQUALLY SPACED ON A .020 DIA BSC
A .005 DIA
.040 .060 R TYP
SLOT F
DATUM PLANE G SEE NOTE 7
2.000 R
45° TYP
23°0' TYP
35°0' TYP
43°0' TYP
.312 TYP
.625 TYP
.312 .313 WIDE SLOT
6 PLACES EQUALLY SPACED ON A 4.375 DIA BSC ⊕ D .005 DIA
No 4 (112) 40 NC-2B .250 MIN FULL THD
CSK 85°±5° TO .13 .15 DIA
6 PLACES EQUALLY SPACED ON A 4.312 DIA BSC ⊕ D .005 DIA
SEE NOTE 5
No 4 (112) 40 NC-2B THRU
CSK 85°±5° TO .13 .15 DIA
3 HOLES EQUALLY SPACED
SEE SECTION A-A ⊕ B .005 DIA
A B C D F
4.312 4.302 DIA
D .010 TIR
R
.125 .130 THRU
DETAIL G
4 PLACES EQUALLY SPACED WITHIN ±.005
SCALE 2/1
A .005 TIR
.5 .7 DIA
37°30' ±2°30'
.010 .020 X 45°±5° CHAMFER
.030 .040
DETAIL E
SCALE 4/1
.234 .238 DIA THRU
.312 DIA CBORE
SF .390 DIA TO DEPTH SHOWN - FARSIDE
CSK 60°±5° TO .260 .270 DIA - FARSIDE
.085 .080
30°0'
10°0'
10°
1.550 R
SECTION B-B
SCALE 2/1
.020 .040 R ALL EDGES OF SLOT
1.553 RAD REF
.156 REF
SECTION C-C
SCALE 2/1
2 PLACES



.020 .040 X 45° ±5° CHAMFER ALL AROUND
.250
.250
.1251 .1253
.1251 .1253
A .001
VIEW D-D
SCALE 1/1
.030 .040 X 45° ±5° BOTH ENDS
.222 .232
.127 .137
3.000 DIA DATUM
3.500 DIA DATUM
.532 .530
1.550 RAD TYP
.120 .130 RAD 2 PLACES
.040 .050
10° TYP
.020 X 45° ±5° CHAMFER
.010 .030 X 45° ±5° CHAMFER
2°30'
.250 .260
.375
.134 .138 DIA THRU
CBORE .187 DIA TO DIM SHOWN
CSINK 60° ±5° TO .160 .165 DIA
8 HOLES
.030 .040 WIDE X .010 .020 DEEP
TYP 2 PLACES
.571
.782 .781
.020 .040 X 45° ±5° CHAMFER
⊥ E .0001
32
SECTION F-F
SCALE 2/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005 .015
4. INSIDE CORNERS .010 RAD UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

INCHES
PHOTOGRAPHIC SCALE ONLY

1000006	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM
BRUSH SPEC S-200
ALT: SPEC MIL-B-2153

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED — DATE
CHECKED
DRAWN MORSE
APPROVED NASA MSC
BY DIRECTION
MIT 11/13/62

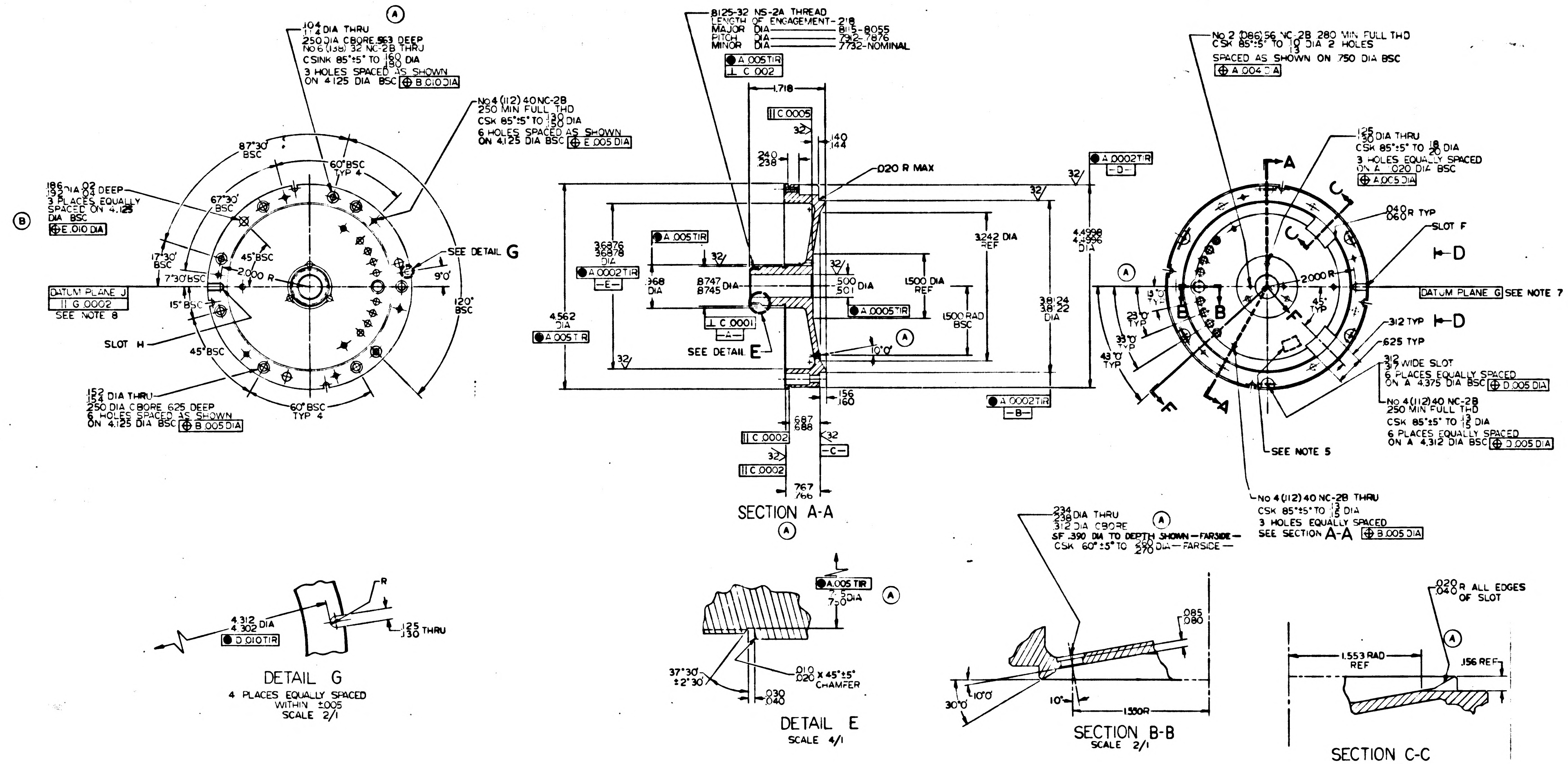
SHAFT, STUB
ONE SPEED OUTER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
ENG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000096
SHEET 1 OF 1 SHEET

REVISIONS DR 00026

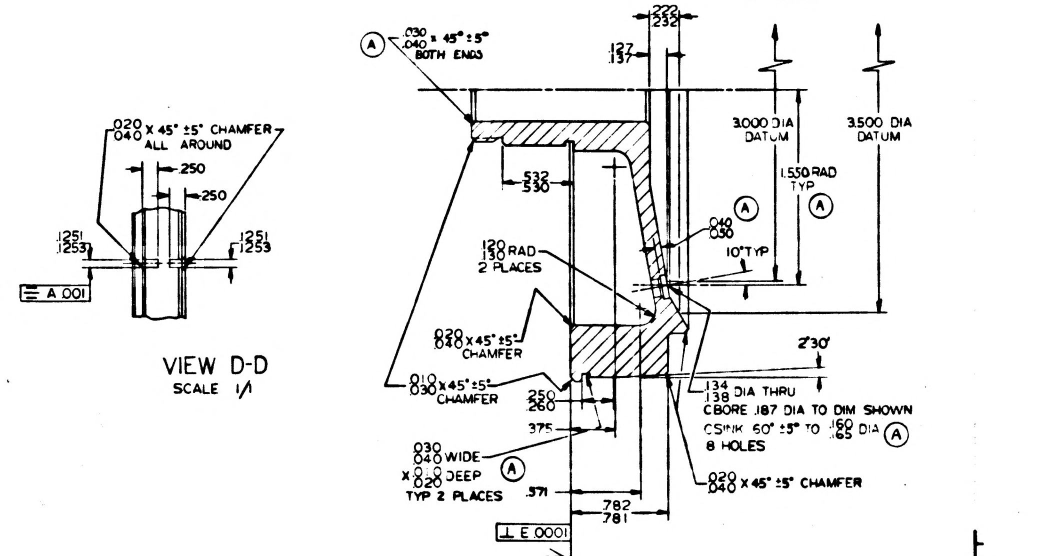
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00040	10-4-62	
	B	TDRR 00155	2-12-62	



.104 / .114 DIA THRU
.250 DIA CBORE .563 DEEP
No 6 (.138) 32 NC-2B THRU
CSINK 85°±5° TO .160/.180 DIA
3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕ B .010 DIA
No 4 (.112) 40 NC-2B .250 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕ E .005 DIA
.186/.192 DIA .02/.03 DEEP 3 PLACES EQUALLY SPACED ON 4.125 DIA BSC ⊕ E .010 DIA
DATUM PLANE J
SEE NOTE 8
SLOT H
SEE DETAIL G
.152/.154 DIA THRU .250 DIA CBORE .625 DEEP 6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕ B .005 DIA
.8125-32 NS-2A THREAD
LENGTH OF ENGAGEMENT-.218
MAJOR DIA .8115-.8055
PITCH DIA .7922-.7876
MINOR DIA .7732-NOMINAL
.020 R MAX
SEE DETAIL E
SECTION A-A
No 2 (.086) 56 NC-2B .280 MIN FULL THD
CSK 85°±5° TO .10/.13 DIA 2 HOLES
SPACED AS SHOWN ON .750 DIA BSC
.125/.130 DIA THRU CSK 85°±5° TO .18/.20 DIA 3 HOLES EQUALLY SPACED ON A .020 DIA BSC
SLOT F
DATUM PLANE G SEE NOTE 7
.312 WIDE SLOT 6 PLACES EQUALLY SPACED ON A 4.375 DIA BSC ⊕ D .005 DIA
No 4 (.112) 40 NC-2B .250 MIN FULL THD CSK 85°±5° TO .13/.15 DIA 6 PLACES EQUALLY SPACED ON A 4.312 DIA BSC ⊕ D .005 DIA
SEE NOTE 5
No 4 (.112) 40 NC-2B THRU CSK 85°±5° TO .13/.15 DIA 3 HOLES EQUALLY SPACED SEE SECTION A-A ⊕ B .005 DIA
DETAIL G
4 PLACES EQUALLY SPACED WITHIN ±.005
SCALE 2/1
DETAIL E
SCALE 4/1
SECTION B-B
SCALE 2/1
.234/.238 DIA THRU .312 DIA CBORE SF .390 DIA TO DEPTH SHOWN — FARSIDE — CSK 60°±5° TO .250/.270 DIA — FARSIDE —
SECTION C-C
SCALE 2/1
2 PLACES
.020/.040 R ALL EDGES OF SLOT

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005/.015
4. INSIDE CORNERS .010 RAD UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J



VIEW D-D
SCALE 1/1
.020/.040 X 45° ±5° CHAMFER ALL AROUND
SECTION F-F
SCALE 2/1
.030/.040 X 45° ±5° BOTH ENDS
3.000 DIA DATUM
3.500 DIA DATUM
1.550 RAD TYP
.120/.130 RAD 2 PLACES
.020/.040 X 45° ±5° CHAMFER
.010/.030 X 45° ±5° CHAMFER
.134/.138 DIA THRU CBORE .187 DIA TO DIM SHOWN CSINK 60° ±5° TO .160/.165 DIA 8 HOLES
.030/.040 WIDE X .010/.020 DEEP TYP 2 PLACES
.020/.040 X 45° ±5° CHAMFER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000006	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
±.005 ±0°30'
DO NOT SCALE THIS DRAWING

MATERIAL:
BERYLLIUM
BRUSH SPEC S-200
ALT. SPEC MIL-B-21531

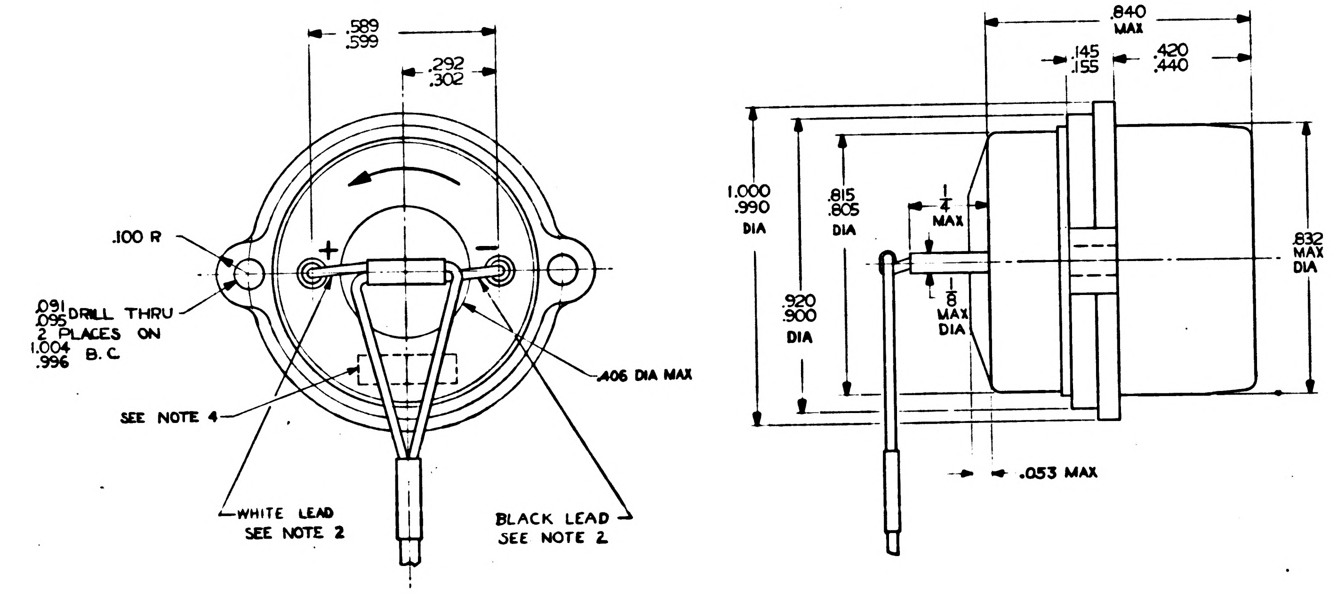
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 9-13-62
CHECKED
DRAWN MORSE 8-22-62
APPROVED NASA MSC 9-13-62
BY DIRECTION
MIT APPROVED 9/13/62

SHAFT, STUB
ONE SPEED OUTER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000096
SHEET 1 OF 1 SHEET

REVISIONS	TDRR 00187			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00645	3-27-63 ajB	WK



.589
.599
.292
.302
.100 R
+
−
.091
.095 DRILL THRU
2 PLACES ON
1.004
.996 B.C.
.406 DIA MAX
SEE NOTE 4
WHITE LEAD
SEE NOTE 2
BLACK LEAD
SEE NOTE 2
.840
MAX
.145
.155
.420
.440
1.000
.990
DIA
.815
.805
DIA
1/4
MAX
1/8
MAX
DIA
.920
.900
DIA
.832
MAX
DIA
.053 MAX

NOTES:

1-INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

2-LEAD WIRES TO BE PER MIL-W-16878-C, TYPE E-26. LENGTH 12 INCHES MIN.

Ⓐ 3-A ROTATION IN THE DIRECTION OF THE ARROW FROM AN INITIAL STATIONARY CONDITION SHOULD RESULT FIRST IN A VOLTAGE AT THE TERMINAL MARKED (+) GOING POSITIVE WITH RESPECT TO THE VOLTAGE AT TERMINAL MARKED (−)

4-IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO., AND MFR SYMBOL AT THE INDICATED POSITION PER MIL-STD-130.

5-ASSEMBLY TO MEET THE REQUIREMENTS OF PS 1000097

ORIGINAL SOURCE OF SUPPLY:

GENERAL ELECTRIC CO.
WEST LYNN, MASS
PART NO. 8TJ74DA

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	
1000005	DL 1000201
1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS .005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: ——

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	12/11/62
CHECKED		
DRAWN	PALERMO	8-24-62
APPROVED FOR MSC	W J Rhine	12-12-62
BY DIRECTION MIT APPROVAL	W J Kapper	12/12/62

ACCELEROMETER
ANGULAR DIFFERENTIATING
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
4/1		

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000097
SHEET 1 OF 1

1000097 A

PROCUREMENT SPECIFICATION

ACCELEROMETER, ANGULAR DIFFERENTIATING

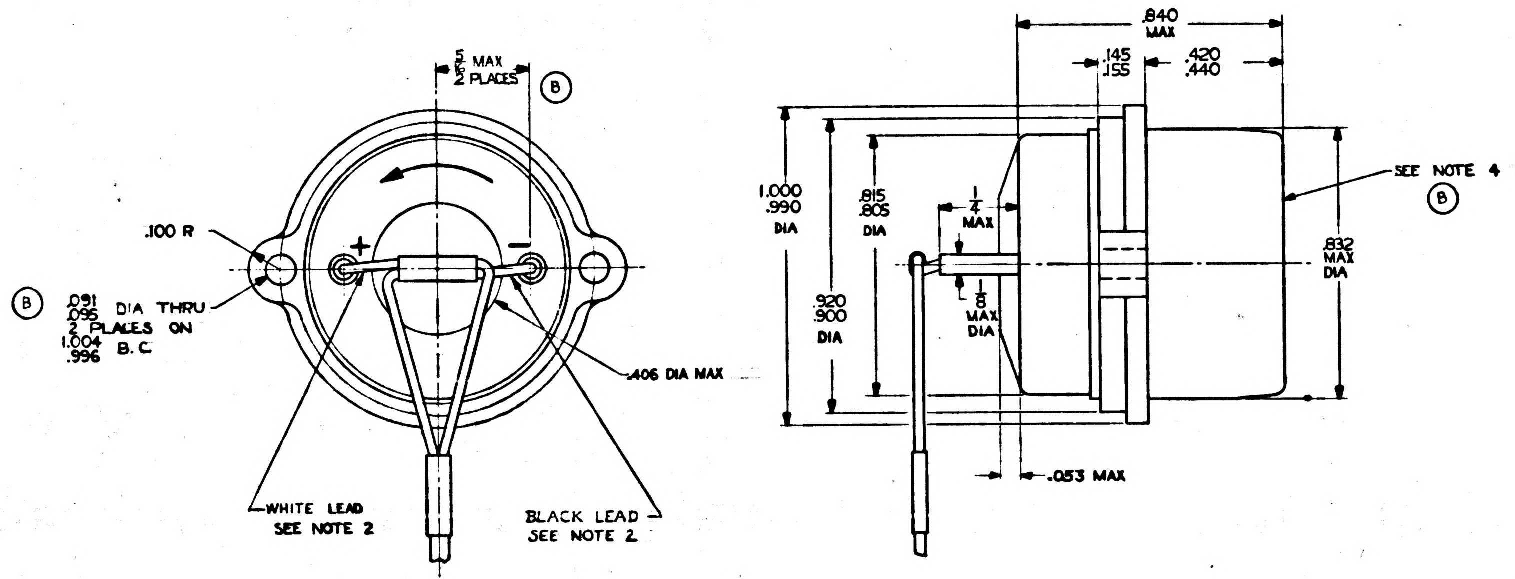
Record of Revisions

Revision Letter	TDRR	Pages Revised	Approvals	
			MIT	NASA
A	00808	Title Page, Page 7		

This specification consists of pages i through ii and 1 to 11 inclusive

(Rev. A)

REVISIONS		TDRR 00187		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00645	3-27-63	ajB WK.
	B	TDRR 01147	5-8-63	ajB WK



5° MAX
2 PLACES
B
.100 R
B
.091
.095 DIA THRU
2 PLACES ON
1.004
.996 B.C.
+
−
.406 DIA MAX
WHITE LEAD
SEE NOTE 2
BLACK LEAD
SEE NOTE 2
.840
MAX
.145
.155
.420
.440
1.000
.990
DIA
.815
.805
DIA
1/4
MAX
1/8
MAX
DIA
.920
.900
DIA
SEE NOTE 4
B
.832
MAX
DIA
.053 MAX

NOTES:

1-INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

2-LEAD WIRES TO BE PER MIL-W-16878-C, TYPE E-26. LENGTH 12 INCHES MIN.

Ⓐ 3-A ROTATION IN THE DIRECTION OF THE ARROW FROM AN INITIAL STATIONARY CONDITION SHOULD RESULT FIRST IN A VOLTAGE AT THE TERMINAL MARKED (+) GOING POSITIVE WITH RESPECT TO THE VOLTAGE AT TERMINAL MARKED (−)

Ⓑ 4-IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO., AND MFR SYMBOL AT THE INDICATED POSITION PER MIL-STD-130. MFR PART NO. MAY ALSO BE USED.

5-ASSEMBLY TO MEET THE REQUIREMENTS OF PS 1000097

ORIGINAL SOURCE OF SUPPLY:

GENERAL ELECTRIC CO.
WEST LYNN, MASS
PART NO. 8TJ74DA

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
1000203	
1000005	DL 1000201
1000003	DL 1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: ——

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
DATE
APPROVED C J Bazan 12/11/62
CHECKED
DRAWN PALERMO 8-24-62
APPROVED FOR MSC W J Rhine 12-12-62
BY DIRECTION MIT APPROVAL
W J Koppen 12/12/62

ACCELEROMETER
ANGULAR DIFFERENTIATING
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000097
SHEET 1 OF 1

1000097 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

Class A
TDRR
27 March 1963 00860

PROCUREMENT SPECIFICATION

ACCELEROMETER, ANGULAR DIFFERENTIATING

Record of Revisions

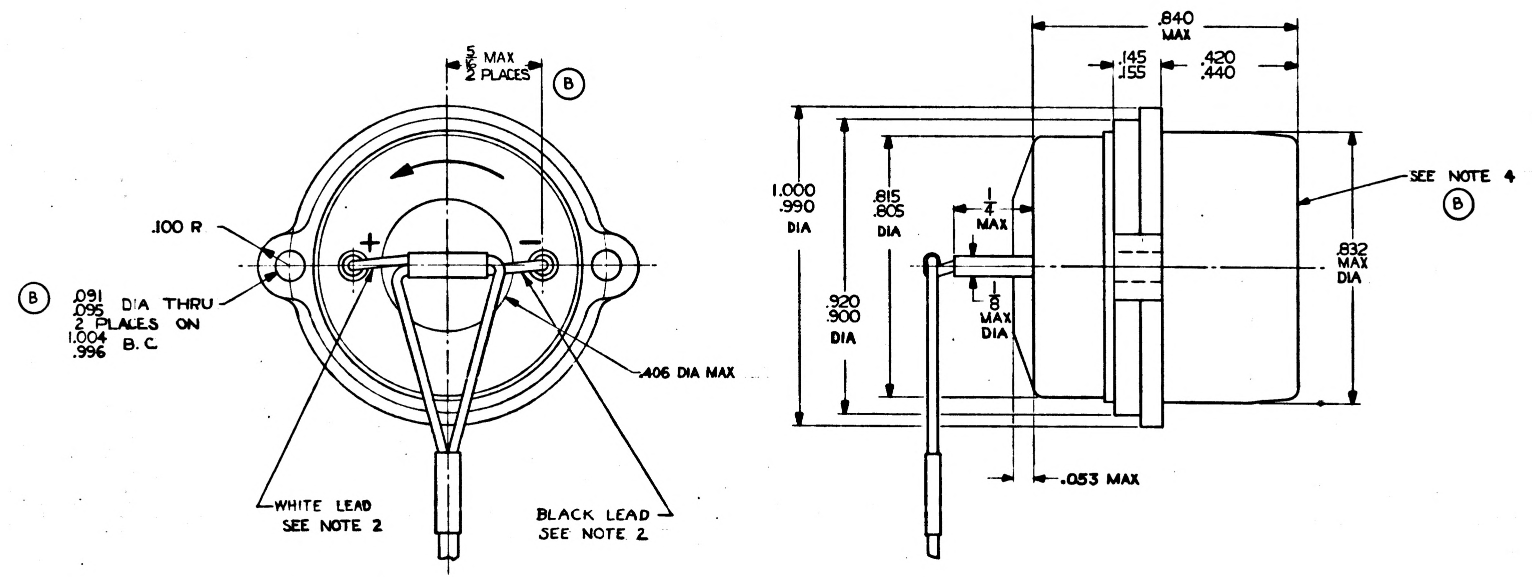
Revision Letter	TDRR	Pages Revised	Approvals	
			MIT	NASA
A	00808	Title Page, Page 7	WK	[illegible]
B	00985	Title Page Page 2,4,6,8,9	WK 24 Apr 63	[illegible] 4/24/63

This specification consists of pages i through ii and 1 to 10 inclusive

(Rev A)
(Rev B)

REVISIONS TDRR 00187

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00645	3-27-63	ajB	wk.
	B	TDRR 01147	5-8-63	ajB	wk
	C	REPLACED WITH CHANGE BY REV D PER TDRR 08524	19 May 64	wk	



5/16 MAX
2 PLACES
B
.100 R
B
.091
.095 DIA THRU
2 PLACES ON
1.004
.996 B.C.
+
−
.406 DIA MAX
WHITE LEAD
SEE NOTE 2
BLACK LEAD
SEE NOTE 2
.840
MAX
.145
.155
.420
.440
1.000
.990
DIA
.815
.805
DIA
1/4
MAX
1/8
MAX
DIA
.920
.900
DIA
.053 MAX
SEE NOTE 4
B
.832
MAX
DIA

NOTES:

1-INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

2-LEAD WIRES TO BE PER MIL-W-16878-C, TYPE E-26. LENGTH 12 INCHES MIN.

Ⓐ 3-A ROTATION IN THE DIRECTION OF THE ARROW FROM AN INITIAL STATIONARY CONDITION SHOULD RESULT FIRST IN A VOLTAGE AT THE TERMINAL MARKED (+) GOING POSITIVE WITH RESPECT TO THE VOLTAGE AT TERMINAL MARKED (−)

Ⓑ 4-IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO., AND MFR SYMBOL AT THE INDICATED POSITION PER MIL-STD-130. MFR PART NO. MAY ALSO BE USED.

5-ASSEMBLY TO MEET THE REQUIREMENTS OF PS 1000097

Ⓒ REPLACED WITH CHANGE BY REV D

ORIGINAL SOURCE OF SUPPLY:

GENERAL ELECTRIC CO.
WEST LYNN, MASS
PART NO. 8TJ74DA

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	
1000005	DL 1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	C J Bogue	12/11/62
CHECKED		
DRAWN	PALERMO	8-24-62
APPROVED FOR MSC	W J Rhine	12-12-62
BY DIRECTION MIT APPROVAL		12/12/62

ACCELEROMETER
ANGULAR DIFFERENTIATING
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000097
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NASA Apollo G&N Specification
PS-1000097-C
Class A
TDRR 00660
27 March 1963

PROCUREMENT SPECIFICATION
ACCELEROMETER, ANGULAR DIFFERENTIATING

Record of Revisions

Revision Letter	TDRR No.	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00808	Title Page, Page 7	WSK	WGR	—
B	00985	Title Page Page 2,4,6,8,9	WSK	WGR	—
C	01309	All Pages	WSK	WGR	5/22/63

This specification consists of pages i throughiii and 1 to 11 inclusive.

~~NASA~~ Apollo G & N Specification
PS-1000097-C
~~27 March 1963~~
21 May 1963

ACCELEROMETER, ANGULAR DIFFERENTIATING

The purpose of this document is to establish the manufacturing and test requirements for procurement. The Accelerometer, Angular Differentiating is intended for use in the APOLLO Guidance and Navigation Equipment program.

W. S. Kupfer 27 March 1963
MIT INSTRUMENTATION LABORATORY

W. J. Rhine 3-27-63
NASA/MSC APPROVAL

Apollo G&N Specification
PS-1000097-C
21 May 1963

PROCUREMENT SPECIFICATION
ACCELEROMETER, ANGULAR DIFFERENTIATING

1. SCOPE

1.1 This specification establishes the requirements for the procurement of an angular differentiating accelerometer hereinafter called ADA.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Methods of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery

Apollo G&N

ND-1015404	General Specification, Configuration, Process and Quality Control Requirements for Suppliers of High Reliability Articles for Use in Spacecraft and Supporting Equipment

STANDARDS

Military

MIL-STD-202	Test Methods for Electrical and Electronic Component Parts
MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment

1000097 D

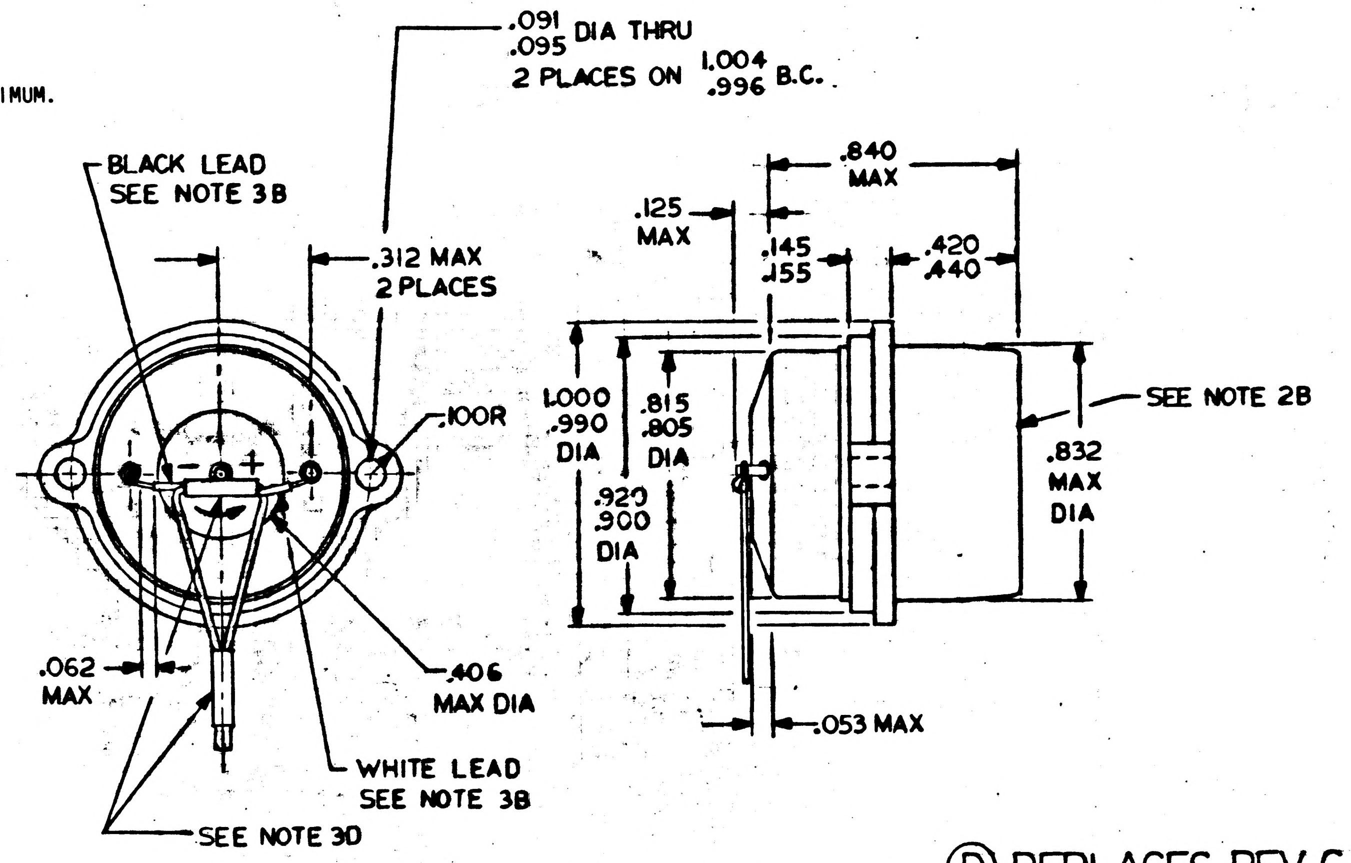
REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
D	REPLACES REV C WITH CHANGES PER TDRR 08524	19 May 64	WR

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS IN ND 1015404, CLASS 1.
   - C. UNITS SHALL BE CAPABLE OF MEETING REQUIREMENTS OF PS 1000097.
2. INSPECTION AND ACCEPTANCE
   - A. INSPECTION: AS SPECIFIED IN PS 1000097.
   - B. MARKING: IDENTIFY PART WITH NASA DRAWING NUMBER, REVISION LETTER, SERIAL NUMBER, MANUFACTURER'S NAME AND/OR SYMBOL, ARROW AND TERMINAL IDENTIFICATION PER ND 1002019 AT THE INDICATED POSITIONS. MFR PART NUMBER MAY ALSO BE USED.
3. DESIGN REQUIREMENTS
   - A. SOLDER LEADS TO TERMINALS PER MIL-STD-440.
   - B. WIRE SHALL BE PER MIL-W-16878, TYPE E-26, 12 INCHES LONG MINIMUM.
   - C. ROTATION IN THE DIRECTION OF THE ARROW FROM AN INITIAL STATIONARY CONDITION SHOULD RESULT FIRST IN A VOLTAGE AT THE TERMINAL MARKED (+) BEING POSITIVE WITH RESPECT TO THE VOLTAGE AT TERMINAL MARKED(-).
   - D. INSULATION, TUBING SIZE #16, 3/8 LONG PER MIL-I-22129 EXCEPT WALL THICKNESS TO BE 0.012 ± .003 INCHES.
   - E. INTERNAL CONSTRUCTION SHALL BE SUCH THAT LEAD REPLACEMENT CAN BE ACCOMPLISHED WITH A 24 WATT SOLDERING IRON, 60-40 TIN LEAD SOLDER, AND NORMAL SOLDERING PRACTICE WITHOUT INTERNAL DAMAGE.



Ⓓ REPLACES REV C WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1000203	
1000005	DL 1000201
1000003	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ——
HEAT TREATMENT ——
FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN L.T. Berkeley DATE 4/16/64
CHECKED A. Mart 4-27-64
APPROVAL Sassoff 27 Ap 64
APPROVAL
NASA APPROVAL 5/19/64
MIT APPROVAL 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ACCELEROMETER ANGULAR DIFFERENTIATING
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1000097

SCALE NONE WT — SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

Apollo G&N Specification
PS-1000097-D
Class A
TDRR 00660
27 March 1963

PROCUREMENT SPECIFICATION
ACCELEROMETER, ANGULAR DIFFERENTIATING

Record of Revisions

Revision Letter	TDRR No.	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00808	Title Page, Page 7	WSK	WJR	—
B	00985	Title Page Page 2,4,6,8,9	WSK	WJR	—
C	01309	All Pages	WSK	WJR	5/22/63
D	01668	7,9,10 and 11 Was 11 pages, now 12 pages.	WSK	JB	6/14/63

This specification consists of pages i through ii and 1 to 12 inclusive.

NASA Apollo G & N Specification
PS-1000097-D
~~27 March 1963~~
21 May 1963

ACCELEROMETER, ANGULAR DIFFERENTIATING

The purpose of this document is to establish the manufacturing and test requirements for procurement. The Accelerometer, Angular Differentiating is intended for use in the APOLLO Guidance and Navigation Equipment program.

27 March 1963
MIT INSTRUMENTATION LABORATORY

W. J. Rhine 3-27-63
NASA/MSC APPROVAL

Apollo G&N Specification
PS-1000097-D
21 May 1963

PROCUREMENT SPECIFICATION
ACCELEROMETER, ANGULAR DIFFERENTIATING

1. SCOPE

1.1 This specification establishes the requirements for the procurement of an angular differentiating accelerometer hereinafter called ADA.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Methods of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery

Apollo G&N

ND-1015404	General Specification, Configuration, Process and Quality Control Requirements for Suppliers of High Reliability Articles for Use in Spacecraft and Supporting Equipment

STANDARDS

Military

MIL-STD-202	Test Methods for Electrical and Electronic Component Parts
MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment

NASA Apollo G&N Specification
PS-1000097-[illegible]
Class A
TDRR 00660
27 March 1963

PROCUREMENT SPECIFICATION
ACCELEROMETER, ANGULAR DIFFERENTIATING

Record of Revisions

Revision Letter	TDRR No.	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00808	Title Page, Page 7	WAK	WJR	—
B	00985	Title Page Page 2,4,6,8,9	WAK.	WJR	—
C	01309	All Pages	WAK	WJR	5/22/63
D	01668	7,9,10 and 11. Was 11 pages, now 12 pages.	WAK	JB	6/19/63
E	02355	10,11 and 12	WAK	JB	7/31/63

This specification consists of pages i throughiii and 1 to 12 inclusive.

NASA Apollo G & N Specification
PS-1000097-[illegible]
~~27 March 1963~~
21 May 1963

ACCELEROMETER, ANGULAR DIFFERENTIATING

The purpose of this document is to establish the manufacturing and test requirements for procurement. The Accelerometer, Angular Differentiating is intended for use in the APOLLO Guidance and Navigation Equipment program.

W.A. Kupfer 27 March 1963
MIT INSTRUMENTATION LABORATORY

W. J. Rhine 3-27-63
NASA/MSC APPROVAL

Apollo G&N Specification
PS-1000097-[illegible]
21 May 1963

PROCUREMENT SPECIFICATION
ACCELEROMETER, ANGULAR DIFFERENTIATING

1. SCOPE

1.1 This specification establishes the requirements for the procurement of an angular differentiating accelerometer hereinafter called ADA.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Methods of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery

Apollo G&N

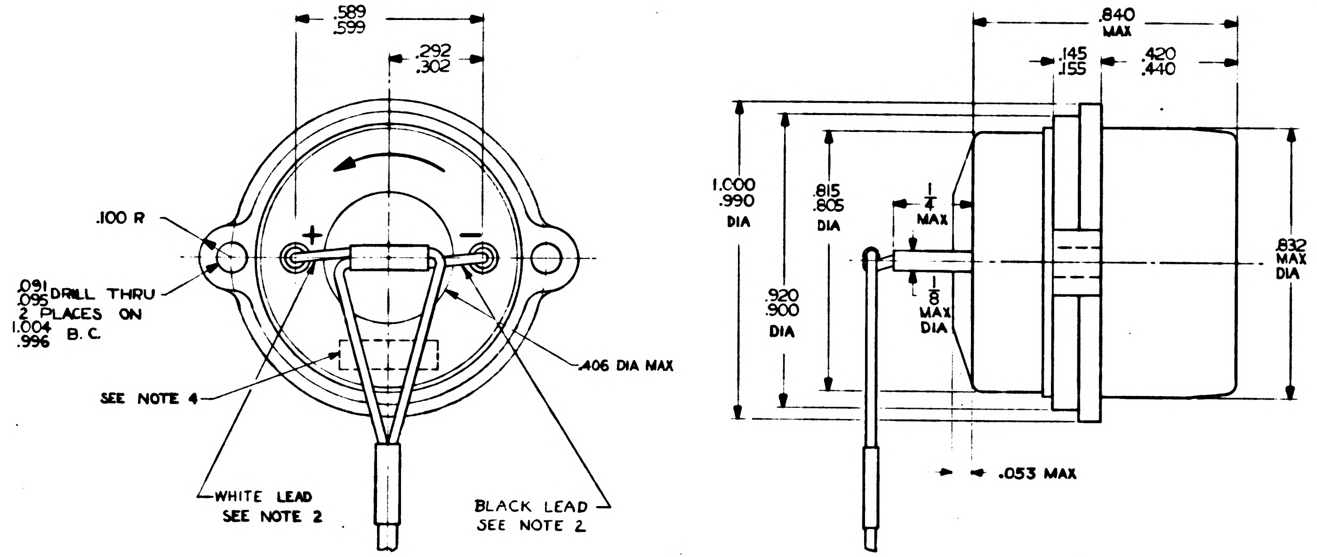
ND-1015404	General Specification, Configuration, Process and Quality Control Requirements for Suppliers of High Reliability Articles for Use in Spacecraft and Supporting Equipment

STANDARDS

Military

MIL-STD-202	Test Methods for Electrical and Electron Component Parts
MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment

REVISIONS		TDRR 00157		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


.589
.599
.292
.302
.100 R
.091
.095 DRILL THRU
2 PLACES ON
1.004
.996 B. C.
+
−
.406 DIA MAX
SEE NOTE 4
WHITE LEAD
SEE NOTE 2
BLACK LEAD
SEE NOTE 2
.840
MAX
.145
.155
.420
.440
1.000
.990
DIA
.815
.805
DIA
.920
.900
DIA
1/4
MAX
1/8
MAX
DIA
.832
MAX
DIA
.053 MAX

NOTES:

1-INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

2-LEAD WIRES TO BE PER MIL-W-16878-C, TYPE E-26. LENGTH 12 INCHES MIN.

3-POLARITY OF OUTPUT VOLTAGE AS INDICATED BY TERMINAL MARKINGS, SHOULD OCCUR WITH CONSTANT ANGULAR ACCELERATION OF CASE IN DIRECTION OF ARROW

4-IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO., AND MFR SYMBOL AT THE INDICATED POSITION PER MIL-STD-130.

5-ASSEMBLY TO MEET THE REQUIREMENTS OF PS 1000097

ORIGINAL SOURCE OF SUPPLY:

GENERAL ELECTRIC CO.
WEST LYNN, MASS
PART NO. 8TJ74DA

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	
1000005	DL 1000201
1000003	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
——	.005	——

DO NOT SCALE THIS DRAWING

MATERIAL: ——

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	2/11/62
CHECKED		
DRAWN	PALERMO	8-24-62

APPROVED FOR MSC
W J Rhine 12-12-68
BY DIRECTION MIT APPROVAL
W L Kaffer 12/12/68

ACCELEROMETER
ANGULAR DIFFERENTIATING
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
4/1		

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000097

SHEET 1 OF 1

1000097

NASA Apollo G & N Specification
PS-1000097
27 March 1963
Class A
TDRR
00660

PROCUREMENT SPECIFICATION

ACCELEROMETER, ANGULAR DIFFERENTIATING

Record of Revisions

Revision Letter	TDRR	Pages Revised	Approvals	
			MIT	NASA

This specification consists of pages i through ii and 1 to 11 inclusive

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ACCELEROMETER, ANGULAR DIFFERENTIATING

The purpose of this document is to establish the manufacturing and test requirements for procurement. The Accelerometer, Angular Differentiating is intended for use in the APOLLO Guidance and Navigation Equipment program.

W. S. Kupfer 27 March 1963
MIT INSTRUMENTATION LABORATORY

W. J. Rhine 3-27-63
NASA/MSC APPROVAL

PROCUREMENT SPECIFICATION

ACCELEROMETER, ANGULAR DIFFERENTIATING

1. SCOPE

1.1 This specification establishes the requirements for the procurement of an angular differentiating accelerometer hereinafter called ADA.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Methods of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery

National Aeronautics and Space Administration (NASA)

ND-1015404	General Specification, Configuration , Process and Quality Control Requirements for Suppliers of High Reliability Acticles for Use In Spacecraft and Supporting Equipment

STANDARDS

Military

MIL-STD-202	Test Methods for Electrical and Electronic Component Parts
MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment

DRAWINGS

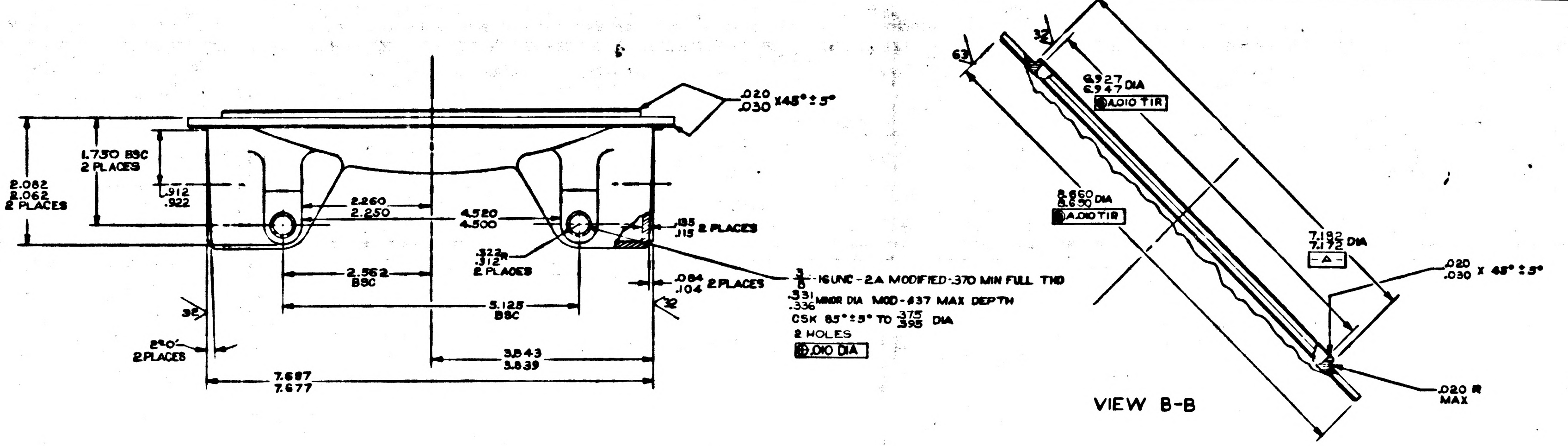
NASA

1000097	Accelerometer, Angular Differentiating, Specification Control Drawing

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity, or as directed by the contracting officer).

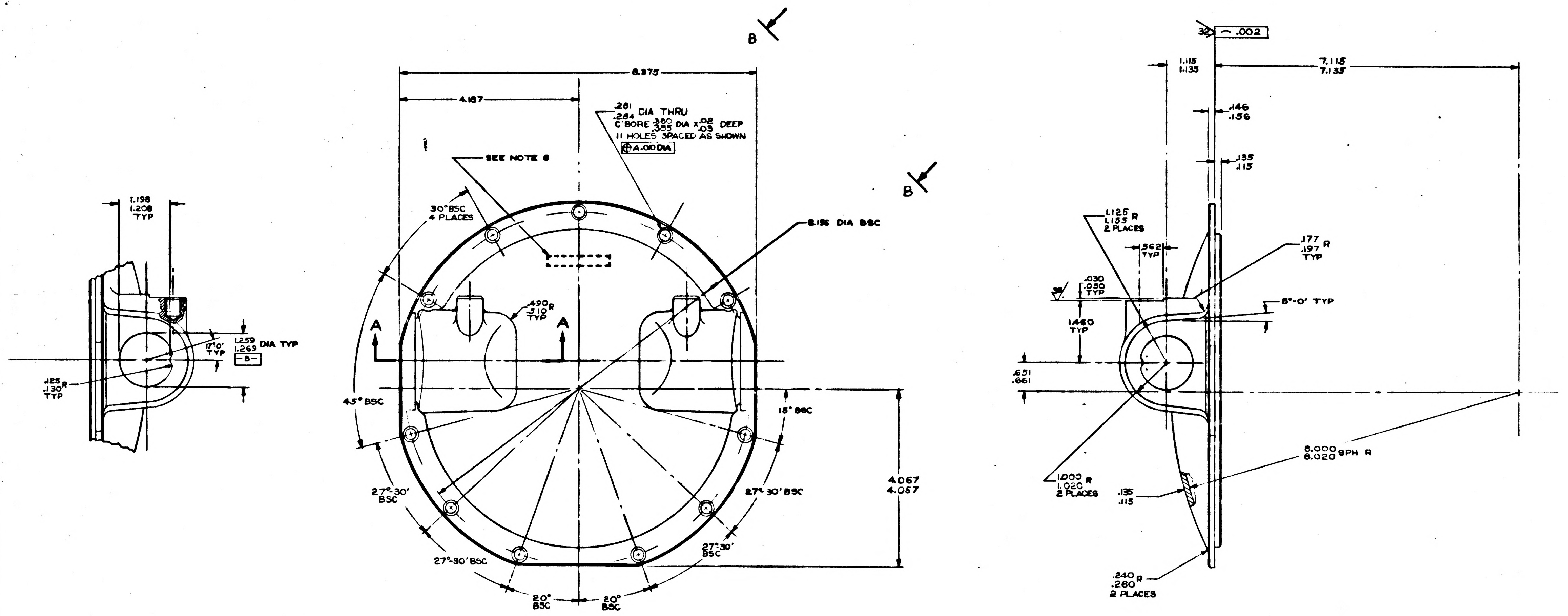
REVISIONS TDRR 00086

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL CHANGES	11-5-62	4/8 W

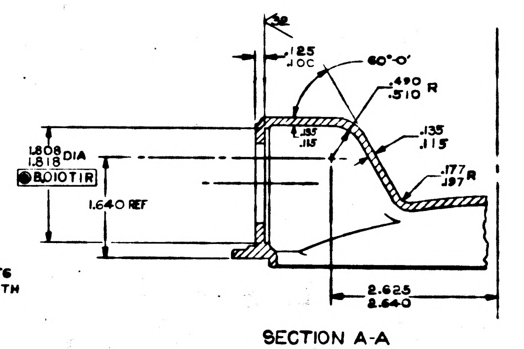


.020 .030 X 45° ± 5°
1.750 BSC 2 PLACES
2.082 2.062 2 PLACES
.912 .922
2.260 2.250
4.520 4.500
.135 .115 2 PLACES
.322 .312 R 2 PLACES
2.562 BSC
.084 .104 2 PLACES
5.125 BSC
32
3/8-16UNC-2A MODIFIED .370 MIN FULL THD
.331 .336 MINOR DIA MOD-.637 MAX DEPTH
CSK 85° ± 5° TO .375 .395 DIA
2 HOLES
.010 DIA
3.843 3.839
2°0' 2 PLACES
7.687 7.677
63
6.927 6.947 DIA
A .010 TIR
8.650 8.630 DIA
A .010 TIR
7.192 7.172 DIA
-A-
.020 .030 X 45° ± 5°
.020 R MAX

VIEW B-B



B
B
8.375
4.187
.281 .284 DIA THRU
C'BORE .380 .385 DIA x .02 .03 DEEP
11 HOLES SPACED AS SHOWN
A .010 DIA
SEE NOTE 6
30° BSC 4 PLACES
8.156 DIA BSC
.490 .510 R TYP
A
A
45° BSC
15° BSC
27°-30' BSC
27°30' BSC
27°-30' BSC
27°30' BSC
20° BSC
20° BSC
4.067 4.057
1.198 1.208 TYP
1.259 1.269 DIA TYP
17°0' TYP
-B-
.125 .130 R TYP
32
.002
1.115 1.135
7.115 7.135
.146 .156
.135 .115
1.125 1.135 R 2 PLACES
.562 TYP
.177 .197 R TYP
.030 .050 TYP
8°-0' TYP
1.460 TYP
.651 .661
8.000 8.020 SPH R
1.000 1.020 R 2 PLACES
.135 .115
.240 .260 R 2 PLACES



32
.125 .100
60°-0'
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
B .010 TIR
1.640 REF
2.625 2.640

SECTION A-A
2 PLACES

NOTES:

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601, CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $^{.115}_{.135}$ UNLESS OTHERWISE SPECIFIED
4. 250 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON-MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   - C. FINISH MACHINE
   - D. ANODIC COAT PER MIL-A-8625 TYPE I
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA
9. RADIOGRAPH REFERENCES PER NAVAER 00-15PC-504
10. STABILIZE HEAT TREAT AT 200° F ± 5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000099	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED J. [illegible] DATE 11/2/62
CHECKED
DRAWN RWC 10-11-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

MOUNT, CONNECTOR
I-X OUTER AXIS

SCALE 1-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000093
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00086			
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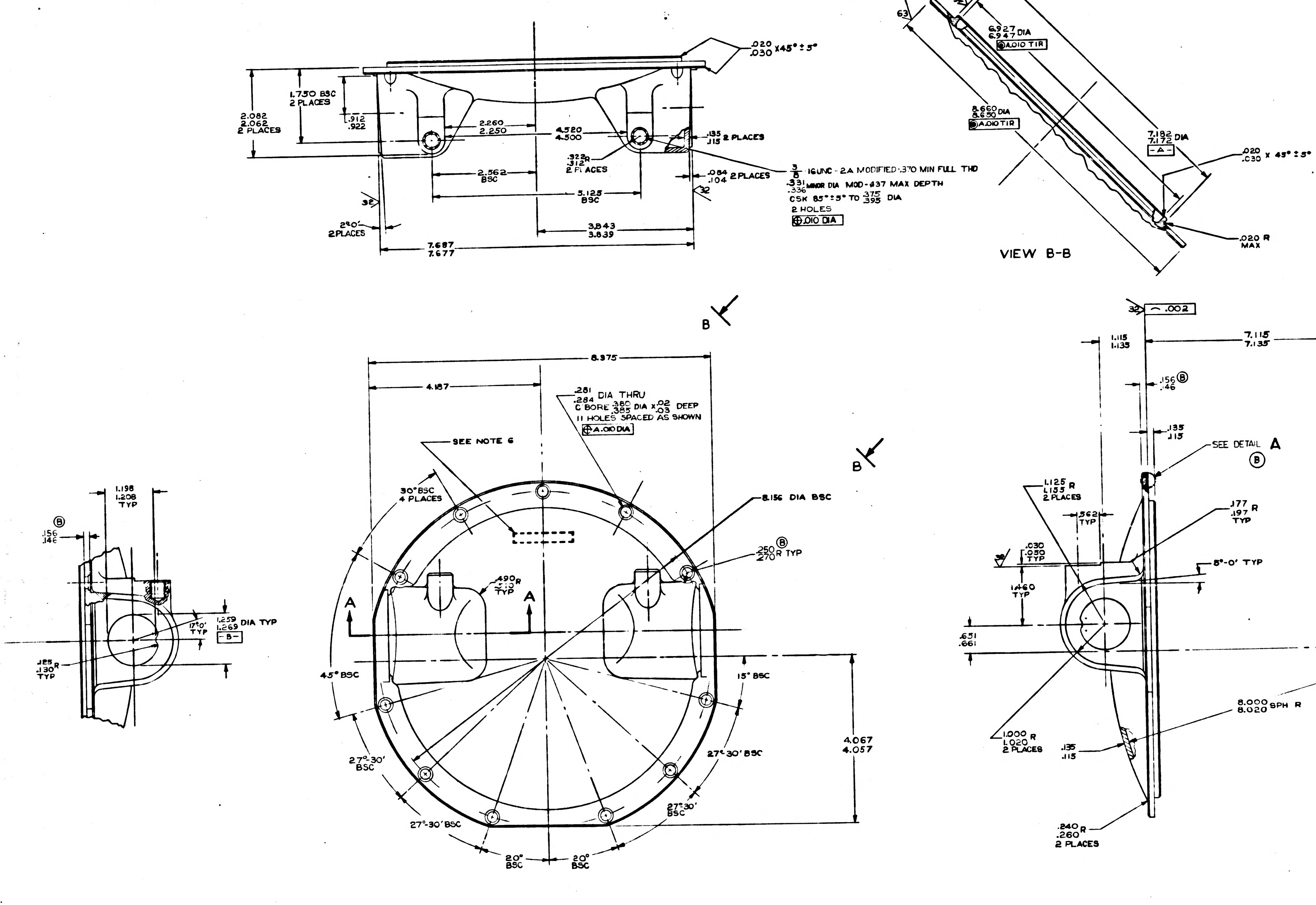
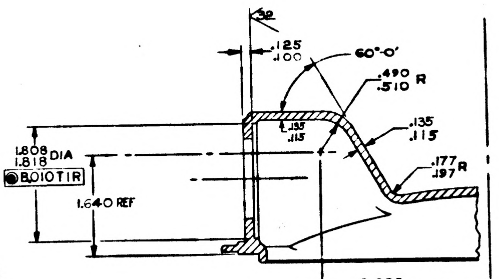
	B5	TDRR 00337	2-6-63	4/10	WK

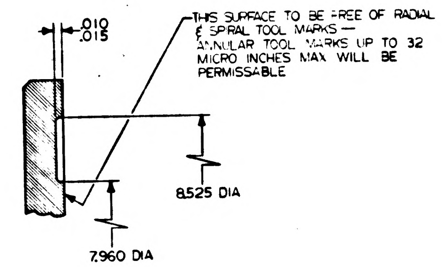


.020
.030 X45° ± 5°
1.750 BSC
2 PLACES
2.082
2.062
2 PLACES
.912
.922
2.260
2.250
4.520
4.500
.135
.115 2 PLACES
.322
.312 R
2 PLACES
2.562
BSC
5.125
BSC
.084
.104 2 PLACES
3/8 - 16UNC - 2A MODIFIED .370 MIN FULL THD
.331
.336 MINOR DIA MOD - .437 MAX DEPTH
CSK 85° ± 5° TO .375
.395 DIA
2 HOLES
.010 DIA
2°0'
2 PLACES
3.843
3.839
7.687
7.677
6.927
6.947 DIA
A.010 TIR
8.660
8.650 DIA
A.010 TIR
7.182
7.172 DIA
-A-
.020
.030 X 45° ± 5°
.020 R
MAX
VIEW B-B
B
8.375
4.187
.281
.284 DIA THRU
C BORE .380
.385 DIA X .02
.03 DEEP
11 HOLES SPACED AS SHOWN
A.010 DIA
SEE NOTE 6
30° BSC
4 PLACES
8.156 DIA BSC
.250
.270 R TYP
.490
.510 R
TYP
A
A
45° BSC
15° BSC
4.067
4.057
27°-30' BSC
27°-30' BSC
27°-30' BSC
27°-30' BSC
20° BSC
20° BSC
1.198
1.208
TYP
.156
.146
1.259
1.269 DIA TYP
-B-
17°0'
TYP
.125
.130 R
TYP
.002
1.115
1.135
7.115
7.135
.156
.146
.135
.115
SEE DETAIL A
1.125
1.135 R
2 PLACES
.562
TYP
.177
.197 R
TYP
.030
.050
TYP
8°-0' TYP
1.460
TYP
.651
.661
8.000
8.020 SPH R
1.000
1.020 R
2 PLACES
.135
.115
.240
.260 R
2 PLACES



.125
.100
60°-0'
.490
.510 R
.135
.115
.177
.197 R
1.808
1.818 DIA
B.010 TIR
1.640 REF
2.625
2.640

SECTION A-A
2 PLACES



.010
.015
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS — ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
8.525 DIA
7.960 DIA

DETAIL A
SCALE: 4X ACTUAL

NOTES:
1. MATERIAL: AL ALLOY PRECISION CASTING
356 T6 COMP 3
ALT: SPEC QQ-A-601, CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH
MIL-D-70327
3. FILLETS & ROUNDS TO BE $^{.115}_{.135}$ UNLESS
OTHERWISE SPECIFIED
4. 250 FINISH ALL OVER UNLESS
OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER,
AND MANUFACTURERS SYMBOL AT INDICATED
LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON-MANDATORY)
  A. ROUGH MACHINE
  B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
  C. FINISH MACHINE
  D. ANODIC COAT PER MIL-A-8625 TYPE I
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA
9. RADIOGRAGH REFERENCES PER NAVAER 00-15PC-504
10. STABILIZE HEAT TREAT AT 200°F ± 5°F FOR 20 HOURS
AT TEMPERATURE, AIR COOL

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
	DL1000201
1000099	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED G. J. Bergman 11/8/62
CHECKED
DRAWN R.W.C. 10-11-62
APPROVED FOR MSC
W. J. Johnson 11-8-62
BY DIRECTION
MIT APPROVAL

MOUNT, CONNECTOR
I-X OUTER AXIS

SCALE 1-1
UNIT WT.
CODE IDENT.

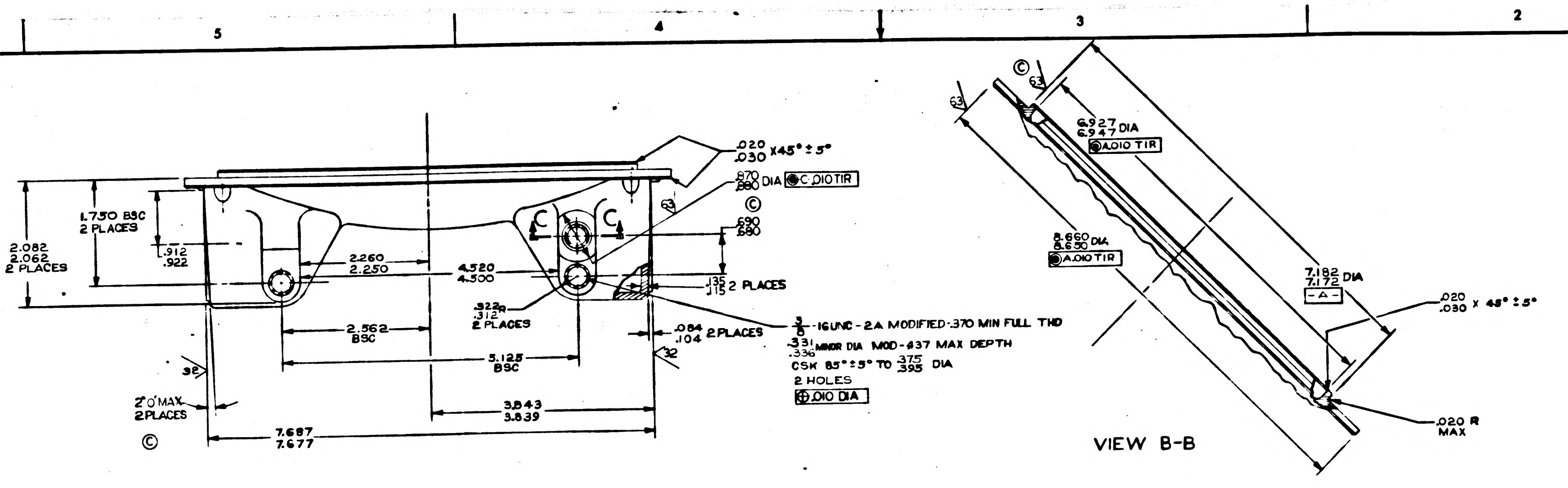
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000098
SHEET 1 OF 1

1000098 B

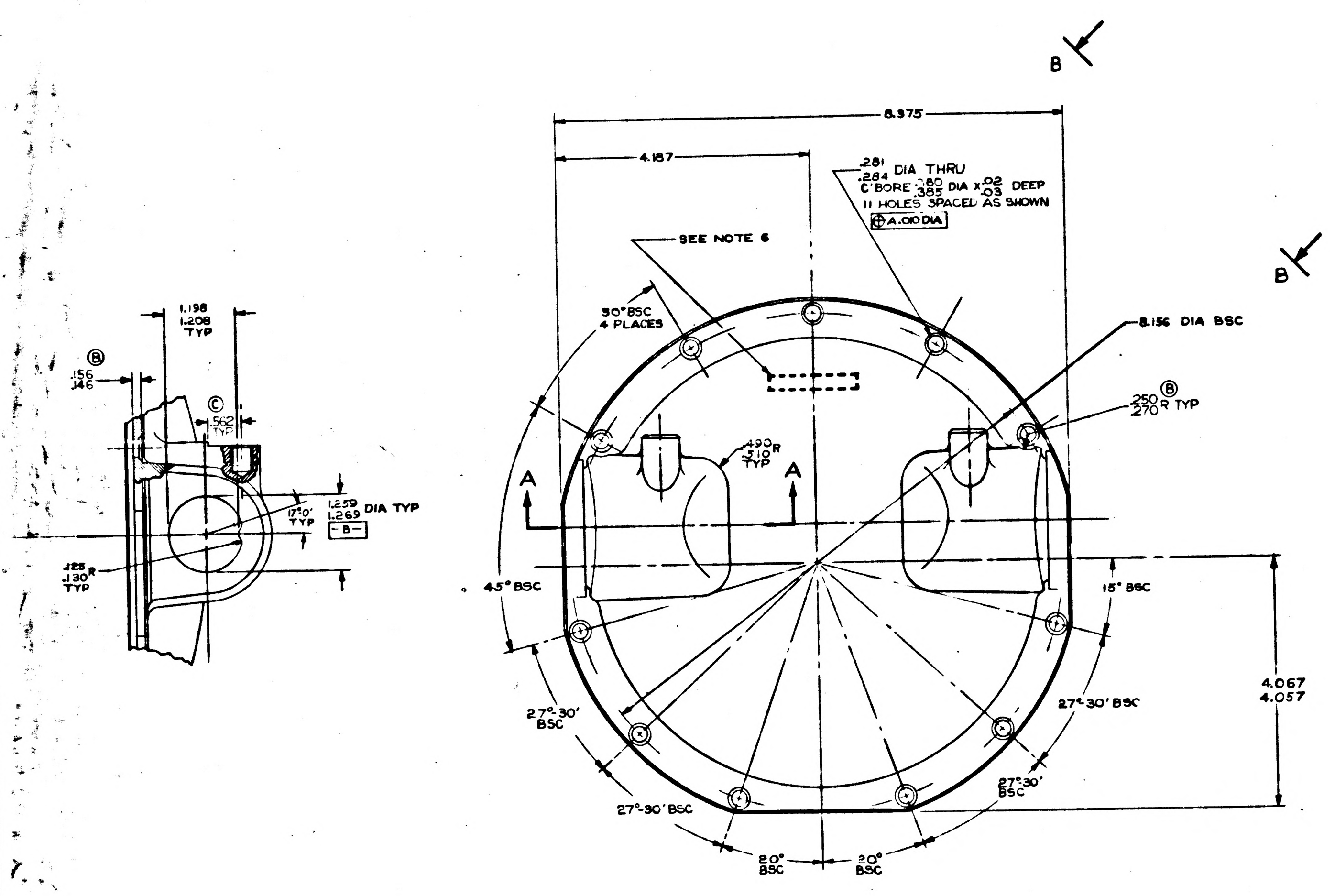
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	GENERAL CHANGES	1-5-62		WK
	B5	TDRR 00337	2-6-63		WK
	C	TDRR 00647	3-27-63		WK

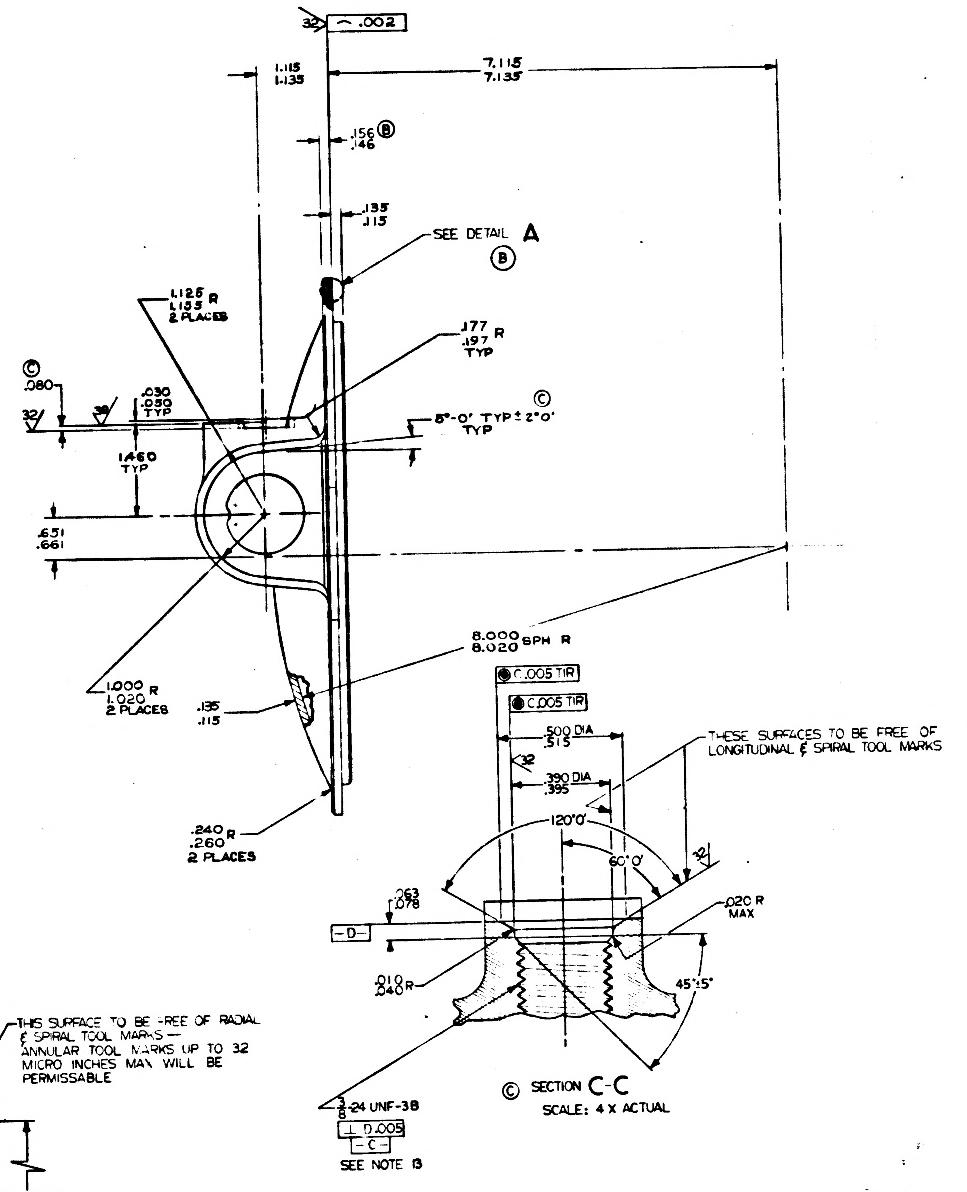
REVISIONS TDRR 000 86

Ⓜ


.020 .030 X45° ± 5°
.870 .880 DIA ◉C .010 TIR
Ⓒ
.690 .680
.135 .115 2 PLACES
1.750 BSC 2 PLACES
2.082 2.062 2 PLACES
.912 .922
2.260 2.250
4.520 4.500
.322 .312 R 2 PLACES
3/8-16UNC-2A MODIFIED .370 MIN FULL THD
.331 .336 MINOR DIA MOD-.437 MAX DEPTH
CSK 85° ± 5° TO .375 .395 DIA
2 HOLES
⊕ .010 DIA
.084 .104 2 PLACES
2.562 BSC
5.125 BSC
3.843 3.839
7.687 7.677
2°0' MAX 2 PLACES
C C
63
32
Ⓒ
6.927 6.947 DIA
◉A.010 TIR
8.660 8.650 DIA
◉A.010 TIR
7.182 7.172 DIA
-A-
.020 .030 X 45° ± 5°
.020 R MAX

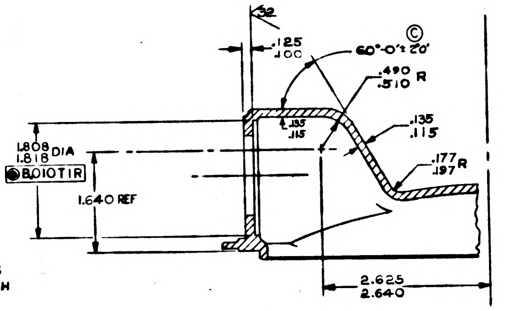
VIEW B-B


B
B
8.375
4.187
.281 .284 DIA THRU
C'BORE .380 .385 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕A.010 DIA
SEE NOTE 6
30° BSC 4 PLACES
8.156 DIA BSC
.250 .270 R TYP Ⓑ
.490 .510 R TYP
A A
45° BSC
15° BSC
27°-30' BSC
27°-30' BSC
27°-30' BSC
27°-30' BSC
20° BSC
20° BSC
4.067 4.057
1.198 1.208 TYP
Ⓑ .156 .146
Ⓒ .562 TYP
17°0' TYP
1.259 1.269 DIA TYP
-B-
.125 .130 R TYP

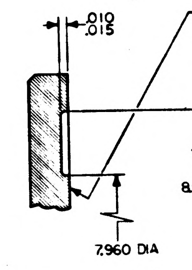

⌒ .002
32
1.115 1.135
7.115 7.135
.156 .146 Ⓑ
.135 .115
SEE DETAIL A Ⓑ
1.125 1.155 R 2 PLACES
.177 .197 R TYP
Ⓒ .080
.030 .050 TYP
5°-0' TYP ± 2°0' TYP Ⓒ
1.460 TYP
.651 .661
8.000 8.020 SPH R
1.000 1.020 R 2 PLACES
.135 .115
.240 .260 R 2 PLACES
◉C.005 TIR
◉C.005 TIR
.500 .515 DIA
.390 .395 DIA
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
120°0'
60°0'
.063 .078
-D-
.020 R MAX
.010 .040 R
45° ± 5°
3/8-24 UNF-3B
⊥ D.005
-C-
SEE NOTE 13

Ⓒ SECTION C-C

SCALE: 4 X ACTUAL


32
.125 .100
60°-0' ± 20' Ⓒ
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
◉B.010 TIR
1.640 REF
2.625 2.640

SECTION A-A
2 PLACES


.010 .015
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS — ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
8.525 DIA
7.960 DIA

DETAIL A Ⓑ

SCALE: 4X ACTUAL

NOTES:
1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601, CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $^{.115}_{.125}$ UNLESS OTHERWISE SPECIFIED
4. 250√ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON-MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   - C. FINISH MACHINE
   - D. ANODIC COAT PER MIL-A-8625 TYPE I
8. Ⓒ CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA GRADE A
9. RADIOGRAGH REFERENCES PER NAVAER 00-15PC-504
10. STABILIZE HEAT TREAT AT 200°F ± 5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. Ⓒ INSIDE MACHINED CORNERS .010 RAD UNLESS OTHERWISE SPECIFIED
12. Ⓒ CAST WALL THICKNESS $^{.135}_{.115}$ UNLESS OTHERWISE SPECIFIED
13. Ⓒ THREADS MUST CONFORM TO MIL-S-7742

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓑ

	DL1000201
1000099	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1

INCHES
PHOTOGRAPHIC SCALE ONLY

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

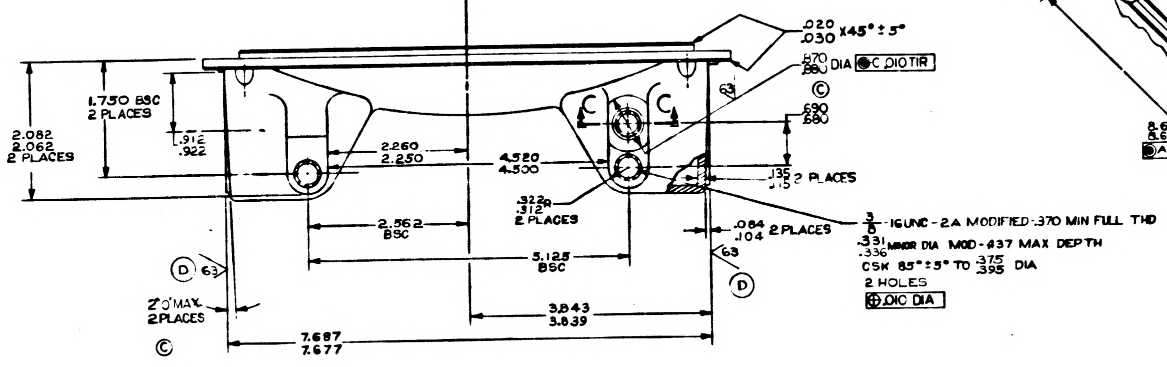
		DATE
APPROVED		11-5-62
CHECKED		
DRAWN	R VC	10-11-62
APPROVED FOR MSC		
BY DIRECTION		
APPROVAL		

MOUNT, CONNECTOR
1-X OUTER AXIS

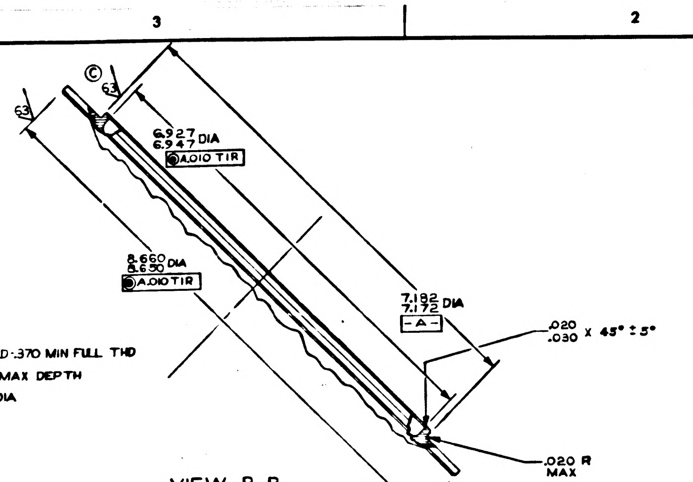
SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000098
SHEET 1 OF 1

		REVISIONS TDRR 00086			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	GENERAL CHANGES	1-5-62	416	WK
	B5	TDRR 00337	2-6-63	416	WK
	C	TDRR 00647	3-27-63	416	WK
	D	TDRR 01047	4-30-63	416	WK

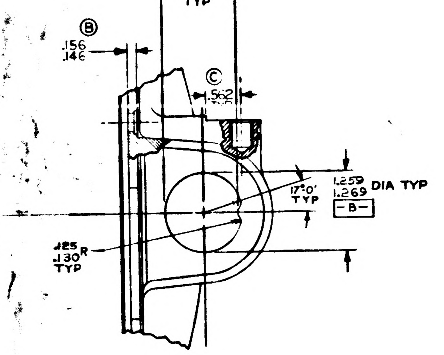


.020 .030 X 45° ± 5°
.870 .880 DIA ⊚ C .010 TIR
.590 .580
1.750 BSC 2 PLACES
.912 .922
2.082 2.062 2 PLACES
2.260 2.250
4.520 4.500
.135 .115 2 PLACES
.322 .312 2 PLACES
3/8 -16UNC-2A MODIFIED .370 MIN FULL THD
.331 .336 MINOR DIA MOD-.437 MAX DEPTH
CSK 85° ± 5° TO .375 .395 DIA
2 HOLES
⊕ .010 DIA
2.562 BSC
.084 .104 2 PLACES
5.128 BSC
2°0' MAX 2 PLACES
3.843 3.839
7.687 7.677

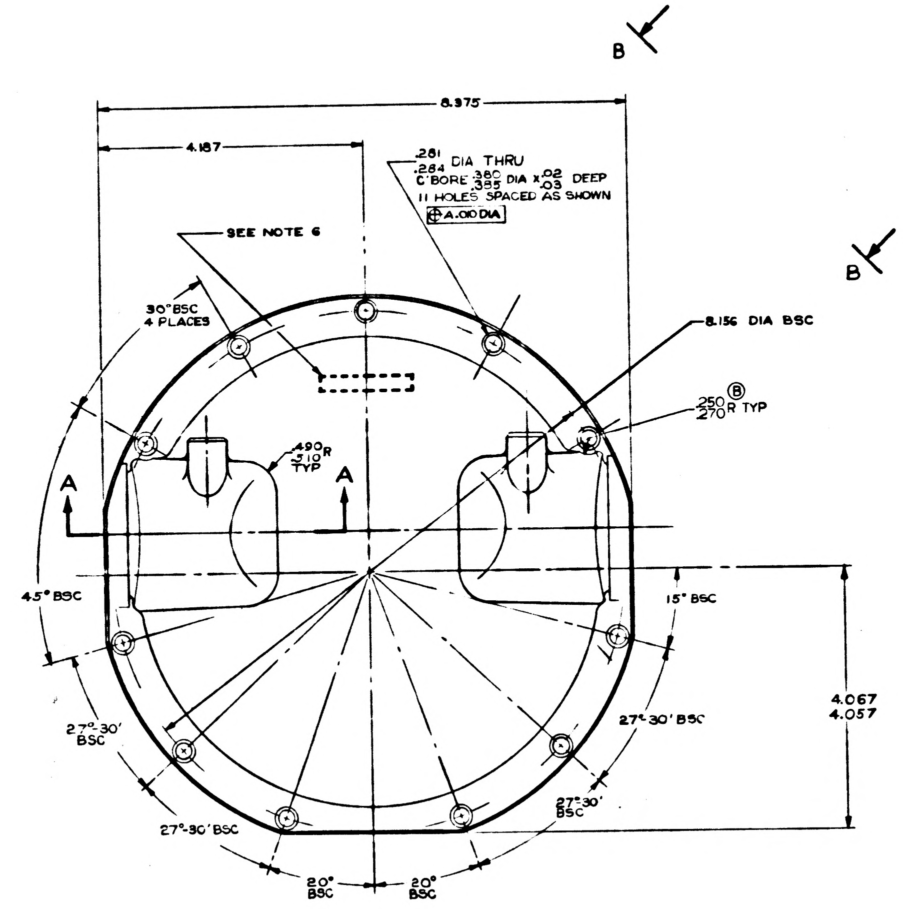


6.927 6.947 DIA
⊚ A .010 TIR
8.660 8.650 DIA
⊚ A .010 TIR
7.182 7.172 DIA
- A -
.020 .030 X 45° ± 5°
.020 R MAX

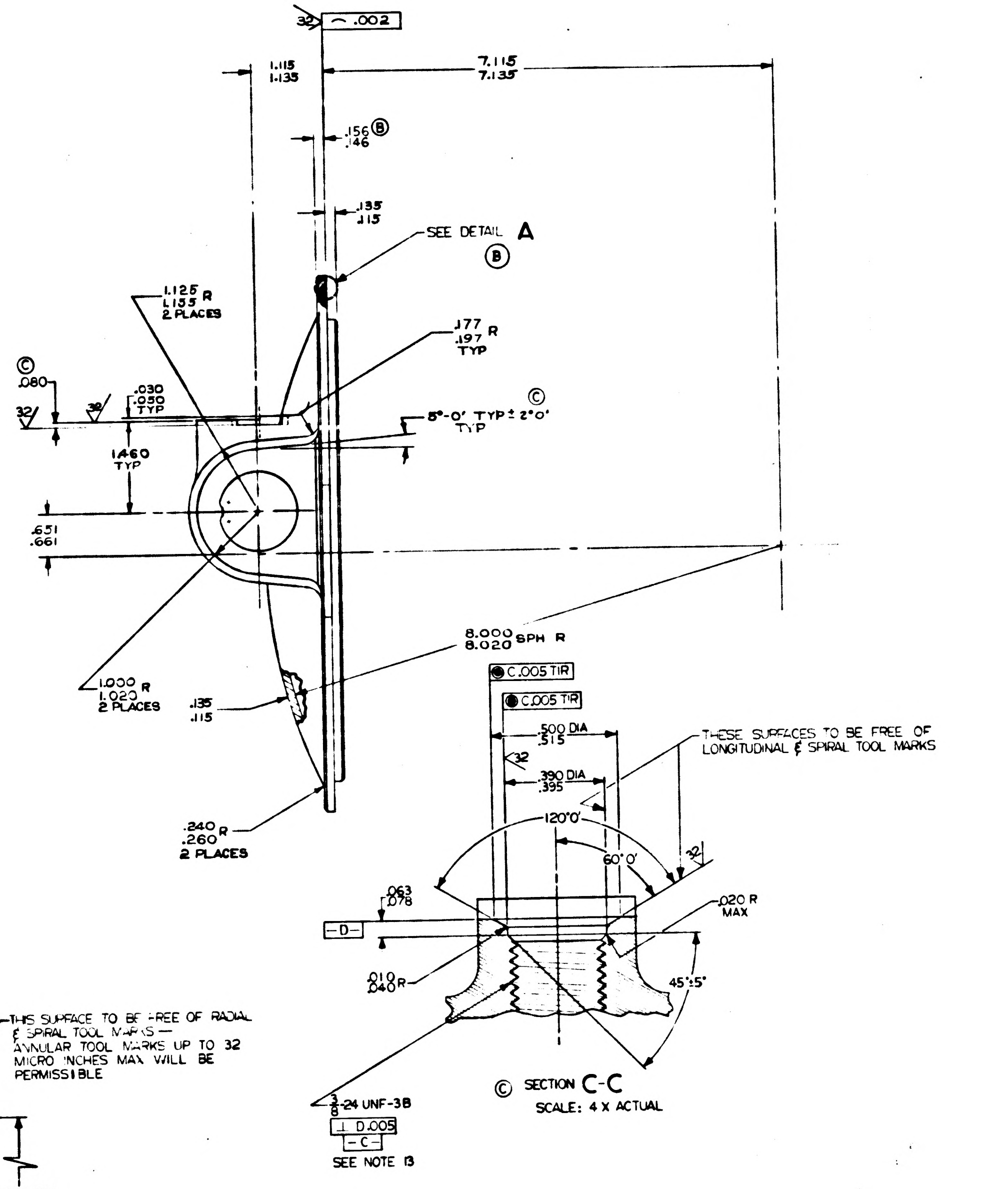
VIEW B-B



1.198 1.208 TYP
.156 .146
.152
17°0' TYP
1.259 1.269 DIA TYP
- B -
.125 .130 R TYP



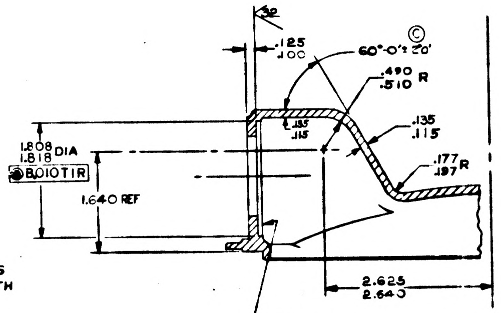
B
8.375
4.187
.281 .284 DIA THRU
C'BORE .380 .395 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕ A .010 DIA
SEE NOTE 6
B
30° BSC 4 PLACES
8.156 DIA BSC
.250 .270 R TYP
.490 .510 R TYP
A
A
45° BSC
15° BSC
4.067 4.057
27°30' BSC
27°30' BSC
27°30' BSC
27°30' BSC
20° BSC
20° BSC



~ .002
1.115 1.135
7.115 7.135
.156 .146
.135 .115
SEE DETAIL A
1.125 1.135 R 2 PLACES
.177 .197 R TYP
.080
.030 .050 TYP
8°-0' TYP ± 2°0'
1.460 TYP
.651 .661
8.000 8.020 SPH R
⊚ C .005 TIR
⊚ C .005 TIR
1.000 1.020 R 2 PLACES
.135 .115
.500 .515 DIA
.390 .395 DIA
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.240 .260 R 2 PLACES
120°0'
60°0'
.063 .078
- D -
.020 R MAX
.010 .040 R
45° ± 5°
3/8 -24 UNF-3B
⊥ D .005
- C -
SEE NOTE 13

SECTION C-C

SCALE: 4 X ACTUAL

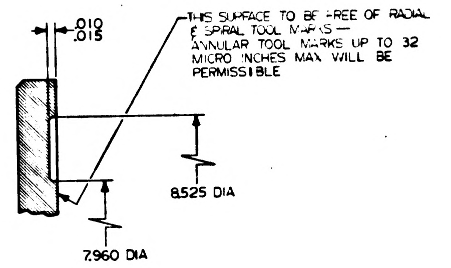


.125 .100
60°-0' ± 30'
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
⊚ B .010 TIR
1.640 REF
2.623 2.643

SECTION A-A

2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE



.010 .015
8.525 DIA
7.960 DIA

THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS — ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

DETAIL A

SCALE: 4X ACTUAL

NOTES:

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601, CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
4. 250 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON-MANDATORY)
   A. ROUGH MACHINE
   B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   C. FINISH MACHINE
   D. ANODIC COAT PER MIL-A-8625 TYPE I
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA GRADE A
9. RADIOGRAGH REFERENCES PER NAVAER 00-15PC-504
10. STABILIZE HEAT TREAT AT 200°F ± 5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. INSIDE MACHINED CORNERS .010 RAD UNLESS OTHERWISE SPECIFIED
12. CAST WALL THICKNESS $\frac{.135}{.115}$ UNLESS OTHERWISE SPECIFIED
13. THREADS MUST CONFORM TO MIL-S-7742

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	LIST OF PARTS AND MATERIALS				

	DL1000201
1000099	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED G. J. [illegible] DATE 11/17/62
CHECKED
DRAWN RWC 10-11-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

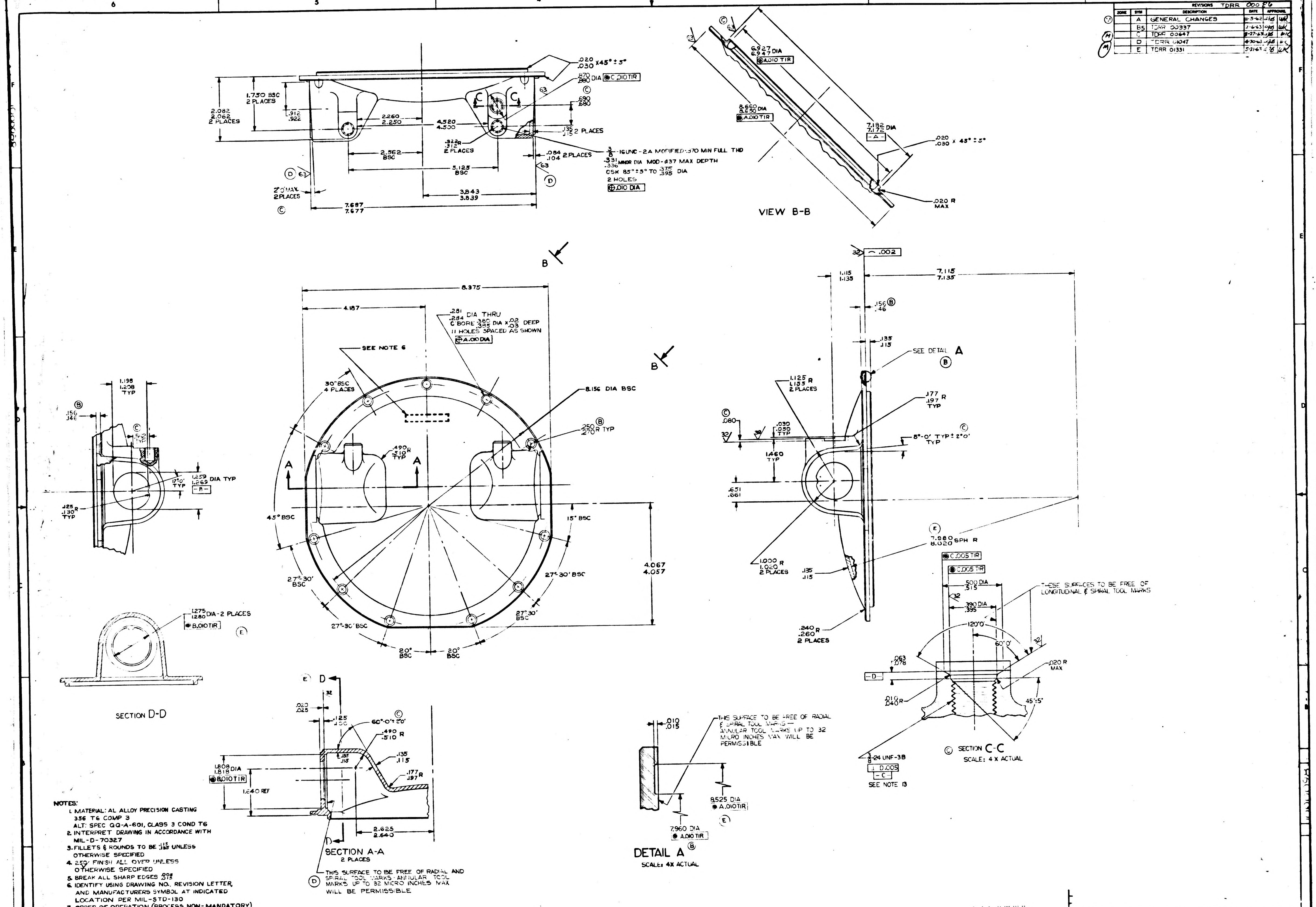
MOUNT, CONNECTOR
1-X OUTER AXIS

SCALE 1-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
ENG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000098
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 000 E6			
	A	GENERAL CHANGES	11-5-62		WK
	B5	TDRR 00337	2-6-63		WK
	C	TDRR 00647	3-27-63		WK
	D	TDRR 01047	4-30-63		WK
	E	TDRR 01331	5-21-63		WK



VIEW B-B
SECTION D-D
SECTION A-A
2 PLACES
DETAIL A
SCALE: 4X ACTUAL
SECTION C-C
SCALE: 4 X ACTUAL
SEE NOTE 6
SEE NOTE 13
SEE DETAIL A
8.375
4.187
8.156 DIA BSC
.281 .284 DIA THRU
C'BORE .380 .395 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
A .010 DIA
30° BSC 4 PLACES
45° BSC
15° BSC
27°30' BSC
20° BSC
4.067 4.057
7.115 7.135
7.960 8.020 SPH R
1.750 BSC 2 PLACES
2.082 2.062 2 PLACES
7.687 7.677
5.125 BSC
3.843 3.839
2.562 BSC
4.520 4.500
2.260 2.250
3/8-16UNC-2A MODIFIED .370 MIN FULL THD
.331 .336 MINOR DIA MOD-.437 MAX DEPTH
CSK 85° ± 5° TO .375 .395 DIA
2 HOLES
.010 DIA
6.927 6.947 DIA
8.650 8.630 DIA
7.192 7.172 DIA
.020 .030 X 45° ± 5°
.020 R MAX
1.275 1.280 DIA-2 PLACES
B .010 TIR
1.808 1.818 DIA
B .010 TIR
1.640 REF
2.625 2.640
60°-0' ± 0°30'
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS — ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
8.525 DIA
A .010 TIR
7.960 DIA
A .010 TIR
.500 .515 DIA
.390 .395 DIA
120°0'
60°0'
3/8-24 UNF-3B
⊥ D .005
C .005 TIR

NOTES:

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601, CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $^{.115}_{.135}$ UNLESS OTHERWISE SPECIFIED
4. 250 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON-MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   - C. FINISH MACHINE
   - D. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR (E)
8. (C) CASTING TO BE INSPECTED PER MIL-C-6021D CLASS I A GRADE A
9. RADIOGRAPH REFERENCES PER NAVAER 00-15PC-504
10. STABILIZE HEAT TREAT AT 200° F ± 5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. (C) INSIDE MACHINED CORNERS .010 RAD UNLESS OTHERWISE SPECIFIED
12. (C) CAST WALL THICKNESS $^{.135}_{.115}$ UNLESS OTHERWISE SPECIFIED
13. (C) THREADS MUST CONFORM TO MIL-S-7742

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000099	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED — DATE
CHECKED
DRAWN R.V.C. 10-11-62
APPROVED FOR MSC
BY DIRECTION
MSC APPROVAL

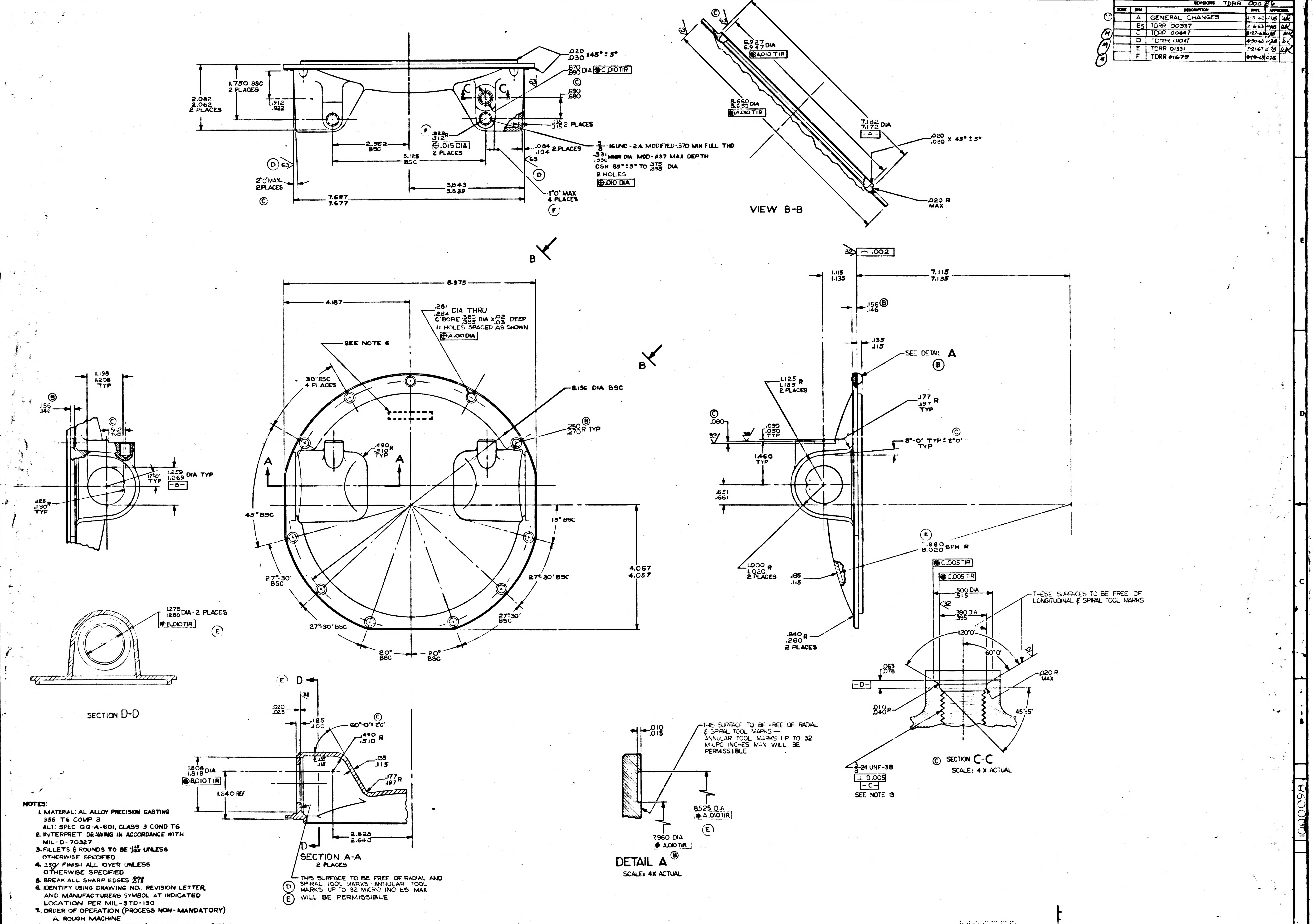
MOUNT, CONNECTOR
I-X OUTER AXIS

SCALE 1-1 | UNIT WT. | CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 10000[illegible]
SHEET 1 OF

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00086			
	A	GENERAL CHANGES	11-5-62		WK
	B5	TDRR 00337	2-6-63		WK
	C	TDRR 00647	3-27-63		WK
	D	TDRR 01047	4-30-63		WK
	E	TDRR 01331	5-21-63		WK
	F	TDRR 01679	6-19-63		


VIEW B-B
SECTION D-D
SECTION A-A
2 PLACES
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS - ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
DETAIL A
SCALE: 4X ACTUAL
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS — ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
SECTION C-C
SCALE: 4 X ACTUAL
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
SEE NOTE 6
SEE NOTE 13
SEE DETAIL A
8.156 DIA BSC
8.375
4.187
.281 .284 DIA THRU C'BORE .385 .395 DIA X .02 .03 DEEP 11 HOLES SPACED AS SHOWN
3/8-16UNC-2A MODIFIED .370 MIN FULL THD
CSK 85° ± 5° TO .375 .395 DIA
2 HOLES
3/8-24 UNF-3B
7.687 7.677
3.843 3.839
5.125 BSC
2.562 BSC
2.082 2.062 2 PLACES
1.750 BSC 2 PLACES
7.115 7.135
4.067 4.057
6.927 6.947 DIA
8.660 8.650 DIA
7.182 7.172 DIA
7.980 8.020 SPH R
1.808 1.818 DIA
1.640 REF
2.625 2.640
8.525 DIA
7.960 DIA
A
B
C
D

NOTES:

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
ALT: SPEC QQ-A-601, CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
4. 250 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON-MANDATORY)
    A. ROUGH MACHINE
    B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
    C. FINISH MACHINE
    D. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR Ⓔ
8. Ⓒ CASTING TO BE INSPECTED PER MIL-C-6021D CLASS I A GRADE A
9. RADIOGRAGH REFERENCES PER NAVAER 00-15PC-504
10. STABILIZE HEAT TREAT AT 200° F ± 5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. Ⓒ INSIDE MACHINED CORNERS .010 RAD UNLESS OTHERWISE SPECIFIED
12. Ⓒ CAST WALL THICKNESS $\frac{.135}{.115}$ UNLESS OTHERWISE SPECIFIED.
13. Ⓒ THREADS MUST CONFORM TO MIL-S-7742

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201	
1000099	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 11/8/62
CHECKED
DRAWN R WC 10-11-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

MOUNT, CONNECTOR
1-X OUTER AXIS

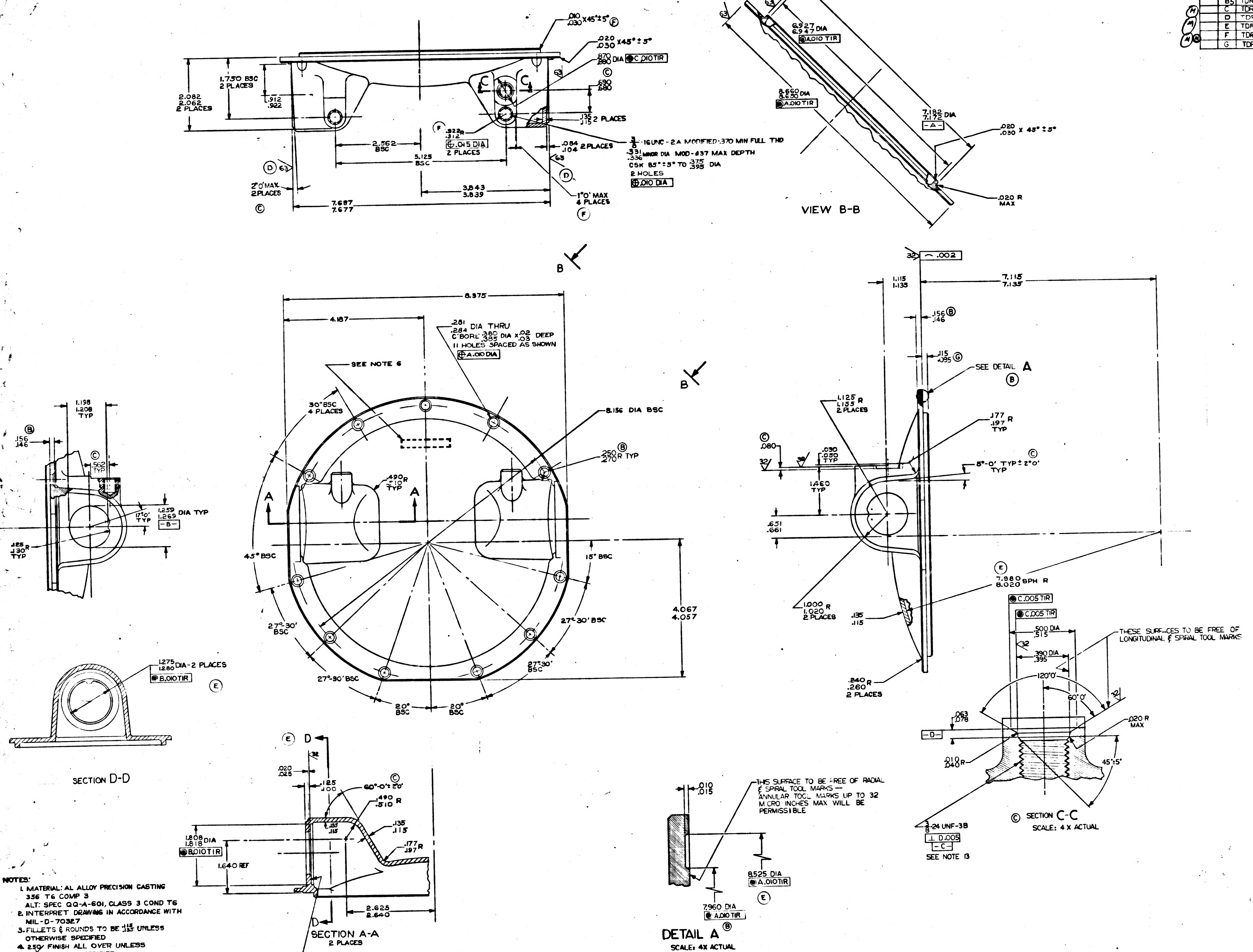
SCALE 1-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000098
SHEET 1 OF 1

1000098

F-2

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00086			
	A	GENERAL CHANGES	1-5-62	ajB	WK
	B5	TDRR 00337	2-6-63	ajB	WK
	C	TDRR 00647	3-27-63	ajB	WK
	D	TDRR 01047	4-30-63	ajB	WK
	E	TDRR 01331	5-21-63	ajB	WK
	F	TDRR 01679	6-19-63	ajB	
	G	TDRR 02896	9-4-63	ajB	WK



.010 .030 X45°±5°
.020 .030 X45°±5°
.870 .880 DIA ◉C.010TIR
.690 .680
1.750 BSC 2 PLACES
2.082 2.062 2 PLACES
.912 .922
.322 .312 R
⊕.015 DIA 2 PLACES
.135 .115 2 PLACES
.084 .104 2 PLACES
3/8-16UNC-2A MODIFIED-.370 MIN FULL THD
.331 .336 MINOR DIA MOD-.837 MAX DEPTH
CSK 85°±5° TO .375 .395 DIA
2 HOLES
⊕.010 DIA
2.562 BSC
5.125 BSC
3.843 3.839
7.687 7.677
2°0' MAX 2 PLACES
1°0' MAX 4 PLACES
VIEW B-B
6.927 6.947 DIA
◉A.010 TIR
8.660 8.650 DIA
◉A.010TIR
7.182 7.172 DIA
-A-
.020 .030 X 45°±5°
.020 R MAX
B
8.375
4.187
.281 .284 DIA THRU
C'BORE .380 .395 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕A.010 DIA
SEE NOTE 6
30° BSC 4 PLACES
8.156 DIA BSC
.250 .270 R TYP
.490 .510 R TYP
A
45° BSC
15° BSC
27°-30' BSC
4.067 4.057
20° BSC
1.198 1.208 TYP
.156 .146
.562 TYP
17°0' TYP
1.259 1.269 DIA TYP
-B-
.125 .130 R TYP
1.275 1.280 DIA-2 PLACES
◉B.010TIR
SECTION D-D
D
.020 .025
.125 .100
60°-0'±2°0'
.490 .510 R
.135 .115
.177 .197 R
1.808 1.818 DIA
◉B.010TIR
1.640 REF
2.625 2.640
SECTION A-A
2 PLACES
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
.010 .015
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
8.525 DIA
◉A.010TIR
7.960 DIA
◉A.010TIR
DETAIL A
SCALE: 4X ACTUAL
⌒ .002
1.115 1.135
7.115 7.135
.156 .146
.115 .095
SEE DETAIL A
1.125 1.135 R 2 PLACES
.177 .197 R TYP
.080
.030 .050 TYP
5°-0' TYP ± 2°0'
1.460 TYP
.651 .661
7.980 8.020 SPH R
◉C.005 TIR
1.000 1.020 R 2 PLACES
.135 .115
.240 .260 R 2 PLACES
.500 .515 DIA
.390 .395 DIA
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
120°0'
60°0'
.063 .078
-D-
.020 R MAX
.010 .040 R
45°±5°
3/8-24 UNF-3B
⊥ D.005
-C-
SEE NOTE 13
SECTION C-C
SCALE: 4 X ACTUAL

NOTES:

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601, CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $^{.115}_{.135}$ UNLESS OTHERWISE SPECIFIED
4. 250✓ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON-MANDATORY)
   A. ROUGH MACHINE
   B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   C. FINISH MACHINE
   D. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR (E)
8. (C) CASTING TO BE INSPECTED PER MIL-C-6021D CLASS I A GRADE A
9. RADIOGRAGH REFERENCES PER NAVAER 00-15PC-504
10. STABILIZE HEAT TREAT AT 200° F ± 5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. (C) INSIDE MACHINED CORNERS .010 RAD UNLESS OTHERWISE SPECIFIED
12. (C) CAST WALL THICKNESS $^{.135}_{.115}$ UNLESS OTHERWISE SPECIFIED
13. (C) THREADS MUST CONFORM TO MIL-S-7742

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	LIST OF PARTS AND MATERIALS				

NEXT ASSY	USED ON
	DL1000201
1000099	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS —— DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED J. Bryan 11/7/62
CHECKED
DRAWN RWC 10-11-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

MOUNT, CONNECTOR
I-X OUTER AXIS

SCALE 1-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000098
SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

F-2

Part Number	Description	Req'd
1000098	Connector Mount (Cast)	1

A	1000099

Ⓜ

REVISIONS TDR 00096			
SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED WITH CHANGE BY REV B TDRR 00112		ajB Wk

Ⓐ REPLACED WITH CHANGE BY REV B

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A. J. Boyce	11/8/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W J Kupfer 8 NOV 1962

CONNECTOR MOUNT ASSEMBLY
ONE SPEED

SCALE	UNIT WT.	CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

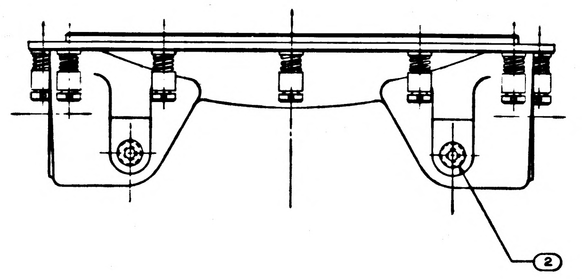
DWG. NO.

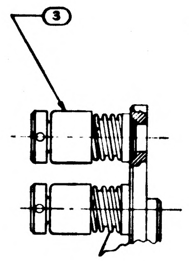
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000099

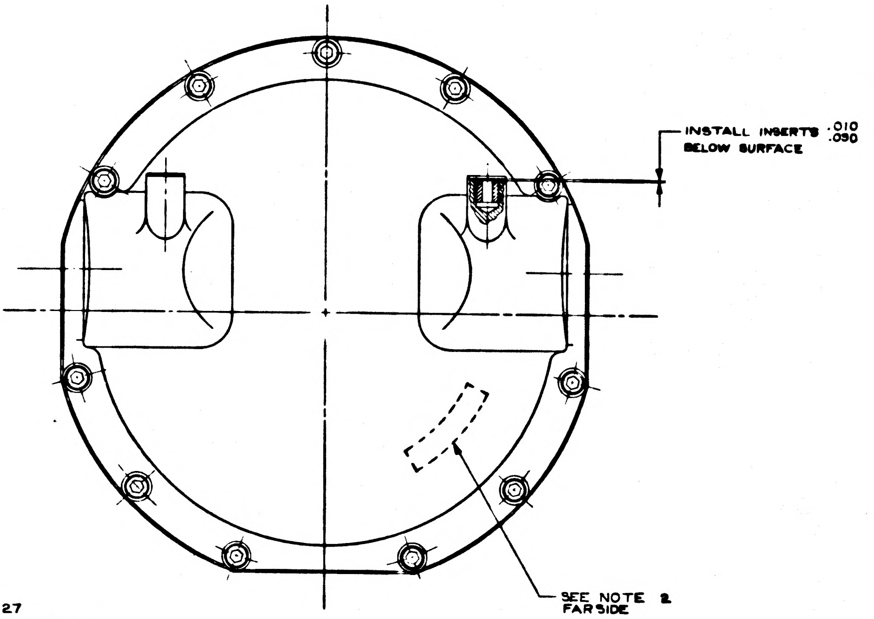
SHEET OF

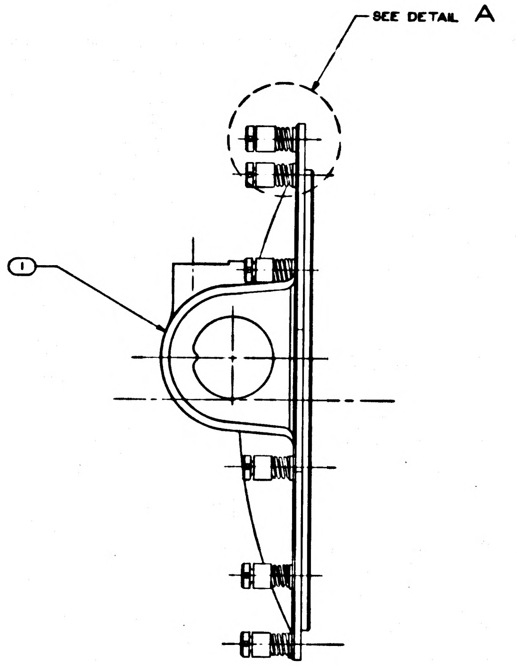
REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
—	B	REPLACES REV A WITH CHANGE [illegible] & REVISED TORR 00112	11-8-62	[illegible] WK





DETAIL A
SCALE 2-1





NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130 AT INDICATED LOCATION

Ⓑ REPLACES REV A WITH CHANGE

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
11	SCREW, CAPTIVE, ASS'Y	1000141-2			3
2	INSERT, THREADED, SELF-LOCKING	1000136-2			2
1	MOUNT CONNECTOR I-X OUTER AXIS	1000098			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		11/8/62
CHECKED		
DRAWN	R W C	11-8-62
APPROVED FOR MSC		
BY DIRECTION		
MIT APPROVAL		

MOUNT, CONNECTOR, ASSEMBLY
I-X OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000099

SHEET 1 OF 1

	1000099

REVISIONS TDR 00096			
SYM	DESCRIPTION	DATE	APPROVAL

Part Number	Description	Req'd
1000098	Connector Mount (Cast)	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		11/8/62
CHECKED		
DRAWN		

APPROVED FOR MSC
11-8-62
BY DIRECTION MIT APPROVAL
8 Nov 1962

CONNECTOR MOUNT ASSEMBLY
ONE SPEED

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000099

SHEET OF

DASH NO.	A ±.005	B ±.005	C ±.005	D DIA ±.005	E ±.005	APPLICATION DATA (REF.)		
						MAX. MTL. THK	MTG. HOLE DIA ±.002	CSK. TO .160/.165 DIA
-1	.334	.154	.046	.046	.093	.100	.136	AT 60°
-2	.254	.154	.046	.046	.093	.020	.136	AT 82°
-3	.350	.210	.100	.040	.080	.060	.136	AT 60°

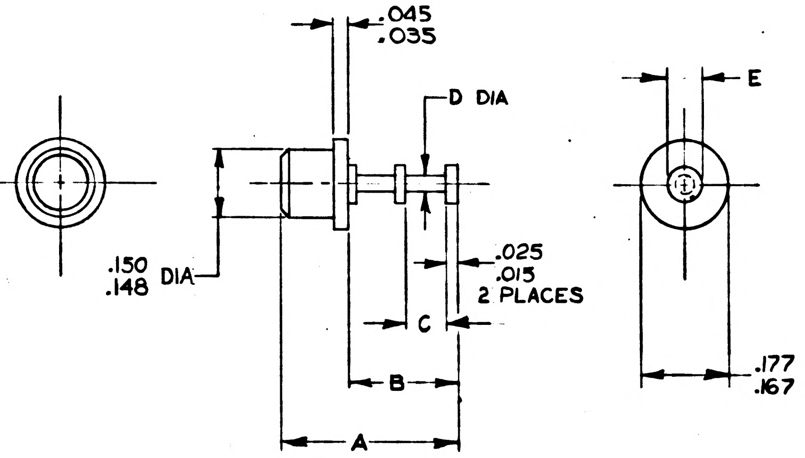
REVISIONS TDRR 00086

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01976	7-23-63	ajB	WK

NOTES:-

1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
   C. IDENTIFY USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130. MANUFACTURERS NAME AND PART NO. MAY ALSO BE USED.

2. INSPECTION & ACCEPTANCE:
   A. MATERIAL: TERMINAL; BRASS, QQ-B-626 COMP 22
      FORM ROD, TEMPER HALF HARD
      INSULATION; TEFLON, VIRGIN WHITE,
      MIL-P-19468
   B. FINISH: TERMINAL; SOLDER ELECTROPLATE, .0003 TO .0005 THK, 40-70 % TIN CONTENT PER MIL-T-10727 TYPE I
   C. DIMENSIONS: AS SHOWN ON DRAWING AND TABLE INCLUDING THE FOLLOWING;
      1. INSIDE CORNERS .010 R MAX
      2. BREAK SHARP EDGES .005/.015



3. DESIGN REQUIREMENTS:
   A. ELECTRICAL:
      1. VOLTAGE RATING; 750 VOLTS (RMS) AT SEA LEVEL
      2. CURRENT RATING; 5.5 AMPS
      3. TEMPERATURE RANGE; -65°C TO 200°C
   B. MECHANICAL:
      1. PULL TEST;
         a. TERMINAL TO TEFLON : 10 LBS MIN
         b. TEFLON TO PLATE : 10 LBS MIN PER APPLICATION DATA CHART.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2A

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	11/8/62
CHECKED		
DRAWN	D.M.WHITE	9-28-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W A Kupfer 9 Nov 1962

TERMINAL, INSULATED
SPECIFICATION CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000100

SHEET 1 OF 1

1000100 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

DASH NO.	A ±.005	B ±.005	C ±.005	D DIA ±.005	E ±.005	APPLICATION DATA (REF.) MAX. MTL. THK	MTG. HOLE DIA ±.002	CSK. TO .160/.165 DIA
-1	.334	.154	.046	.046	.093	.100	.136	AT 60°
-2	.254	.154	.046	.046	.093	.020	.136	AT 82°
-3	.350	.210	.100	.040	.080	.060	.136	AT 60°

REVISIONS TDRR 00086

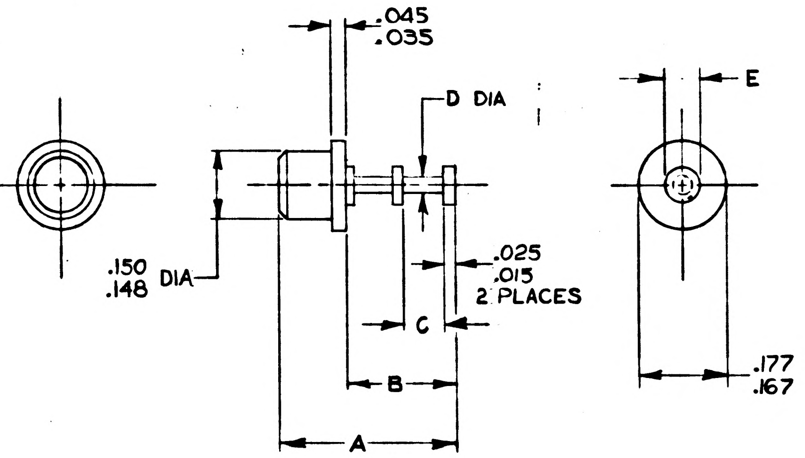
	ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ		A	TDRR 01976	7-23-63	ajB WK
Ⓜ		B	TDRR 02894	9-4-63	ajB WK

NOTES:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
   - C. IDENTIFY USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130. MANUFACTURERS NAME AND PART NO. MAY ALSO BE USED.

2. INSPECTION & ACCEPTANCE:
   - A. MATERIAL: TERMINAL; BRASS, QQ-B-626 COMP 22 FORM ROD, TEMPER HALF HARD
     INSULATION; TEFLON, VIRGIN WHITE, MIL-P-19468
   - B. FINISH: TERMINAL; SOLDER ELECTROPLATE, .0003 TO .0005 THK, 40-70 % TIN CONTENT PER MIL-T-10727 TYPE I
   - C. DIMENSIONS: AS SHOWN ON DRAWING AND TABLE INCLUDING THE FOLLOWING;
     1. INSIDE CORNERS .010 R MAX
     2. BREAK SHARP EDGES .005/.015

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL:
     1. VOLTAGE RATING; 750 VOLTS (RMS) AT SEA LEVEL
     2. CURRENT RATING; 5.5 AMPS
     3. TEMPERATURE RANGE; -65°C TO 200°C
   - B. MECHANICAL:
     Ⓑ 1. PULL TEST; (TERMINAL INSTALLED IN PLATE)
       - a. TERMINAL TO TEFLON : 10 LBS MIN
       - b. TEFLON TO PLATE : 10 LBS MIN PER APPLICATION DATA CHART.



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	11/8/62
CHECKED		
DRAWN	D.M.WHITE	9-28-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W A Gopher 8 Nov 1962

TERMINAL, INSULATED
SPECIFICATION CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

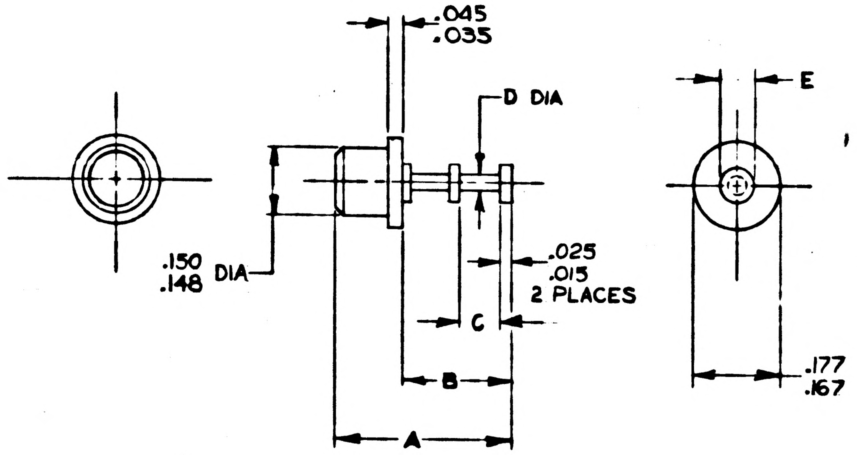
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000100
SHEET 1 OF 1

1000100

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SEALECTRO PART NO.	PART NO.	A ±.005	B ±.005	C ±.005	D DIA ±.005	E ±.005
ST-SM-25 TUR	1000100-1	.334	.154	.046	.046	.093
ST-SM-25 TUR-C2	1000100-2	.254	.154	.046	.046	.093
ST-SM-1 TUR	1000100-3	.350	.210	.100	.040	.080

REVISIONS TDRR 00086				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: BRASS, ROD, ASTM B 16-52, TEMPER HALF-HARD
   ALT: QQ-B-626, COM 22, FORM ROD, TEMPER HALF-HARD
3. SILVER PLATE .0003 TO .0005 THK PER-QQ-S 365, TYPE I
4. BREAK SHARP EDGES .005/.015
5. INSIDE CORNERS .010 R MAX.
6. IDENTIFY USING DRAWING NO., REVISION LETTER, APPLICABLE DASH NO, & MANUFACTURERS SYMBOL PER MIL-STD-130.
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3

ORIGINAL SOURCE OF SUPPLY:
SEALECTRO CORPORATION
139 HOYT STREET
MAMARONECK, NEW YORK

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL 1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	D.M.WHITE	9-28-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W A Cooper 9 Nov 1962

TERMINAL, INSULATED
SPECIFICATION CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

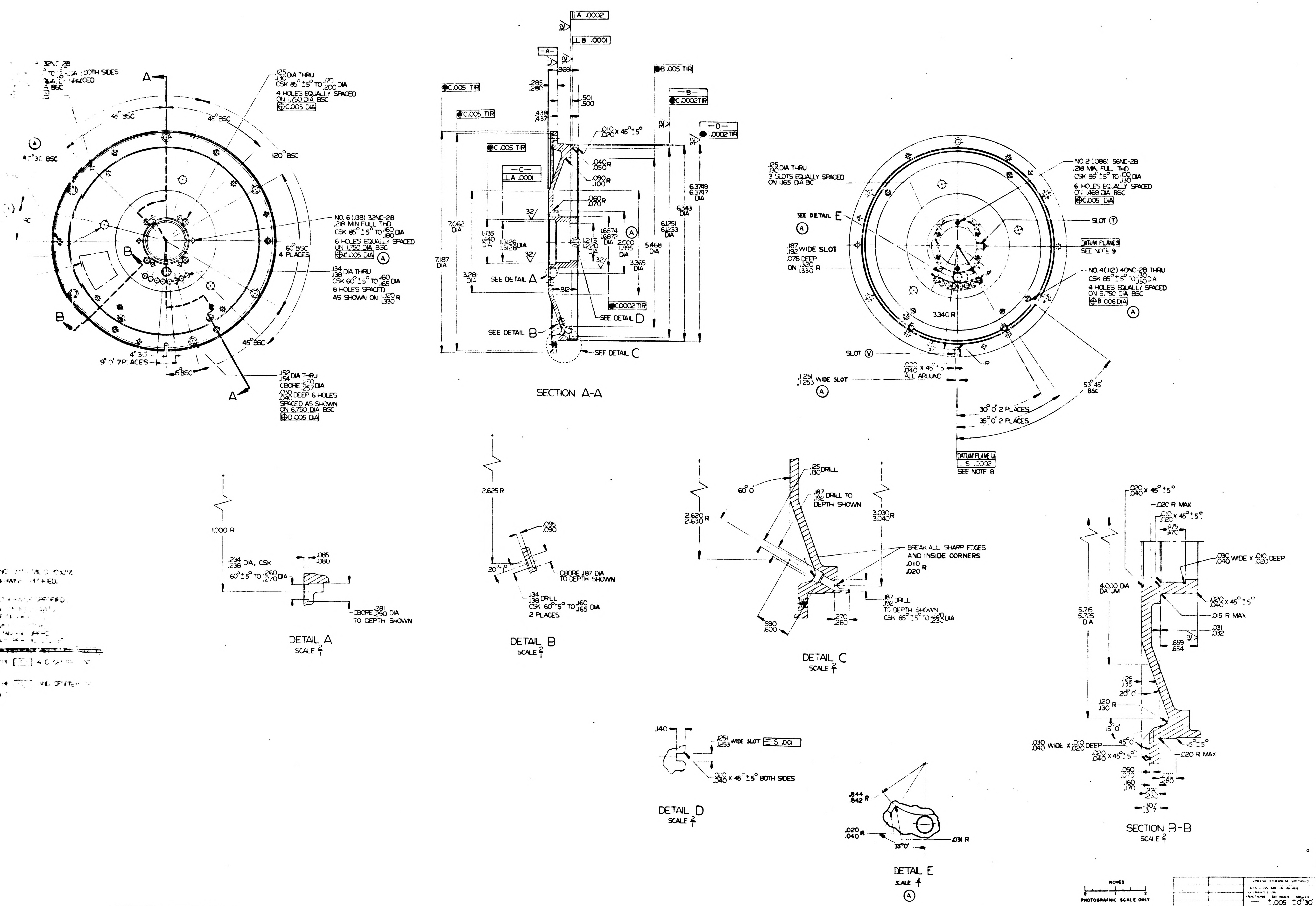
NASA DRAWING NO.
1000100

SHEET 1 OF 1

1000100

REVISIONS TDRR 00026

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00045	10-8-62	



SECTION A-A
DETAIL A
SCALE 2/1
DETAIL B
SCALE 2/1
DETAIL C
SCALE 4/1
DETAIL D
SCALE 2/1
DETAIL E
SCALE 4/1
SECTION B-B
SCALE 2/1
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
SEE DETAIL D
SEE DETAIL E
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010/.020 R
DATUM PLANES SEE NOTE 9
DATUM PLANE U SEE NOTE 8
SLOT T
SLOT V
NO. 6 (.138) 32NC-2B .218 MIN FULL THD CSK 85° ±5° TO .160/.180 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC
NO. 2 (.086) 56NC-2B .218 MIN FULL THD CSK 85° ±5° TO .100/.150 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
NO. 4 (.112) 40NC-2B THRU CSK 85° ±5° TO .220/.250 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
.125/.130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.152/.154 DIA THRU CBORE .220/.257 DIA .030/.040 DEEP 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
.134/.138 DIA THRU CSK 60° ±5° TO .160/.165 DIA 8 HOLES SPACED AS SHOWN ON 1.320/1.330 R
.182/.192 WIDE SLOT .078 DEEP ON 1.320/1.330 R
1.251/1.253 WIDE SLOT
30° 0' 2 PLACES
35° 0' 2 PLACES
53° 45' BSC
PHOTOGRAPHIC SCALE ONLY
INCHES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING

MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-2153

1000006 DL1000001
APPLICATION

M.I.T. INSTRUMENTATION LAB
A. J. Bergan
E. Mills
W. J. Pline 9-18-62
W. Kupp 9/13/62

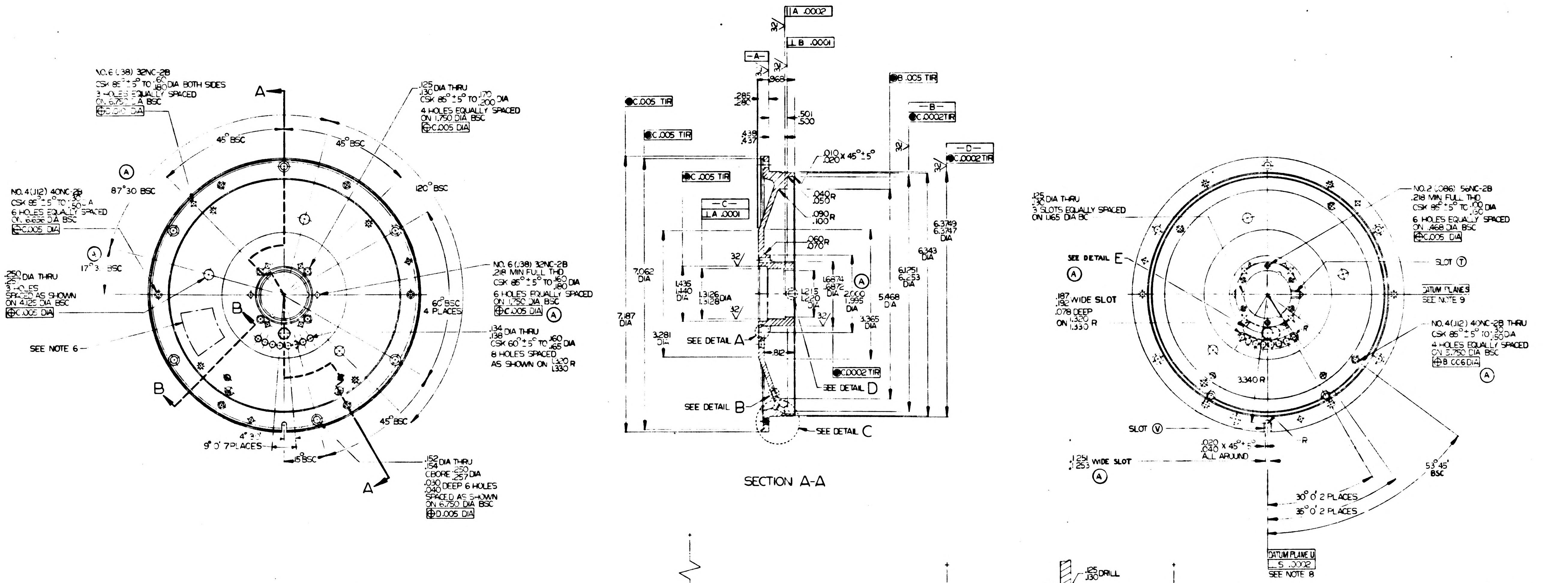
HOUSING, BEARING
1 SPEED, OUTER AXIS

SCALE 1—1
UNIT WT —
CODE IDENT —

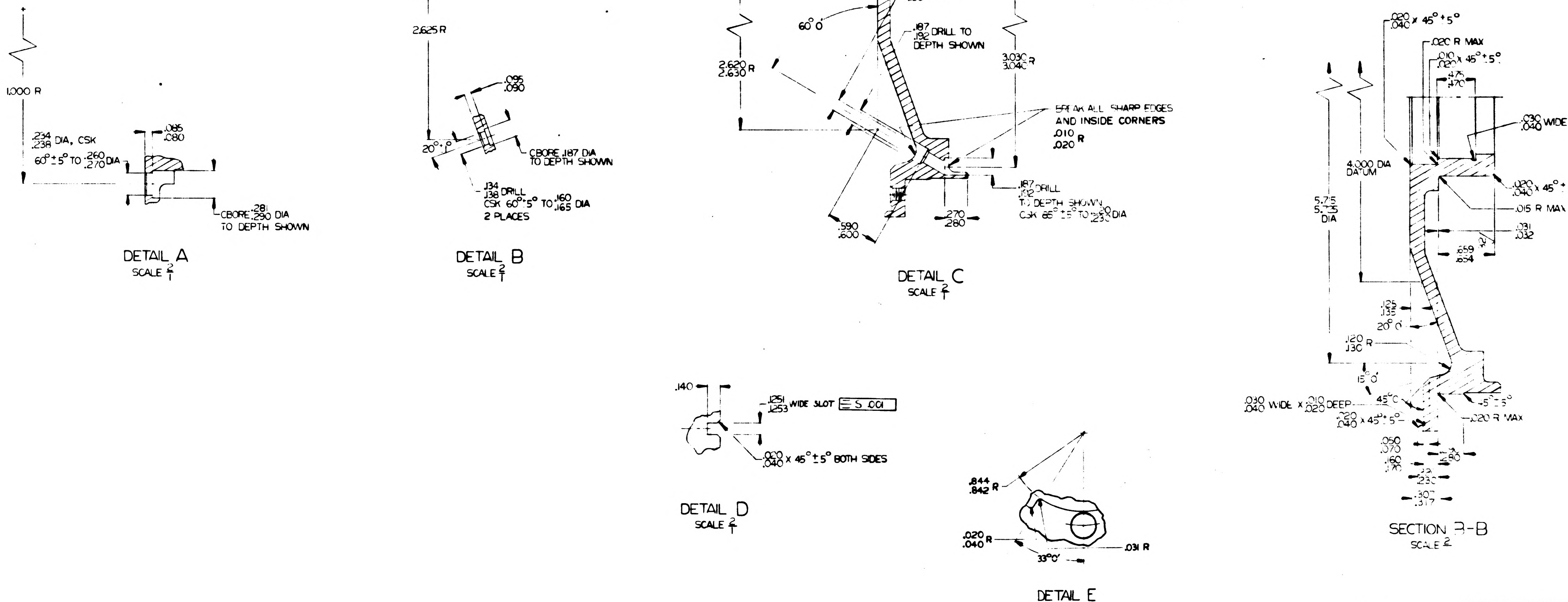
M.I.T. INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NASA DRAWING NO. 1000101
SHEET 1

1000101 REV A SHEET 1

2/41



NO.6 (.138) 32NC-2B CSK 85° ±5° TO .160/.180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED ON 6.750 A BSC
.125/.130 DIA THRU CSK 85° ±5° TO .170/.200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
45° BSC
87°30 BSC
120° BSC
NO.4 (.112) 40NC-2B CSK 85° ±5° TO .130/.150 A 6 HOLES EQUALLY SPACED ON 6.656 DIA BSC ⊕C.005 DIA
17°3' BSC
.250/.252 DIA THRU 3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕C.005 DIA
SEE NOTE 6
NO.6 (.138) 32NC-2B .218 MIN FULL THD CSK 85° ±5° TO .160/.180 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
60° BSC 4 PLACES
.134/.136 DIA THRU CSK 60° ±5° TO .160/.165 DIA 6 HOLES SPACED AS SHOWN ON 1.320/1.330 R
45° BSC
4°3' 9°0' 7 PLACES
15° BSC
.152/.154 DIA THRU CBORE .250/.257 DIA .030/.040 DEEP 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕D.005 DIA
A
B
SECTION A-A
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
SEE DETAIL D
7.062 DIA
7.187 DIA
6.3749/6.3747 DIA
6.343 DIA
6.1251/6.1253 DIA
5.468 DIA
3.365 DIA
2.000/1.995 DIA
1.6874/1.6872 DIA
1.215/1.220
1.3126/1.3128 DIA
1.435/1.440 DIA
3.281/.31
.812
.285/.280
.439/.437
.501/.500
.268
.010/.020 x 45° ±5°
.040/.050 R
.090/.100 R
.060/.070 R
∥A .0002
⊥B .0001
⊥A .0001
●C.005 TIR
●B.005 TIR
●C.0002 TIR
-A-
-B-
-C-
-D-
.125/.130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
SEE DETAIL E
.187/.192 WIDE SLOT .078 DEEP ON 1.320/1.330 R
NO.2 (.086) 56NC-2B .218 MIN FULL THD CSK 85° ±5° TO .100/.130 DIA 6 HOLES EQUALLY SPACED ON .468 DIA BSC ⊕C.005 DIA
SLOT Ⓣ
DATUM PLANE S SEE NOTE 9
NO.4 (.112) 40NC-2B THRU CSK 85° ±5° TO .130/.150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC ⊕B.006 DIA
3.340 R
SLOT Ⓥ
.020/.040 x 45° ±5° ALL AROUND
.1251/.1253 WIDE SLOT
53°45' BSC
30°0' 2 PLACES
35°0' 2 PLACES
DATUM PLANE U
⊥S .0002
SEE NOTE 8



1.000 R
.234/.238 DIA, CSK 60° ±5° TO .260/.270 DIA
.085/.080
CBORE .281/.290 DIA TO DEPTH SHOWN
DETAIL A
SCALE 4
2.625 R
.095/.090
20°
CBORE .187 DIA TO DEPTH SHOWN
.134/.138 DRILL CSK 60° ±5° TO .160/.165 DIA 2 PLACES
DETAIL B
SCALE 4
2.620/2.630 R
60°
.125/.130 DRILL
.187/.192 DRILL TO DEPTH SHOWN
3.030/3.040 R
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010/.020 R
.187/.192 DRILL TO DEPTH SHOWN CSK 85° ±5° TO .220/.230 DIA
.590/.600
.270/.280
DETAIL C
SCALE 4
.140
.1251/.1253 WIDE SLOT ⊏S .001
.020/.040 x 45° ±5° BOTH SIDES
DETAIL D
SCALE 4
.844/.842 R
.020/.040 R
33°0'
.031 R
DETAIL E
SCALE 4
.020/.040 x 45° +5°
.020 R MAX
.010/.020 x 45° ±5°
.475/.470
.030/.040 WIDE x .010/.020 DEEP
4.000 DIA DATUM
5.75/5.25 DIA
.020/.040 x 45° +5°
.015 R MAX
.031/.032
.659/.654
.125/.135
20°0'
.120/.130 R
15°0'
.030/.040 WIDE x .010/.020 DEEP
45°0'
.020/.040 x 45° +5°
45° ±5°
.020 R MAX
.060/.070
.160/.170
.230
.307/.317
.280
SECTION B-B
SCALE 2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ± °.

Ⓐ 6. IDENTIFY USING DRAWING NO., REVISION LETTER, ~~APPLICABLE DASH NO.~~, AND THE MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.

Ⓐ ~~7. LINE THRU CENTER OF BORE -C- ESTABLISHES~~

Ⓐ 8. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓥ ESTABLISHES DATUM PLANE U

Ⓐ 9. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓣ ESTABLISHES DATUM PLANE S.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

000006	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-2 53

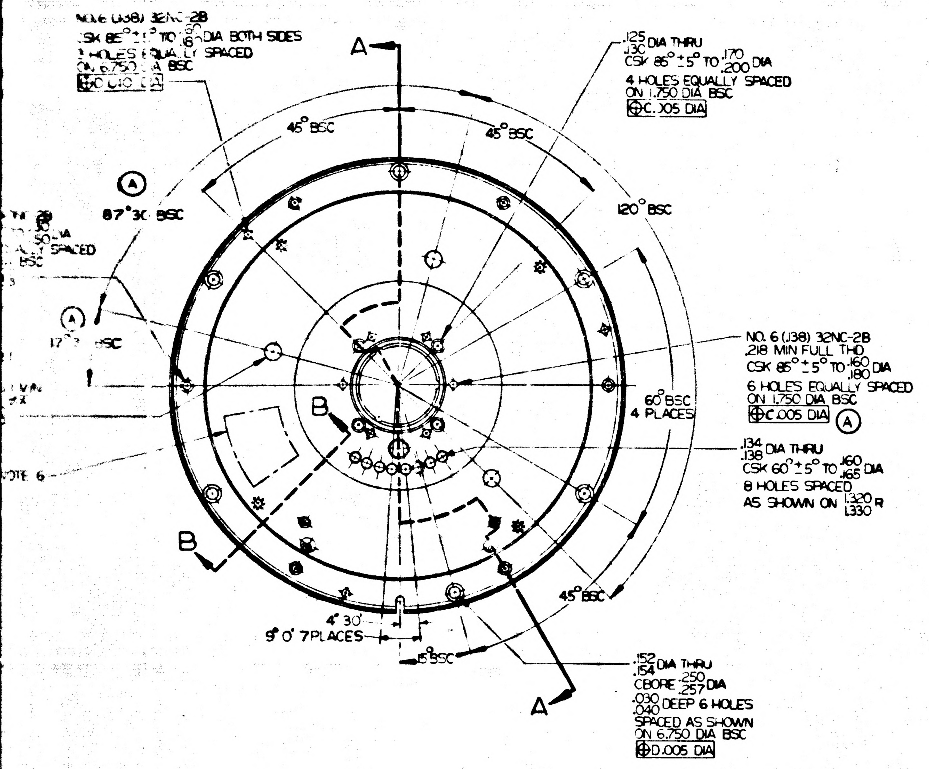
QTY REQD | NOMENCLATURE OR DESCRIPTION
LIST

INSTRUMENTATION LAB
M.I.T.
HOU
SCALE 1—1

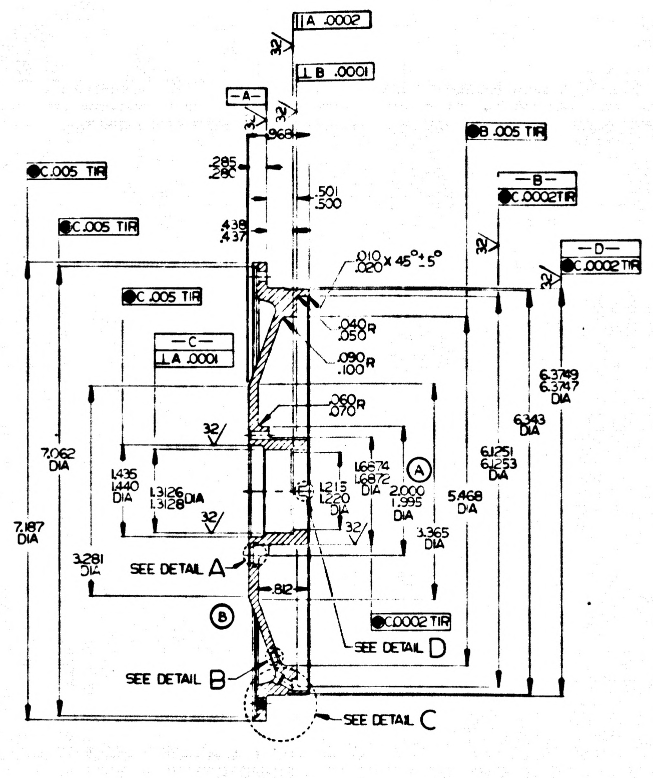
1000101 | REV A | SHEET 1

17/41

ITEM	DESCRIPTION	DATE	APPROVAL
	REVISIONS TDRR 00026		
A	TDRR 00045	10-8-62	
B	TDRR 00149	12-12-62	

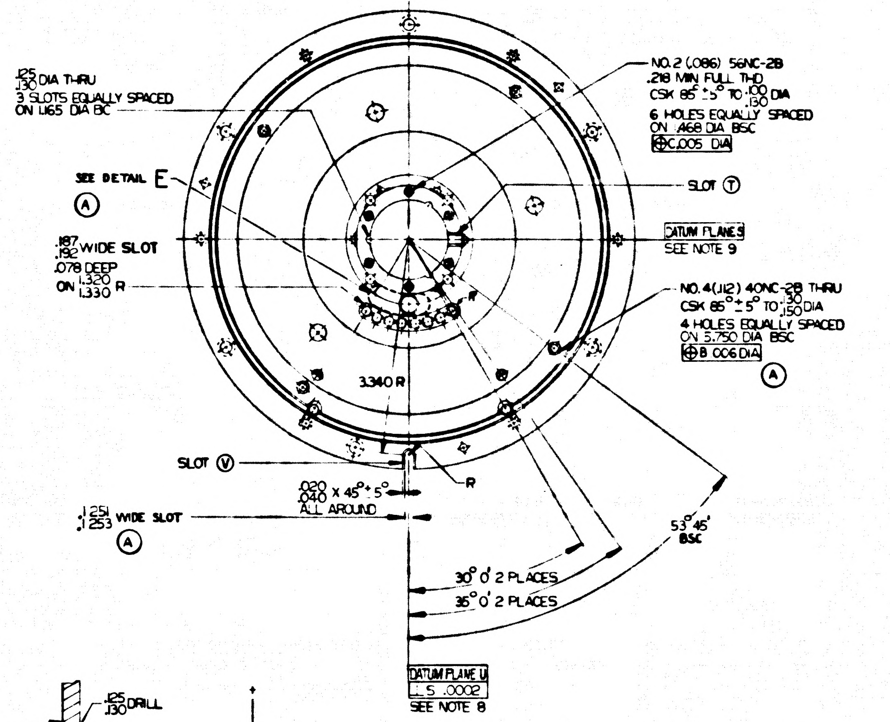


NO.6 (.138) 32NC-2B CSK 85°±5° TO .160/.165 DIA BOTH SIDES 3 HOLES EQUALLY SPACED ON 6.750 DIA BSC
A
45° BSC
45° BSC
87°30' BSC
120° BSC
.125/.130 DIA THRU CSK 85°±5° TO .170/.200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
NO.6 (.138) 32NC-2B .218 MIN FULL THD CSK 85°±5° TO .160/.180 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA Ⓐ
60° BSC 4 PLACES
.134/.138 DIA THRU CSK 60°±5° TO .160/.165 DIA 8 HOLES SPACED AS SHOWN ON 1.320/1.330 R
B
B
45° BSC
4°30'
9°0' 7 PLACES
.152/.154 DIA THRU CBORE .250/.257 DIA .030/.040 DEEP 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕D.005 DIA
A

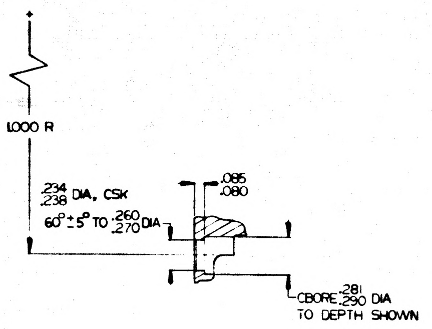


∥A .0002
⊥B .0001
-A-
.968
.285/.280
.501/.500
.438/.437
●C.005 TIR
●C.005 TIR
●C.005 TIR
●B.005 TIR
-B-
●C.0002 TIR
-D-
●C.0002 TIR
.010/.020 x 45°±5°
.040/.050 R
.090/.100 R
-C-
⊥A .0001
.260/.270 R
7.062 DIA
7.187 DIA
1.435/1.440 DIA
1.3126/1.3128 DIA
1.6874/1.6872 DIA
1.215/1.220 DIA
2.000/1.995 DIA
3.365 DIA
5.468 DIA
6.1251/6.1253 DIA
6.343 DIA
6.3749/6.3747 DIA
3.281 DIA
SEE DETAIL A
.812
●C.0002 TIR
SEE DETAIL D
SEE DETAIL B
SEE DETAIL C

SECTION A-A

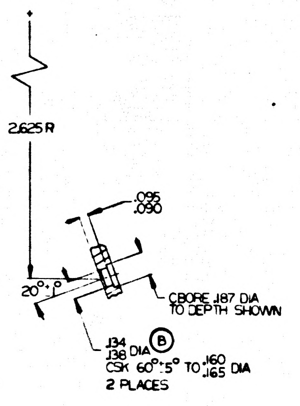


.125/.130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
SEE DETAIL E Ⓐ
.187/.192 WIDE SLOT .078 DEEP ON 1.320/1.330 R
NO.2 (.086) 56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100/.130 DIA 6 HOLES EQUALLY SPACED ON .468 DIA BSC ⊕C.005 DIA
SLOT Ⓣ
DATUM PLANE S SEE NOTE 9
NO.4 (.112) 40NC-2B THRU CSK 85°±5° TO .130/.150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC ⊕B.006 DIA Ⓐ
3.340 R
SLOT Ⓥ
.020/.040 x 45°±5° ALL AROUND
R
.1251/.1253 WIDE SLOT Ⓐ
53°45' BSC
30°0' 2 PLACES
35°0' 2 PLACES
DATUM PLANE U ⊥S .0002 SEE NOTE 8



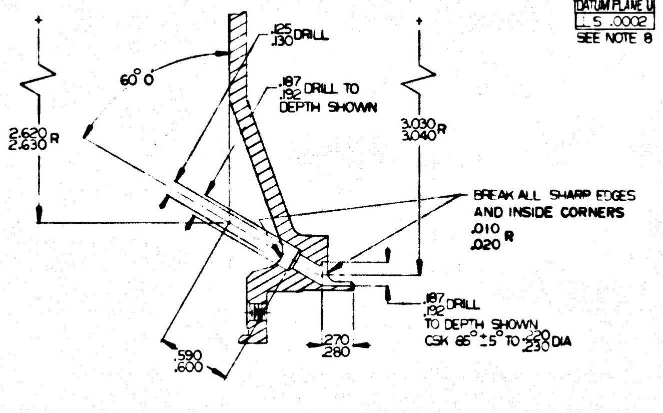
1.000 R
.234/.238 DIA, CSK 60°±5° TO .260/.270 DIA
.085/.080
CBORE .281/.290 DIA TO DEPTH SHOWN

DETAIL A
SCALE 2/1



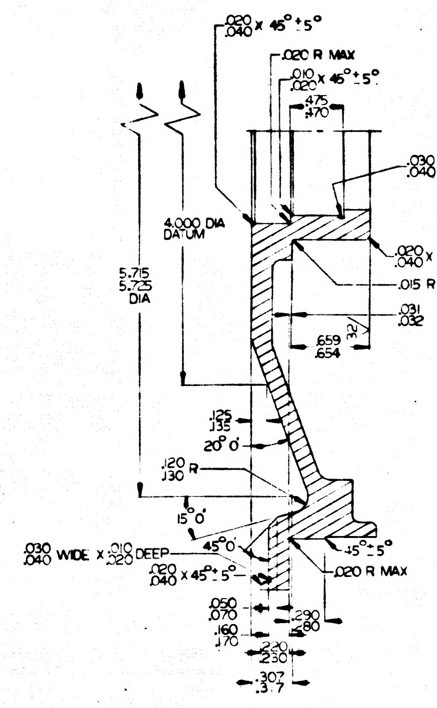
2.625 R
.095/.090
20°0'
CBORE .187 DIA TO DEPTH SHOWN
.134/.136 DIA Ⓑ CSK 60°±5° TO .160/.165 DIA 2 PLACES

DETAIL B
SCALE 2/1



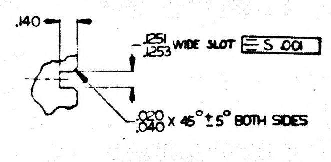
60°0'
.125/.130 DRILL
.187/.192 DRILL TO DEPTH SHOWN
2.620/2.630 R
3.030/3.040 R
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010/.020 R
.187 DRILL TO DEPTH SHOWN CSK 85°±5° TO .220/.230 DIA
.270/.280
.590/.600

DETAIL C
SCALE 2/1



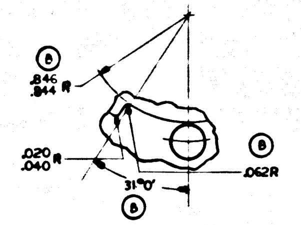
.020/.040 x 45°±5°
.020 R MAX
.010/.020 x 45°±5°
.475/.470
.030/.040 WIDE x .010/.020 DEEP
4.000 DIA DATUM
5.715/5.735 DIA
.020/.040 x 45°±5°
.015 R MAX
.031/.032
.659/.654
.125/.135
20°0'
.120/.130 R
15°0'
.030/.040 WIDE x .010/.020 DEEP
.020/.040 x 45°±5°
45°0'
45°±5°
.020 R MAX
.050/.070
.160/.170
.290/.280
.220/.230
.307/.317

SECTION B-B
SCALE 2/1



.140
.1251/.1253 WIDE SLOT ≡S .001
.020/.040 x 45°±5° BOTH SIDES

DETAIL D
SCALE 2/1



Ⓑ
.846/.844 R
.020/.040 R
31°0'
Ⓑ
Ⓑ
.062R

DETAIL E
SCALE 4/1
Ⓐ

ACCORDANCE WITH MIL-D-70327.
LESS OTHERWISE SPECIFIED.
S .005
S .015
UNLESS OTHERWISE SPECIFIED.
BE WITHIN SPECIFIED LIMITS
PERATURE OF 68°F ±1°.
G NO., REVISION LETTER,
AND THE MANUFACTURERS;
EL LOCATION PER MIL-STD-130.
~~[illegible]~~
TER OF BOLT [-C-] AND CENTER OF
[DATUM PLANE]
TER OF BUH [-C-] AND CENTER OF
[DATUM PLANE S]

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000006	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-2153

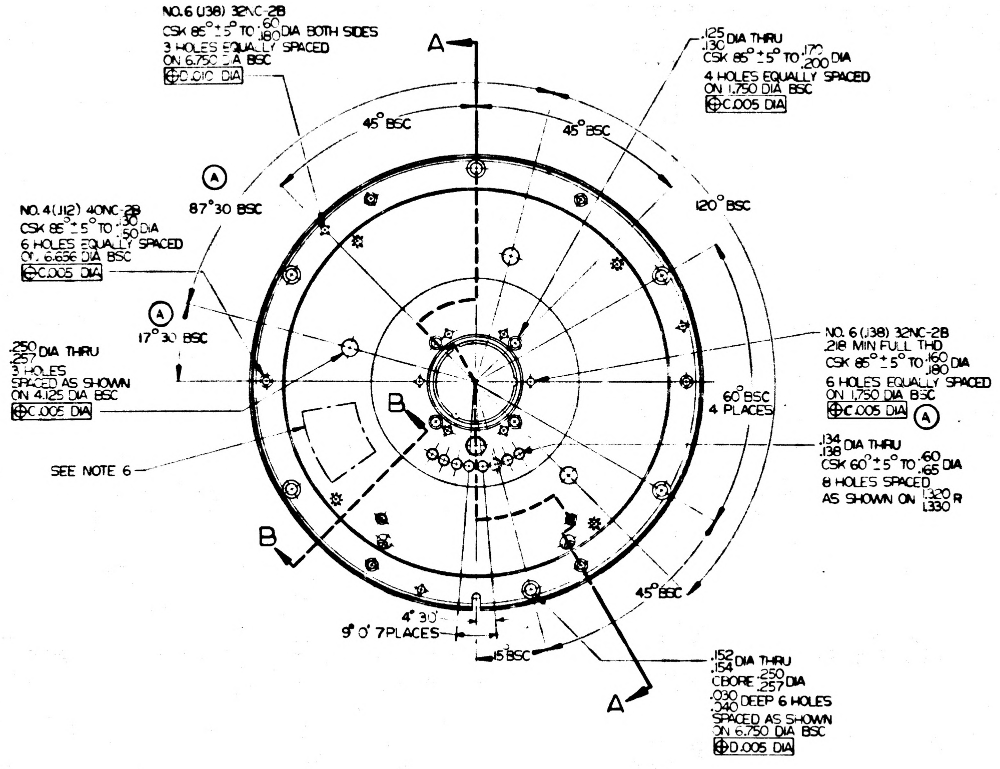
MIT INSTRUMENTATION LAB
APPROVED A J Bryan
CHECKED
DRAWN L. MILLS
APPROVED W J Rollins
MIT APPROVED

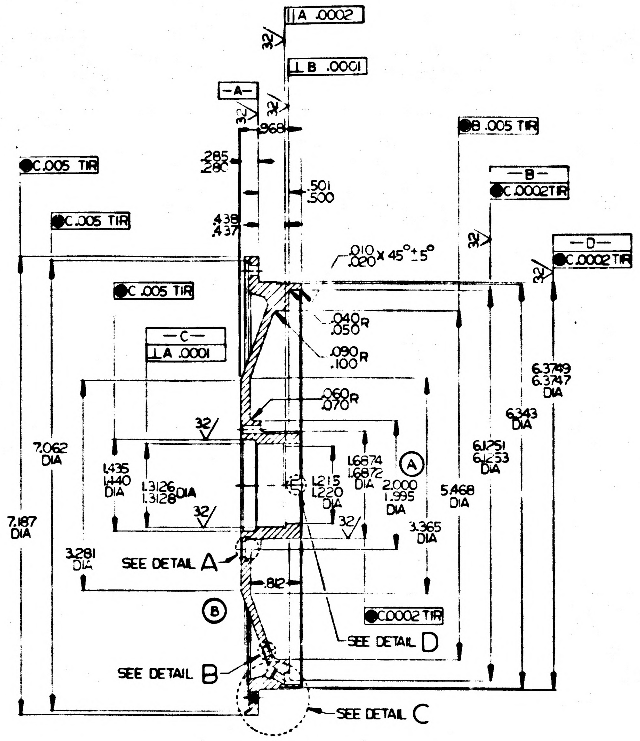
HOUSING, BEARING
1 SPEED, OUTER AXIS

SCALE 1—1
UNIT WT —
CODE IDENT —

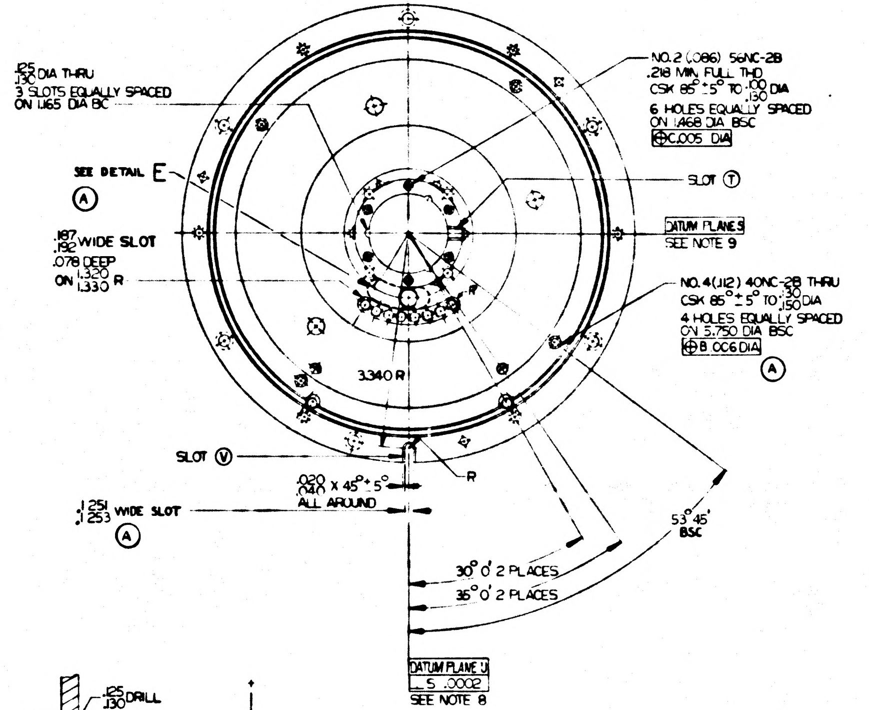
MIT INSTRUMENTATION LABORATORY CAMBRIDGE MASS.
DWG NO
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000101
SHEET 1

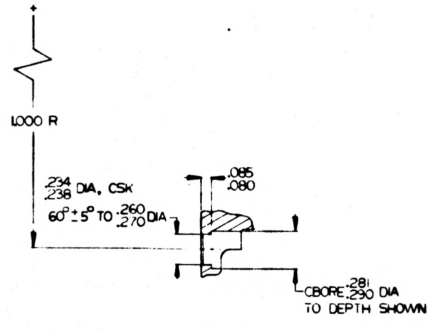
	REV	SHEET
1000101	B	1


NO.6 (.138) 32NC-2B
CSK 85°±5° TO .160/.180 DIA BOTH SIDES
3 HOLES EQUALLY SPACED
ON 6.750 DIA BSC
⊕D.010 DIA
.125/.130 DIA THRU
CSK 85°±5° TO .170/.200 DIA
4 HOLES EQUALLY SPACED
ON 1.750 DIA BSC
⊕C.005 DIA
A
45° BSC
45° BSC
Ⓐ
87°30 BSC
120° BSC
NO. 4 (.112) 40NC-2B
CSK 85°±5° TO .130/.150 DIA
6 HOLES EQUALLY SPACED
ON 6.656 DIA BSC
⊕C.005 DIA
Ⓐ
17°30 BSC
.250/.257 DIA THRU
3 HOLES
SPACED AS SHOWN
ON 4.125 DIA BSC
⊕C.005 DIA
NO. 6 (.138) 32NC-2B
.218 MIN FULL THD
CSK 85°±5° TO .160/.180 DIA
6 HOLES EQUALLY SPACED
ON 1.750 DIA BSC
⊕C.005 DIA Ⓐ
60° BSC
4 PLACES
B
SEE NOTE 6
.134/.138 DIA THRU
CSK 60°±5° TO .160/.165 DIA
8 HOLES SPACED
AS SHOWN ON 1.320/1.330 R
B
45° BSC
4°30'
9°0' 7 PLACES
15° BSC
.152/.154 DIA THRU
CBORE .250/.257 DIA
.030/.040 DEEP 6 HOLES
SPACED AS SHOWN
ON 6.750 DIA BSC
⊕D.005 DIA
A

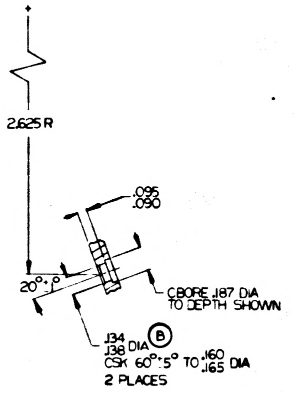

∥A .0002
32
⊥B .0001
-A-
32
32
.968
●B .005 TIR
●C.005 TIR
.285/.280
.501/.500
-B-
●C.0002TIR
●C.005 TIR
.438/.437
32
-D-
●C.0002 TIR
32
.010/.020 X 45°±5°
●C.005 TIR
.040/.050 R
-C-
⊥A .0001
.090/.100 R
6.3749/6.3747 DIA
6.343 DIA
.060/.070 R
6.1251/6.1253 DIA
7.062 DIA
32
1.435/1.440 DIA
1.3126/1.3128 DIA
1.215/1.220 DIA
1.6874/1.6872 DIA
Ⓐ
2.000/1.995 DIA
5.468 DIA
7.187 DIA
32
32
3.365 DIA
3.281 DIA
SEE DETAIL A
.812
Ⓑ
●C.0002 TIR
SEE DETAIL D
SEE DETAIL B
SEE DETAIL C

SECTION A-A

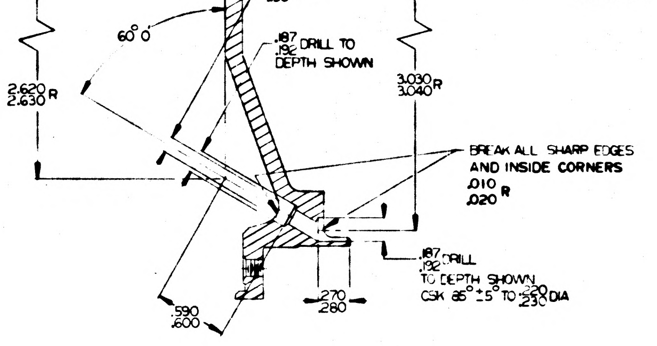

.125/.130 DIA THRU
3 SLOTS EQUALLY SPACED
ON 1.165 DIA BC
NO.2 (.086) 56NC-2B
.218 MIN FULL THD
CSK 85°±5° TO .100/.130 DIA
6 HOLES EQUALLY SPACED
ON 1.468 DIA BSC
⊕C.005 DIA
SEE DETAIL E
Ⓐ
SLOT Ⓣ
DATUM PLANE S
SEE NOTE 9
.187/.192 WIDE SLOT
.078 DEEP
ON 1.320/1.330 R
NO. 4 (.112) 40NC-2B THRU
CSK 85°±5° TO .130/.150 DIA
4 HOLES EQUALLY SPACED
ON 5.750 DIA BSC
⊕B.006 DIA
Ⓐ
3.340 R
SLOT Ⓥ
R
.020/.040 X 45°±5°
ALL AROUND
.1251/.1253 WIDE SLOT
Ⓐ
53°45' BSC
30°0' 2 PLACES
35°0' 2 PLACES
DATUM PLANE U
⊥S .0002
SEE NOTE 8


1.000 R
.234/.238 DIA, CSK
60°±5° TO .260/.270 DIA
.085/.080
CBORE .281/.290 DIA
TO DEPTH SHOWN

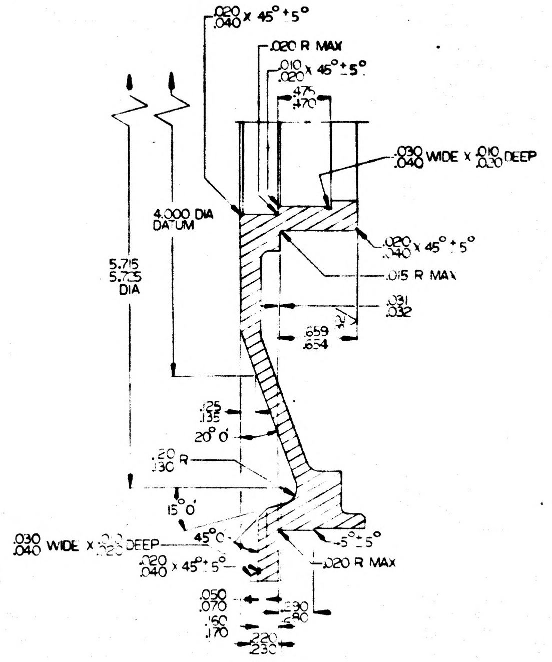
DETAIL A
SCALE 2/1


2.625 R
.095/.090
20°±1°
CBORE .187 DIA
TO DEPTH SHOWN
.134/.138 DIA Ⓑ
CSK 60°±5° TO .160/.165 DIA
2 PLACES

DETAIL B
SCALE 2/1


.125/.130 DRILL
60°0'
.187/.192 DRILL TO
DEPTH SHOWN
2.620/2.630 R
3.030/3.040 R
BREAK ALL SHARP EDGES
AND INSIDE CORNERS
.010/.020 R
.187/.192 DRILL
TO DEPTH SHOWN
CSK 85°±5° TO .220/.230 DIA
.270/.280
.590/.600

DETAIL C
SCALE 2/1


.020/.040 X 45°±5°
.020 R MAX
.010/.020 X 45°±5°
.475/.470
.030/.040 WIDE X .010/.020 DEEP
4.000 DIA
DATUM
.020/.040 X 45°±5°
5.715/5.725 DIA
.015 R MAX
.031/.032
32
.659/.654
.125/.135
20°0'
.120/.130 R
15°0'
.030/.040 WIDE X .010/.020 DEEP
45°0'
5°±5°
.020/.040 X 45°±5°
.020 R MAX
.050/.070
.290/.280
.160/.170
.220/.230
.307/.317

SECTION B-B
SCALE 2/1

NOTES:

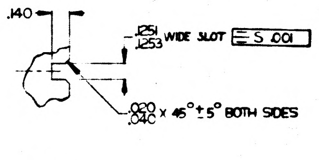
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES .005/.015.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°.

Ⓐ 6. IDENTIFY USING DRAWING NO., REVISION LETTER, ~~APPLICABLE DASH NO.~~, AND THE MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.

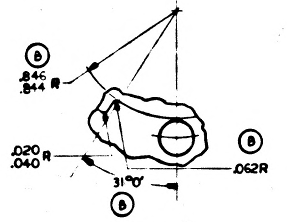
Ⓐ ~~7. LINE THRU CENTER OF BORE -C- ESTABLISHES [illegible]~~.

Ⓐ 8. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓥ ESTABLISHES DATUM PLANE U

Ⓐ 9. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓣ ESTABLISHES DATUM PLANE S.


.140
.1251/.1253 WIDE SLOT ≡S .001
.020/.040 X 45°±5° BOTH SIDES

DETAIL D
SCALE 2/1


Ⓑ
.846/.844 R
.020/.040 R
Ⓑ
.062R
31°0'
Ⓑ

DETAIL E
SCALE 2/1
Ⓐ

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD | NOMENCLATURE OR DESCRIPTION
LIST OF

1000006 NEXT ASSY
DL1000001 USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-2?53

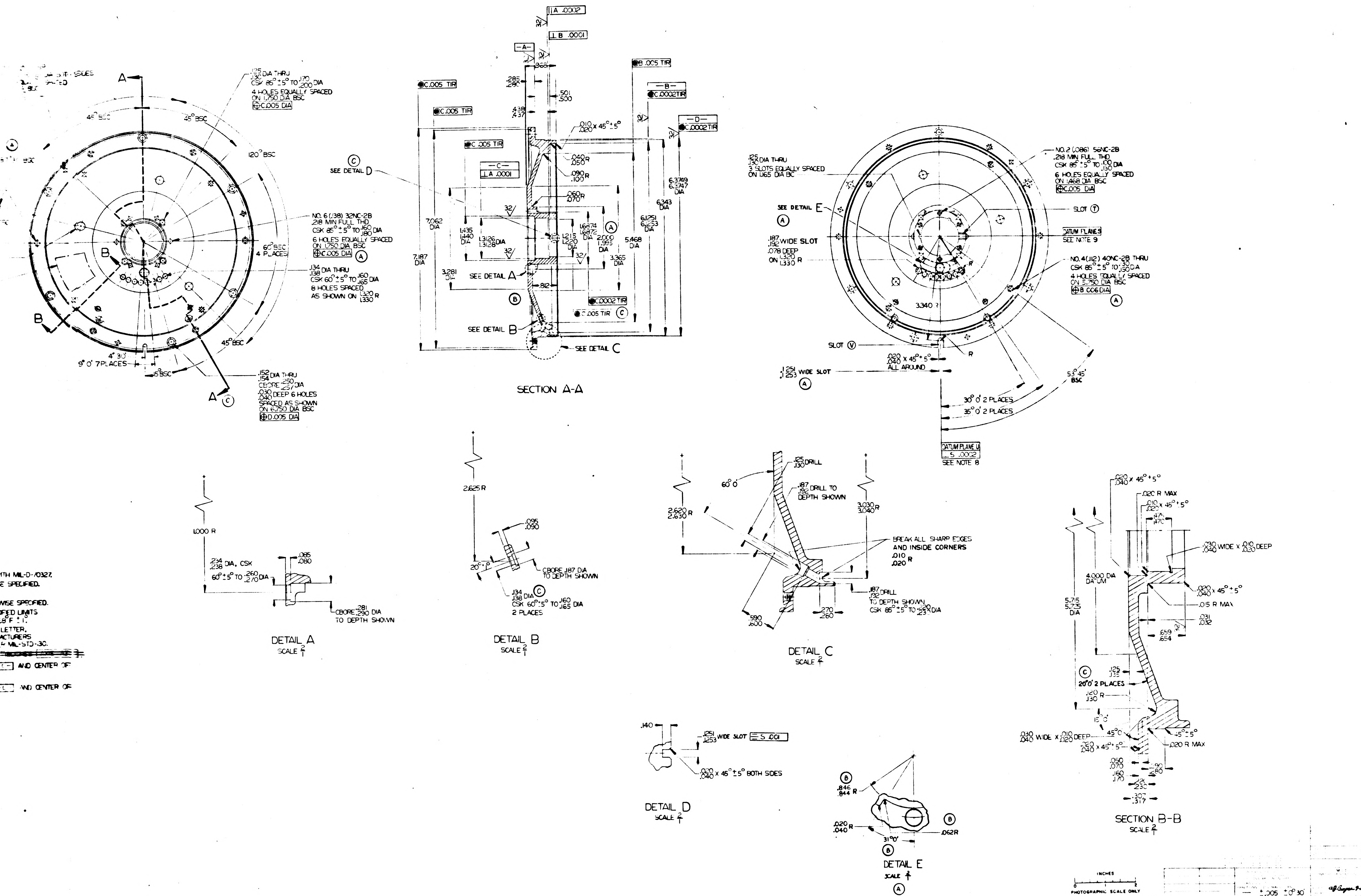
M I T
INSTRUMENTATION LAB
APPROVED
CHECKED
DRAWN K. MILLS
DATE

HOUS

SCALE

1000101 | REV B | SHEET 1

	REVISION TDRR 00026			
A	TDRR 00045	10-8-62		
B	TDRR 00149	12-12-62		
C	TDRR 00277	1-16-63		


SECTION A-A
DETAIL A
SCALE 2/1
DETAIL B
SCALE 2/1
DETAIL C
SCALE 2/1
DETAIL D
SCALE 2/1
DETAIL E
SCALE 2/1
SECTION B-B
SCALE 2/1
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
SEE DETAIL D
SEE DETAIL E
.125/.130 DIA THRU CSK 85° ±5° TO .170/.200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
NO. 6 (.138) 32NC-2B .218 MIN FULL THD CSK 85° ±5° TO .160/.180 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC
.134/.138 DIA THRU CSK 60° ±5° TO .160/.165 DIA 8 HOLES SPACED AS SHOWN ON 1.320/1.330 R
.152/.154 DIA THRU CBORE .250/.257 DIA .030/.040 DEEP 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
NO. 2 (.086) 56NC-2B .218 MIN FULL THD CSK 85° ±5° TO .100/.150 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
NO. 4 (.112) 40NC-2B THRU CSK 85° ±5° TO .130/.150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
.125/.130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.187/.192 WIDE SLOT .078 DEEP ON 1.320/1.330 R
DATUM PLANES SEE NOTE 9
DATUM PLANE U SEE NOTE 8
SLOT T
SLOT V
.1251/.1253 WIDE SLOT
.020/.040 X 45° ±5° ALL AROUND
30° 0' 2 PLACES
35° 0' 2 PLACES
53° 45' BSC
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010/.020 R
.187/.192 DRILL TO DEPTH SHOWN
.125/.130 DRILL
CBORE .187 DIA TO DEPTH SHOWN
CBORE .281/.290 DIA TO DEPTH SHOWN
.234/.238 DIA, CSK 60° ±5° TO .260/.270 DIA
.020/.040 X 45° ±5° BOTH SIDES
.030/.040 WIDE X .010/.020 DEEP
4.000 DIA DATUM
PHOTOGRAPHIC SCALE ONLY
INCHES
...TH MIL-D-7032?
...E SPECIFIED.
...WISE SPECIFIED.
...FIED LIMITS
...LETTER.
...ACTURERS
...MIL-STD-130.
AND CENTER OF

1000006 DL1000201 DL1000001

BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-2153

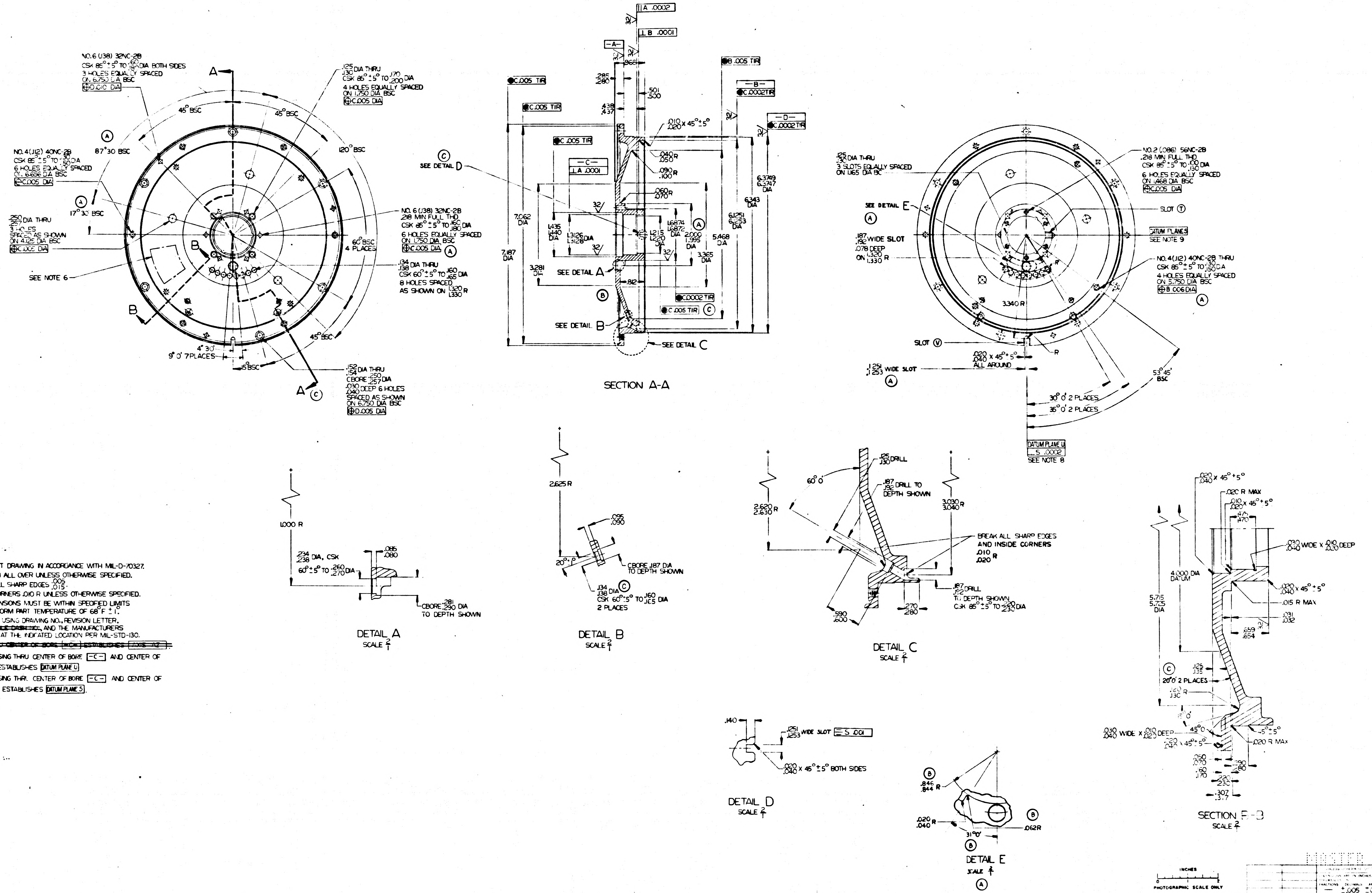
±.005 ±0° 30'

L. MILLS 7-8-62

HOUSING, BEARING
SPEED, OUTER AXIS

1000101

1000101 REV C SHEET 1


SECTION A-A
DETAIL A SCALE 2/1
DETAIL B SCALE 2/1
DETAIL C SCALE 2/1
DETAIL D SCALE 2/1
DETAIL E SCALE 2/1
SECTION B-B SCALE 2/1
SEE NOTE 6
DATUM PLANE U
DATUM PLANES SEE NOTE 9
SLOT T
SLOT V
BREAK ALL SHARP EDGES AND INSIDE CORNERS .010 .020 R

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ± 1°.

Ⓐ 6. IDENTIFY USING DRAWING NO., REVISION LETTER, ~~APPLICABLE DASH NO.~~, AND THE MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.

Ⓐ ~~7. LINE THRU CENTER OF BORE -C- ESTABLISHES AXIS AZ~~

Ⓐ 8. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓥ ESTABLISHES DATUM PLANE U

Ⓐ 9. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓣ ESTABLISHES DATUM PLANE S.

MASTER

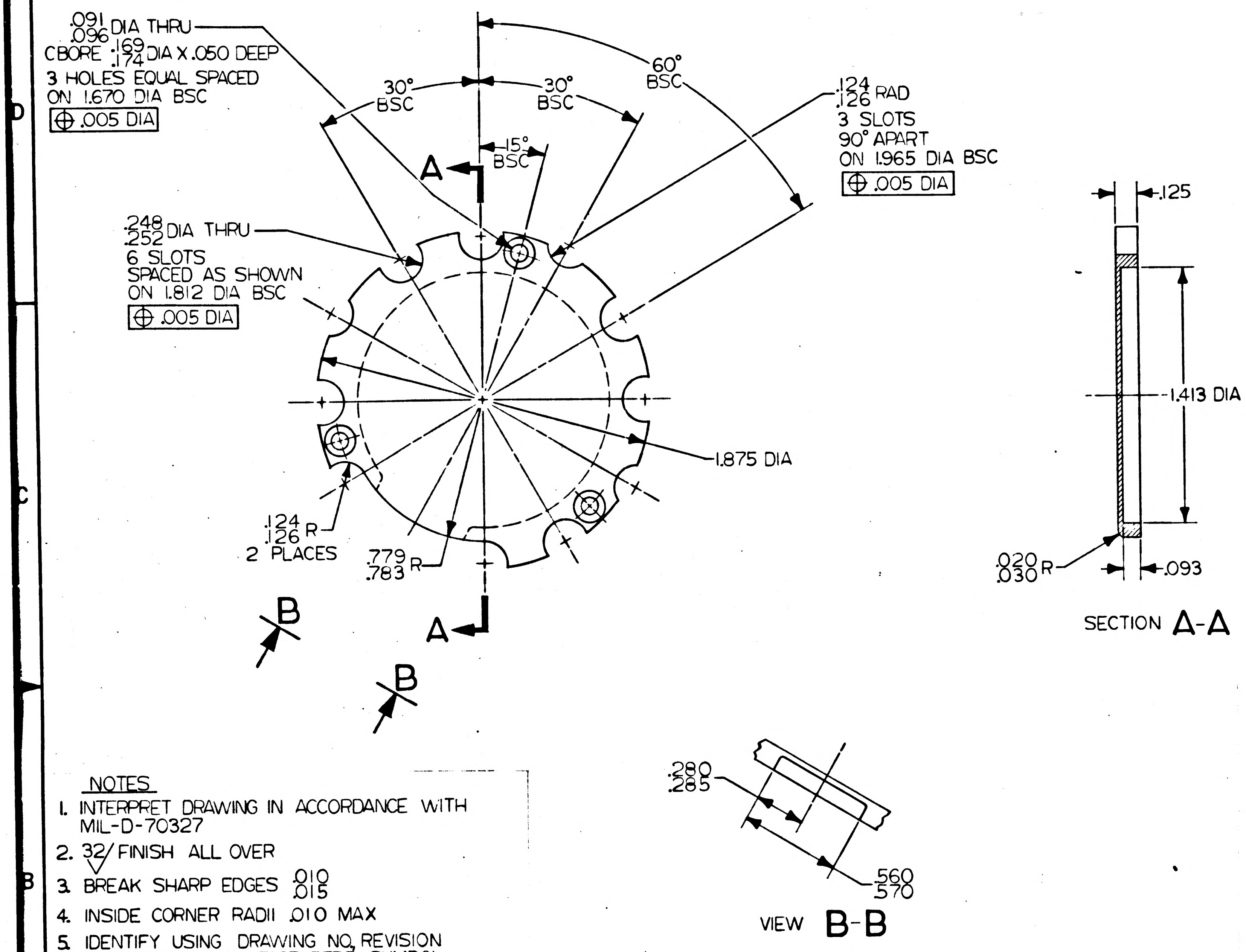
INCHES
PHOTOGRAPHIC SCALE ONLY

Ⓒ

0C0006	DL1000201 DL1000001	FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
		MATERIAL BERYLLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531

1000101 | REV C | SHEET 1

REVISIONS TDRR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS	2/6/63	



.091 .096 DIA THRU
CBORE .169 .174 DIA X .050 DEEP
3 HOLES EQUAL SPACED
ON 1.670 DIA BSC
⊕ .005 DIA
30° BSC
30° BSC
60° BSC
15° BSC
.124 .126 RAD
3 SLOTS
90° APART
ON 1.965 DIA BSC
⊕ .005 DIA
.248 .252 DIA THRU
6 SLOTS
SPACED AS SHOWN
ON 1.812 DIA BSC
⊕ .005 DIA
A
A
1.875 DIA
.124 .126 R
2 PLACES
.779 .783 R
B
B
.125
1.413 DIA
.020 .030 R
.093
SECTION A-A
.280 .285
.560 .570
VIEW B-B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 32/ FINISH ALL OVER
3. BREAK SHARP EDGES .010 .015
4. INSIDE CORNER RADII .010 MAX
5. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
6. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000134	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY 6061 TEMP T6
ALT SPEC: QQ-A-327B
TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED AJ Boyce DATE 2/6/63
CHECKED
DRAWN MORSE 11/8/63
APPROVED FOR MSC William J. Sumpf 6 3 Feb 63
MIT/IL APPROVAL W Kupfer DATE 6 Feb 63

HEATER PLATE
16 PIP MOD D

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000102
SHEET 1 OF 1 SHEET

	1000103	M

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL
A	TDR 00111	19 Nov. 62	ajb

PART NO.	DESCRIPTION	REQD.
1000059	Hemisphere Assy, Movable Outer Gimbal	1
1000066	Hemisphere Assy, Fixed Outer Gimbal	1
1000110-7	Screw, Cap, Socket Head, Hexagon	16
MS 16555-25	Dowel Pin	4
1000088-1	Pin Locating	4
1000115-2	Insert, Threaded Self Locking	8
1000115-3	Insert, Threaded Self Locking	40

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
101762
BY DIRECTION MIT Approval
10/17/62

OUTER GIMBAL HOUSING ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000103

SHEET OF

B	1000103

REVISIONS TDRR 00065				
SYM	DESCRIPTION	DATE	APPROVAL	
A	TDR 00111	19 Nov. 62	agb	
B	REPLACED WITH CHANGE BY REV C TDRR 00158	11-29-62	agb	WK

PART NO.	DESCRIPTION	REQD.
1000059	Hemisphere Assy, Movable Outer Gimbal	1
1000066	Hemisphere Assy, Fixed Outer Gimbal	1
1000110-7	Screw, Cap, Socket Head, Hexagon	16
MS 16555-25	Dowel Pin	4
1000088-1	Pin Locating	4
1000115-2	Insert, Threaded Self Locking	8
1000115-3	Insert, Threaded Self Locking	40

REPLACED WITH CHANGE BY REV C

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000002	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10/17/62
BY DIRECTION MIT Approval
10/17/62

OUTER GIMBAL HOUSING ASSEMBLY

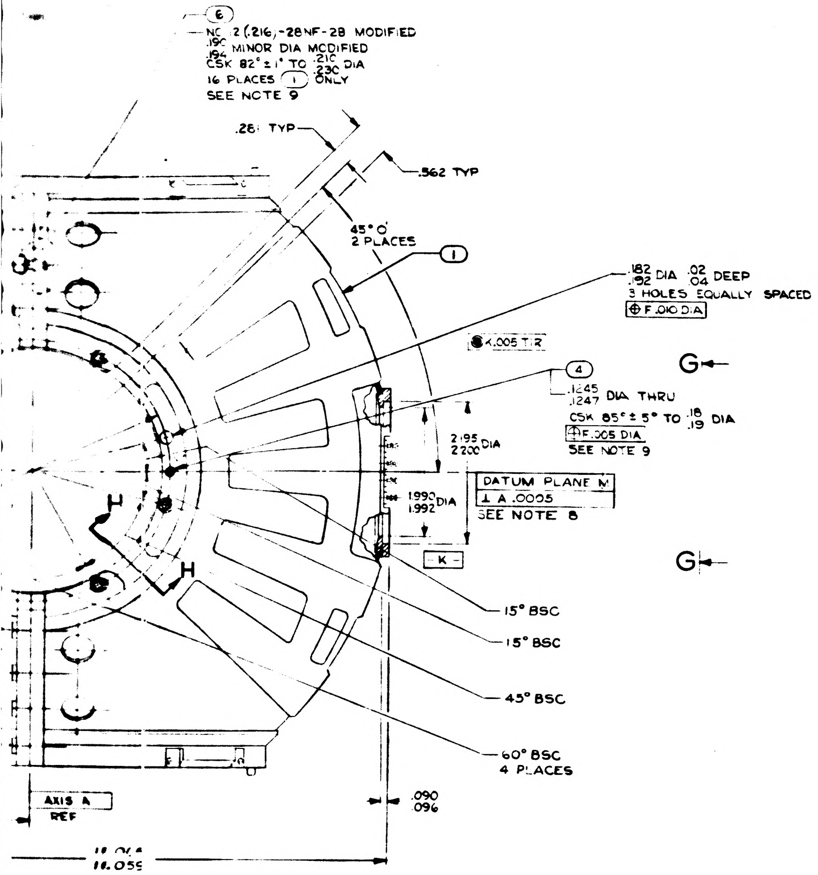
SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

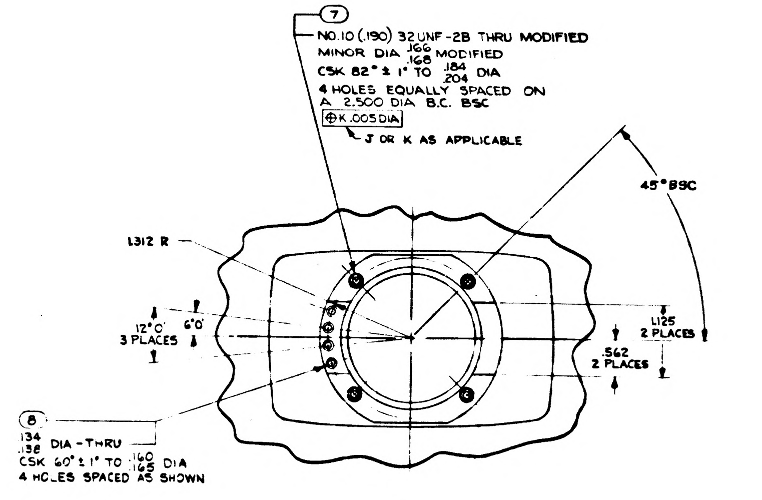
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000103
SHEET OF

SYM	DESCRIPTION	DATE	APPROVED
C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62	

SEE DETAIL J

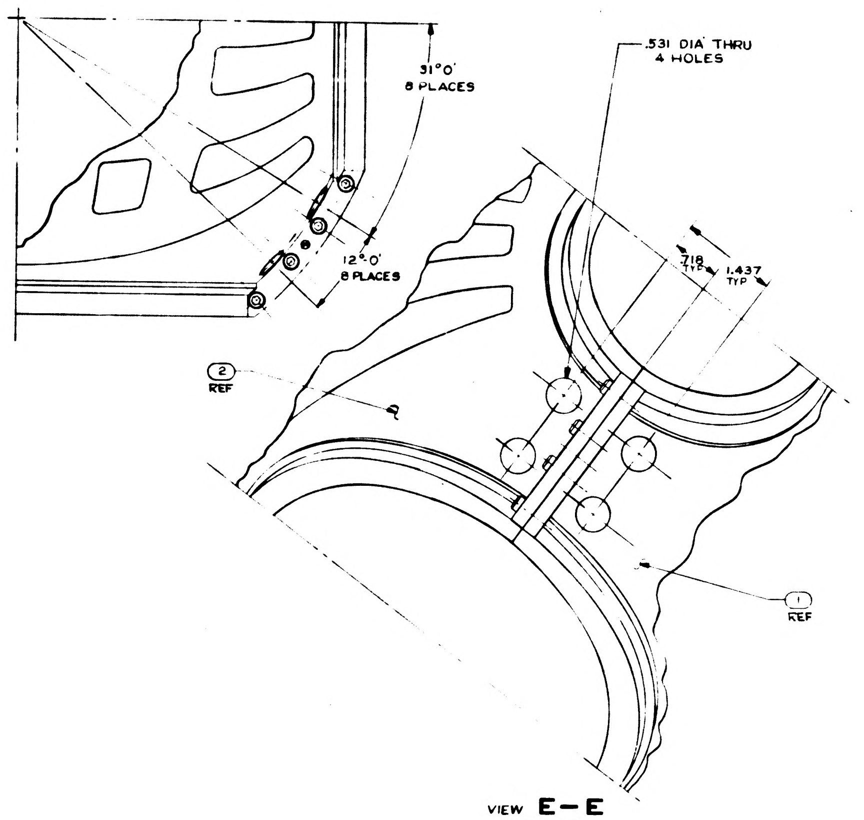


⑥
NC 12 (.216)-28NF-2B MODIFIED
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
16 PLACES ① ONLY
SEE NOTE 9
.281 TYP
.562 TYP
45°0' 2 PLACES
①
.182 .192 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ F .010 DIA
◉ K .005 TIR
④
.1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .19 DIA
⊕ F .005 DIA
SEE NOTE 9
G
G
2.195 2.200 DIA
1.990 1.992 DIA
DATUM PLANE M
⊥ A .0005
SEE NOTE 8
K
H
H
15° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
.090 .096
AXIS A REF
11.054 11.059



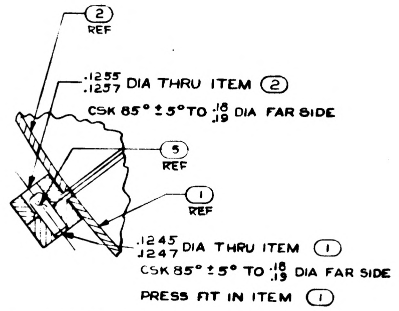
⑦
NO.10 (.190) 32UNF-2B THRU MODIFIED
MINOR DIA .166 .168 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES EQUALLY SPACED ON
A 2.500 DIA B.C. BSC
⊕ K .005 DIA
J OR K AS APPLICABLE
45° BSC
1.312 R
12°0' 3 PLACES
6°0'
1.125 2 PLACES
.562 2 PLACES
⑧
.134 .138 DIA-THRU
CSK 60° ± 1° TO .160 .165 DIA
4 HOLES SPACED AS SHOWN

VIEW **G-G**
2 PLACES



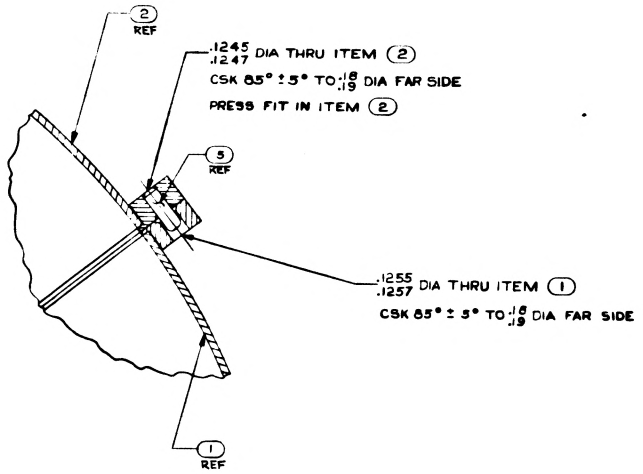
31°0' 8 PLACES
.531 DIA THRU
4 HOLES
12°-0' 8 PLACES
.718 TYP
1.437 TYP
② REF
① REF

VIEW **E—E**
4 PLACES



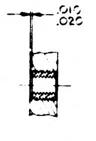
② REF
.1255 .1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
⑤ REF
① REF
.1245 .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
PRESS FIT IN ITEM ①

SECTION **B — B**
SCALE 2-1
SEE NOTE 9

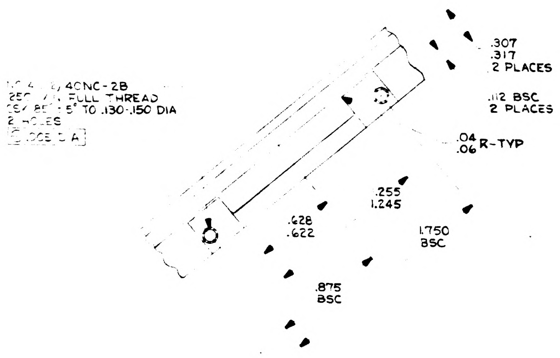


② REF
.1245 .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤ REF
.1255 .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
① REF

SECTION **C — C**
SCALE 2-1
SEE NOTE 9



DETAIL **J**
SCALE 2/1
TYPICAL INSTALLATION
OF ITEMS ⑥ & ⑦



NC 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
.005 DIA
.307 .317 2 PLACES
.112 BSC 2 PLACES
.04 .06 R-TYP
.255 1.245
.628 .622
1.750 BSC
.875 BSC

VIEW **D-D**
4 PLACES
SCALE 2/1

DISREGARD ROLLBOND PATTERN

REPLACES REV B WITH CHANGE

QTY	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
8	TERMINAL, INSULATED	[illegible]			[illegible]
8	INSERT, THREADED SELF LOCKING	[illegible] 5-2			[illegible]
40	INSERT, THREADED SELF LOCKING	[illegible] 3			[illegible]
4	PIN, STRAIGHT HEADLESS	MS16555-625			[illegible]
4	PIN, LOCATING, STRAIGHT, HEADLESS	000088-[illegible]			4
16	SCREW CAP, SOCKET HEAD, HEX	[illegible]			3
1	HEMISPHERE ASSY MOVABLE OUTER GMBL	1000059			2
1	HEMISPHERE ASSY FIXED OUTER GMBL	1000066			[illegible]

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T.
INSTRUMENTATION LAB
CONTRACT
NAS 9-[illegible]
APPROVED DATE
[illegible] 12/11/62
DRAWN RWC 10-21-62
W. J. Rhine 12-12-62
M.I.T. APPROVAL
[illegible] 12/14/62

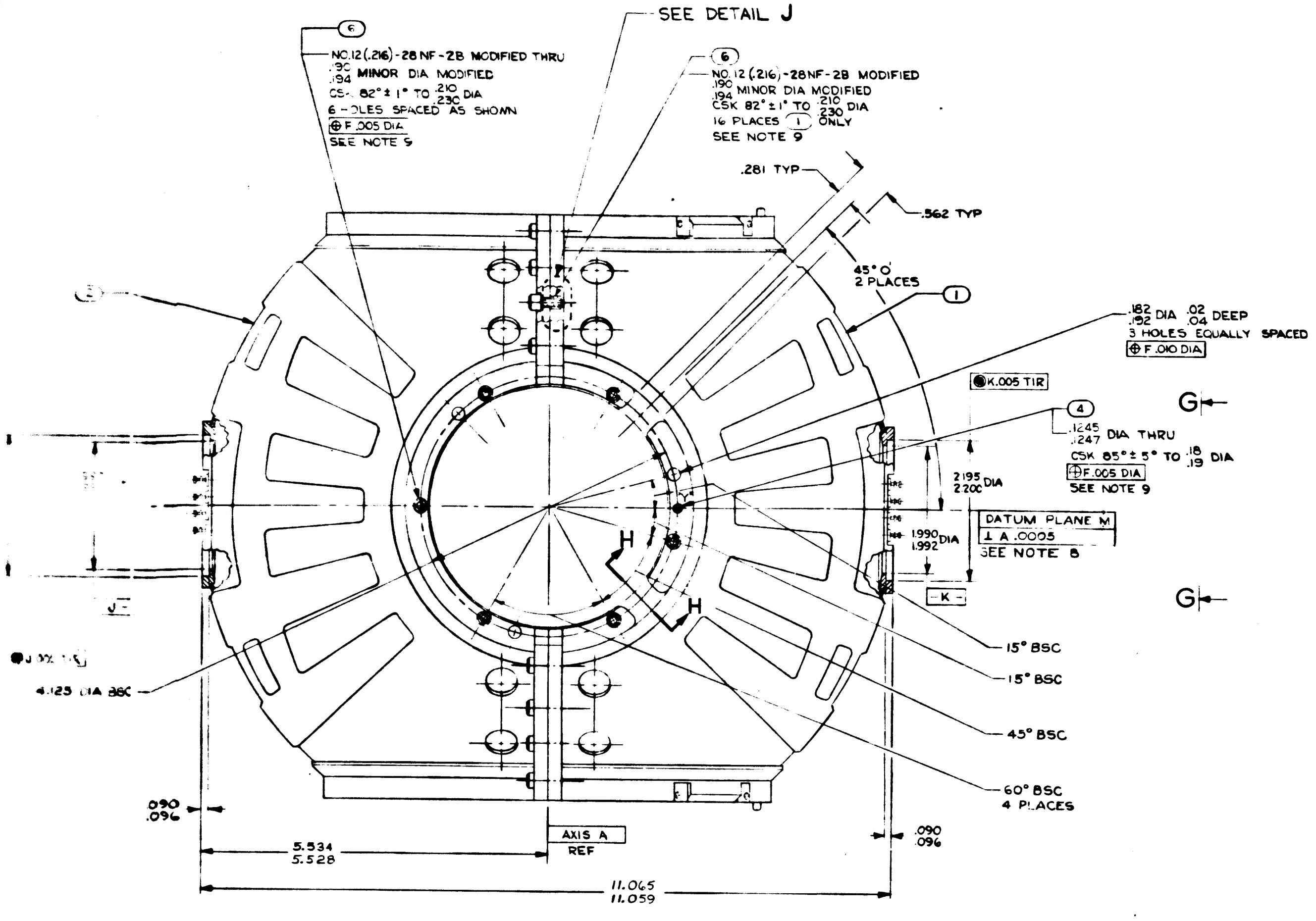
HOUSING ASSEMBLY
OUTER GIMBAL

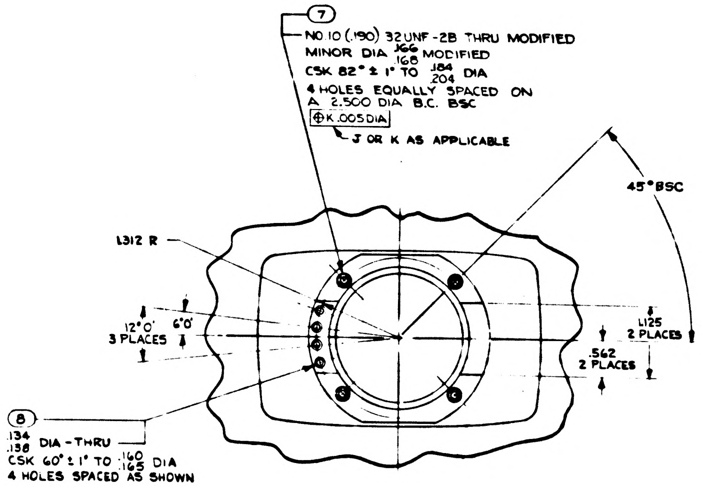
SCALE 1/1 | UNIT WT | CODE IDENT

M.I.T.
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO.
10[illegible]0103
SHEET 1 OF 1

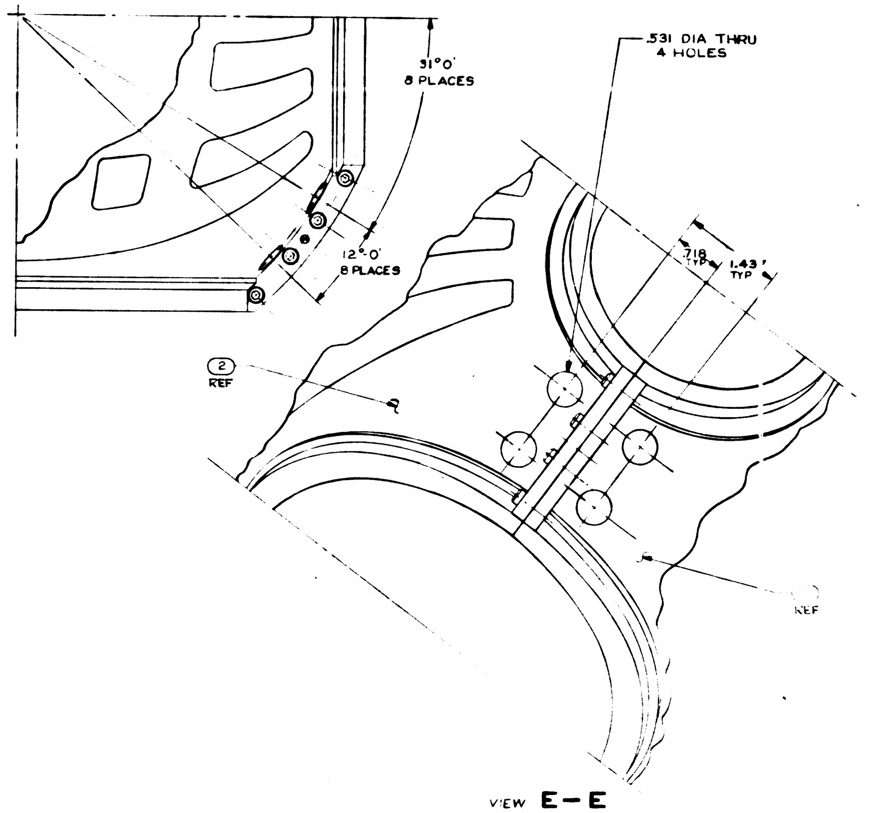
1000103 REV C SHT 1

3/85


SEE DETAIL J
⑥
NO.12(.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6-HOLES SPACED AS SHOWN
⊕ F .005 DIA
SEE NOTE 9
⑥
NO.12(.216)-28NF-2B MODIFIED
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
16 PLACES ① ONLY
SEE NOTE 9
.281 TYP
.562 TYP
45° 0' 2 PLACES
①
.182 .192 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ F .010 DIA
● K .005 TIR
④
.1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .19 DIA
⊕ F .005 DIA
SEE NOTE 9
2.195 2.200 DIA
1.990 1.992 DIA
DATUM PLANE M
⊥ A .0005
SEE NOTE 8
K
G
G
H
H
15° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
4.125 DIA BSC
.090 .096
.090 .096
5.534 5.528
AXIS A REF
11.065 11.059

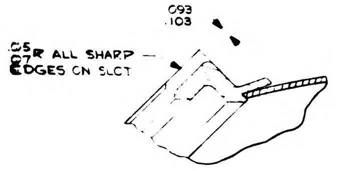

⑦
NO.10 (.190) 32UNF-2B THRU MODIFIED
MINOR DIA .166 .168 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES EQUALLY SPACED ON
A 2.500 DIA B.C. BSC
⊕ K .005 DIA
J OR K AS APPLICABLE
45° BSC
1.312 R
12° 0' 3 PLACES
6° 0'
1.125 2 PLACES
.562 2 PLACES
⑧
.134 .138 DIA - THRU
CSK 60° ± 1° TO .160 .165 DIA
4 HOLES SPACED AS SHOWN

VIEW **G-G**
2 PLACES

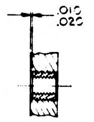

31° 0'
8 PLACES
.531 DIA THRU
4 HOLES
12° 0'
8 PLACES
.718 TYP
1.43 TYP
②
REF
REF

VIEW **E-E**
4 PLACES

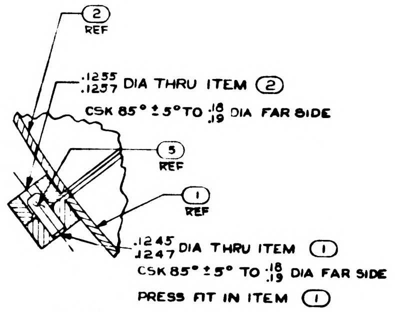
.18 .19 DIA - .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ .010 DIA


.093 .103
.05 .07 R ALL SHARP EDGES ON SECT

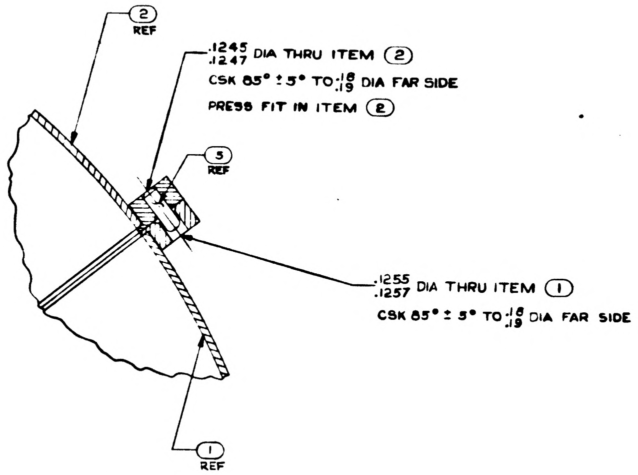
SECTION **H-H**
4 PLACES
SCALE 2/1



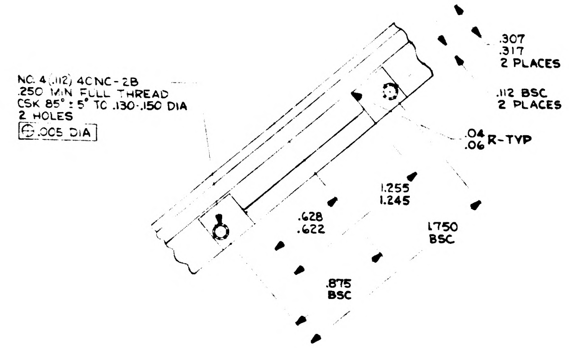
DETAIL **J**
SCALE 2/1
TYPICAL INSTALLATION
OF ITEMS ⑥ & ⑦


②
REF
.1255 .1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
⑤
REF
①
REF
.1245 .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
PRESS FIT IN ITEM ①

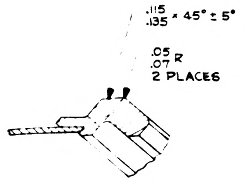
SECTION **B - B**
SCALE 2-1
SEE NOTE 9


②
REF
.1245 .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤
REF
.1255 .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .19 DIA FAR SIDE
①
REF

SECTION **C - C**
SCALE 2-1
SEE NOTE 9


NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .005 DIA
.307 .317 2 PLACES
.112 BSC 2 PLACES
.04 .06 R-TYP
1.255 1.245
.628 .622
1.750 BSC
.875 BSC

VIEW **D-D**
4 PLACES
SCALE 2/1


.115 .135 × 45° ± 5°
.05 .07 R
2 PLACES

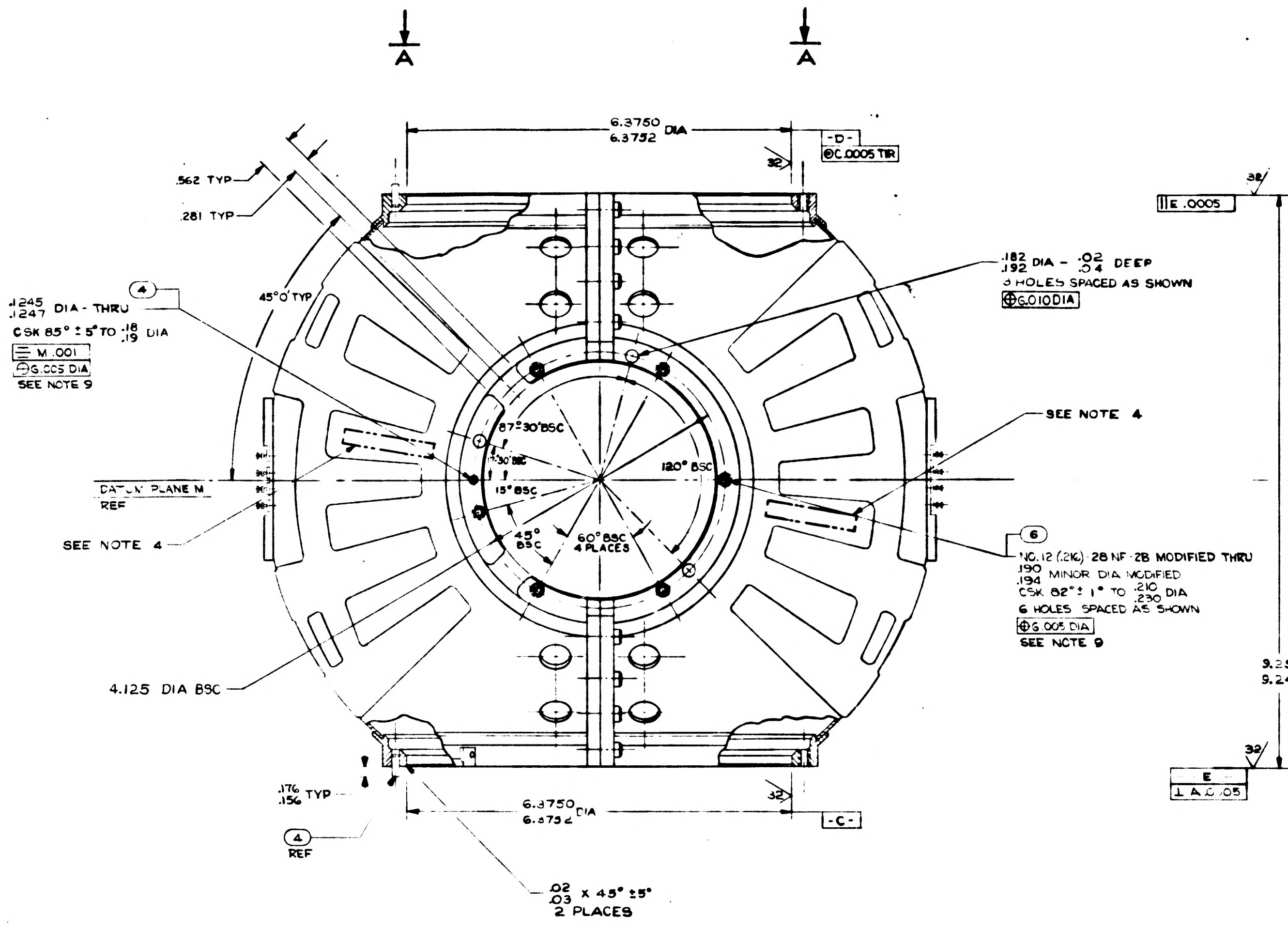
SECTION **F-F**
4 PLACES
SCALE 2/1

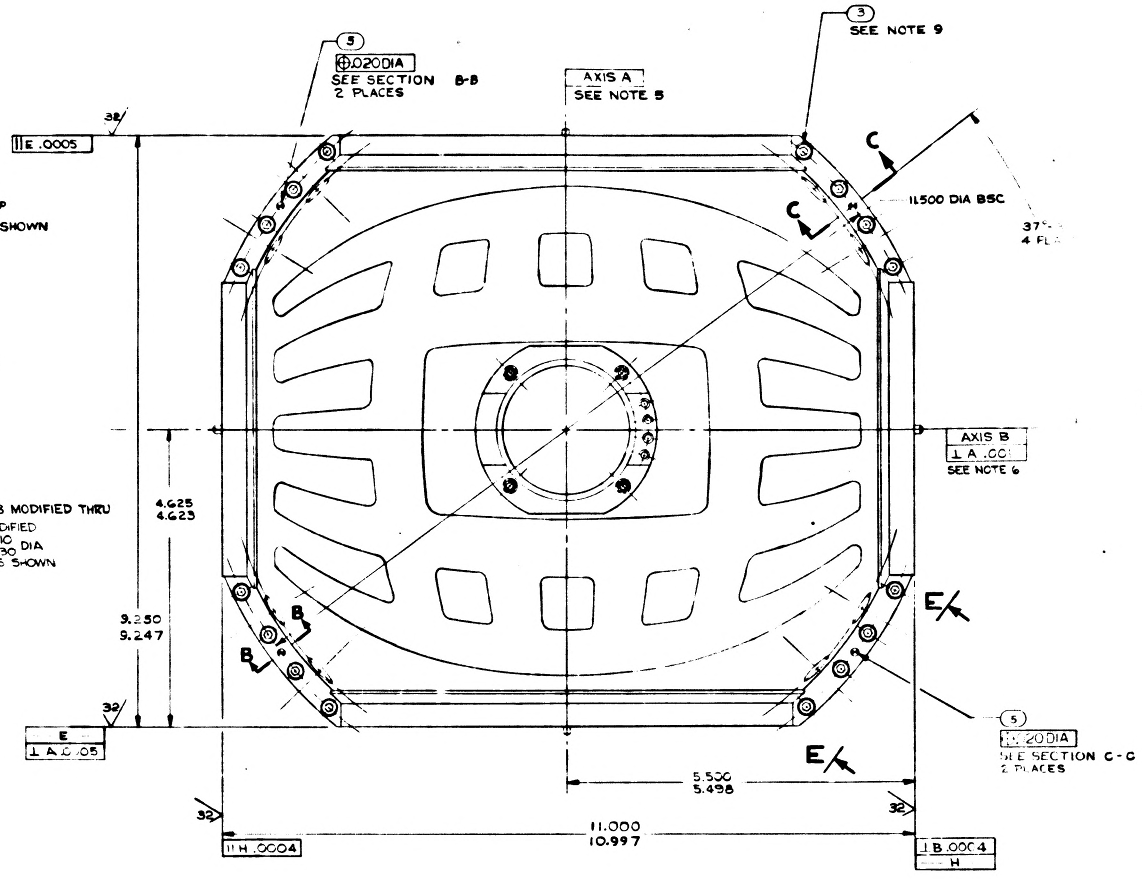
REPLACES REV B WITH CHANGE

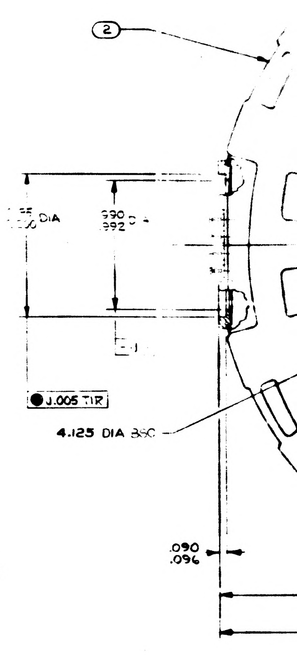
		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES
		TOLERANCES ON
		FRACTIONS DECIMALS ANGLES
		— ±.005 ±0°
000202	DL 00020	DO NOT SCALE THIS DRAWING
000002	DL 00009	
NEXT ASSY	USED ON	
APPLICATION		

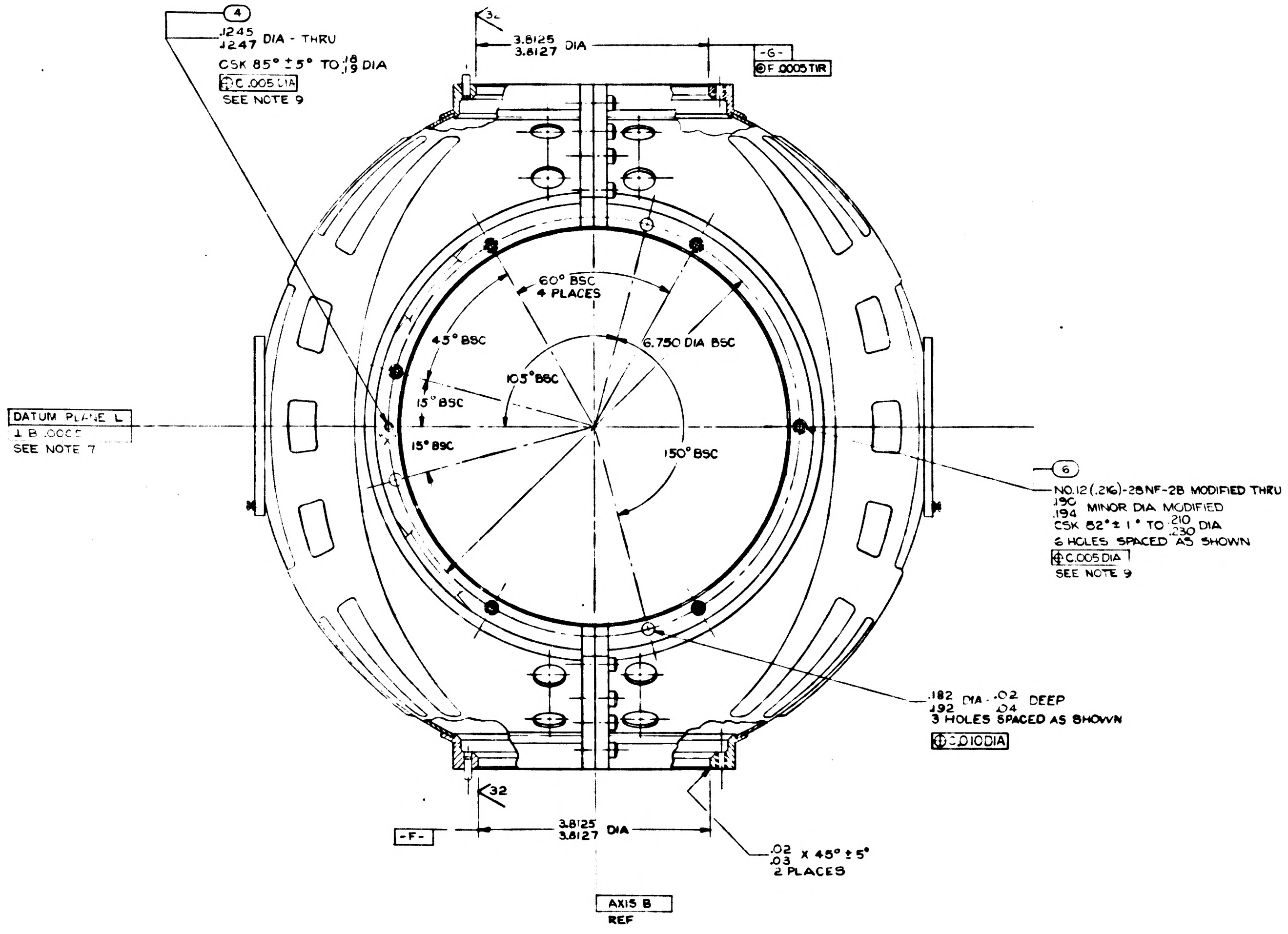
1000103	REV C	SHT 1

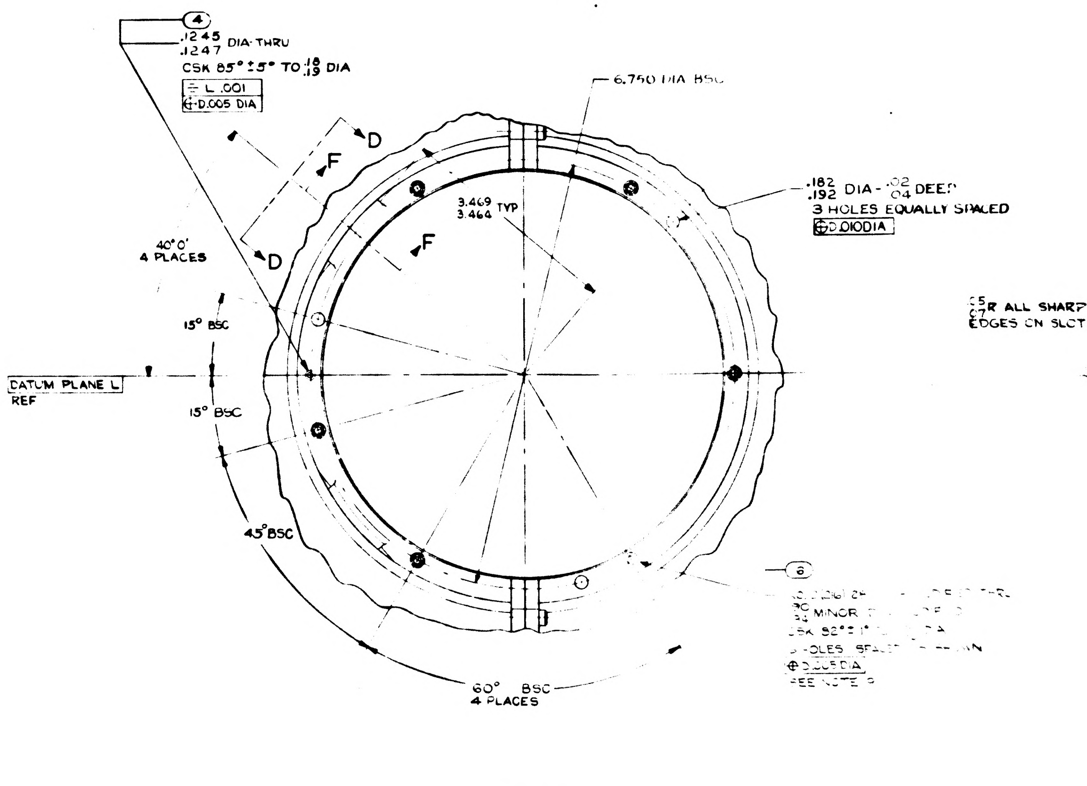
2/85


A
A
6.3750
6.3752 DIA
-D-
⊚C.0005 TIR
.562 TYP
.281 TYP
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .19 DIA
⊥ M .001
⊕ G .005 DIA
SEE NOTE 9
45°0' TYP
.182
.192 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
⊕ G.010 DIA
SEE NOTE 4
87°30' BSC
30° BSC
120° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
DATUM PLANE M
REF
SEE NOTE 4
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ G .005 DIA
SEE NOTE 9
4.125 DIA BSC
.176
.156 TYP
6.3750
6.3752 DIA
-C-
REF
.02
.03 X 45° ± 5°
2 PLACES


⊕ .020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5
SEE NOTE 9
∥ E .0005
11.500 DIA BSC
C
C
AXIS B
⊥ A .001
SEE NOTE 6
4.625
4.623
9.250
9.247
B
B
E
E
E
⊥ A .005
⊕ .020 DIA
SEE SECTION C-C
2 PLACES
5.500
5.498
11.000
10.997
∥ H .0004
⊥ B .0004
H


37°
4 PL
DIA
.990
.992 D
● .005 TIR
4.125 DIA BSC
.090
.096


.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .19 DIA
⊥ C .005 DIA
SEE NOTE 9
3.8125
3.8127 DIA
-G-
⊚F .0005 TIR
60° BSC 4 PLACES
45° BSC
105° BSC
15° BSC
15° BSC
6.750 DIA BSC
150° BSC
DATUM PLANE L
⊥ B .0005
SEE NOTE 7
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ C.005 DIA
SEE NOTE 9
.182
.192 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
⊕ D.010 DIA
32
-F-
3.8125
3.8127 DIA
.02
.03 X 45° ± 5°
2 PLACES
AXIS B
REF


.1245
.1247 DIA THRU
CSK 85° ± 5° TO .18 .19 DIA
⊥ L .001
⊕ D.005 DIA
6.750 DIA BSC
D
F
F
D
40°0'
4 PLACES
3.469
3.464 TYP
.182
.192 DIA - .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ D.010 DIA
15° BSC
DATUM PLANE L
REF
15° BSC
45° BSC
60° BSC
4 PLACES
.015R ALL SHARP
EDGES ON SECT
SEE NOTE 9

VIEW A - A

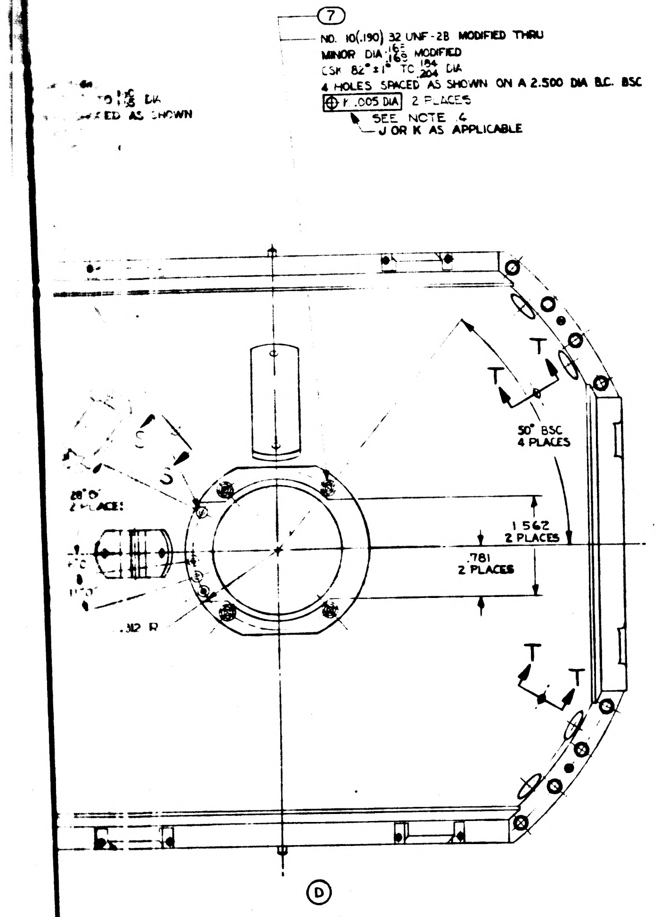
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7. A PLANE CONTAINING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES DATUM PLANE L
8. A PLANE CONTAINING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES DATUM PLANE M
9. ORDER OF OPERATIONS (NON MANDATORY)
   - A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
   - B DRILL, REAM, & C'SINK FOR ITEM ⑤
   - C INSTALL ITEM ⑤
   - D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
   - E STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   - F FINISH MACHINE
   - G REMOVE ITEM ⑤ AND ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
   - INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦ & ⑧

1000103	REV C	SHT 1

1/85

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62	ajs	WK
D	TDRR 00959	8-2-63	ajs	WK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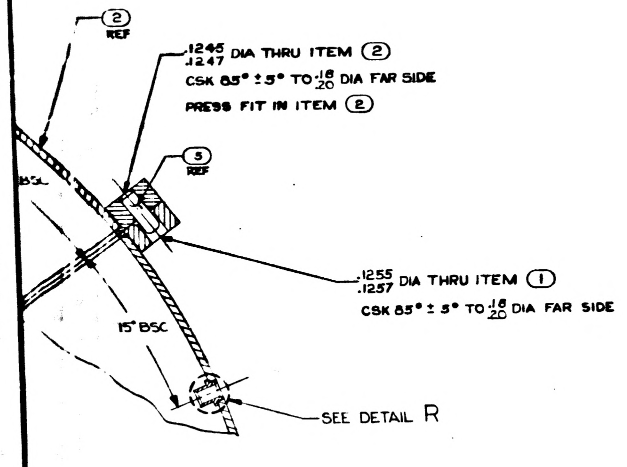
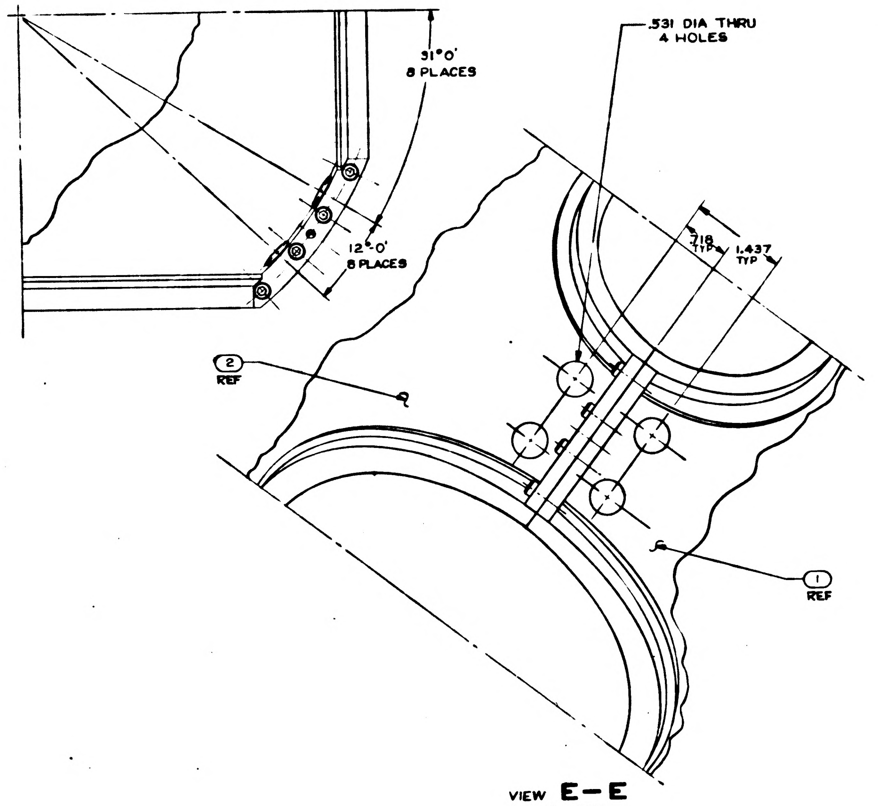
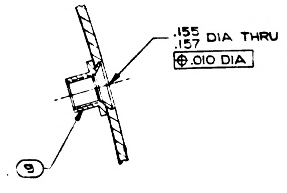
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165 .169 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 4
J OR K AS APPLICABLE
TO .166 .185 DIA
SPACED AS SHOWN
T
T
50° BSC
4 PLACES
1.562
2 PLACES
.781
2 PLACES
28° 0'
2 PLACES
.312 R
T
T
D


2
REF
.1245 .1247 DIA THRU ITEM 2
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM 2
3
REF
BSC
.1255 .1257 DIA THRU ITEM 1
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
15° BSC
SEE DETAIL R

SECTION C-C
SCALE 2-1
SEE NOTE 14
Ⓒ


31° 0'
8 PLACES
12° 0'
8 PLACES
.531 DIA THRU
4 HOLES
.718 TYP
1.437 TYP
2
REF
1
REF

VIEW E-E
4 PLACES


.155 .157 DIA THRU
⊕ .010 DIA
9

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓒ

REPLACES REV B WITH CHANGE

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓓ	9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
	8	TERMINAL, INSULATED	1000100-1			8
Ⓓ	14	INSERT, THREADED, SELF LOCKING	1000115-2			7
	40	INSERT, THREADED, SELF LOCKING	1000115-3			6
	4	PIN, STRAIGHT HEADLESS	MS16555-625			5
	4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
	16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
	1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
	1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED ajs DATE 12/14/62
CHECKED
DRAWN RWC 12-11-62
W. J. Robinson 12-18-62
M.I.T. APPROVAL
W. J. Kupfer 12/14/62

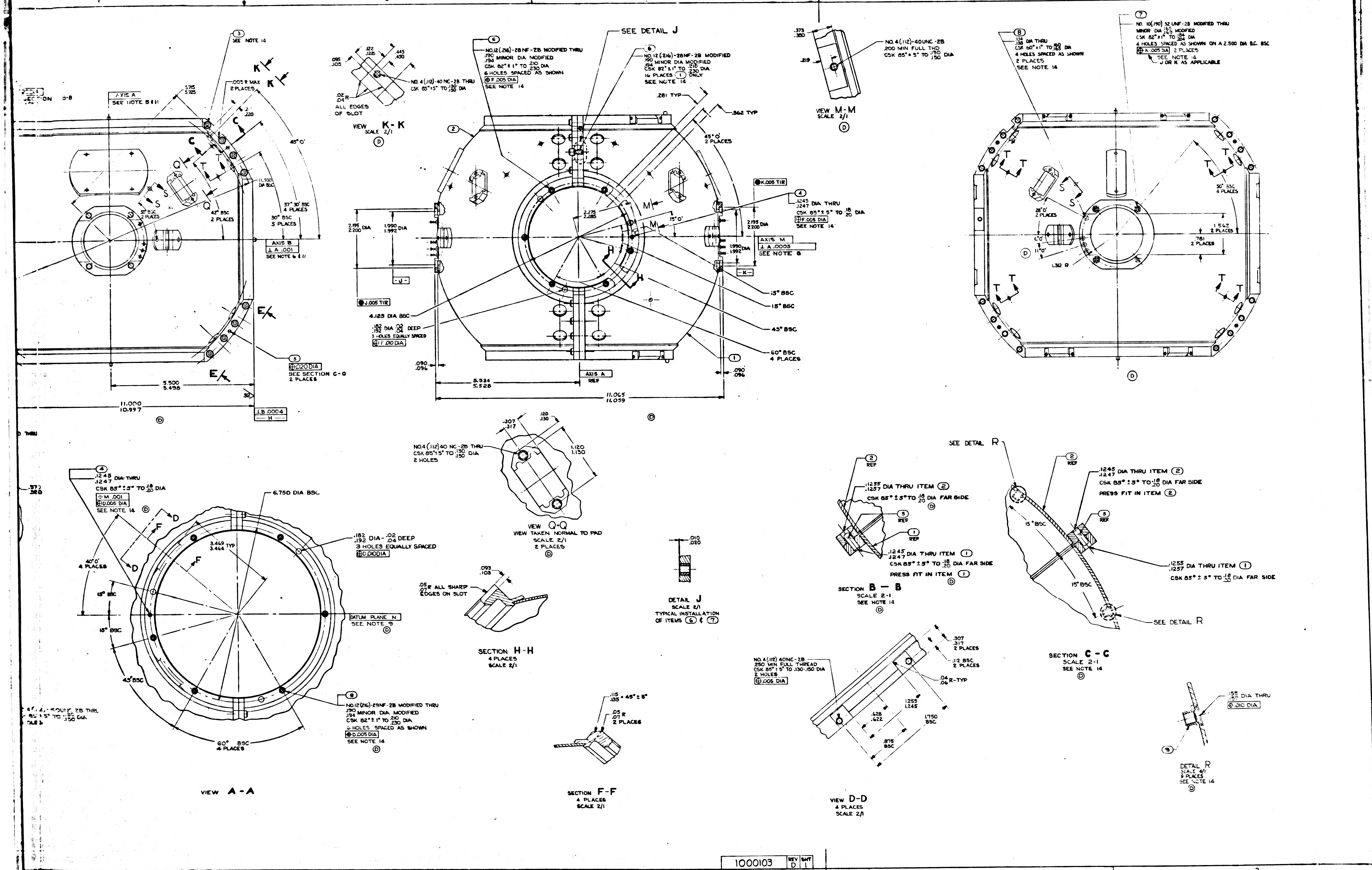
HOUSING ASSEMBLY
OUTER GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000103
SHEET 1 OF 1

1000103 D

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY



SECTION B-B
SEE NOTE 5 & 11
AXIS A
SEE NOTE 14
.005 R MAX 2 PLACES
5.715 5.725
K
C
Q
S
T
45° 0'
11.500 DIA BSC
37° 30' BSC 4 PLACES
30° BSC 5 PLACES
42° BSC 2 PLACES
5° BSC 2 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
E
.020 DIA
SEE SECTION G-G 2 PLACES
5.500 5.498
11.000 10.997
⊥ B .0004
-H-
.095 .105
.122 .128
.445 .430
NO. 4 (.112)-40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA
.02 .04 R
ALL EDGES OF SLOT
VIEW K-K SCALE 2/1
SEE DETAIL J
NO. 12 (.216)-28 NF-2B MODIFIED THRU .190 .194 MINOR DIA MODIFIED CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN F .005 DIA SEE NOTE 14
NO. 12 (.216)-28NF-2B MODIFIED .190 .194 MINOR DIA MODIFIED CSK 82°±1° TO .210 .230 DIA 16 PLACES ① ONLY SEE NOTE 14
.281 TYP
.562 TYP
45° 0' 2 PLACES
K .005 TIR
.1245 .1247 DIA THRU CSK 85°±5° TO .18 .20 DIA F .005 DIA SEE NOTE 14
2.195 2.200 DIA
1.990 1.992 DIA
2.275 2.285
15° 0'
M
H
AXIS M
⊥ A .0005
SEE NOTE 8
-J-
-K-
J .005 TIR
4.125 DIA BSC
.182 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED F .010 DIA
15° BSC
18° BSC
45° BSC
60° BSC 4 PLACES
.090 .096
5.534 5.528
AXIS A REF
11.065 11.059
.373 .350
.219
NO. 4 (.112)-40UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130 .150 DIA
VIEW M-M SCALE 2/1
.134 .138 DIA THRU CSK 60°±1° TO .160 .163 DIA 4 HOLES SPACED AS SHOWN 2 PLACES SEE NOTE 14
NO. 10 (.190) 32 UNF-2B MODIFIED THRU MINOR DIA .161 .163 MODIFIED CSK 82°±1° TO .184 .204 DIA 4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC K .005 DIA 2 PLACES SEE NOTE 14 J OR K AS APPLICABLE
28° 0' 2 PLACES
50° BSC 4 PLACES
1.562 2 PLACES
.781 2 PLACES
6° 0'
11° 0'
1.312 R
.1245 .1247 DIA THRU CSK 85°±5° TO .18 .20 DIA M .001 D .005 DIA SEE NOTE 14
6.750 DIA BSC
3.469 3.464 TYP
.182 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED D .010 DIA
D
F
40° 0' 4 PLACES
15° BSC
DATUM PLANE N SEE NOTE 9
45° BSC
NO. 12 (.216)-28NF-2B MODIFIED THRU .190 .194 MINOR DIA MODIFIED CSK 82°±1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN D .005 DIA SEE NOTE 14
60° BSC 4 PLACES
.307 .317
.120 .130
NO. 4 (.112) 40 NC-2B THRU CSK 85°±5° TO .130 .150 DIA 2 HOLES
1.120 1.130
.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT
.010 .020
.115 .135 × 45° ± 5°
.05 .07 R 2 PLACES
.1255 .1257 DIA THRU ITEM ② CSK 85°±5° TO .18 .20 DIA FAR SIDE
.1245 .1247 DIA THRU ITEM ① CSK 85°±5° TO .18 .20 DIA FAR SIDE PRESS FIT IN ITEM ①
REF
NO. 4 (.112) 40NC-2B .250 MIN FULL THREAD CSK 85°±5° TO .130-.150 DIA 2 HOLES .005 DIA
.307 .317 2 PLACES
.112 BSC 2 PLACES
.04 .06 R-TYP
1.255 1.245
.628 .622
1.750 BSC
.875 BSC
SEE DETAIL R
.1245 .1247 DIA THRU ITEM ② CSK 85°±5° TO .18 .20 DIA FAR SIDE PRESS FIT IN ITEM ②
15° BSC
.1255 .1257 DIA THRU ITEM ① CSK 85°±5° TO .18 .20 DIA FAR SIDE
.155 .157 DIA THRU .010 DIA

VIEW K-K SCALE 2/1

VIEW M-M SCALE 2/1

VIEW A-A

VIEW Q-Q VIEW TAKEN NORMAL TO PAD SCALE 2/1 2 PLACES

SECTION H-H 4 PLACES SCALE 2/1

DETAIL J SCALE 2/1 TYPICAL INSTALLATION OF ITEMS ⑥ & ⑦

SECTION F-F 4 PLACES SCALE 2/1

SECTION B-B SCALE 2-1 SEE NOTE 14

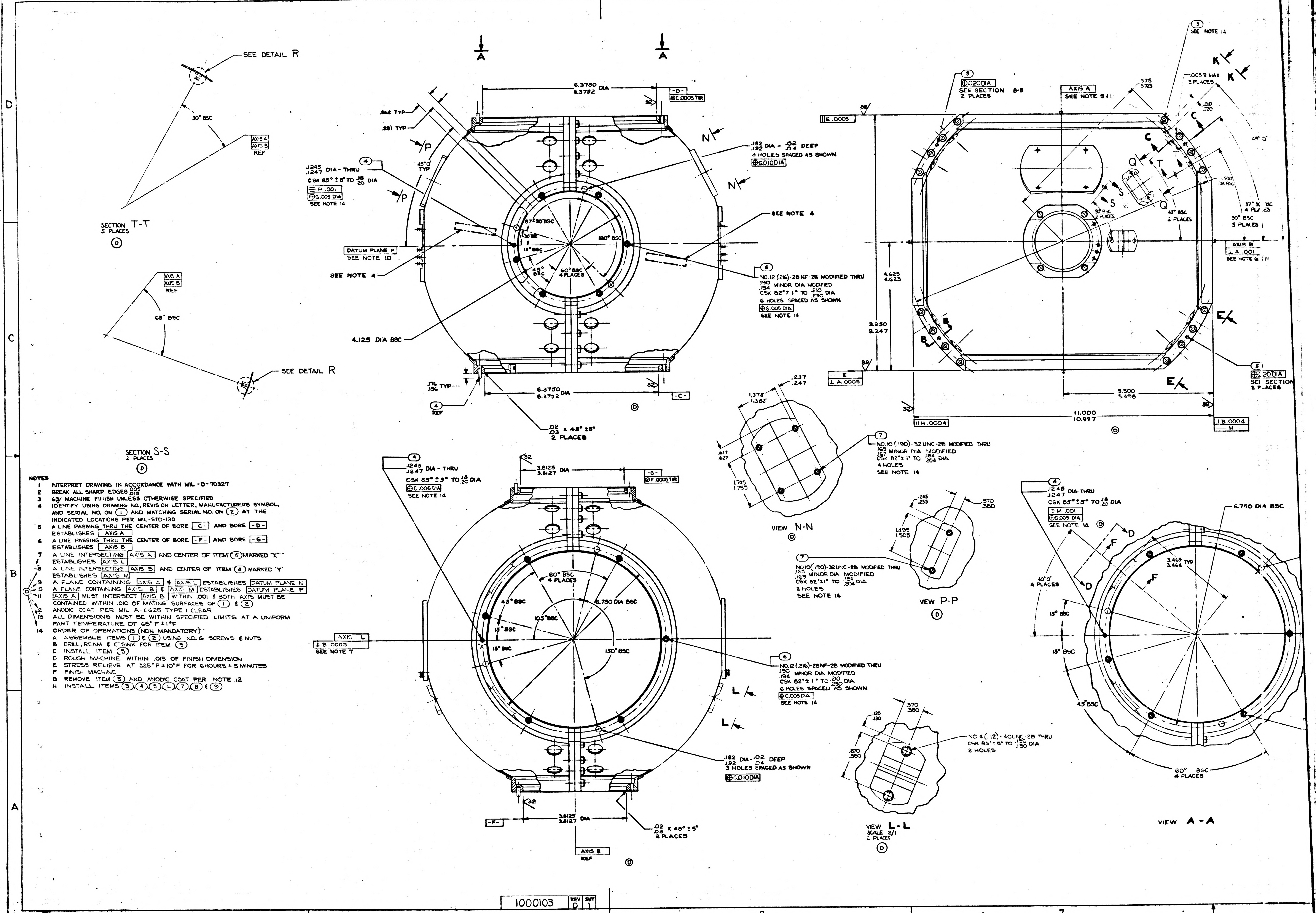
VIEW D-D 4 PLACES SCALE 2/1

SECTION C-C SCALE 2-1 SEE NOTE 14

DETAIL R SCALE 4/1 9 PLACES SEE NOTE 14

1000103 REV D SHT 1

INCHES
PHOTOGRAPHIC SCALE ONLY


SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF
SECTION T-T
5 PLACES
65° BSC
SECTION S-S
2 PLACES
A
6.3750
6.3752 DIA
-D-
C .0005 TIR
.562 TYP
.281 TYP
P
45° TYP
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .20 DIA
P .001
G .005 DIA
SEE NOTE 14
.182
.192 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
G .010 DIA
N
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
67°30' BSC
180° BSC
15° BSC
60° BSC 4 PLACES
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
G .005 DIA
SEE NOTE 14
4.125 DIA BSC
.176
.156 TYP
6.3750
6.3752 DIA
-C-
.02
.03 X 45° ± 5°
2 PLACES
.020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
E .0005
.005 R MAX 2 PLACES
K
C
Q
T
S
42° BSC 2 PLACES
37° 30' BSC 4 PLACES
30° BSC 5 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
4.625
4.623
3.250
3.247
B
E
⊥ A .0005
.20 DIA
SEE SECTION
5.500
5.498
11.000
10.997
H .0004
⊥ B .0004
-H-
1.375
1.365
.237
.247
1.745
1.755
NO. 10 (.190)-32 UNC-2B MODIFIED THRU
.165
.167 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES
SEE NOTE 14
VIEW N-N
.245
.255
.370
.380
1.495
1.505
NO 10 (.190)-32 UNC-2B MODIFIED THRU
.165
.169 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
2 HOLES
SEE NOTE 14
VIEW P-P
.1245
.1247 DIA-THRU
CSK 85° ± 5° TO .18 .20 DIA
M .001
D .005 DIA
SEE NOTE 14
6.750 DIA BSC
3.469
3.464 TYP
40°0' 4 PLACES
15° BSC
45° BSC
60° BSC 4 PLACES
VIEW A-A
3.8125
3.8127 DIA
-G-
F .0005 TIR
CSK 85° ± 5° TO .18 .20 DIA
C .005 DIA
60° BSC 4 PLACES
45° BSC
105° BSC
6.750 DIA BSC
15° BSC
150° BSC
AXIS L
⊥ B .0005
SEE NOTE 7
L
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
C .005 DIA
SEE NOTE 14
.182
.192 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
C .010 DIA
-F-
3.8125
3.8127 DIA
.02
.03 X 45° ± 5°
2 PLACES
AXIS B
REF
.120
.130
.370
.380
.870
.880
NO. 4 (.112)-40 UNC-2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
VIEW L-L
SCALE 2/1
2 PLACES
10
9
8
7
D
C
B
A

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 BREAK ALL SHARP EDGES .005 .015

3 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED

4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130

5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A

6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B

7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L

8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M

9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N

10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P

11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②

12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

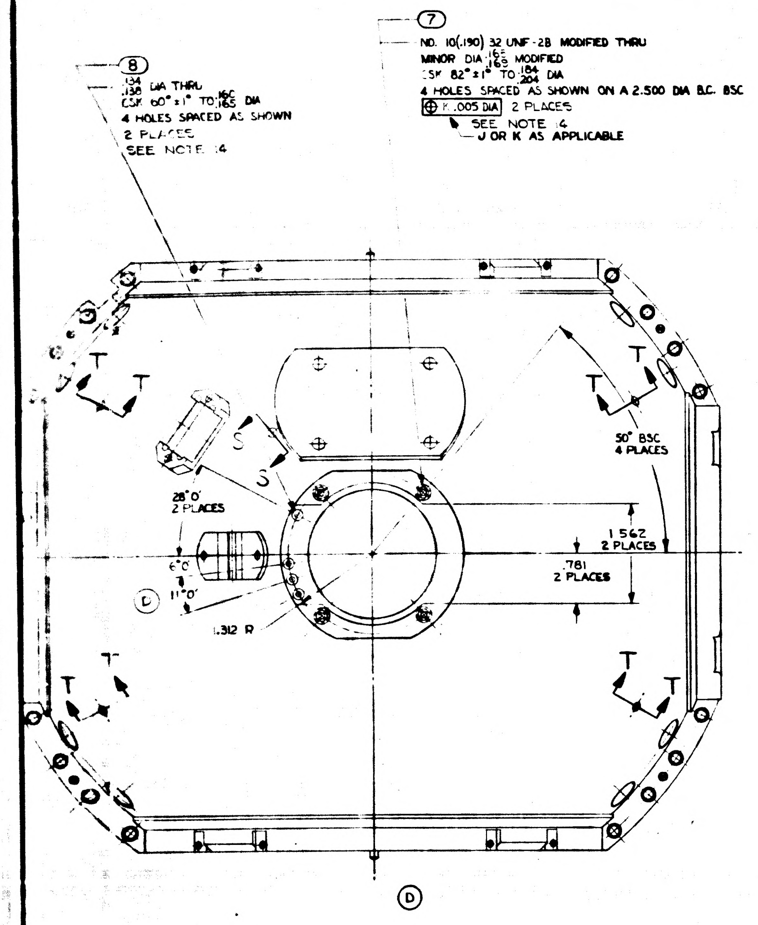
13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1°F

14 ORDER OF OPERATIONS (NON MANDATORY)
- A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
- B DRILL, REAM & C'SINK FOR ITEM ⑤
- C INSTALL ITEM ⑤
- D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
- E STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
- F FINISH MACHINE
- G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 12
- H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨

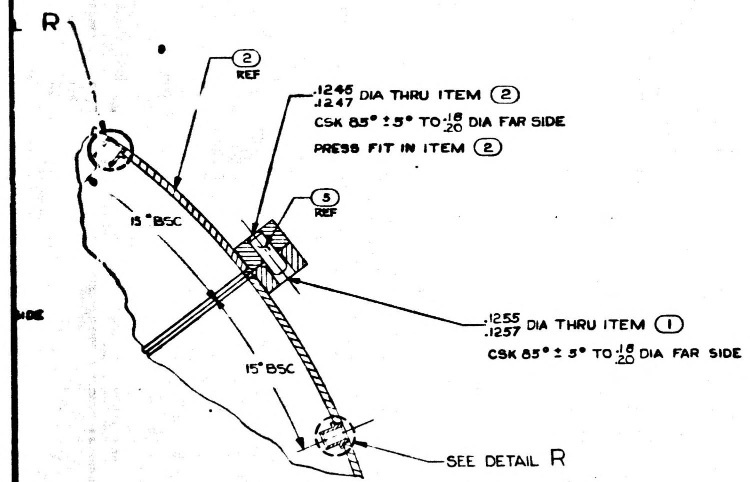
1000103	REV D	SHT 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62	ajm	WK
D	TDRR 00959	4-2-63	ajm	WK
E	TDRR 01234	8-21-63	ajm	WK

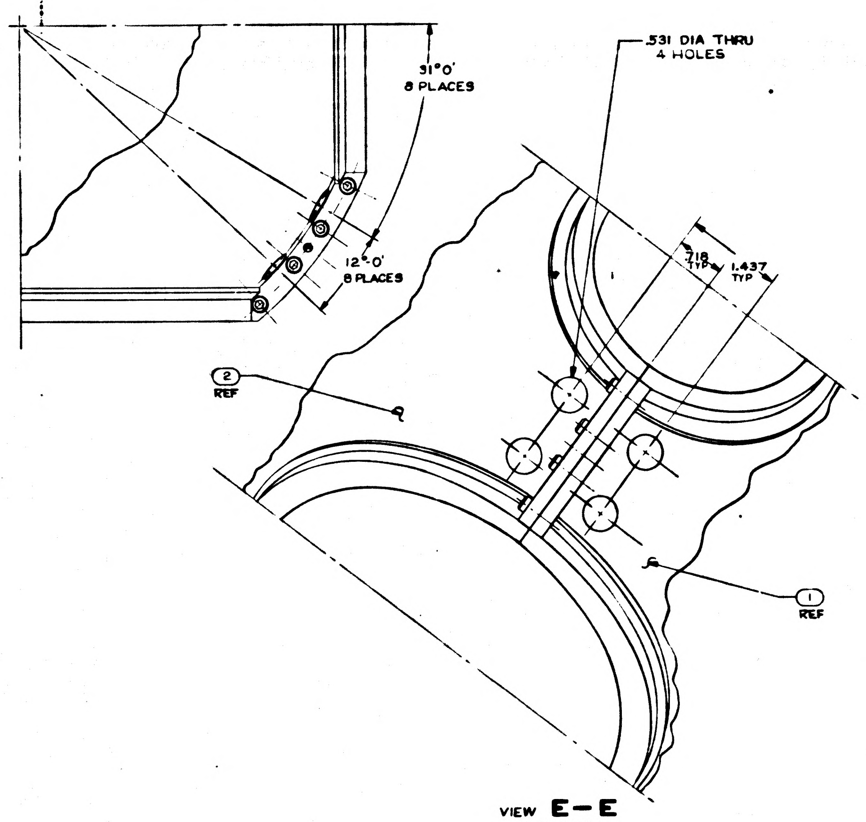


8
.134 .138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
4 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
7
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165 .169 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
K .005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
T
S
50° BSC 4 PLACES
28°0' 2 PLACES
1.562 2 PLACES
.781 2 PLACES
6°0'
11°0'
1.312 R
D



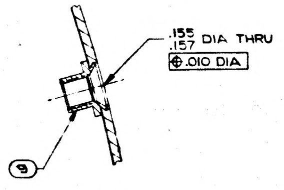
R
2 REF
.1245 .1247 DIA THRU ITEM 2
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM 2
5 REF
15° BSC
.1255 .1257 DIA THRU ITEM 1
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
15° BSC
SEE DETAIL R

SECTION C - C
SCALE 2-1
SEE NOTE 14
Ⓓ



31°0' 8 PLACES
12°0' 8 PLACES
.531 DIA THRU 4 HOLES
.718 TYP
1.437 TYP
2 REF
1 REF

VIEW E—E
4 PLACES



.155 .157 DIA THRU
.010 DIA
9

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ

9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
8	TERMINAL, INSULATED	1000100-1			8
14	INSERT, THREADED, SELF LOCKING	1000115-2			7
40	INSERT, THREADED, SELF LOCKING	1000115-3			6
4	PIN, STRAIGHT HEADLESS	MS16555-625			5
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FI N

LIST OF PARTS AND MATERIALS

REPLACES REV B WITH CHANGE

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED ajm DATE 12/11/62
CHECKED
DRAWN RWC 12-21-62
APPROVED FOR MIT W J Robinson 12-18-62
MIT APPROVAL 12/18/62

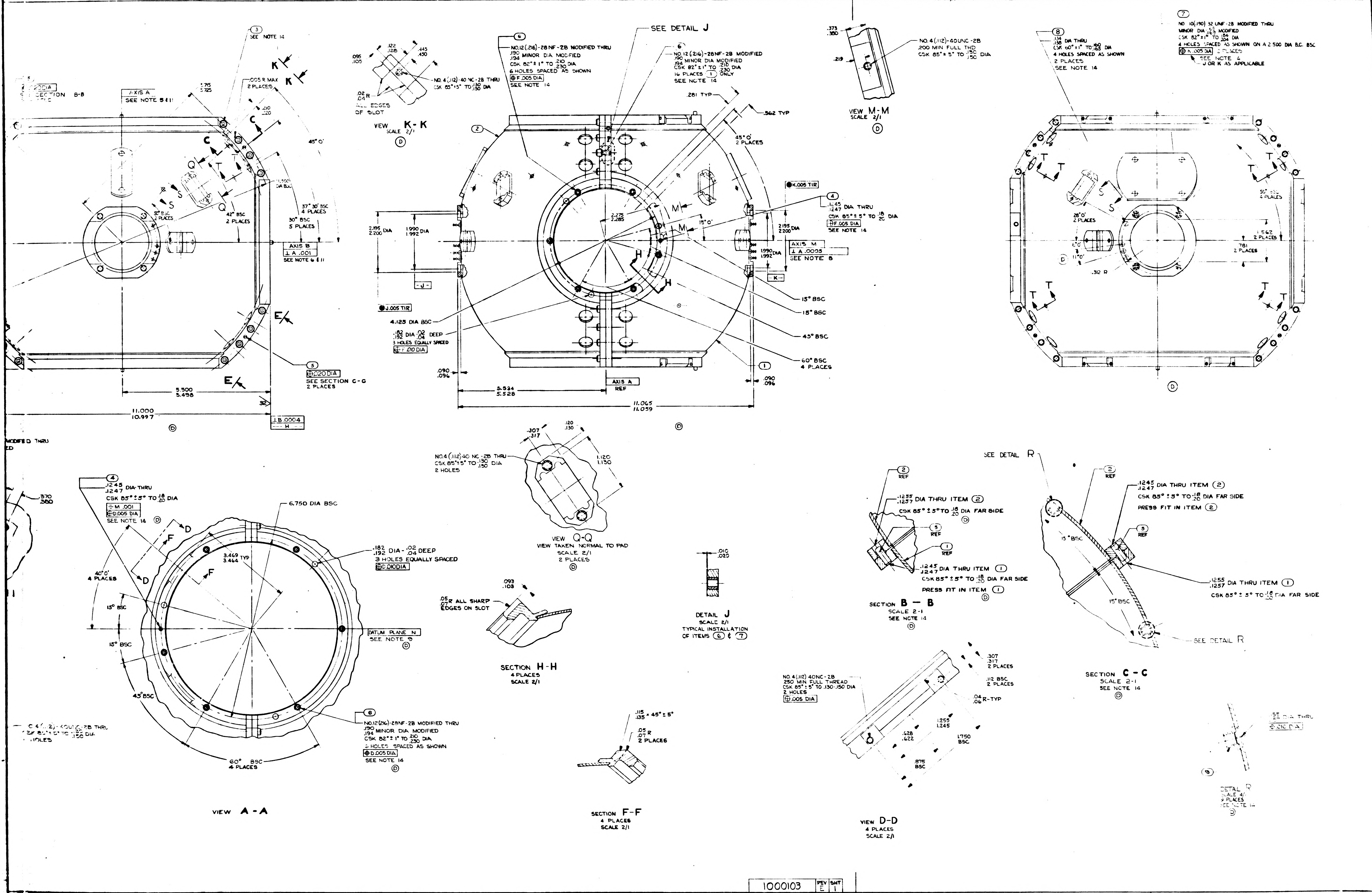
HOUSING ASSEMBLY
OUTER GIMBAL

SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000103
SHEET 1 OF 1

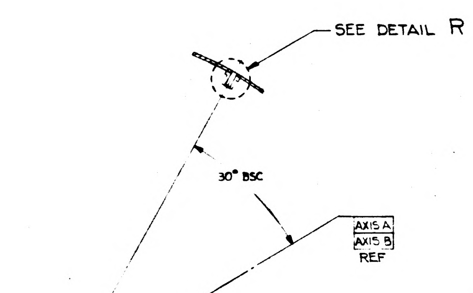
E
1000103

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

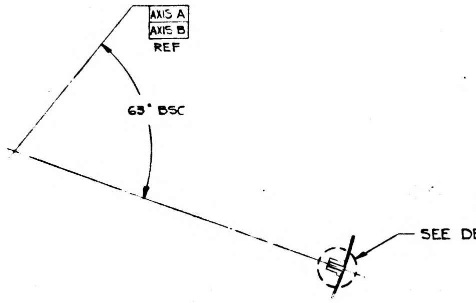


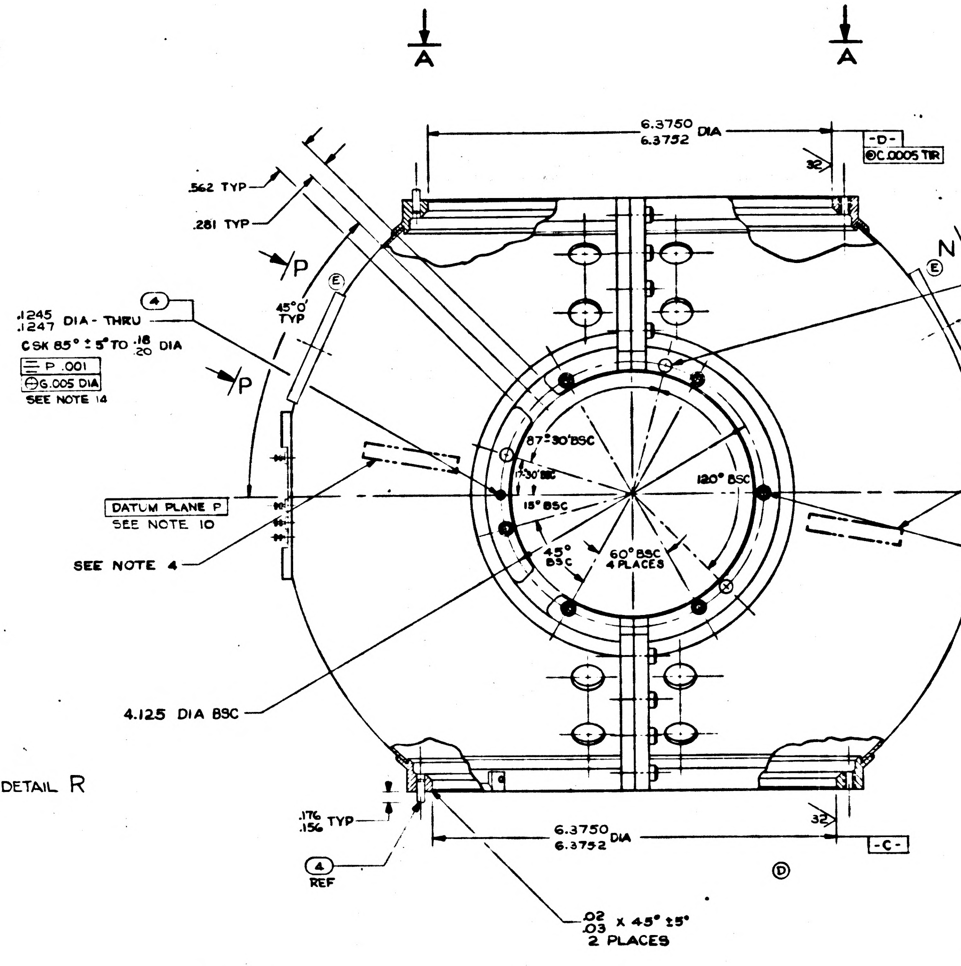
7
6
5
4
3
SEE NOTE 14
AXIS A
SEE NOTE 5 & 11
.005 R MAX
2 PLACES
45° 0'
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
42° BSC
2 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
⊕ .020 DIA
SEE SECTION C-C
2 PLACES
5.500
5.498
11.000
10.997
⊥ B .0004
H
SEE SECTION B-B
VIEW K-K
SCALE 2/1
ALL EDGES OF SLOT
NO. 4 (.112)-40 NC-2B THRU
CSK 85° ± 5° TO .130/.150 DIA
SEE DETAIL J
NO. 12 (.216)-28 NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕ F .005 DIA
SEE NOTE 14
NO. 12 (.216)-28 NF-2B MODIFIED
.190/.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
16 PLACES ① ONLY
SEE NOTE 14
.281 TYP
.562 TYP
45° 0'
2 PLACES
2.275
2.285
15° 0'
2.195
2.200 DIA
1.990
1.992 DIA
J
⊙ J .005 TIR
4.125 DIA BSC
.182/.192 DIA .02/.04 DEEP
3 HOLES EQUALLY SPACED
⊕ F .010 DIA
.090
.096
5.534
5.528
AXIS A REF
11.065
11.059
⊙ K .005 TIR
.1245/.1247 DIA THRU
CSK 85° ± 5° TO .18/.20 DIA
⊕ F .005 DIA
SEE NOTE 14
AXIS M
⊥ A .0005
SEE NOTE 8
K
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
VIEW M-M
SCALE 2/1
NO. 4 (.112)-40 UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130/.150 DIA
.134/.138 DIA THRU
CSK 60° ± 1° TO .160/.165 DIA
4 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
NO. 10 (.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .155/.165 MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 4
J OR K AS APPLICABLE
28° 0'
2 PLACES
11° 0'
.312 R
1.562
2 PLACES
.781
2 PLACES
VIEW A-A
.1245/.1247 DIA THRU
CSK 85° ± 5° TO .18/.20 DIA
⊥ M .001
⊕ D .005 DIA
SEE NOTE 14
6.750 DIA BSC
3.469
3.464 TYP
.182/.192 DIA .02/.04 DEEP
3 HOLES EQUALLY SPACED
⊕ D .010 DIA
DATUM PLANE N
SEE NOTE 9
40° 0'
4 PLACES
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
NO. 12 (.216)-28 NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
2 HOLES SPACED AS SHOWN
⊕ D .005 DIA
SEE NOTE 14
VIEW Q-Q
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
NO. 4 (.112) 40 NC-2B THRU
CSK 85° ± 5° TO .130/.150 DIA
2 HOLES
1.120
1.130
SECTION H-H
4 PLACES
SCALE 2/1
.05/.07 R ALL SHARP EDGES ON SLOT
.093
.103
DETAIL J
SCALE 2/1
TYPICAL INSTALLATION OF ITEMS ⑥ & ⑦
SECTION F-F
4 PLACES
SCALE 2/1
.115/.135 × 45° ± 5°
.05/.07 R
2 PLACES
SECTION B-B
SCALE 2-1
SEE NOTE 14
.1235/.1237 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
.1245/.1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ①
VIEW D-D
4 PLACES
SCALE 2/1
NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .005 DIA
.307
.317
2 PLACES
.112 BSC
2 PLACES
.04/.06 R-TYP
1.255
1.245
.628
.622
1.750 BSC
.875 BSC
SEE DETAIL R
SECTION C-C
SCALE 2-1
SEE NOTE 14
.1245/.1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ②
.1255/.1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
15° BSC
15° BSC
SEE DETAIL R
DETAIL R
SCALE 4/1
4 PLACES
SEE NOTE 14

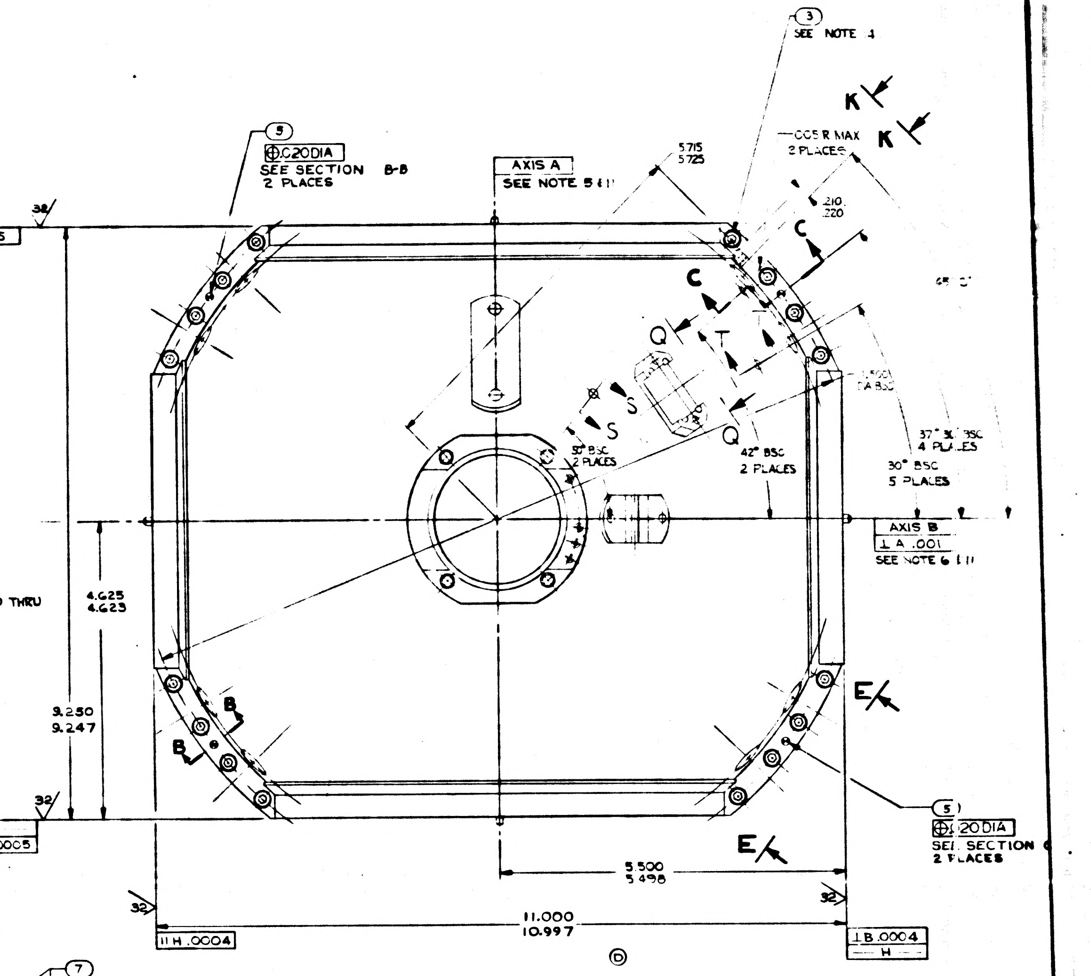
INCHES
PHOTOGRAPHIC SCALE ONLY

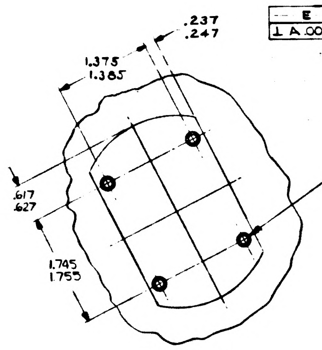

SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF

SECTION T-T
5 PLACES
Ⓓ


AXIS A
AXIS B
REF
63° BSC
SEE DETAIL R


A
A
6.3750
6.3752 DIA
-D-
ⒸC.0005 TIR
32
.562 TYP
.281 TYP
P
P
45°0' TYP
Ⓔ
④
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18
.20 DIA
═ P .001
⊕G.005 DIA
SEE NOTE 14
N
N
Ⓔ
.182
.192 DIA - .02
.04 DEEP
3 HOLES SPACED AS SHOWN
⊕G.010 DIA
SEE NOTE 4
87°30' BSC
17°30' BSC
15° BSC
120° BSC
45° BSC
60° BSC
4 PLACES
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
⑥
NO. 12 (.216) - 28 NF - 2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210
.230 DIA
6 HOLES SPACED AS SHOWN
⊕G.005 DIA
SEE NOTE 14
4.125 DIA BSC
.176
.156 TYP
④
REF
6.3750
6.3752 DIA
32
-C-
Ⓓ
.02
.03 X 45° ± 5°
2 PLACES


③
SEE NOTE 4
K
K
.005 R MAX
2 PLACES
⑤
⊕.C20 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
.5715
.5725
.210
.220
C
C
Q
T
S
S
Q
1.500 DIA BSC
32
‖E .0005
50° BSC
2 PLACES
42° BSC
2 PLACES
37°30' BSC
4 PLACES
30° BSC
5 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
4.625
4.623
9.250
9.247
B
B
E
E
32
E
⊥ A .0005
⑤
⊕.020 DIA
SEE SECTION
2 PLACES
5.500
5.498
32
32
11.000
10.997
‖H .0004
⊥B .0004
H
Ⓓ

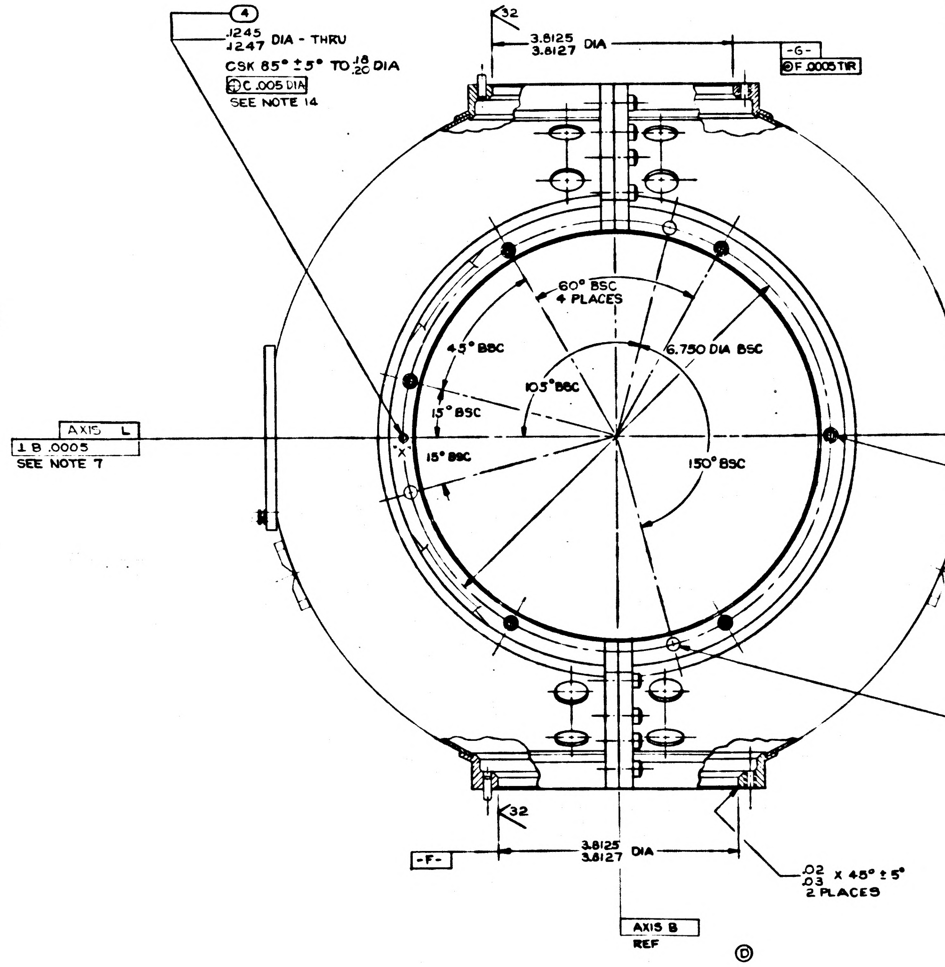

.237
.247
1.375
1.385
.617
.627
1.745
1.755
⑦
NO. 10 (.190) - 32 UNC - 2B MODIFIED THRU
.165
.167 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184
.204 DIA
4 HOLES
SEE NOTE 14

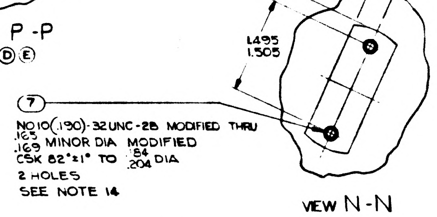
VIEW P-P
Ⓓ Ⓔ

SECTION S-S
2 PLACES
Ⓓ

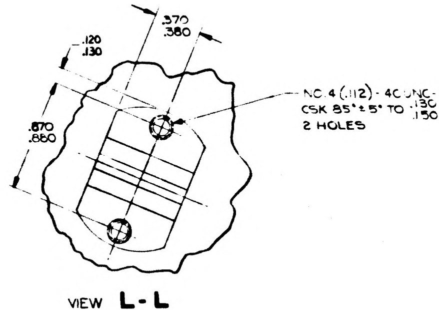
NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES $^{.005}_{.015}$
3 63∕ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130
5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L
8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M
9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
Ⓓ 11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1°F
14 ORDER OF OPERATIONS (NON MANDATORY)
- A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
- B DRILL, REAM & C'SINK FOR ITEM ⑤
- C INSTALL ITEM ⑤
- D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
- E STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
- F FINISH MACHINE
- G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 12
- H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨

Ⓔ 15. MACHING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT

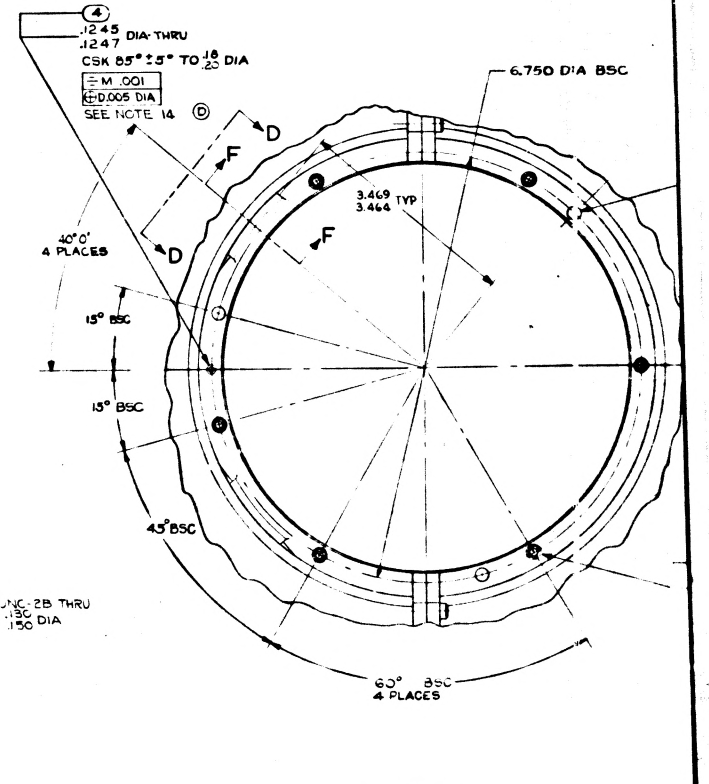

④
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18
.20 DIA
⊕C.005 DIA
SEE NOTE 14
32
3.8125
3.8127 DIA
-G-
ⒸF.0005 TIR
60° BSC
4 PLACES
45° BSC
6.750 DIA BSC
105° BSC
15° BSC
15° BSC
150° BSC
"X"
AXIS L
⊥ B .0005
SEE NOTE 7
⑥
NO. 12 (.216) - 28 NF - 2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210
.230 DIA
6 HOLES SPACED AS SHOWN
⊕C.005 DIA
SEE NOTE 14
L
L
.182
.192 DIA - .02
.04 DEEP
3 HOLES SPACED AS SHOWN
⊕C.010 DIA
32
-F-
3.8125
3.8127 DIA
.02
.03 X 45° ± 5°
2 PLACES
AXIS B
REF
Ⓓ


.245
.255
.370
.380
1.495
1.505
⑦
NO 10 (.190) - 32 UNC - 2B MODIFIED THRU
.165
.169 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184
.204 DIA
2 HOLES
SEE NOTE 14

VIEW N-N
Ⓓ Ⓔ


.370
.380
.120
.130
.870
.880
NO. 4 (.112) - 40 UNC - 2B THRU
CSK 85° ± 5° TO .130
.150 DIA
2 HOLES

VIEW L-L
SCALE 2/1
2 PLACES
Ⓓ

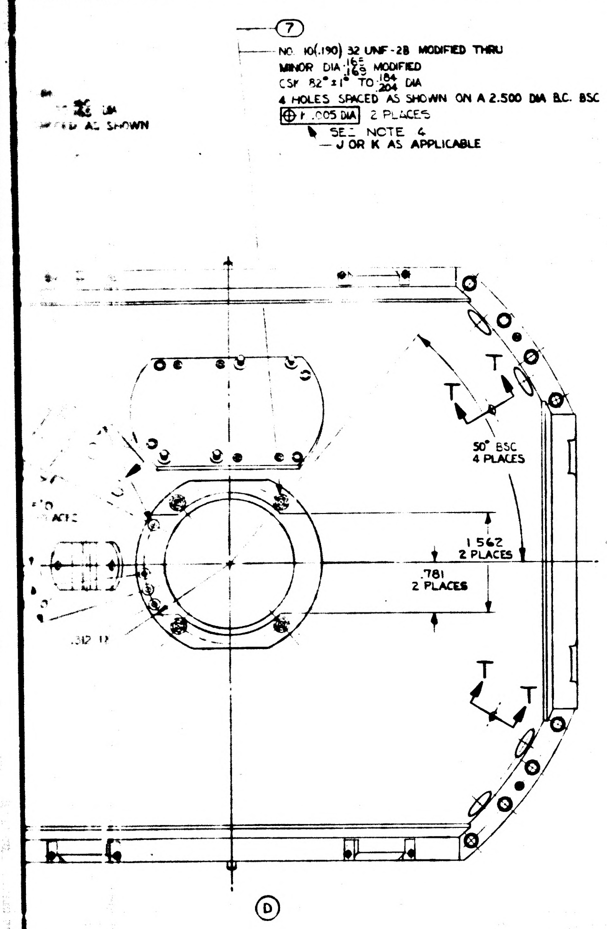

④
.1245
.1247 DIA-THRU
CSK 85° ± 5° TO .18
.20 DIA
═ M .001
⊕D.005 DIA
SEE NOTE 14
Ⓓ
6.750 DIA BSC
D
F
F
D
3.469
3.464 TYP
40°0'
4 PLACES
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES

VIEW A-A

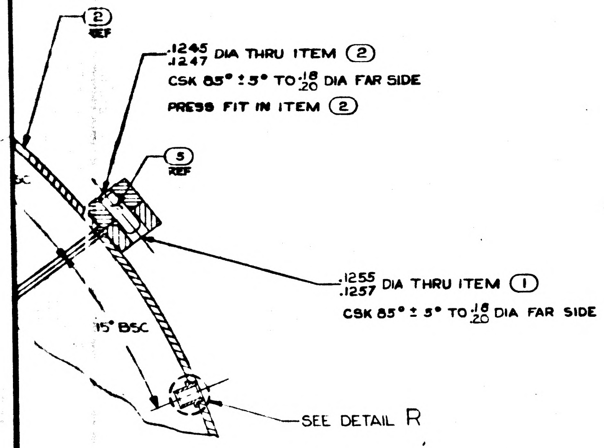
1000103 REV E SHT 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62	ajb	WK
Ⓜ D	TDRR 00959	4-2-63	ajb	WK
Ⓜ E	TDRR 01234	5-21-63	ajb	WK
F	TDRR 01530	6-11-63	ajb	BKB

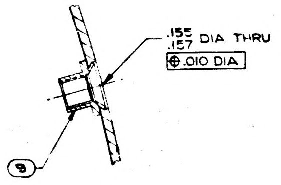


7
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165/.169 MODIFIED
CSK 82°±1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ .005 DIA 2 PLACES
SEE NOTE 4
J OR K AS APPLICABLE
AS SHOWN
T
T
50° BSC 4 PLACES
1.562 2 PLACES
.781 2 PLACES
T
T
D



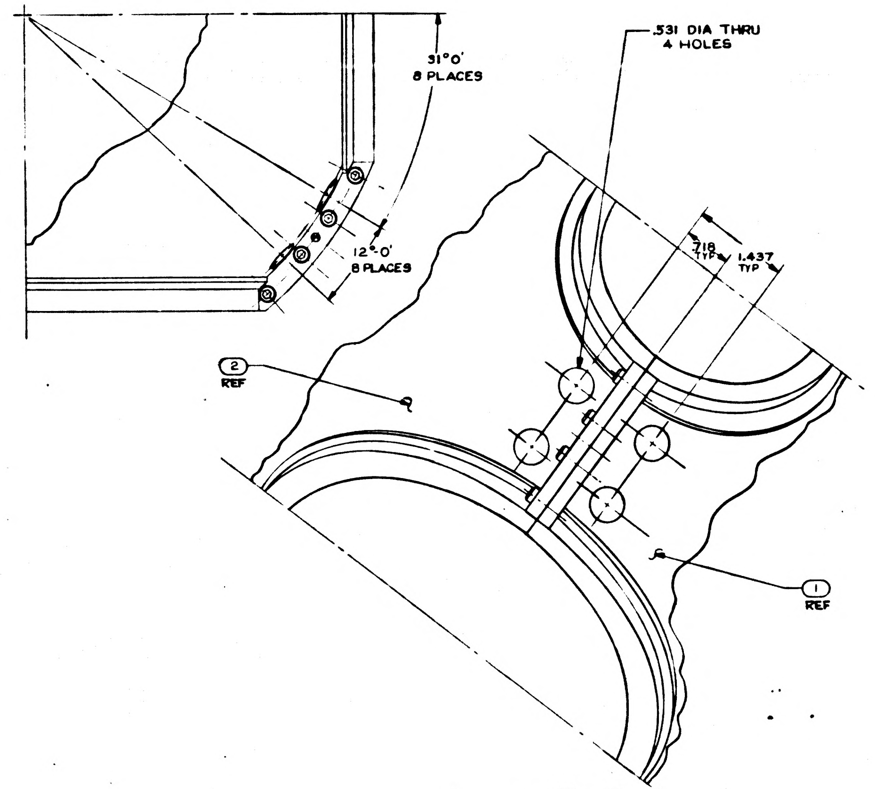
2 REF
.1245/.1247 DIA THRU ITEM 2
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM 2
5 REF
.1255/.1257 DIA THRU ITEM 1
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
15° BSC
SEE DETAIL R

SECTION C - C
SCALE 2-1
SEE NOTE 14
Ⓔ



.155/.157 DIA THRU
⊕ .010 DIA
9

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓒ



31°0' 8 PLACES
.531 DIA THRU 4 HOLES
12°0' 8 PLACES
.718 TYP
1.437 TYP
2 REF
1 REF

VIEW E—E
4 PLACES

Ⓓ 9	NUT,CLINCH, FLUSH MOUNTED	1000076-1			9
Ⓕ 12	TERMINAL, INSULATED	1000100-1			8
ⒻⒹ 10	INSERT, THREADED, SELF LOCKING	1000115-2			7
40	INSERT, THREADED, SELF LOCKING	1000115-3			6
4	PIN, STRAIGHT HEADLESS	MS16555-625			5
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

REPLACES REV B WITH CHANGE

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL ~

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED [illegible] DATE 12/11/62
CHECKED
DRAWN RWC 9-21-62
APPROVED FOR MSC
W J Robinson 12-18-62
M.I.T. APPROVAL
[illegible] 12/10/62

HOUSING ASSEMBLY
OUTER GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

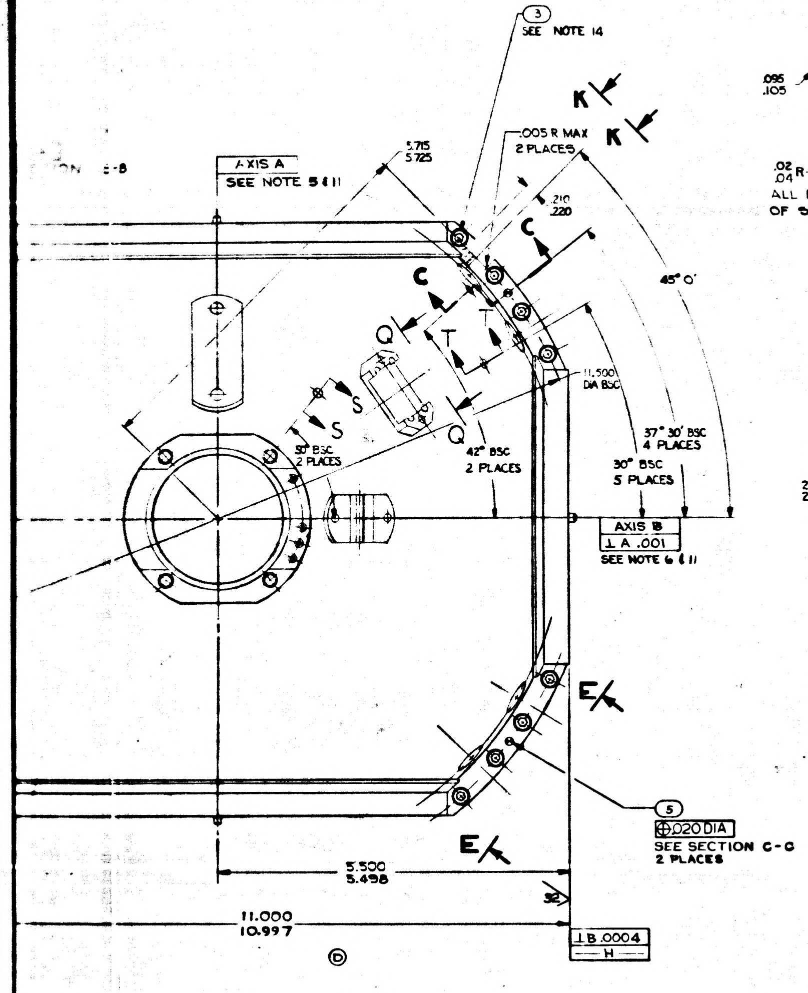
M I T
INSTRUMENTATION
LABORATORY
Cambridge, Mass.
DWG NO

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000103
SHEET 1 OF 1

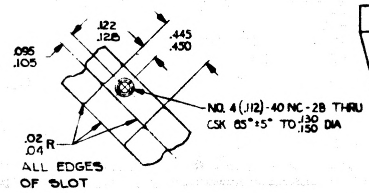
1000103

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

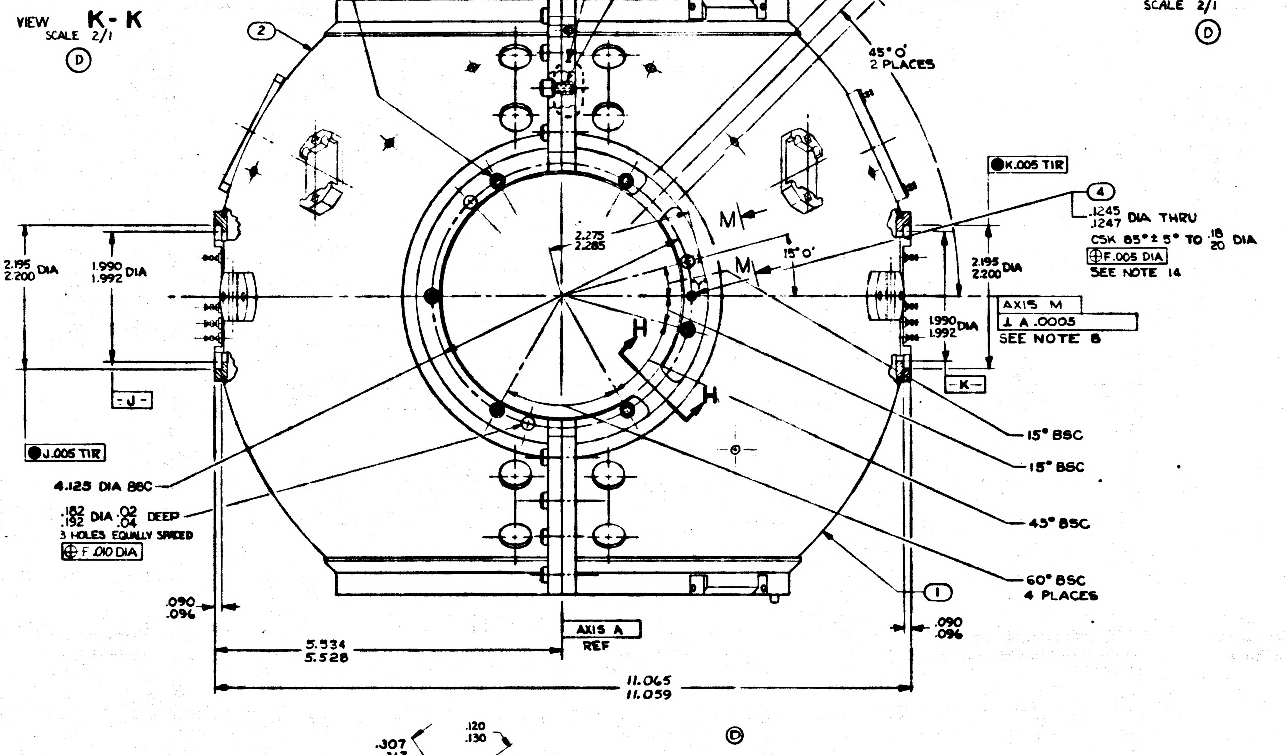


AXIS A
SEE NOTE 5 & 11
③ SEE NOTE 14
5.715
5.725
.005 R MAX
2 PLACES
.210
.220
K
C
45° 0'
Q
T
S
37° BSC
2 PLACES
42° BSC
2 PLACES
11.500 DIA BSC
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
E
⑤ ⊕ .020 DIA
SEE SECTION C-C
2 PLACES
5.500
5.498
11.000
10.997
⊥ B .0004
H
D

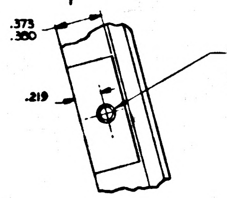


.095
.105
.122
.128
.445
.450
NO. 4 (.112)-40 NC-2B THRU
CSK 85°±5° TO .130 .150 DIA
.02 .04 R
ALL EDGES OF SLOT

VIEW K-K
SCALE 2/1
Ⓓ

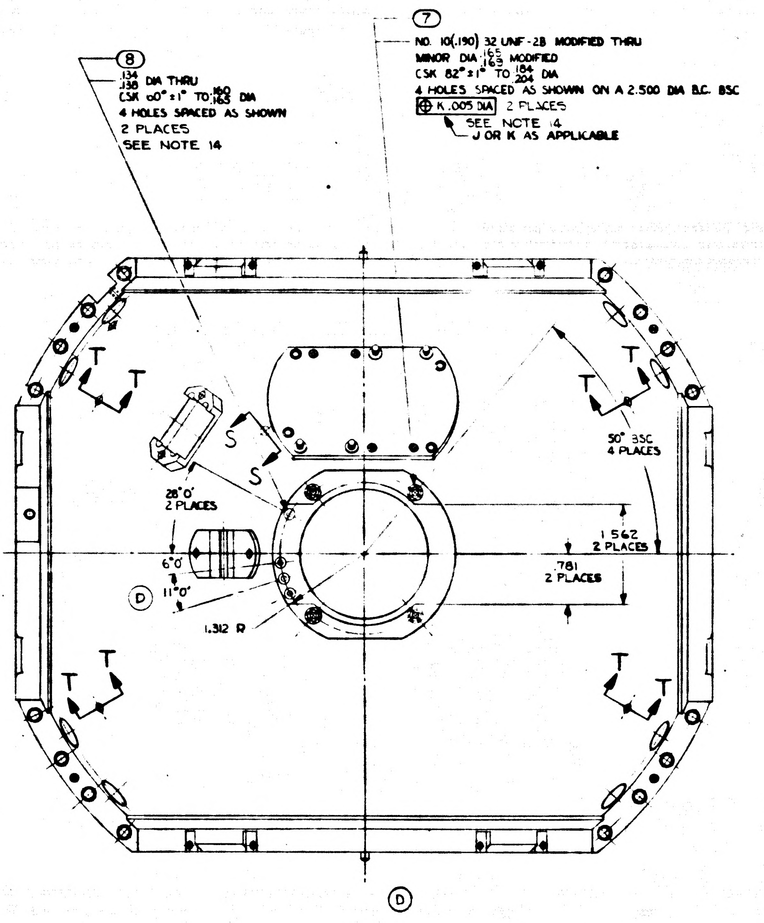


SEE DETAIL J
⑥
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 MINOR DIA MODIFIED
.194
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ F .005 DIA
SEE NOTE 14
⑥
NO. 12 (.216)-28NF-2B MODIFIED
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
16 PLACES ① ONLY
SEE NOTE 14
.281 TYP
.562 TYP
②
45° 0'
2 PLACES
K .005 TIR
④
.1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .20 DIA
⊕ F .005 DIA
SEE NOTE 14
2.195 2.200 DIA
1.990 1.992 DIA
2.275 2.285
M
15° 0'
2.195 2.200 DIA
1.990 1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
K
J
H
J .005 TIR
4.125 DIA BSC
.182 .192 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ F .010 DIA
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
①
.090 .096
.090 .096
AXIS A
REF
5.534
5.528
11.065
11.059
Ⓓ

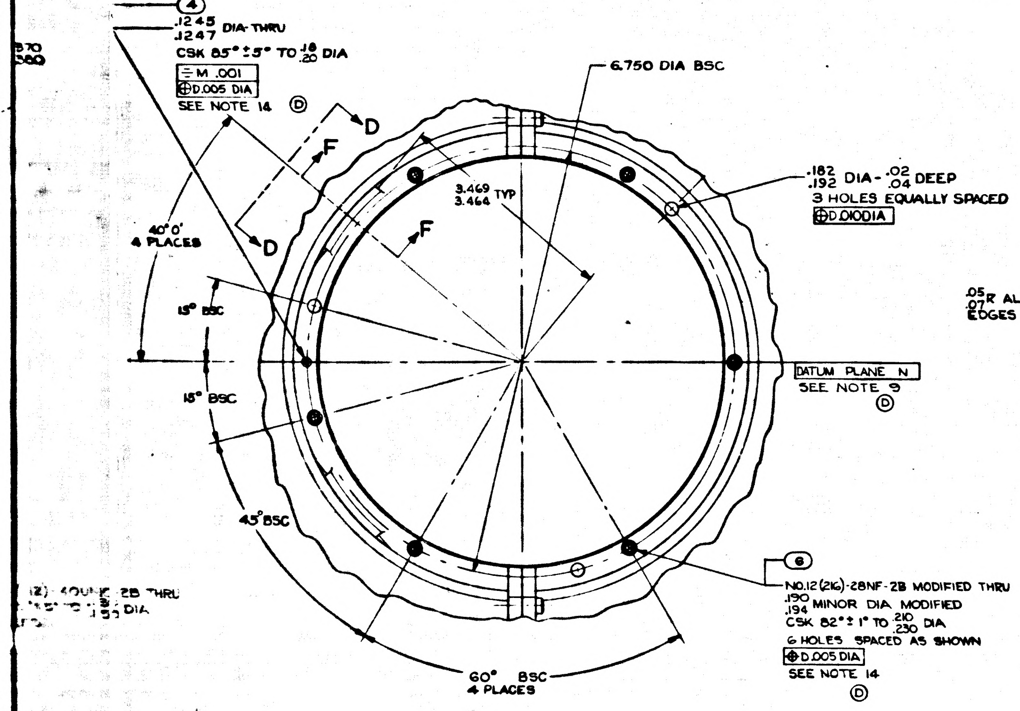


.373
.380
.219
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA

VIEW M-M
SCALE 2/1
Ⓓ

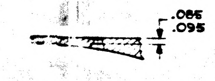


⑧
.134 .138 DIA THRU
CSK 60° ± 1° TO .160 .163 DIA
4 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .161 .163 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
T
S
50° BSC
4 PLACES
28° 0'
2 PLACES
6° 0'
11° 0'
1.312 R
1.562
2 PLACES
.781
2 PLACES
Ⓓ

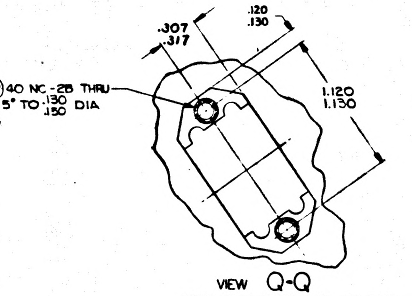


④
.1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .20 DIA
= M .001
⊕ D .005 DIA
SEE NOTE 14 Ⓓ
6.750 DIA BSC
D
F
3.469 3.464 TYP
.182 .192 DIA - .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ D .010 DIA
40° 0'
4 PLACES
15° BSC
15° BSC
DATUM PLANE N
SEE NOTE 9 Ⓓ
45° BSC
⑥
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ D .005 DIA
SEE NOTE 14
Ⓓ
60° BSC
4 PLACES

VIEW A-A

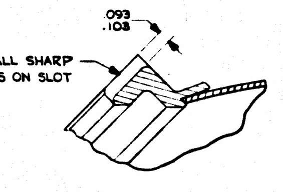


SECTION U-U
Ⓕ



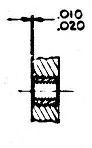
NO.4 (.112) 40 NC-2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
.307
.317
.120
.130
1.120
1.130

VIEW Q-Q
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
Ⓓ

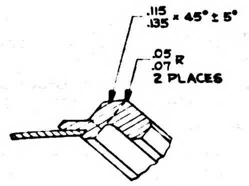


.05 .07 R ALL SHARP EDGES ON SLOT
.093
.103

SECTION H-H
4 PLACES
SCALE 2/1

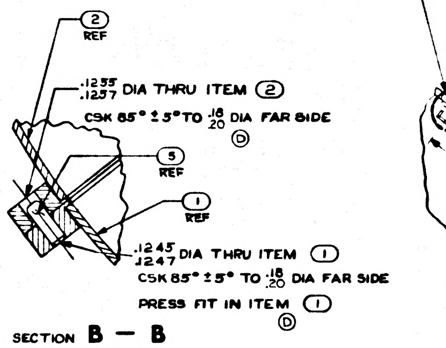


DETAIL J
SCALE 2/1
TYPICAL INSTALLATION OF ITEMS ⑥ & ⑦



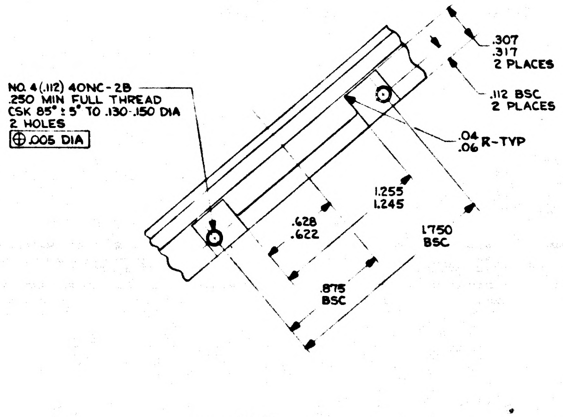
.115 .135 × 45° ± 5°
.05 .07 R
2 PLACES

SECTION F-F
4 PLACES
SCALE 2/1



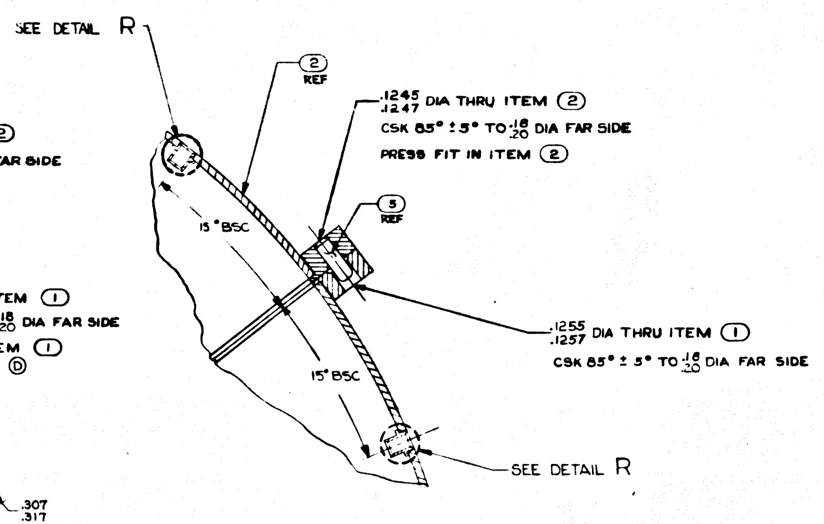
② REF
.1255 .1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
Ⓓ
⑤ REF
① REF
.1245 .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ①
Ⓓ

SECTION B — B
SCALE 2-1
SEE NOTE 14
Ⓓ



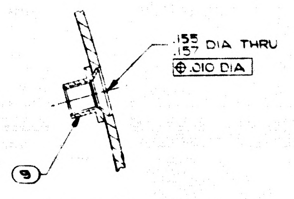
NO.4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
⊕ .005 DIA
.307
.317
2 PLACES
.112 BSC
2 PLACES
.04 .06 R-TYP
.628
.622
1.255
1.245
1.750 BSC
.875 BSC

VIEW D-D
4 PLACES
SCALE 2/1



SEE DETAIL R
② REF
.1245 .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤ REF
15° BSC
15° BSC
.1255 .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R

SECTION C - C
SCALE 2-1
SEE NOTE 14
Ⓓ

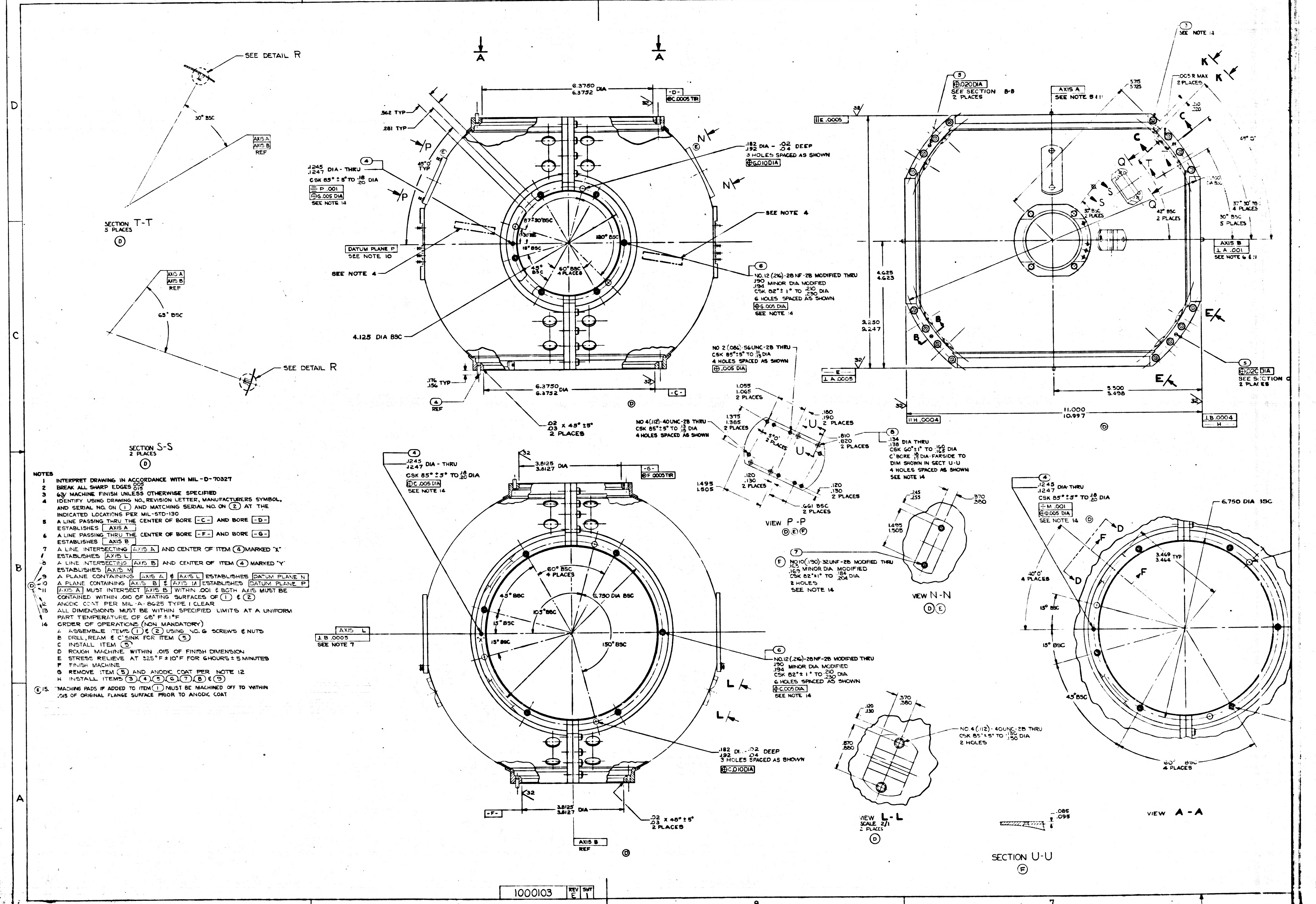


.155 .157 DIA THRU
⊕ .010 DIA
⑨

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ

1000103	REV E	SHT 1

INCHES
PHOTOGRAPHIC SCALE ONLY


SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF
SECTION T-T
5 PLACES
Ⓓ
65° BSC
SEE DETAIL R
SECTION S-S
2 PLACES
Ⓓ
A
A
6.3750
6.3752 DIA
-D-
⊚C.0005 TIR
.562 TYP
.281 TYP
P
P
45°0' TYP
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18/.20 DIA
⌓P .001
⊕G.005 DIA
SEE NOTE 14
.182
.192 DIA - .02/.04 DEEP
3 HOLES SPACED AS SHOWN
⊕G.010 DIA
N
N
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
87°30' BSC
180° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕G.005 DIA
SEE NOTE 14
4.125 DIA BSC
.176
.156 TYP
6.3750
6.3752 DIA
-C-
REF
.02
.03 X 45° ± 5°
2 PLACES
Ⓓ
⊕.020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
SEE NOTE 14
.005 R MAX
2 PLACES
K
K
C
C
Q
Q
T
S
S
45° 0'
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
42° BSC
2 PLACES
AXIS B
⊥A .001
SEE NOTE 6 & 11
E .0005
4.625
4.623
9.250
9.247
E
⊥A .0005
B
B
E
E
⊕.020 DIA
SEE SECTION C
2 PLACES
5.500
5.498
11.000
10.997
H .0004
⊥B .0004
H
Ⓓ
NO 2 (.086)-56UNC-2B THRU
CSK 85° ± 5° TO .11/.13 DIA
4 HOLES SPACED AS SHOWN
⊕.005 DIA
1.055
1.065
2 PLACES
1.375
1.385
2 PLACES
NO 4 (.112)-40UNC-2B THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
U
U
.180
.190
2 PLACES
.810
.820
2 PLACES
.120
.130
2 PLACES
1.495
1.505
.120
.130
2 PLACES
.661 BSC
2 PLACES
VIEW P-P
ⒹⒺⒻ
.134
.138 DIA THRU
CSK 60° ± 1° TO .160/.165 DIA
C'BORE .18/.19 DIA FARSIDE TO
DIM SHOWN IN SECT U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
.245
.255
.370
.380
1.495
1.505
NO10 (.190)-32UNF-2B MODIFIED THRU
.163
.165 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
2 HOLES
SEE NOTE 14
VIEW N-N
ⒹⒺ
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18/.20 DIA
⊕C.005 DIA
SEE NOTE 14
3.8125
3.8127 DIA
-G-
⊚F.0005 TIR
60° BSC
4 PLACES
45° BSC
6.750 DIA BSC
105° BSC
15° BSC
15° BSC
150° BSC
AXIS L
⊥B .0005
SEE NOTE 7
NO.12 (.216)-28NF-2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕C.005 DIA
SEE NOTE 14
L
L
.182
.192 DIA .02/.04 DEEP
3 HOLES SPACED AS SHOWN
⊕C.010 DIA
-F-
3.8125
3.8127 DIA
.02
.03 X 45° ± 5°
2 PLACES
AXIS B
REF
Ⓓ
.120
.130
.370
.380
.870
.880
NO 4 (.112)-40UNC-2B THRU
CSK 85° ± 5° TO .130/.150 DIA
2 HOLES
VIEW L-L
SCALE 2/1
2 PLACES
Ⓓ
.085
.095
SECTION U-U
Ⓕ
.1245
.1247 DIA-THRU
CSK 85° ± 5° TO .18/.20 DIA
⌓M .001
⊕D.005 DIA
SEE NOTE 14
6.750 DIA BSC
D
D
F
F
3.469
3.464 TYP
40°0'
4 PLACES
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
VIEW A-A
10
9
8
7
D
C
B
A

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 BREAK ALL SHARP EDGES .005/.015

3 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED

4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130

5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A

6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B

7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L

8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M

9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N

10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P

11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②

12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1°F

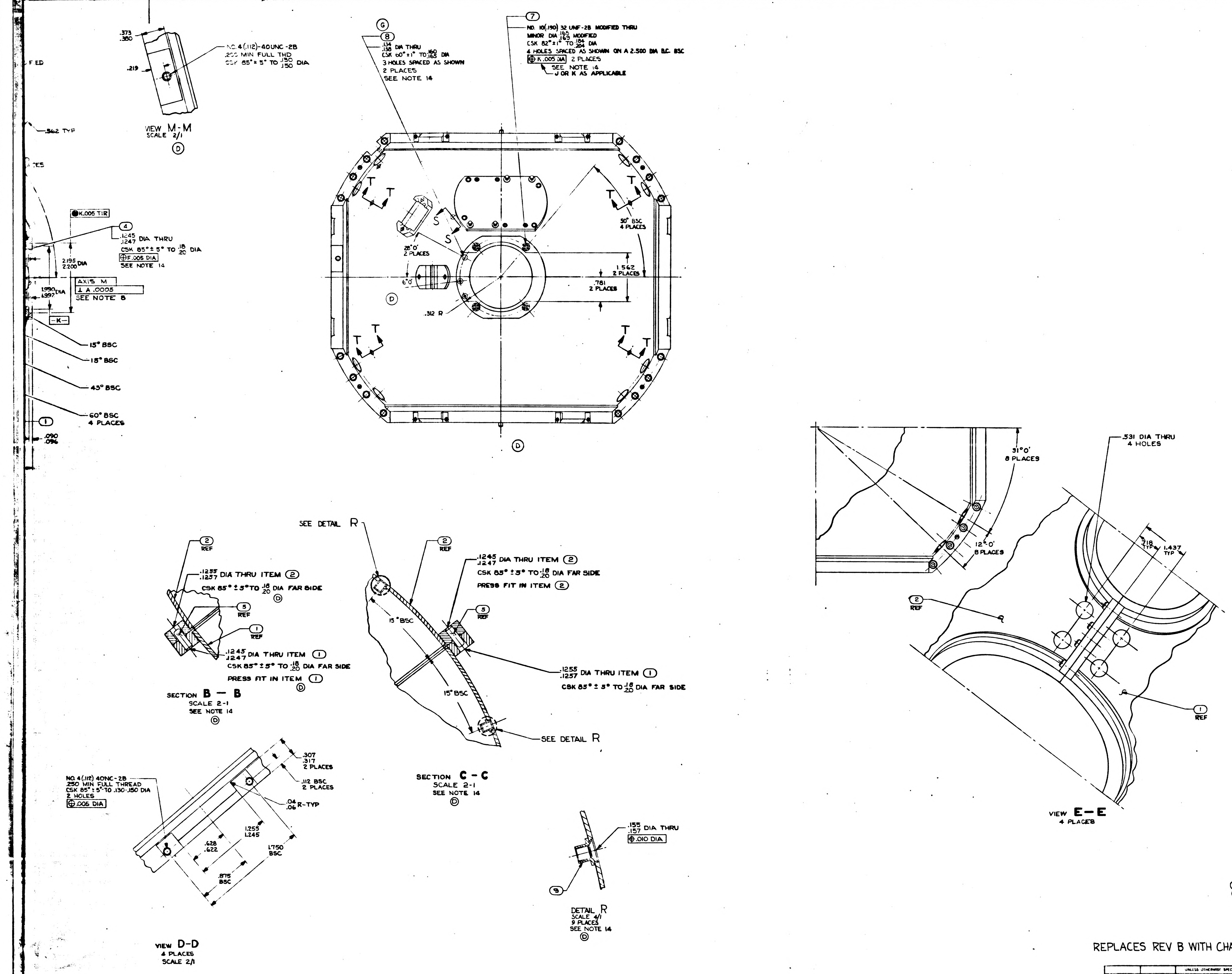
14 ORDER OF OPERATIONS (NON MANDATORY)
  - A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
  - B DRILL, REAM & C'SINK FOR ITEM ⑤
  - C INSTALL ITEM ⑤
  - D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
  - E STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
  - F FINISH MACHINE
  - G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 12
  - H INSTALL ITEMS ③,④,⑤,⑥,⑦,⑧ & ⑨

Ⓔ 15. MACHING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT

1000103	REV	SHT
	E	1

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62	ajB	WK
D	TDRR 00959	4-2-63	ajB	WK
E	TDRR 01234	5-21-63	ajB	WK
F	TDRR 01530	6-11-63	ajB	BKB
G	TDRR 02123	7-23-63	ajB	WK



VIEW M-M
SCALE 2/1
.373
.380
.219
NO. 4(.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130/.150 DIA
.562 TYP
K.005 TIR
4
.1245/.1247 DIA THRU
CSK 85° ± 5° TO .18/.20 DIA
F.005 DIA
SEE NOTE 14
2.195/2.200 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
1.990/1.992 DIA
-K-
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
1
.090/.096
G
8
.134/.138 DIA THRU
CSK 60° ± 1° TO .160/.165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
7
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165/.169 MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
K.005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
T
S
28°0' 2 PLACES
6°0'
.312 R
50° BSC 4 PLACES
1.562 2 PLACES
.781 2 PLACES
D
SEE DETAIL R
2 REF
.1255/.1257 DIA THRU ITEM 2
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
5 REF
1 REF
.1245/.1247 DIA THRU ITEM 1
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM 1
SECTION B — B
SCALE 2-1
SEE NOTE 14
.1245/.1247 DIA THRU ITEM 2
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM 2
15° BSC
15° BSC
.1255/.1257 DIA THRU ITEM 1
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
SEE DETAIL R
SECTION C - C
SCALE 2-1
SEE NOTE 14
NO. 4(.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
.005 DIA
.307/.317 2 PLACES
.112 BSC 2 PLACES
.04/.06 R-TYP
1.255/1.245
.628/.622
1.750 BSC
.875 BSC
VIEW D-D
4 PLACES
SCALE 2/1
.155/.157 DIA THRU
.010 DIA
9
DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
31°0' 8 PLACES
12°0' 8 PLACES
.531 DIA THRU
4 HOLES
.718 TYP
1.437 TYP
2 REF
1 REF
VIEW E—E
4 PLACES

REPLACES REV B WITH CHANGE

9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
10	TERMINAL, INSULATED	1000100-1			8
10	INSERT, THREADED, SELF LOCKING	1000115-2			7
40	INSERT, THREADED, SELF LOCKING	1000115-3			6
4	PIN, STRAIGHT HEADLESS	MS16555-625			5
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1
QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 12/11/62
CHECKED
DRAWN RWC 8-21-62
APPROVED FOR MSC W J Rhine 12-12-62
M.I.T. APPROVAL 12/12/62

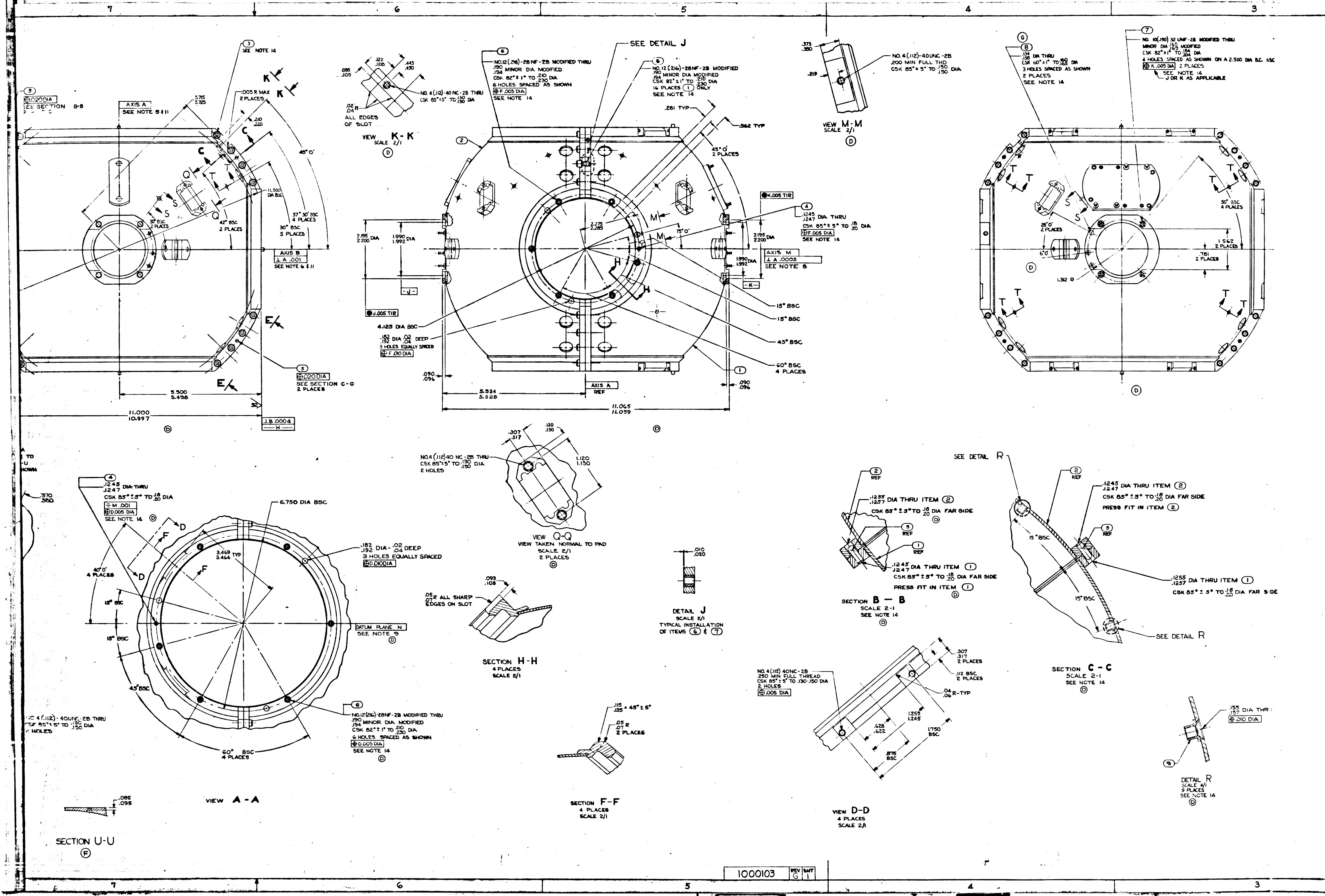
HOUSING ASSEMBLY OUTER GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000103
SHEET 1 OF 1

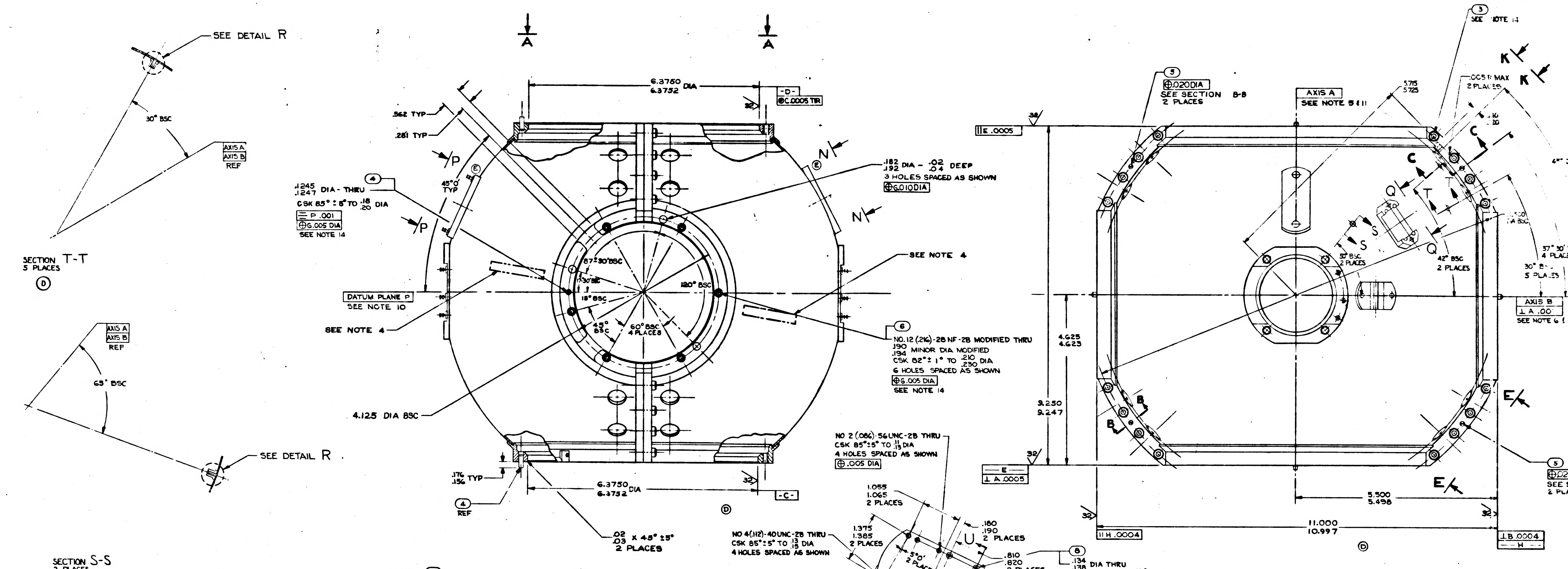
1000103 REV G SHT 1

MASTER


7
6
5
4
3
(5)
⊕.020 DIA
SEE SECTION B-B
AXIS A
SEE NOTE 5 & 11
5.715
5.725
(3)
SEE NOTE 14
.005 R MAX
2 PLACES
.210
.220
C
C
45° 0'
T
Q
S
S
Q
11.500 DIA BSC
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
42° BSC
2 PLACES
52° BSC
2 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
E
E
(5)
⊕.020 DIA
SEE SECTION C-C
2 PLACES
5.500
5.498
11.000
10.997
⊥B .0004
-H-
Ⓓ
.095
.105
.122
.128
.445
.450
K
K
.02
.04 R
ALL EDGES OF SLOT
NO. 4 (.112)-40 NC-2B THRU
CSK 85°±5° TO .130/.150 DIA
VIEW K-K
SCALE 2/1
Ⓓ
(6)
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕ F .005 DIA
SEE NOTE 14
SEE DETAIL J
(6)
NO. 12 (.216)-28NF-2B MODIFIED
.190/.194 MINOR DIA MODIFIED
CSK 82°±1° TO .210/.230 DIA
16 PLACES (1) ONLY
SEE NOTE 14
.281 TYP
.562 TYP
45° 0'
2 PLACES
(2)
●K.005 TIR
(4)
.1245/.1247 DIA THRU
CSK 85°±5° TO .18/.20 DIA
⊕F.005 DIA
SEE NOTE 14
2.195
2.200 DIA
1.990
1.992 DIA
2.275
2.285
15° 0'
M
M
H
H
2.195
2.200 DIA
1.990
1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
-K-
-J-
●J.005 TIR
4.125 DIA BSC
.182/.192 DIA .02/.04 DEEP
3 HOLES EQUALLY SPACED
⊕F.010 DIA
15° BSC
15° BSC
45° BSC
(1)
60° BSC
4 PLACES
.090
.096
5.534
5.528
AXIS A
REF
.090
.096
11.065
11.059
Ⓓ
.373
.380
.219
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85°±5° TO .130/.150 DIA
VIEW M-M
SCALE 2/1
Ⓓ
(G)
(8)
.134/.138 DIA THRU
CSK 60°±1° TO .160/.165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
(7)
NO. 10 (.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165/.169 MODIFIED
CSK 82°±1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
T
T
T
T
T
T
T
T
S
S
28° 0'
2 PLACES
6° 0'
50° BSC
4 PLACES
1.562
2 PLACES
.781
2 PLACES
1.312 R
Ⓓ
Ⓓ
TO
-U
SHOWN
.370
.380
(4)
.1245/.1247 DIA-THRU
CSK 85°±5° TO .18/.20 DIA
⌯M .001
⊕D.005 DIA
SEE NOTE 14 Ⓓ
D
D
F
F
40° 0'
4 PLACES
15° BSC
15° BSC
45° BSC
6.750 DIA BSC
3.469
3.464 TYP
.182/.192 DIA -.02/.04 DEEP
3 HOLES EQUALLY SPACED
⊕D.010 DIA
DATUM PLANE N
SEE NOTE 9
Ⓓ
NO 4 (.112)-40UNC-2B THRU
CSK 85°±5° TO .130/.150 DIA
2 HOLES
(6)
NO.12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕D.005 DIA
SEE NOTE 14
Ⓓ
60° BSC
4 PLACES
VIEW A-A
.085
.095
SECTION U-U
Ⓕ
.307
.317
.120
.130
NO.4 (.112) 40 NC-2B THRU
CSK 85°±5° TO .130/.150 DIA
2 HOLES
1.120
1.130
VIEW Q-Q
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
Ⓓ
.093
.108
.05/.07 R ALL SHARP EDGES ON SLOT
SECTION H-H
4 PLACES
SCALE 2/1
.010
.020
DETAIL J
SCALE 2/1
TYPICAL INSTALLATION OF ITEMS (6) & (7)
.115/.135 × 45° ± 5°
.05/.07 R
2 PLACES
SECTION F-F
4 PLACES
SCALE 2/1
(2)
REF
.1255/.1257 DIA THRU ITEM (2)
CSK 85°±5° TO .18/.20 DIA FAR SIDE
Ⓓ
(5)
REF
(1)
REF
.1245/.1247 DIA THRU ITEM (1)
CSK 85°±5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM (1)
Ⓓ
SECTION B — B
SCALE 2-1
SEE NOTE 14
Ⓓ
NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85°±5° TO .130-.150 DIA
2 HOLES
⊕.005 DIA
.307
.317
2 PLACES
.112 BSC
2 PLACES
.04/.06 R-TYP
1.255
1.245
.628
.622
1.750 BSC
.875 BSC
VIEW D-D
4 PLACES
SCALE 2/1
SEE DETAIL R
(2)
REF
.1245/.1247 DIA THRU ITEM (2)
CSK 85°±5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM (2)
(5)
REF
15° BSC
15° BSC
.1255/.1257 DIA THRU ITEM (1)
CSK 85°±5° TO .18/.20 DIA FAR SIDE
SEE DETAIL R
SECTION C-C
SCALE 2-1
SEE NOTE 14
Ⓓ
.155/.157 DIA THRU
⊕.010 DIA
(9)
DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ
1000103
REV G
SHT 1

INCHES
PHOTOGRAPHIC SCALE ONLY

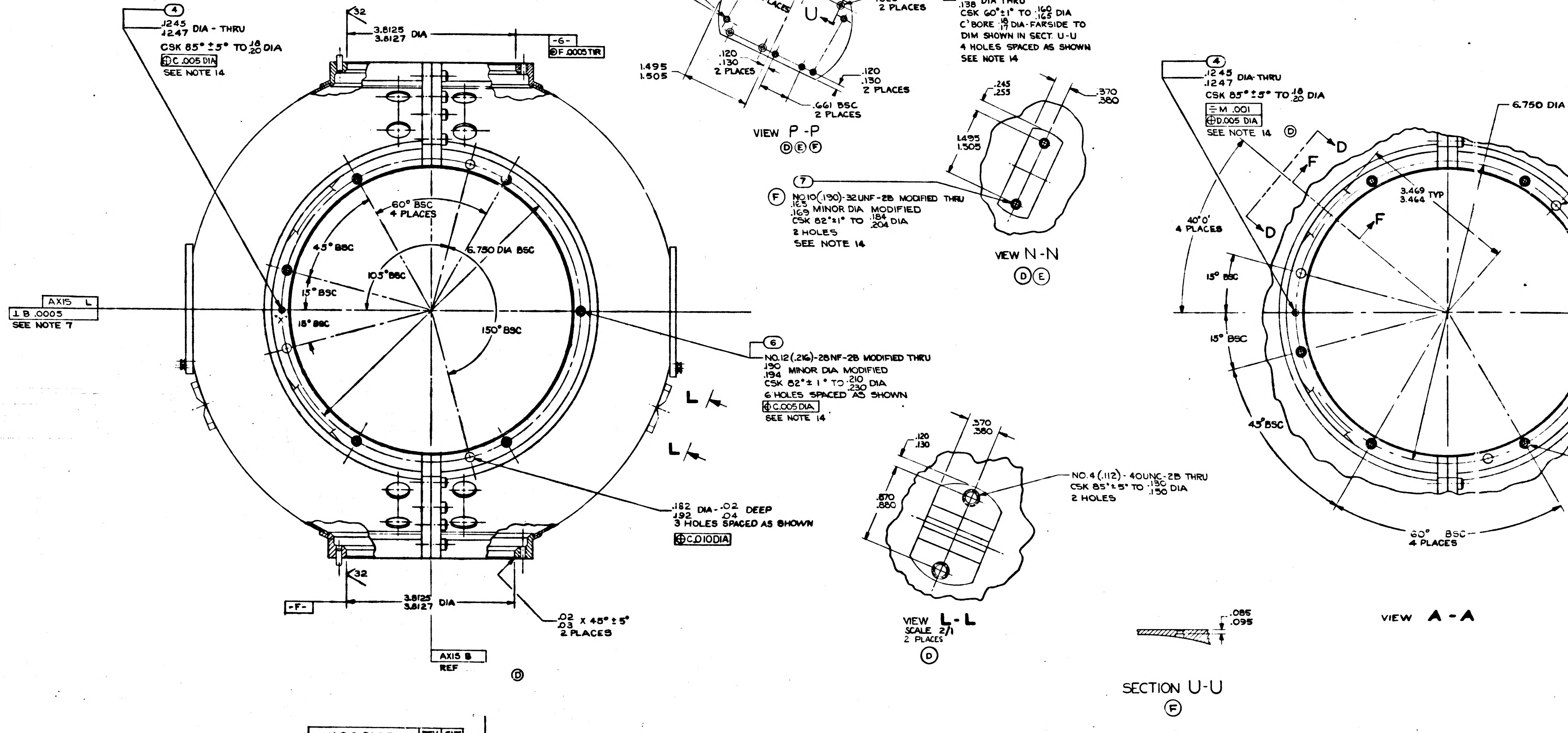
F-2


SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF
65° BSC
SEE DETAIL R
6.3750 DIA
6.3752
-D-
C .0005 TIR
.562 TYP
.281 TYP
P
P
45°0' TYP
.1245 DIA - THRU
.1247
CSK 85° ± 5° TO .18 .20 DIA
= P .001
G .005 DIA
SEE NOTE 14
.182 DIA - .02 DEEP
.192 .04
3 HOLES SPACED AS SHOWN
G .010 DIA
N
N
SEE NOTE 4
67°30' BSC
30° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
120° BSC
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190 MINOR DIA MODIFIED
.194
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
G .005 DIA
SEE NOTE 14
4.125 DIA BSC
.176 .156 TYP
REF
6.3750 DIA
6.3752
-C-
.02 .03 X 45° ± 5°
2 PLACES
SEE NOTE 14
E .0005
AXIS A
SEE NOTE 5 & 11
.020 DIA
SEE SECTION B-B
2 PLACES
5.715
5.725
.0051 MAX
2 PLACES
K
K
C
C
Q
Q
T
S
S
42° BSC
2 PLACES
30° BSC
2 PLACES
37° 30'
4 PLACES
30° B
5 PLACES
AXIS B
⊥ A .00
SEE NOTE 6
4.625
4.623
9.250
9.247
B
B
E
E
E
⊥ A .0005
5.500
5.498
11.000
10.997
H .0004
⊥ B .0004
H
NO 2 (.086)-56 UNC-2B THRU
CSK 85° ± 5° TO .11 .13 DIA
4 HOLES SPACED AS SHOWN
.005 DIA
1.055
1.065
2 PLACES
1.375
1.385
2 PLACES
NO 4 (.112)-40 UNC-2B THRU
CSK 85° ± 5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
.180
.190
2 PLACES
.810
.820
2 PLACES
U
U
5° 0'
2 PLACES

SECTION T-T
5 PLACES
Ⓓ

SECTION S-S
2 PLACES
Ⓓ

NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES $^{.005}_{.015}$
3 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130
5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L
8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M
9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1°F
14 ORDER OF OPERATIONS (NON MANDATORY)
  A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
  B DRILL, REAM & C'SINK FOR ITEM ⑤
  C INSTALL ITEM ⑤
  D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
  E STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
  F FINISH MACHINE
  G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 12
  H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨
Ⓔ 15. MACHING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT


.1245 DIA - THRU
.1247
CSK 85° ± 5° TO .18 .20 DIA
C .005 DIA
SEE NOTE 14
3.8125 DIA
3.8127
-G-
F .0005 TIR
60° BSC 4 PLACES
45° BSC
105° BSC
15° BSC
15° BSC
6.750 DIA BSC
150° BSC
AXIS L
⊥ B .0005
SEE NOTE 7
X
L
L
NO.12 (.216)-28NF-2B MODIFIED THRU
.190 MINOR DIA MODIFIED
.194
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
C .005 DIA
SEE NOTE 14
.182 DIA - .02 DEEP
.192 .04
3 HOLES SPACED AS SHOWN
C .010 DIA
-F-
3.8125 DIA
3.8127
.02 .03 X 45° ± 5°
2 PLACES
AXIS B
REF
1.495
1.505
.120
.130
2 PLACES
.120
.130
2 PLACES
.661 BSC
2 PLACES
.134 DIA THRU
.138
CSK 60° ± 1° TO .160 .165 DIA
C'BORE .16 .17 DIA - FARSIDE TO DIM SHOWN IN SECT. U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
.245
.255
.370
.380
1.495
1.505
NO.10 (.190)-32 UNF-2B MODIFIED THRU
.163 MINOR DIA MODIFIED
.169
CSK 82° ± 1° TO .184 .204 DIA
2 HOLES
SEE NOTE 14
.120
.130
.370
.380
.870
.880
NO. 4 (.112)-40 UNC-2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
.1245 DIA THRU
.1247
CSK 85° ± 5° TO .18 .20 DIA
M .001
D .005 DIA
SEE NOTE 14
6.750 DIA
D
D
F
F
40° 0'
4 PLACES
15° BSC
15° BSC
3.469
3.464 TYP
45° BSC
60° BSC
4 PLACES
.085
.095

VIEW P-P
Ⓓ Ⓔ Ⓕ

VIEW N-N
Ⓓ Ⓔ

VIEW L-L
SCALE 2/1
2 PLACES
Ⓓ

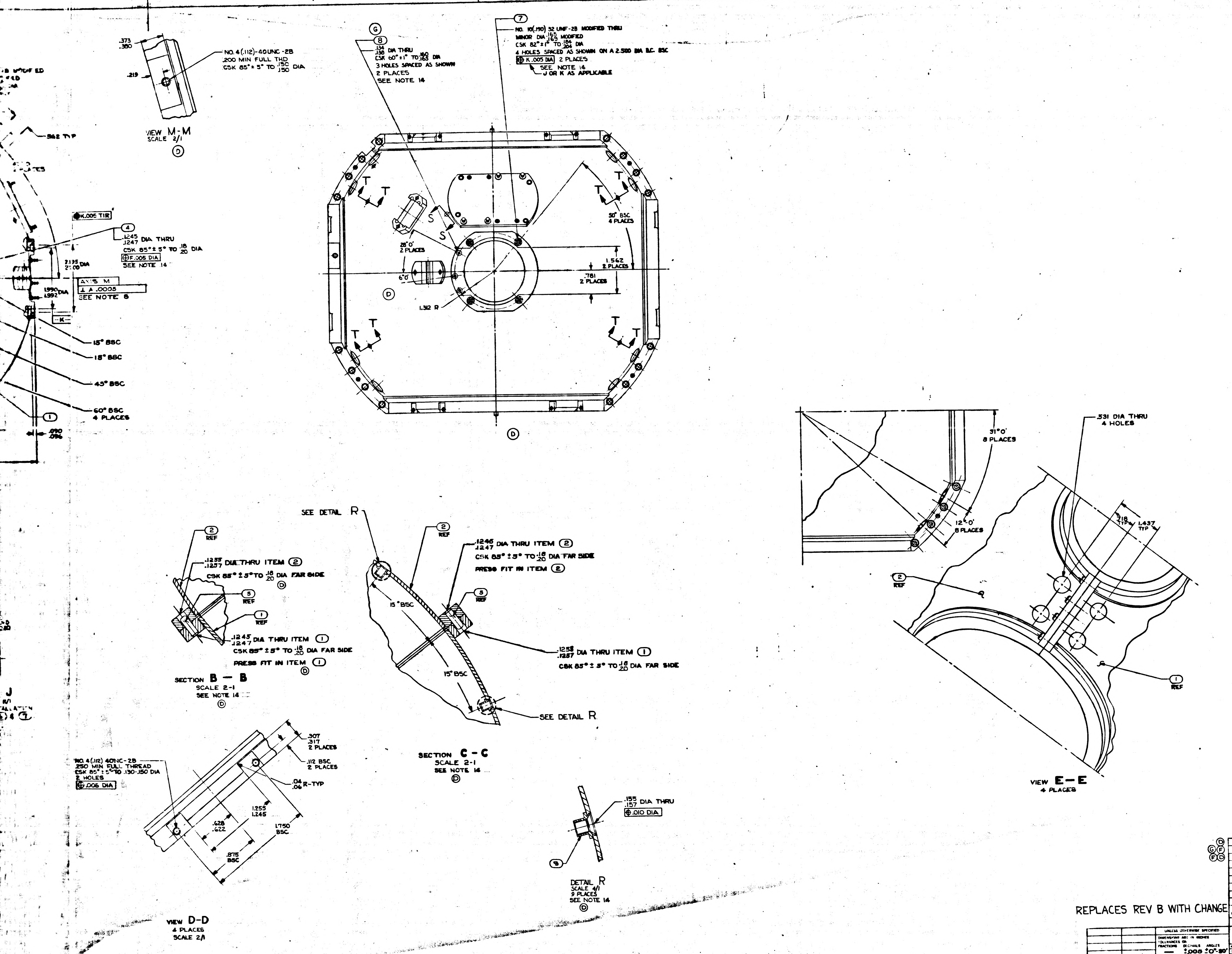
SECTION U-U
Ⓕ

VIEW A-A

1000103	REV G	SHT 1

INCHES
PHOTOGRAPHIC SCALE ONLY

	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62		
Ⓜ	D	TDRR 00959	4-2-63		
Ⓜ	E	TDRR 01234	5-21-63		WR
	F	TDRR 01530	6-11-63		
	G	TDRR 02123	7-23-63		WR
	H	TDRR 04942	11-19-63		



4
3
2
1
VIEW M-M
SCALE 2/1
Ⓓ
.373
.380
.219
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .150/.150 DIA
.562 TYP
K.005 TIR
④
.1245/.1247 DIA THRU
CSK 85° ± 5° TO .18/.20 DIA
⊕F.005 DIA
SEE NOTE 14
2.135/2.100 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
1.990/1.992 DIA
K
15° BSC
18° BSC
45° BSC
60° BSC
4 PLACES
①
.090
.096
Ⓖ
⑧
.134/.138 DIA THRU
CSK 60° ± 1° TO .160/.165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165/.169 MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
T
S
28°0'
2 PLACES
6°0'
1.312 R
50° BSC
4 PLACES
1.562
2 PLACES
.781
2 PLACES
Ⓓ
SEE DETAIL R
②
REF
.1255/.1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
⑤
REF
①
REF
.1245/.1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ①
SECTION B — B
SCALE 2-1
SEE NOTE 14
.1246/.1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ②
15° BSC
15° BSC
.1255/.1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
SEE DETAIL R
SECTION C - C
SCALE 2-1
SEE NOTE 14
NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .006 DIA
.307
.317
2 PLACES
.112 BSC
2 PLACES
.04/.06 R-TYP
1.255
1.245
.628
.622
1.750
BSC
.875
BSC
VIEW D-D
4 PLACES
SCALE 2/1
.155/.157 DIA THRU
⊕ .010 DIA
⑨
DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
31°0'
8 PLACES
12°0'
8 PLACES
.531 DIA THRU
4 HOLES
.218 TYP
1.437 TYP
②
REF
①
REF
VIEW E—E
4 PLACES

REPLACES REV B WITH CHANGE

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	ITEM NO
Ⓓ	9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
Ⓖ Ⓕ	10	TERMINAL, INSULATED	1000100-1			8
Ⓕ Ⓓ	10	INSERT, THREADED, SELF LOCKING	1000115-2			7
	40	INSERT, THREADED, SELF LOCKING	1000115-3			6
	4	PIN, STRAIGHT HEADLESS	MS16555-625			5
	4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
	16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
	1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059	-		2
	1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED DATE
CHECKED
DRAWN RWC
APPROVED FOR MSC
W J Rhine 12-15-62
M.I.T. APPROVAL

HOUSING ASSEMBLY
OUTER GIMBAL

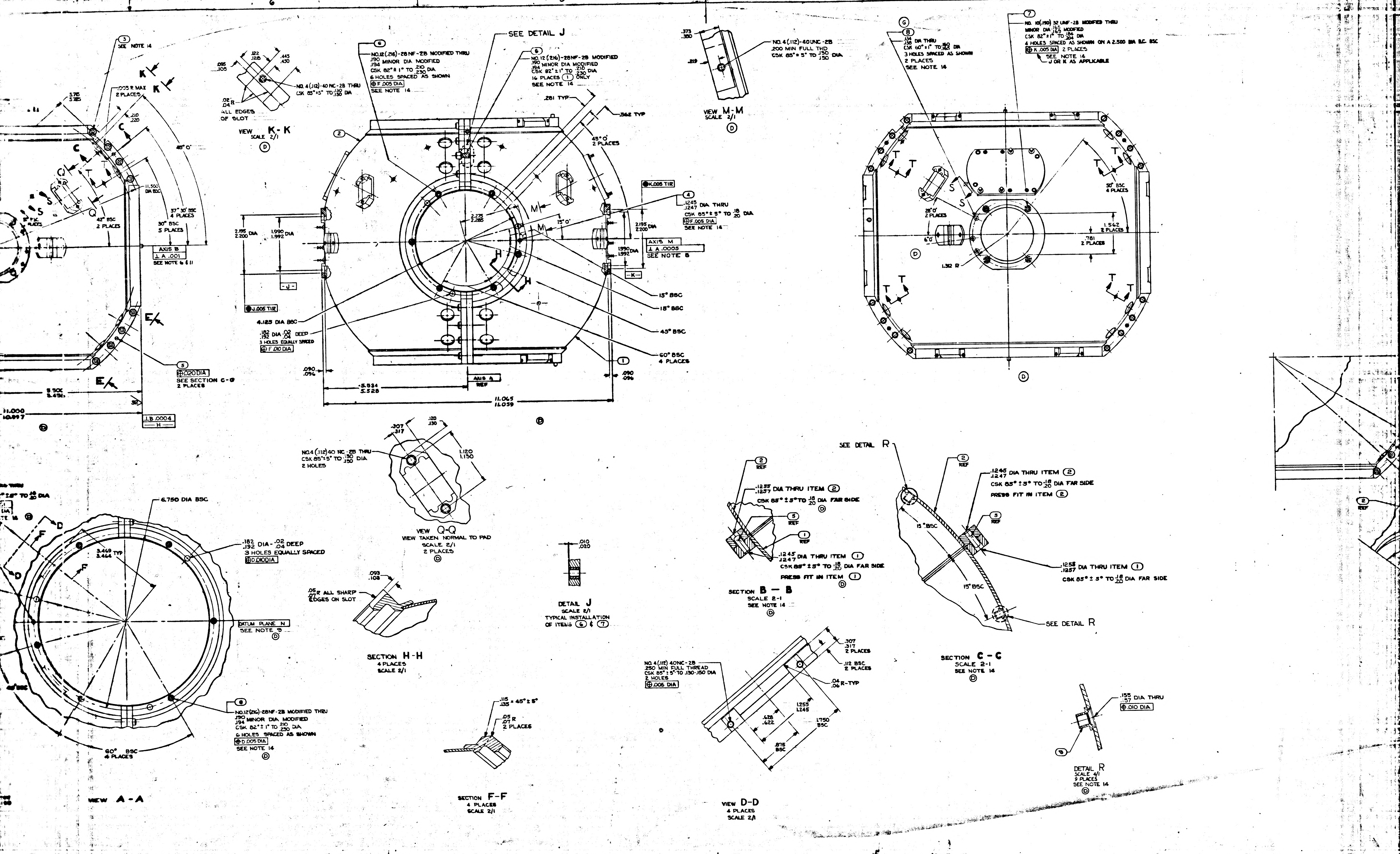
SCALE 1/1
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO.
1000103
SHEET OF

MASTER

000103 REV H SHT 1

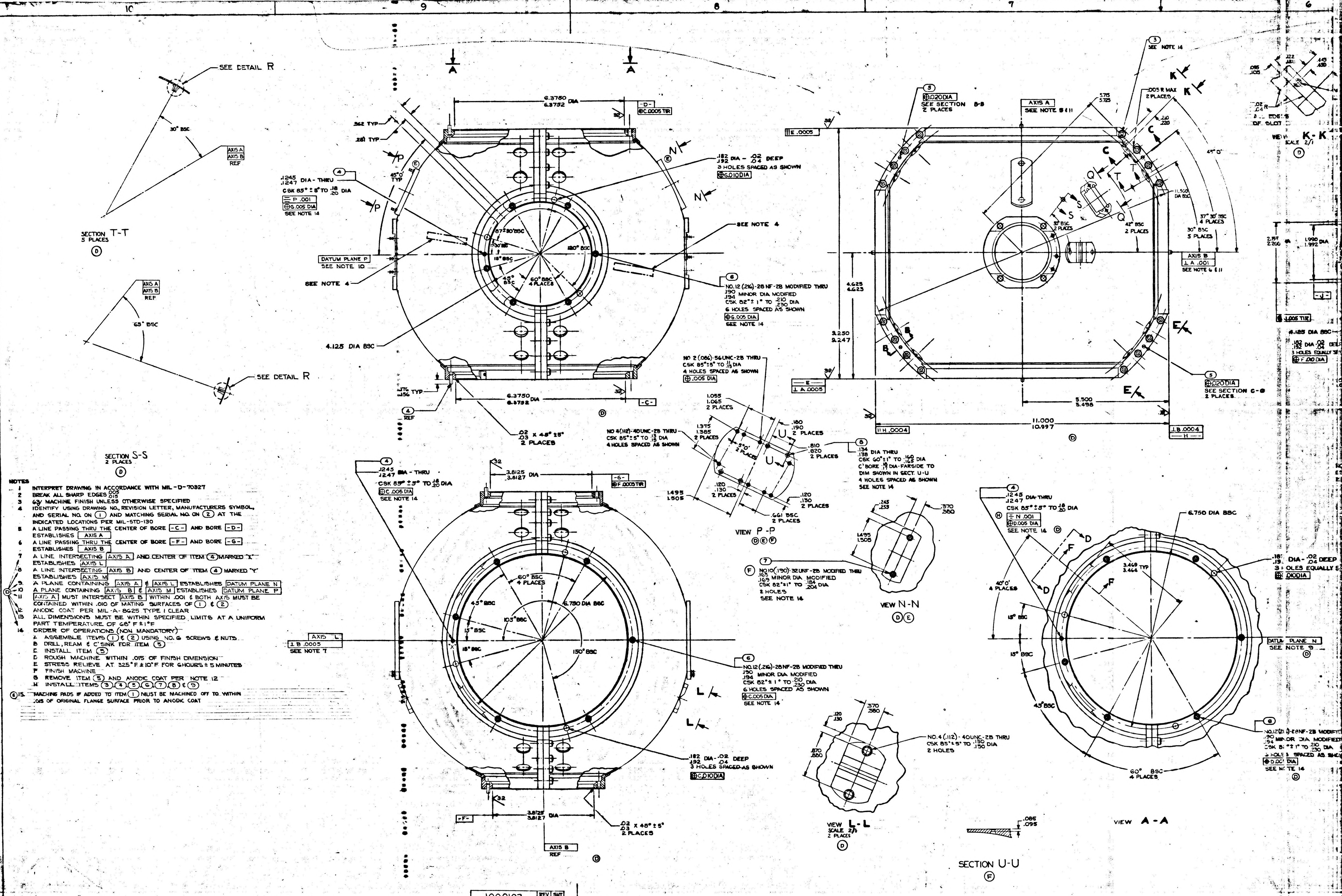
1000103


6
5
4
3
③ SEE NOTE 14
K
K
.005 R MAX 2 PLACES
5.715 5.725
.210 .220
C
C
45° 0'
11.500 DIA BSC
37° 30' BSC 4 PLACES
30° BSC 5 PLACES
42° BSC 2 PLACES
Q
Q
S
S
T
AXIS B
⊥ A .001
SEE NOTE 6 & 11
E
E
⑤ ⊕ .020 DIA
SEE SECTION C-C
2 PLACES
5.500 5.496
11.000 10.997
⊥ B .0004
H
Ⓓ
.095 .105
.122 .128
.445 .450
NO. 4 (.112)-40 NC-2B THRU CSK 85° ± 5° TO .130 .150 DIA
.02 .04 R ALL EDGES OF SLOT
VIEW K-K SCALE 2/1
Ⓓ
SEE DETAIL J
⑥ NO. 12 (.216)-28 NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ F .005 DIA
SEE NOTE 14
⑥ NO. 12 (.216)-28 NF-2B MODIFIED
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
16 PLACES ① ONLY
SEE NOTE 14
.281 TYP
.562 TYP
45° 0' 2 PLACES
②
2.195 2.200 DIA
1.990 1.992 DIA
-J-
● J .005 TIR
4.125 DIA BSC
.182 .192 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ F .010 DIA
2.275 2.285
M
M
15° 0'
H
H
● K .005 TIR
④ .1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .20 DIA
⊕ F .005 DIA
SEE NOTE 14
2.195 2.200 DIA
1.990 1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
-K-
15° BSC
18° BSC
45° BSC
60° BSC 4 PLACES
①
.090 .096
.090 .096
5.534 5.528
AXIS A REF
11.065 11.059
Ⓓ
.373 .380
.219
NO. 4 (.112)-40 UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA
VIEW M-M SCALE 2/1
Ⓓ
Ⓖ
⑧ .134 .138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦ NO. 10 (.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165 .169 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
T
T
T
T
S
S
28° 0' 2 PLACES
6° 0'
50° BSC 4 PLACES
1.562 2 PLACES
.781 2 PLACES
1.312 R
Ⓓ
Ⓓ
.307 .317
.120 .130
1.120 1.130
NO. 4 (.112) 40 NC-2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
VIEW Q-Q
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
Ⓓ
6.750 DIA BSC
D
D
F
F
3.469 3.464 TYP
.182 .192 DIA - .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ D .010 DIA
DATUM PLANE N
SEE NOTE 9
Ⓓ
⑥ NO. 12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ D .005 DIA
SEE NOTE 14
Ⓓ
60° BSC 4 PLACES
45° BSC
VIEW A-A
.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT
SECTION H-H
4 PLACES
SCALE 2/1
.010 .020
DETAIL J
SCALE 2/1
TYPICAL INSTALLATION OF ITEMS ⑥ & ⑦
.115 .135 × 45° ± 5°
.05 .07 R 2 PLACES
SECTION F-F
4 PLACES
SCALE 2/1
② REF
.1255 .1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
Ⓓ
⑤ REF
① REF
.1245 .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ①
Ⓓ
SECTION B-B
SCALE 2-1
SEE NOTE 14
Ⓓ
SEE DETAIL R
② REF
.1245 .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤ REF
15° BSC
15° BSC
.1255 .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R
SECTION C-C
SCALE 2-1
SEE NOTE 14
Ⓓ
NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .005 DIA
.307 .317 2 PLACES
.112 BSC 2 PLACES
.04 .06 R-TYP
1.255 1.245
.628 .622
1.750 BSC
.875 BSC
VIEW D-D
4 PLACES
SCALE 2/1
.155 .157 DIA THRU
⊕ .010 DIA
⑨
DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ

1000103	REV H	SHT 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F-2


SEE DETAIL R
SECTION T-T
5 PLACES
SECTION S-S
2 PLACES
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
4.125 DIA BSC
6.3750 DIA
6.3752
NO. 12 (.216)-28 NF-2B MODIFIED THRU
6 HOLES SPACED AS SHOWN
.182 DIA - .02 DEEP
3 HOLES SPACED AS SHOWN
AXIS A
SEE NOTE 5 & 11
AXIS B
SEE NOTE 6 & 11
SEE SECTION B-B
SEE SECTION C-C
11.000
10.997
5.500
5.498
VIEW K-K
SCALE 2/1
VIEW P-P
VIEW N-N
AXIS L
SEE NOTE 7
3.8125 DIA
3.8127
6.780 DIA BSC
AXIS B
REF
VIEW L-L
SCALE 2/1
2 PLACES
NO. 4 (.112) - 40UNC-2B THRU
2 HOLES
6.750 DIA BSC
DATUM PLANE N
SEE NOTE 9
VIEW A-A
SECTION U-U

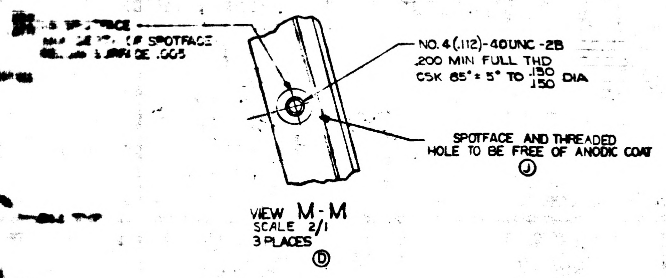
NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES $^{.005}_{.015}$
3 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130
5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L
8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M
9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F
14 ORDER OF OPERATIONS (NON MANDATORY)
  A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
  B DRILL, REAM & C'SINK FOR ITEM ⑤
  C INSTALL ITEM ⑤
  D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
  E STRESS RELIEVE AT 325° F ± 10° F FOR 6 HOURS ± 5 MINUTES
  F FINISH MACHINE
  G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 12
  H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨
Ⓔ 15. MACHING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT

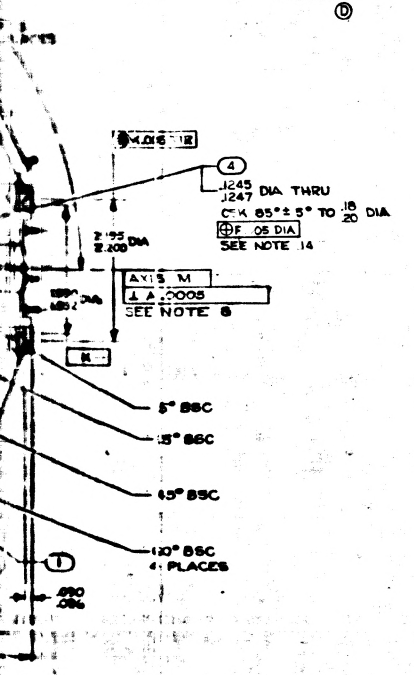
	REV	SHT
1000103	H	1

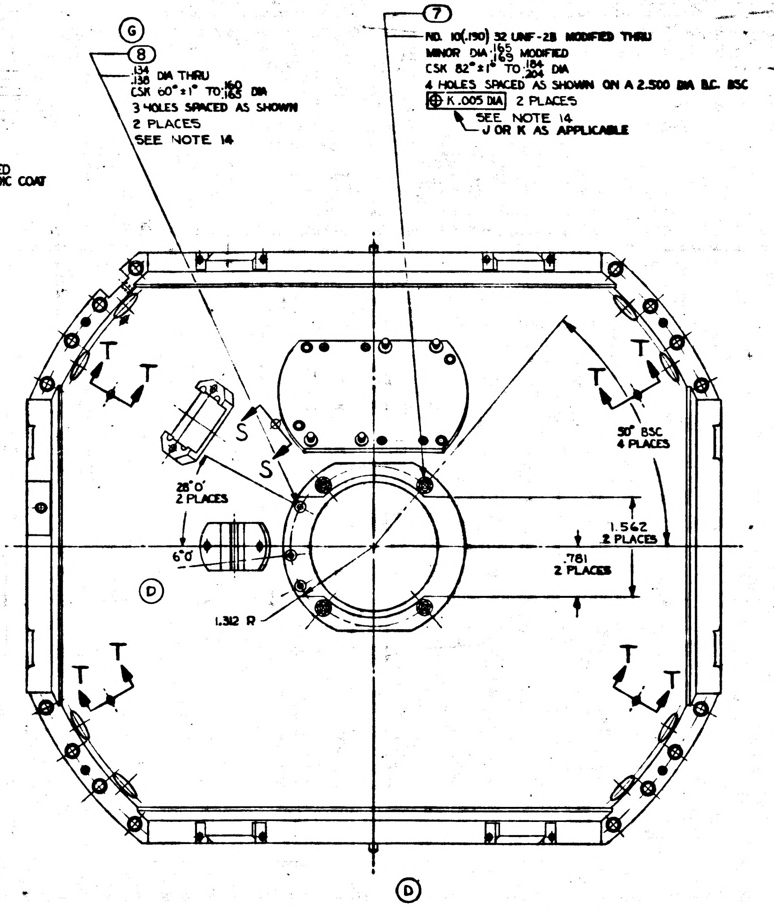
PHOTOGRAPHED SCALE ONLY

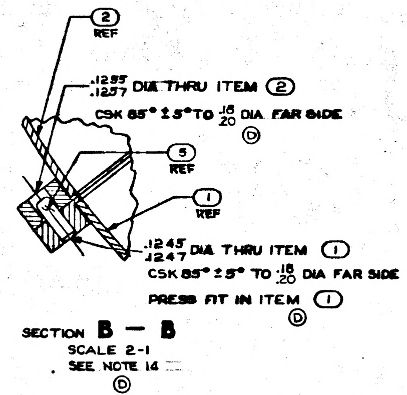
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62	
D	TDRR 00959	5-2-63	
E	TDRR 01234	5-21-63	
F	TDRR 01530	6-11-63	
G	TDRR 02123	7-23-63	
H	TDRR 04942		
J	TDRR 06176	2-4-64	
K	TDRR 06180	2-4-64	


SPOTFACE
SPOTFACE
.005
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT
Ⓙ

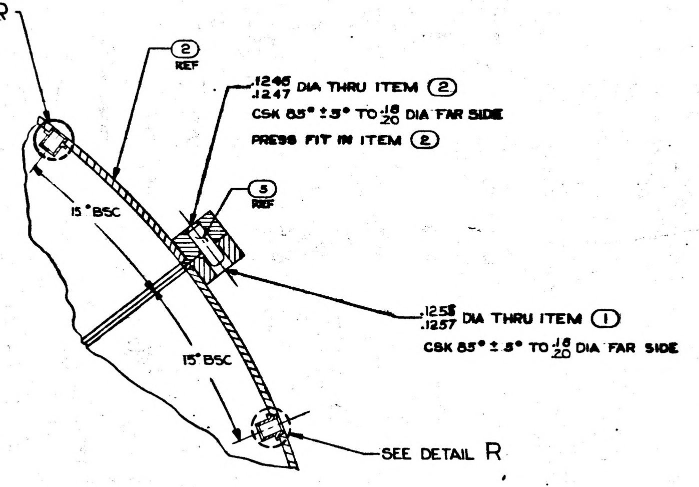
VIEW M-M
SCALE 2/1
3 PLACES
Ⓓ


.015
④
.1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .20 DIA
⊕ F .05 DIA
SEE NOTE 14
2.195 2.200 DIA
DIA
AXIS M
⊥ A .0005
SEE NOTE 8
5° BSC
15° BSC
45° BSC
120° BSC
4 PLACES
①
.090 .096

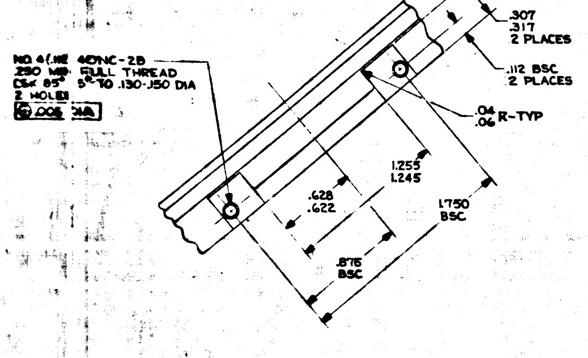

Ⓖ
⑧
.134 .138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165 .169 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
T
T
T
T
T
T
T
T
S
S
30° BSC
4 PLACES
28°0'
2 PLACES
6°0'
1.542
2 PLACES
.781
2 PLACES
1.312 R
Ⓓ
Ⓓ


②
REF
.1255 .1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
Ⓓ
⑤
REF
①
REF
.1245 .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ①
Ⓓ

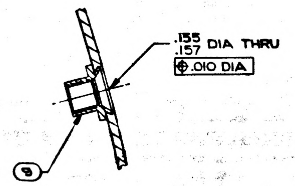
SECTION B — B
SCALE 2-1
SEE NOTE 14
Ⓓ


SEE DETAIL R
②
REF
.1246 .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤
REF
15° BSC
15° BSC
.1255 .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R

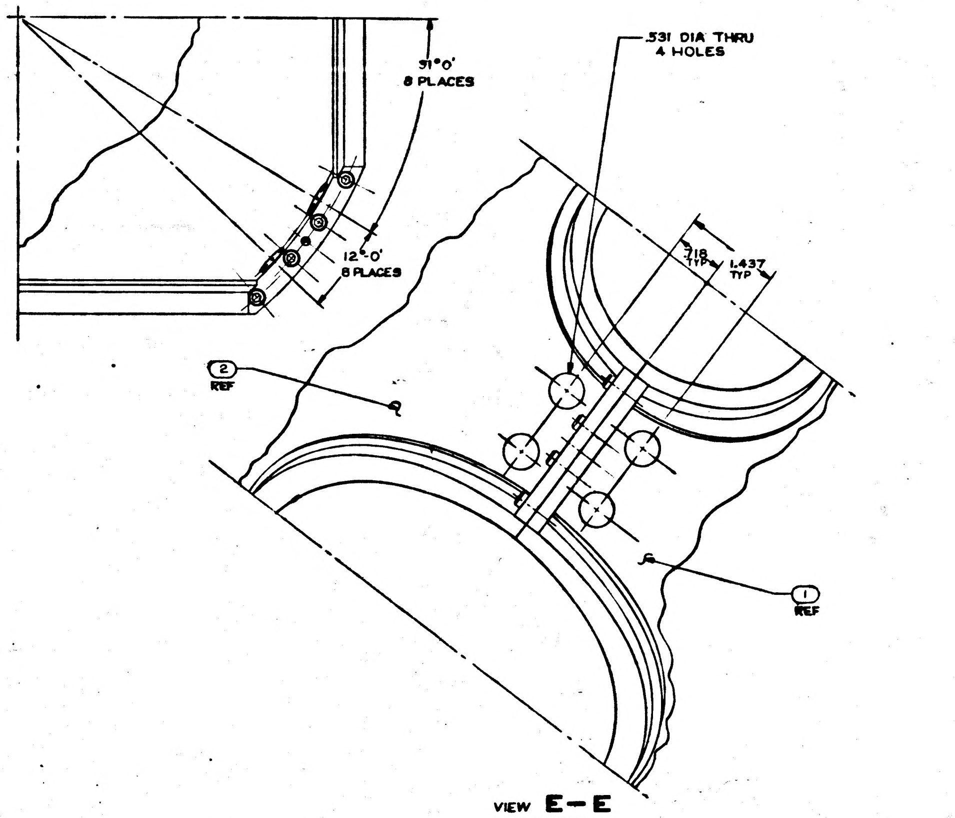
SECTION C - C
SCALE 2-1
SEE NOTE 14
Ⓓ


NO. 4 (.112) 40UNC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .005 DIA
.307 .317
2 PLACES
.112 BSC
2 PLACES
.04 .06 R-TYP
1.255 1.245
.628 .622
1.750 BSC
.876 BSC

VIEW D-D
4 PLACES
SCALE 2/1


.155 .157 DIA THRU
⊕ .010 DIA
⑧

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ


31°0'
8 PLACES
12°0'
8 PLACES
.531 DIA THRU
4 HOLES
.718 TYP
1.437 TYP
②
REF
①
REF

VIEW E—E
4 PLACES

REPLACES REV B WITH CHANGE

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	ITEM NO
Ⓓ	9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
Ⓖ Ⓕ	10	TERMINAL, INSULATED	1000100-1			8
Ⓕ Ⓓ	10	INSERT, THREADED, SELF LOCKING	1000115-2			7
	40	INSERT, THREADED, SELF LOCKING	1000115-3			6
	4	PIN, STRAIGHT HEADLESS	MS16555-325			5
	4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
	16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
	1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
	1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN RWC
APPROVED FOR NASA
W J Robins 12-
M.I.T. APPROVAL

HOUSING ASSEMBLY
OUTER GIMBAL

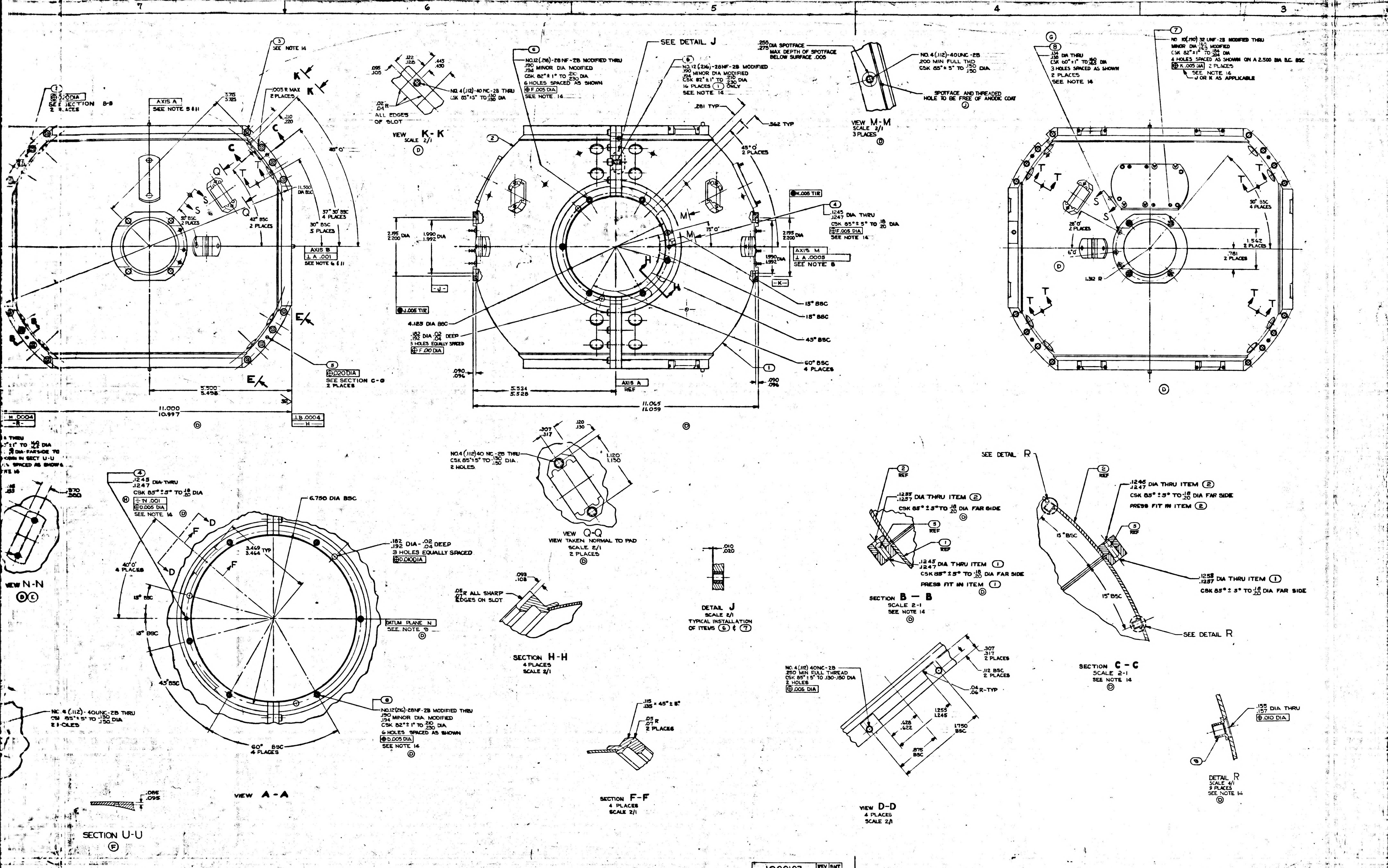
SCALE 1/1
UNIT WT
CODE IDENT.

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000103
SHEET 1 OF 1

MASTER

1000103
REV K
SHT 1

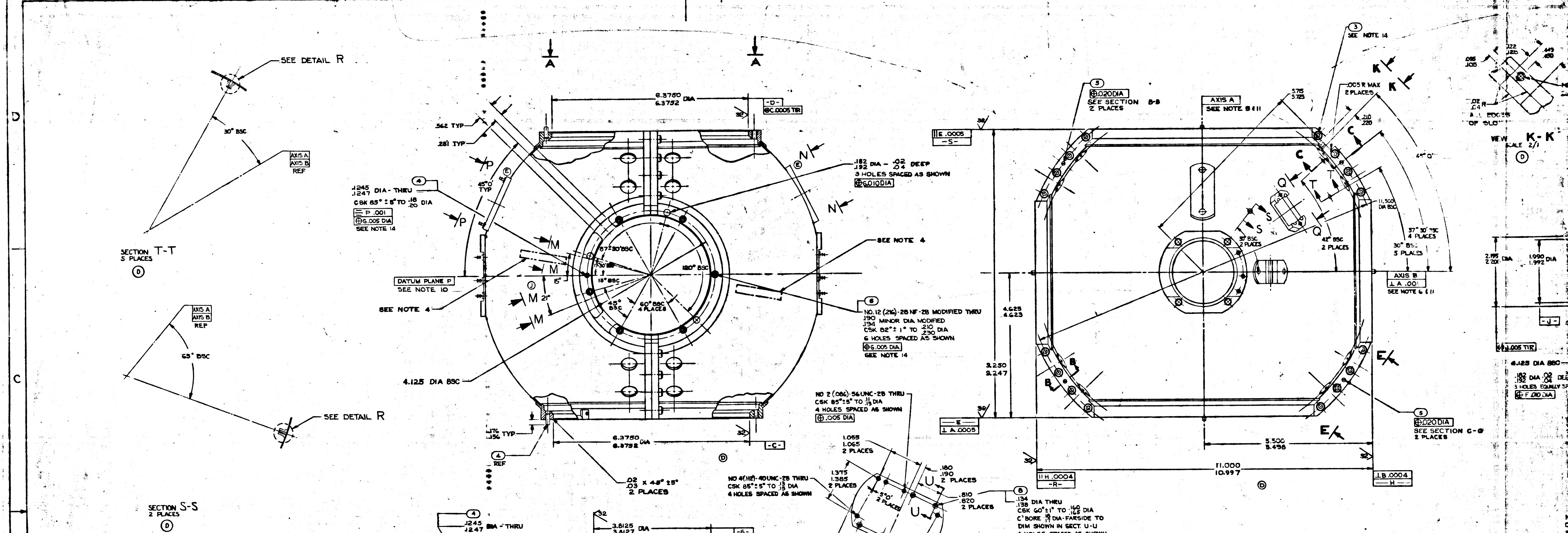
F-3


7
6
5
4
3
③ SEE NOTE 14
① .020 DIA SEE SECTION B-B 2 PLACES
AXIS A SEE NOTE 5 & 11
3.715 3.725
.005 R MAX 2 PLACES
K K
C
.210 .220
45° 0'
11.500 DIA BSC
37° 30' BSC 4 PLACES
30° BSC 5 PLACES
42° BSC 2 PLACES
30° BSC 2 PLACES
AXIS B ⊥ A .001 SEE NOTE 6 & 11
S S Q Q T T C
E E
⑤ .020 DIA SEE SECTION C-C 2 PLACES
5.500 5.498
11.000 10.997
⊥ B .0004 H
H .0004 R
D
.095 .105
.122 .128
.445 .450
NO. 4 (.112)-40 NC-2B THRU CSK 85° ± 5° TO .130 .150 DIA
.02 .04 R ALL EDGES OF SLOT
VIEW K-K SCALE 2/1
D
⑥ NO.12 (.216)-28 NF-2B MODIFIED THRU .190 .194 MINOR DIA MODIFIED CSK 82° ± 1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ⊕ F .005 DIA SEE NOTE 14
SEE DETAIL J
⑥ NO.12 (.216)-28NF-2B MODIFIED .190 .194 MINOR DIA MODIFIED CSK 82° ± 1° TO .210 .230 DIA 14 PLACES ① ONLY SEE NOTE 14
.281 TYP
.362 TYP
45° 0' 2 PLACES
②
K .005 TIR
④ .1245 .1247 DIA THRU CSK 85° ± 5° TO .18 .20 DIA ⊕ F .005 DIA SEE NOTE 14
2.195 2.200 DIA
1.990 1.992 DIA
M M H H 15° 0'
AXIS M ⊥ A .0005 SEE NOTE 8
J K
J .005 TIR
4.125 DIA BSC
.182 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED ⊕ F .010 DIA
15° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
.090 .096
5.524 5.528
AXIS A REF
11.065 11.059
①
D
.255 .275 DIA SPOTFACE MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO. 4 (.112)-40UNC-2B .200 MIN FULL THD CSK 85° ± 5° TO .130 .150 DIA
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT J
VIEW M-M SCALE 2/1 3 PLACES D
G ⑧ .134 .138 DIA THRU CSK 60° ± 1° TO .160 .163 DIA 3 HOLES SPACED AS SHOWN 2 PLACES SEE NOTE 14
⑦ NO 10 (.190) 32 UNF-2B MODIFIED THRU MINOR DIA .165 .169 MODIFIED CSK 82° ± 1° TO .184 .204 DIA 4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC ⊕ K .005 DIA 2 PLACES SEE NOTE 14 J OR K AS APPLICABLE
T T S S
28° 0' 2 PLACES
6° 0'
50° BSC 4 PLACES
1.562 2 PLACES
.781 2 PLACES
1.312 R
D
D
.5 THRU
° ± 1° TO .160 .163 DIA
DIA FARSIDE TO
SHOWN IN SECT U-U
SPACED AS SHOWN
NOTE 14
.48 .53
.370 .380
VIEW N-N D E
④ .1245 .1247 DIA THRU CSK 85° ± 5° TO .18 .20 DIA
N ⊥ N .001 ⊕ D .005 DIA SEE NOTE 14 D
6.750 DIA BSC
D F D F
3.469 3.464 TYP
.182 .192 DIA .02 .04 DEEP 3 HOLES EQUALLY SPACED ⊕ D .010 DIA
40° 0' 4 PLACES
15° BSC
18° BSC
DATUM PLANE N SEE NOTE 9 D
45° BSC
60° BSC 4 PLACES
⑥ NO.12 (.216)-28NF-2B MODIFIED THRU .190 .194 MINOR DIA MODIFIED CSK 82° ± 1° TO .210 .230 DIA 6 HOLES SPACED AS SHOWN ⊕ D .005 DIA SEE NOTE 14 D
NO. 4 (.112)-40UNC-2B THRU CSK 85° ± 5° TO .130 .150 DIA 2 HOLES
VIEW A-A
.085 .095
SECTION U-U F
NO.4 (.112) 40 NC-2B THRU CSK 85° ± 5° TO .130 .150 DIA. 2 HOLES
.307 .317
.120 .130
1.120 1.130
VIEW Q-Q VIEW TAKEN NORMAL TO PAD SCALE 2/1 2 PLACES D
.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT
SECTION H-H 4 PLACES SCALE 2/1
.010 .020
DETAIL J SCALE 2/1 TYPICAL INSTALLATION OF ITEMS ⑥ & ⑦
.115 .135 × 45° ± 5°
.05 .07 R 2 PLACES
SECTION F-F 4 PLACES SCALE 2/1
② REF
.1255 .1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
⑤ REF
① REF
.1245 .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ① D
SECTION B-B SCALE 2-1 SEE NOTE 14 D
SEE DETAIL R
② REF
.1245 .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤ REF
15° BSC
15° BSC
.1255 .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R
SECTION C-C SCALE 2-1 SEE NOTE 14 D
NO. 4 (.112) 40NC-2B .250 MIN FULL THREAD CSK 85° ± 5° TO .130-.150 DIA 2 HOLES ⊕ .005 DIA
.307 .317 2 PLACES
.112 BSC 2 PLACES
.04 .06 R-TYP
1.255 1.245
.628 .622
1.750 BSC
.875 BSC
VIEW D-D 4 PLACES SCALE 2/1
.155 .157 DIA THRU ⊕ .010 DIA
⑨
DETAIL R SCALE 4/1 9 PLACES SEE NOTE 14 D
7
6
5
4
3

1000103 REV K SHT 1

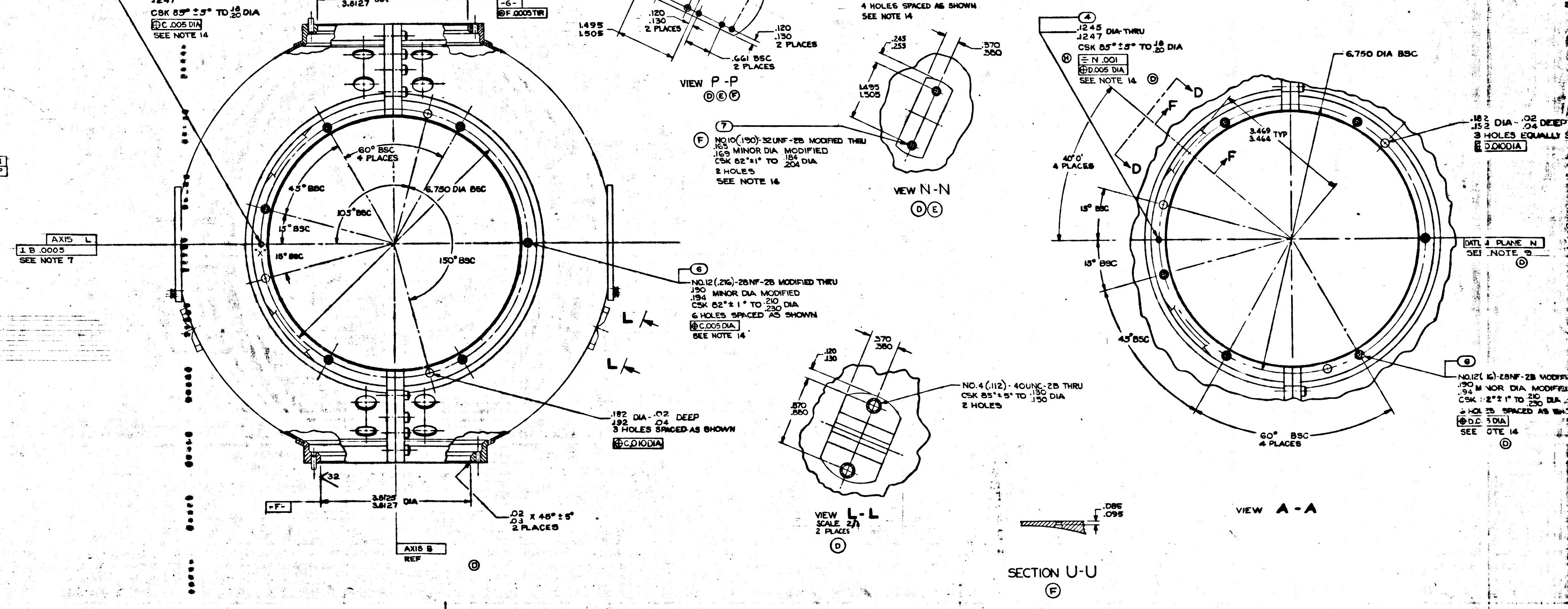
INCHES
PHOTOGRAPHIC SCALE ONLY

E-2


SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF
SECTION T-T
5 PLACES
63° BSC
SEE DETAIL R
A
A
6.3760
6.3752 DIA
-D-
C .0005 TIR
.562 TYP
.281 TYP
45°0' TYP
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .20 DIA
P .001
G .005 DIA
SEE NOTE 14
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
4.125 DIA BSC
.182
.192 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
G .010 DIA
SEE NOTE 4
180° BSC
60° BSC 4 PLACES
NO. 12 (.216) - 28 NF - 2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
G .005 DIA
SEE NOTE 14
.126
.156 TYP
REF
6.3750
6.3752 DIA
-C-
.02
.03 X 45° ± 5°
2 PLACES
SECTION S-S
2 PLACES
II E .0005
-S-
.020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
5.715
5.725
.005 R MAX
2 PLACES
.210
.220
SEE NOTE 14
11.500
11.490 DIA BSC
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
37 BSC
2 PLACES
42° BSC
2 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
4.625
4.623
3.250
3.247
-E-
⊥ A .0005
.020 DIA
SEE SECTION C-C
2 PLACES
5.500
5.498
11.000
10.997
II H .0004
-R-
⊥ B .0004
-H-
VIEW K-K
SCALE 2/1
2.195
2.200 DIA
1.990
1.992 DIA
-J-
.005 TIR
4.125 DIA BSC
.182
.192 DIA .02 .04 DEEP
3 HOLES EQUALLY SP
F .010 DIA

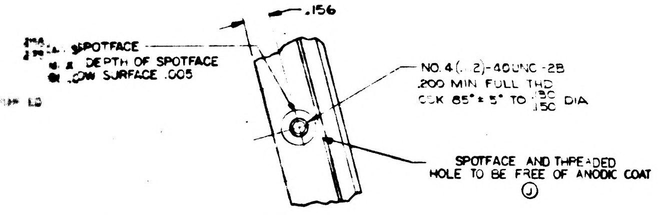
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130
5. A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6. A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7. A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L
8. A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M
9. A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
10. A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
11. AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②
12. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
13. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F
14. ORDER OF OPERATIONS (NON MANDATORY)
    - A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
    - B DRILL REAM & C'SINK FOR ITEM ⑤
    - C INSTALL ITEM ⑤
    - D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
    - E STRESS RELIEVE AT 325° F ± 10° F FOR 6 HOURS ± 5 MINUTES
    - F FINISH MACHINE
    - G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 12
    - H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨
15. MACHINING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT
16. ALTERNATE FINISH: BORES -C- -D- -G- & -F- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541

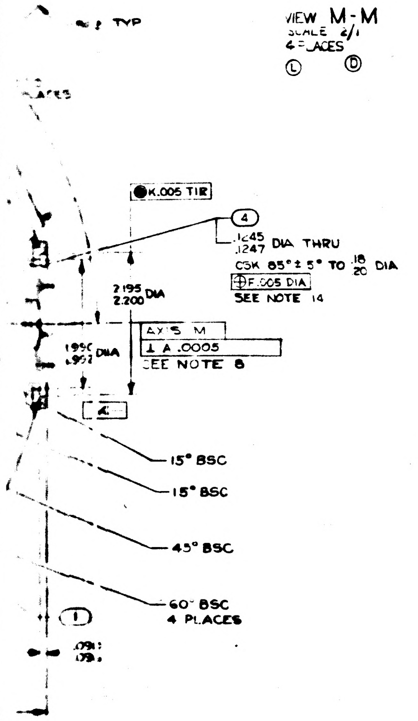

.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .20 DIA
C .005 DIA
SEE NOTE 14
3.8125
3.8127 DIA
-G-
F .0005 TIR
60° BSC 4 PLACES
45° BSC
105° BSC
15° BSC
15° BSC
6.750 DIA BSC
150° BSC
AXIS L
⊥ B .0005
SEE NOTE 7
NO. 12 (.216) - 28 NF - 2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
C .005 DIA
SEE NOTE 14
.182
.192 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
C .010 DIA
-F-
3.8125
3.8127 DIA
.02
.03 X 45° ± 5°
2 PLACES
AXIS B
REF
NO 2 (.086) - 56 UNC - 2B THRU
CSK 85° ± 5° TO .11 .13 DIA
4 HOLES SPACED AS SHOWN
.005 DIA
1.055
1.065
2 PLACES
1.375
1.385
2 PLACES
NO 4 (.112) - 40 UNC - 2B THRU
CSK 85° ± 5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
.180
.190
2 PLACES
.810
.820
2 PLACES
.120
.130
2 PLACES
1.495
1.505
.661 BSC
2 PLACES
.120
.130
2 PLACES
VIEW P-P
.134
.138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
C'BORE .18 DIA - FARSIDE TO DIM SHOWN IN SECT. U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
NO. 10 (.190) - 32 UNF - 2B MODIFIED THRU
.165
.169 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
2 HOLES
SEE NOTE 14
.245
.255
.370
.380
1.495
1.505
VIEW N-N
.120
.130
.370
.380
.870
.880
NO. 4 (.112) - 40 UNC - 2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
VIEW L-L
SCALE 2/1
2 PLACES
.086
.095
SECTION U-U
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .20 DIA
N .001
D .005 DIA
SEE NOTE 14
6.750 DIA BSC
3.469
3.464 TYP
40° 0'
4 PLACES
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
DATUM PLANE N
SEE NOTE 9
.182
.152 DIA - .02 .04 DEEP
3 HOLES EQUALLY S
D .010 DIA
VIEW A-A

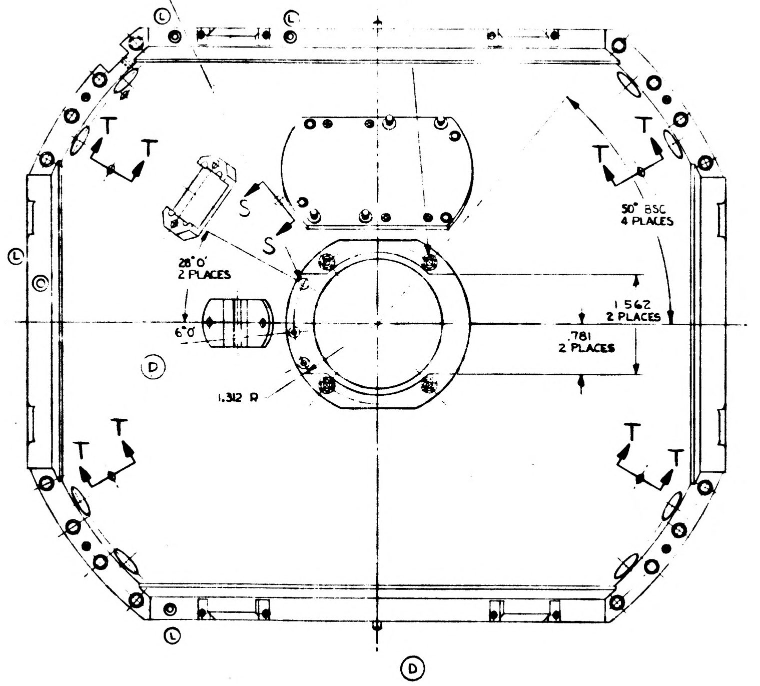
INCHES
PHOTOGRAPHIC SCALE ONLY

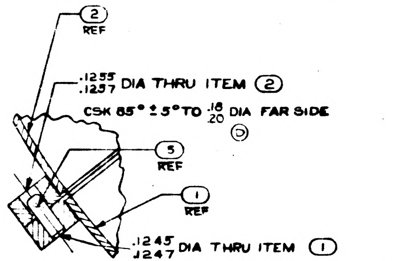
	REV	DESCRIPTION	DATE		APPROV
Ⓜ	C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62		
Ⓜ	D	TDRR 00959	4-2-63		WK
Ⓜ	E	TDRR 01234	5-21-63		WK
Ⓜ	F	TDRR 01530	6-11-63		BKB
Ⓜ	G	TDRR 02123	7-23-63		WK
Ⓜ	H	TDRR 04942	11-19-63		
Ⓜ	J	TDRR 06176	2-4-64		WK
Ⓜ	K	TDRR 06180	2-4-64		WK
	L	REVISED PER TDRR 08082	11 MAY 64		CP


Ⓛ
.156
SPOTFACE
DEPTH OF SPOTFACE
LOW SURFACE .005
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130/.150 DIA
SPOTFACE AND THREADED
HOLE TO BE FREE OF ANODIC COAT
Ⓙ

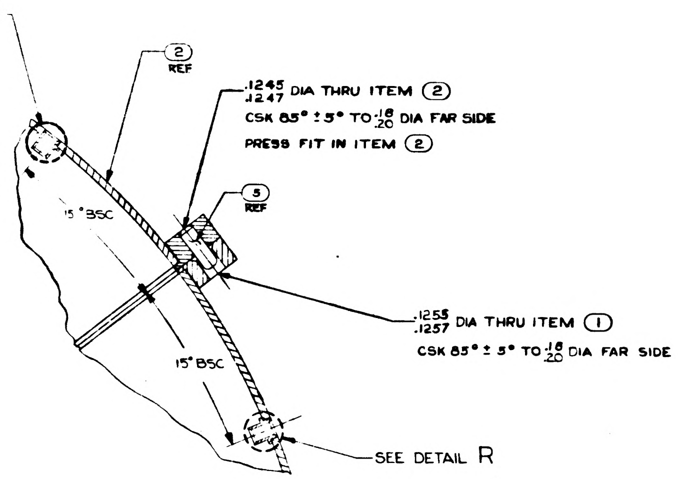
VIEW M-M
SCALE 2/1
4 PLACES
Ⓛ Ⓓ


TYP
PLACES
K .005 TIR
④
.1245/.1247 DIA THRU
CSK 85° ± 5° TO .18/.20 DIA
⊕ F .005 DIA
SEE NOTE 14
2.195/2.200 DIA
1.990/1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
A
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
①
.091/.093

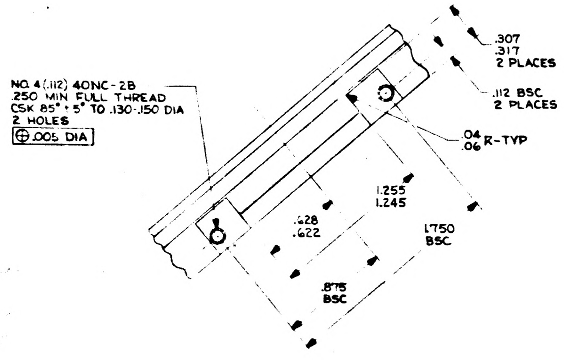

Ⓖ
⑧
.134/.138 DIA THRU
CSK 60° ± 1° TO .160/.165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO. 10 (.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165/.169 MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 14
J OR K AS APPLICABLE
Ⓛ
Ⓛ
Ⓒ
T
T
S
S
50° BSC
4 PLACES
28° 0'
2 PLACES
6° 0'
1.562
2 PLACES
.781
2 PLACES
Ⓓ
1.312 R
Ⓛ
Ⓓ


② REF
.1255/.1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
Ⓓ
⑤ REF
① REF
.1245/.1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ①
Ⓓ

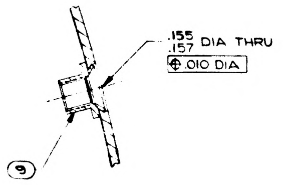
SECTION B — B
SCALE 2-1
SEE NOTE 14
Ⓓ


SEE DETAIL R
② REF
.1245/.1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤ REF
15° BSC
15° BSC
.1255/.1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
SEE DETAIL R

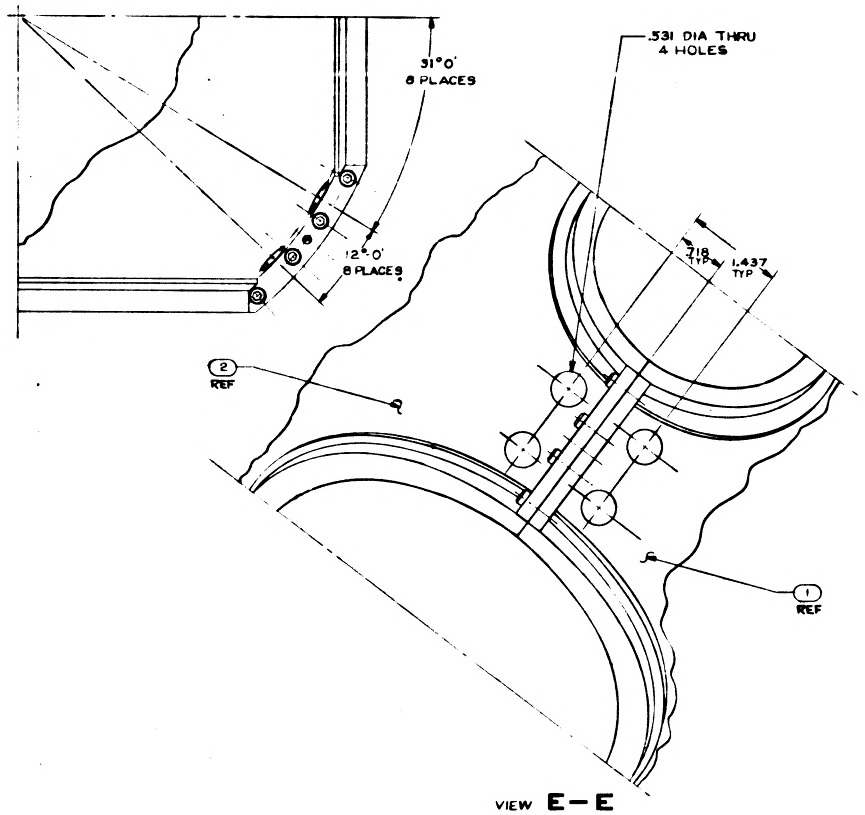
SECTION C — C
SCALE 2-1
SEE NOTE 14
Ⓓ


NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .005 DIA
.307/.317
2 PLACES
.112 BSC
2 PLACES
.04/.06 R-TYP
1.255/1.245
.628/.622
1.750 BSC
.875 BSC

VIEW D-D
4 PLACES
SCALE 2/1


.155/.157 DIA THRU
⊕ .010 DIA
⑨

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ


31° 0'
8 PLACES
12° 0'
8 PLACES
.531 DIA THRU
4 HOLES
.718 TYP
1.437 TYP
② REF
① REF

VIEW E—E
4 PLACES

REPLACES REV B WITH CHANGE

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	ITEM NO
Ⓓ	9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
Ⓖ Ⓕ	10	TERMINAL, INSULATED	1000100-1			8
Ⓕ Ⓓ	10	INSERT, THREADED, SELF LOCKING	1000115-2			7
	40	INSERT, THREADED, SELF LOCKING	1000115-3			6
	4	PIN, STRAIGHT HEADLESS	MS16555-625			5
	4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
	16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
	1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
	1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T.
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED 12/11/62
CHECKED
DRAWN RWC
APPROVED FOR MSC
W J Rhine 12-12-62
M.I.T. APPROVAL
12/12/62

HOUSING ASSEMBLY OUTER GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

M.I.T.
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000103
SHEET OF

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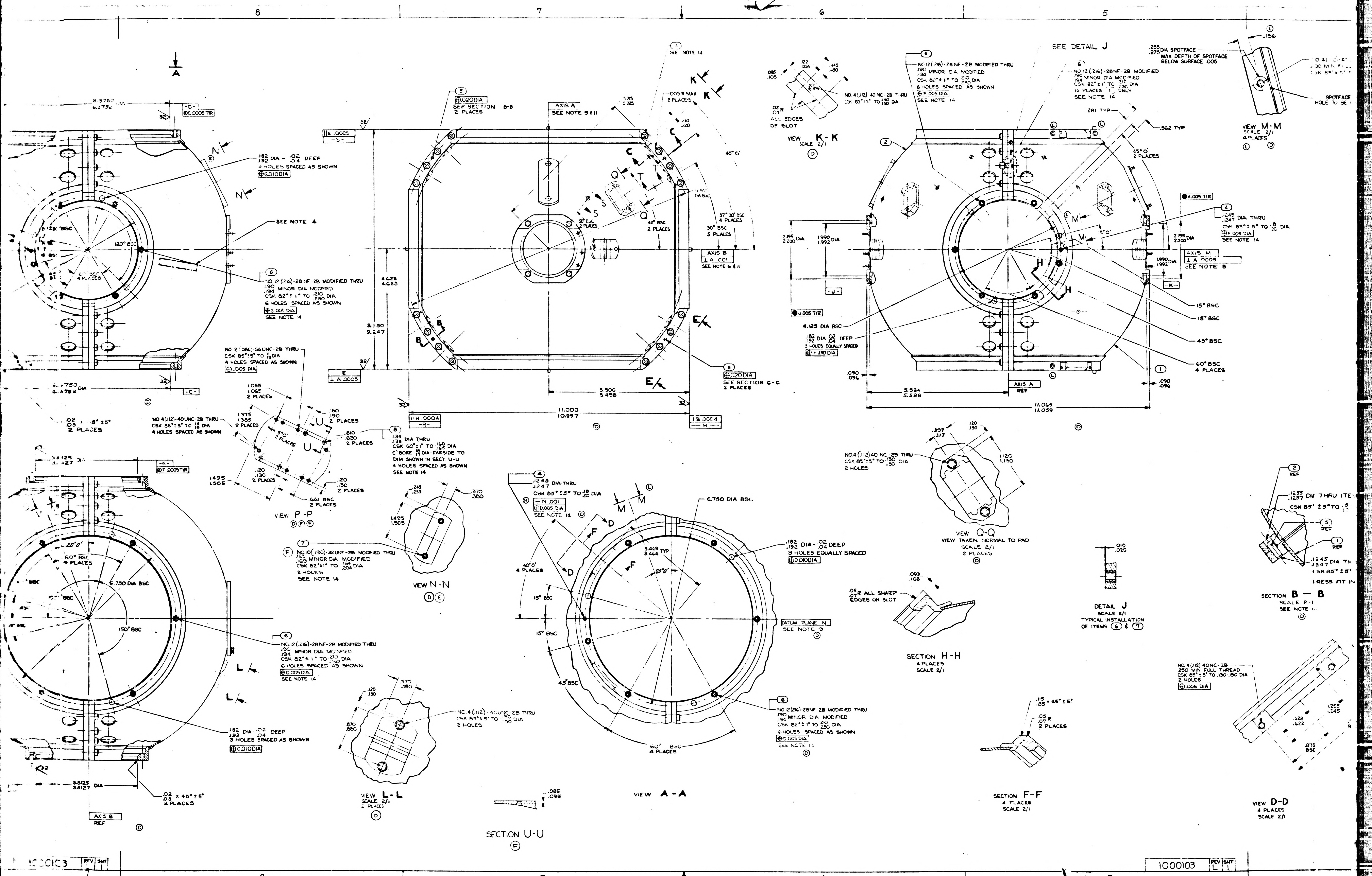
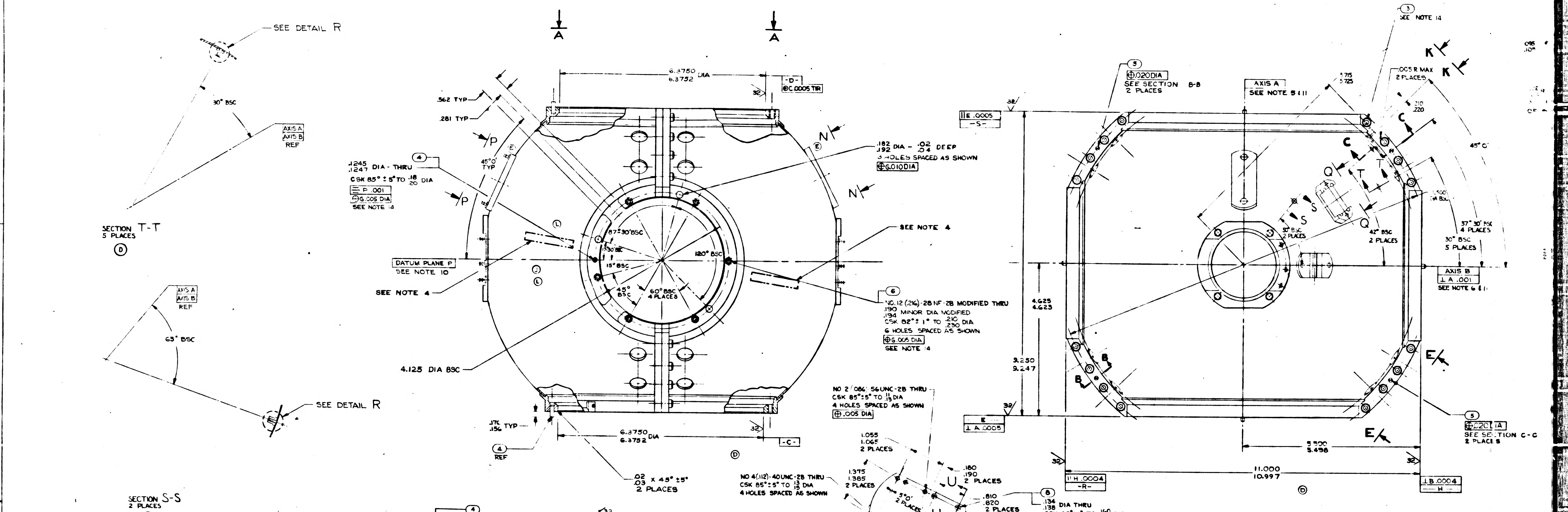
1000103

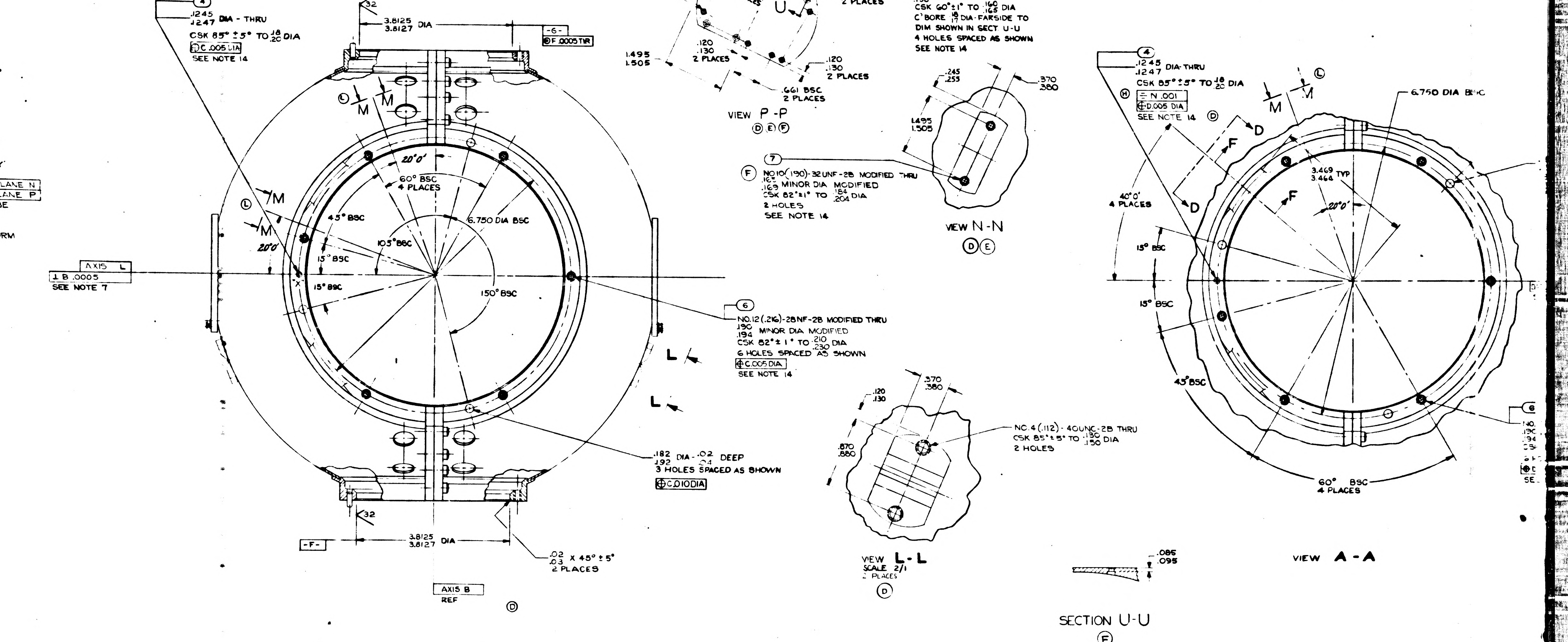
3/1000103


8
7
6
5
A
VIEW K-K
SCALE 2/1
ALL EDGES OF SLOT
NO.4 (.112) 40 NC-2B THRU CSK 85°±5° TO .130/.150 DIA
SEE NOTE 14
SEE DETAIL J
.255/.275 DIA SPOTFACE
MAX DEPTH OF SPOTFACE BELOW SURFACE .005
SPOTFACE HOLE TO BE
VIEW M-M
SCALE 2/1
4 PLACES
.182/.192 DIA - .02/.04 DEEP
3 HOLES SPACED AS SHOWN
SEE NOTE 4
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
SEE NOTE 14
.020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
SEE NOTE 14
.005 R MAX
2 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
42° BSC
2 PLACES
45° 0'
.220 DIA
SEE SECTION C-C
2 PLACES
11.000
10.997
5.500
5.498
4.625
4.623
9.250
9.247
NO.2 (.086) 56UNC-2B THRU
CSK 85°±5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
NO 4 (.112)-40UNC-2B THRU
CSK 85°±5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
VIEW P-P
.134/.138 DIA THRU
CSK 60°±1° TO .160/.165 DIA
C'BORE .18 DIA-FARSIDE TO DIM SHOWN IN SECT U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
NO.10 (.190)-32UNF-2B MODIFIED THRU
.165/.169 MINOR DIA MODIFIED
CSK 82°±1° TO .184/.204 DIA
2 HOLES
SEE NOTE 14
VIEW N-N
.1245/.1247 DIA THRU
CSK 85°±5° TO .18/.20 DIA
6.750 DIA BSC
.182/.192 DIA - .02/.04 DEEP
3 HOLES EQUALLY SPACED
DATUM PLANE N
SEE NOTE 9
60° BSC
4 PLACES
VIEW A-A
SECTION U-U
NO.4 (.112) 40 NC-2B THRU
CSK 85°±5° TO .130/.150 DIA
2 HOLES
VIEW Q-Q
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
.05/.07 R ALL SHARP EDGES ON SLOT
SECTION H-H
4 PLACES
SCALE 2/1
DETAIL J
SCALE 2/1
TYPICAL INSTALLATION OF ITEMS ⑥ & ⑦
SECTION B-B
SECTION F-F
4 PLACES
SCALE 2/1
NO.4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85°±5° TO .130-.150 DIA
2 HOLES
VIEW D-D
4 PLACES
SCALE 2/1
AXIS M
⊥ A .0005
SEE NOTE 8
15° BSC
45° BSC
60° BSC
4 PLACES
4.125 DIA BSC
11.065
11.059
5.534
5.528
AXIS A
REF
VIEW L-L
SCALE 2/1
2 PLACES
AXIS B
REF
1000103
REV L
SHT 1

2/1000103



10
9
8
7
D
C
SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF
SECTION T-T
5 PLACES
63° BSC
SEE DETAIL R
SECTION S-S
2 PLACES
A
A
6.3750
6.3752 DIA
-D-
.562 TYP
.281 TYP
P
P
45°0' TYP
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .20 DIA
SEE NOTE 14
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
4.125 DIA BSC
67°30' BSC
30° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
120° BSC
N
N
.182 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
SEE NOTE 4
NO.12 (.216) - 28 NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
SEE NOTE 14
.176 .156 TYP
REF
6.3750
6.3752 DIA
-C-
.02 .03 X 45° ± 5°
2 PLACES
AXIS A
SEE NOTE 5 & 11
SEE SECTION B-B
2 PLACES
.005 R MAX 2 PLACES
SEE NOTE 14
K
K
C
C
Q
Q
T
T
S
S
37° 30' BSC 4 PLACES
30° BSC 5 PLACES
42° BSC 2 PLACES
45° C
AXIS B
SEE NOTE 6 & 11
4.625
4.623
9.250
9.247
E
E
B
B
SEE SECTION C-C
2 PLACES
5.500
5.498
11.000
10.997
-R-
-H-
-S-



NO 2 (.086) - 56 UNC-2B THRU
CSK 85° ± 5° TO 1/1 DIA
4 HOLES SPACED AS SHOWN
1.055
1.065
2 PLACES
NO 4 (.112) - 40 UNC-2B THRU
CSK 85° ± 5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
1.375
1.385
2 PLACES
U
U
.180
.190
2 PLACES
.810
.820
2 PLACES
.134
.138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
C'BORE .18 .17 DIA - FARSIDE TO
DIM SHOWN IN SECT U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
1.495
1.505
.120
.130
2 PLACES
.661 BSC
2 PLACES
VIEW P-P
.245
.255
.370
.380
VIEW N-N
NO 10 (.190) - 32 UNF-2B MODIFIED THRU
.161
.165 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
2 HOLES
SEE NOTE 14
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18 .20 DIA
SEE NOTE 14
3.8125
3.8127 DIA
-G-
-F-
M
M
20°0'
60° BSC 4 PLACES
45° BSC
105° BSC
6.750 DIA BSC
15° BSC
150° BSC
AXIS L
SEE NOTE 7
NO.12 (.216) - 28 NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
SEE NOTE 14
.182 DIA - .02 .04 DEEP
3 HOLES SPACED AS SHOWN
.02 .03 X 45° ± 5°
2 PLACES
L
L
AXIS B
REF
.120
.130
.370
.380
.870
.880
NO 4 (.112) - 40 UNC-2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
VIEW L-L
SCALE 2/1
2 PLACES
6.750 DIA BSC
D
D
F
F
3.469 TYP
3.464
40°0' 4 PLACES
15° BSC
45° BSC
60° BSC 4 PLACES
.085
.095
VIEW A-A
SECTION U-U

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 BREAK ALL SHARP EDGES $^{.005}_{.015}$

3 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED

4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130

5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A

6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B

7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L

8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M

9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N

10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P

11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②

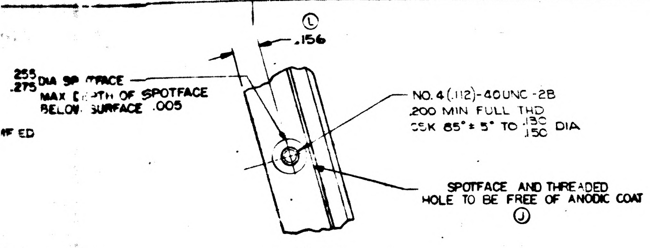
12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F

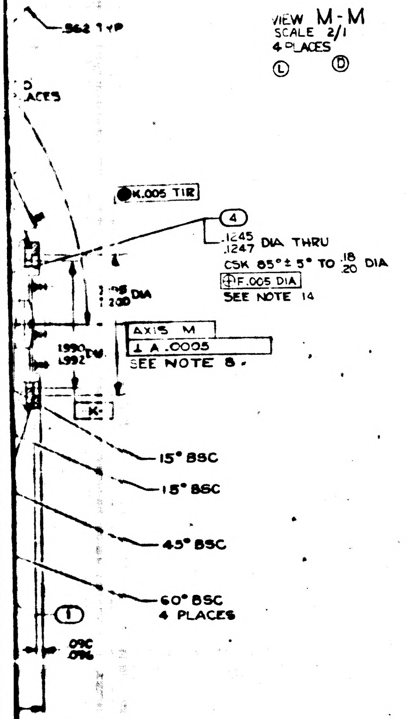
14 ORDER OF OPERATIONS (NON MANDATORY)
- A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
- B DRILL, REAM & C'SINK FOR ITEM ⑤
- C INSTALL ITEM ⑤
- D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
- E STRESS RELIEVE AT 325° F ± 10° F FOR 6 HOURS ± 5 MINUTES
- F FINISH MACHINE
- G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 12
- H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨

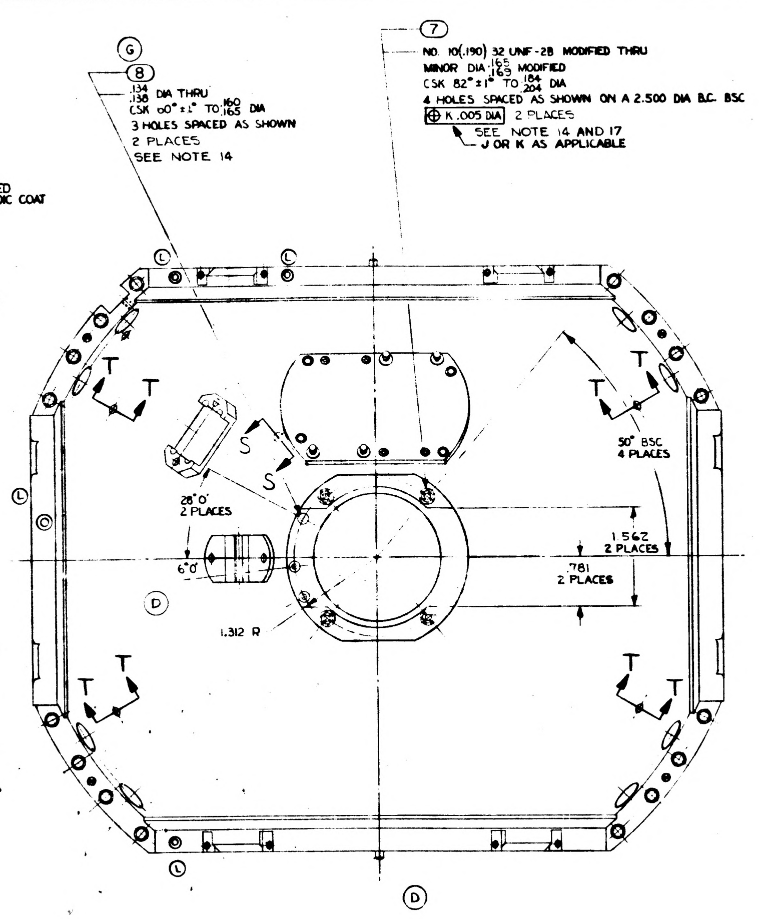
Ⓔ 15. MACHINING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT

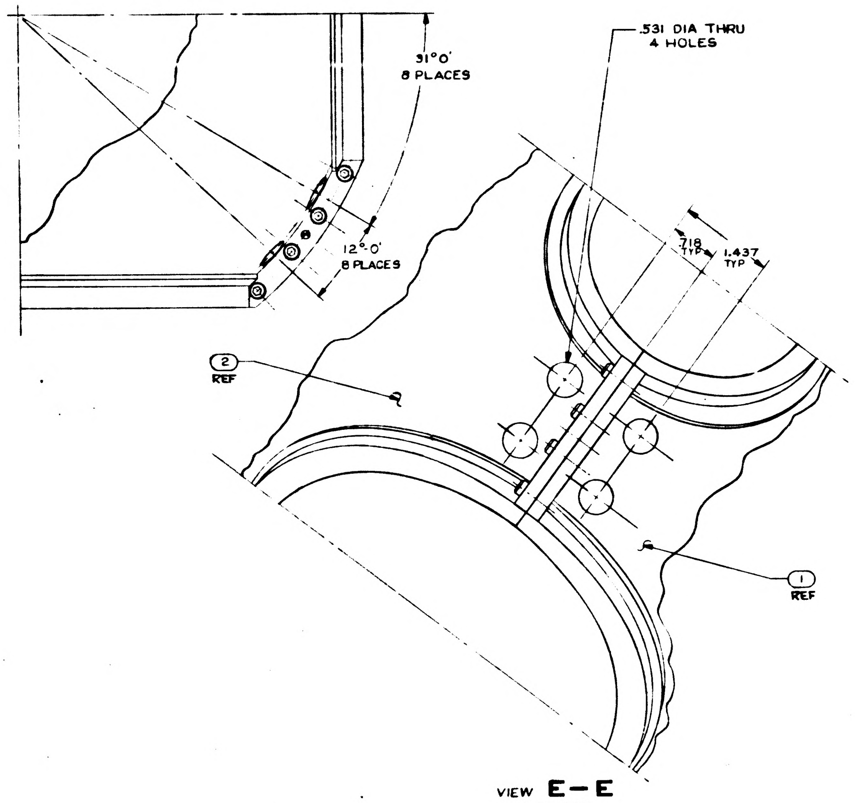
16. ALTERNATE FINISH: BORES -C- -D- -G- & -F- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541 Ⓚ


.156
.255 .275 DIA SPOTFACE
MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT
J
L

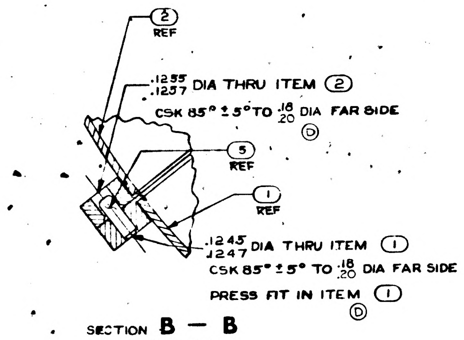
VIEW M-M
SCALE 2/1
4 PLACES
L D


.562 TYP
K .005 TIR
4
.1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .20 DIA
F .005 DIA
SEE NOTE 14
DIA
AXIS M
⊥ A .0005
SEE NOTE 8.
.1990 .1992 DIA
K
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
1
.090 .096

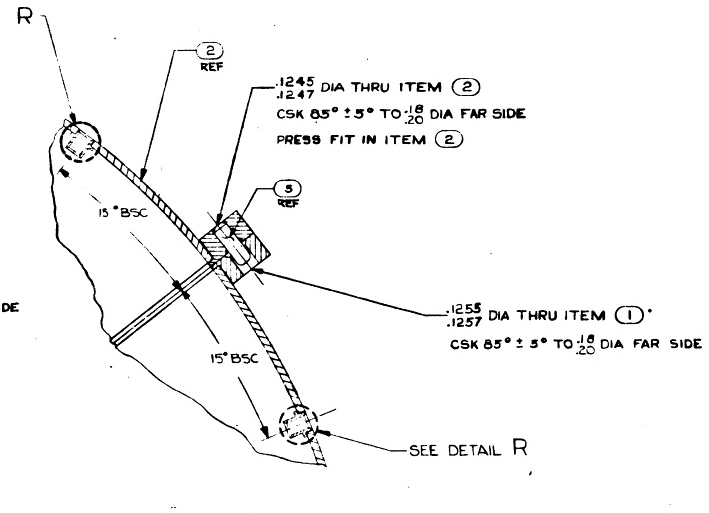

G
8
.134 .138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
7
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165 .169 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
K .005 DIA 2 PLACES
SEE NOTE 14 AND 17
J OR K AS APPLICABLE
L
L
T
T
S
S
28° 0'
2 PLACES
6° 0'
D
1.312 R
50° BSC
4 PLACES
1.562
2 PLACES
.781
2 PLACES
L
D


31° 0'
8 PLACES
12° 0'
8 PLACES
.531 DIA THRU
4 HOLES
.718 TYP
1.437 TYP
2
REF
1
REF

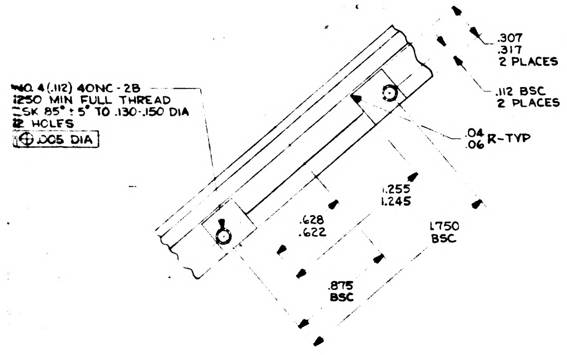
VIEW E-E
4 PLACES


2
REF
.1255 .1257 DIA THRU ITEM 2
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
D
5
REF
1
REF
.1245 .1247 DIA THRU ITEM 1
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM 1
D

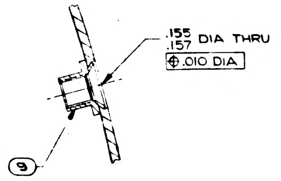
SECTION B — B
SCALE 2-1
SEE NOTE 14
D


SEE DETAIL R
2
REF
.1245 .1247 DIA THRU ITEM 2
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM 2
5
REF
15° BSC
15° BSC
.1255 .1257 DIA THRU ITEM 1
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R

SECTION C - C
SCALE 2-1
SEE NOTE 14
D


.307 .317
2 PLACES
.112 BSC
2 PLACES
NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
12 HOLES
.005 DIA
.04 .06 R-TYP
1.255 1.245
.628 .622
1.750 BSC
.875 BSC

VIEW D-D
4 PLACES
SCALE 2/1


.155 .157 DIA THRU
.010 DIA
9

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
D

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL	
C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62		WK
D	TDRR 00959	4-2-63		WK
E	TDRR 01234	5-21-63		WK
F	TDRR 01530	6-11-63		BKB
G	TDRR 02123	7-23-63		WK
H	TDRR 04942	11-19-63		
J	TDRR 06176	2-4-64		WK
K	TDRR 06180	2-4-64		WK
L	REVISED PER TDRR 08082	11 MAY 64	J.G	CP
M	REVISED PER TDRR 14105	19 NOV 64		

REPLACES REV B WITH CHANGE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AR	SURFACE PRIMER	GRADE NR	MIL-S-22473		1
AR	SEALING COMPOUND	GRADE AV	MIL-S-22473		1
9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
10	TERMINAL, INSULATED	1000100-1			8
10	INSERT, THREADED SELF LOCKING	1000115-2			7
40	INSERT, THREADED, SELF LOCKING	000115-3			6
4	PIN, STRAIGHT HEADLESS	MS16555-625			5
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED 12/14/62
DRAWN RWC 8-21-62
W J Rhine 12-12-62
MIT APPROVAL

HOUSING ASSEMBLY
OUTER GIMBAL

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000103
SHEET 1 OF 1

1000103 M

1000103 REV M SHT 1

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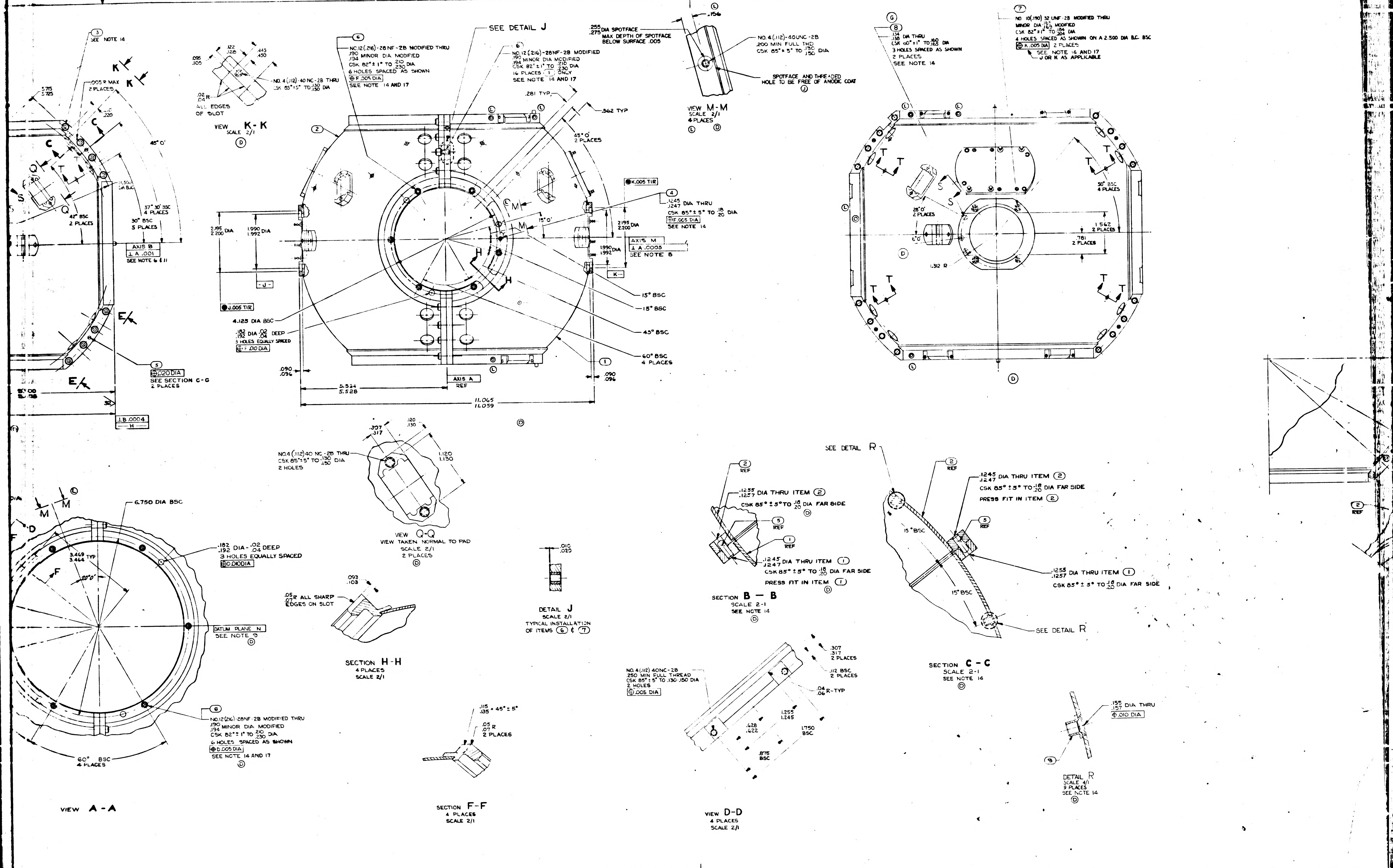
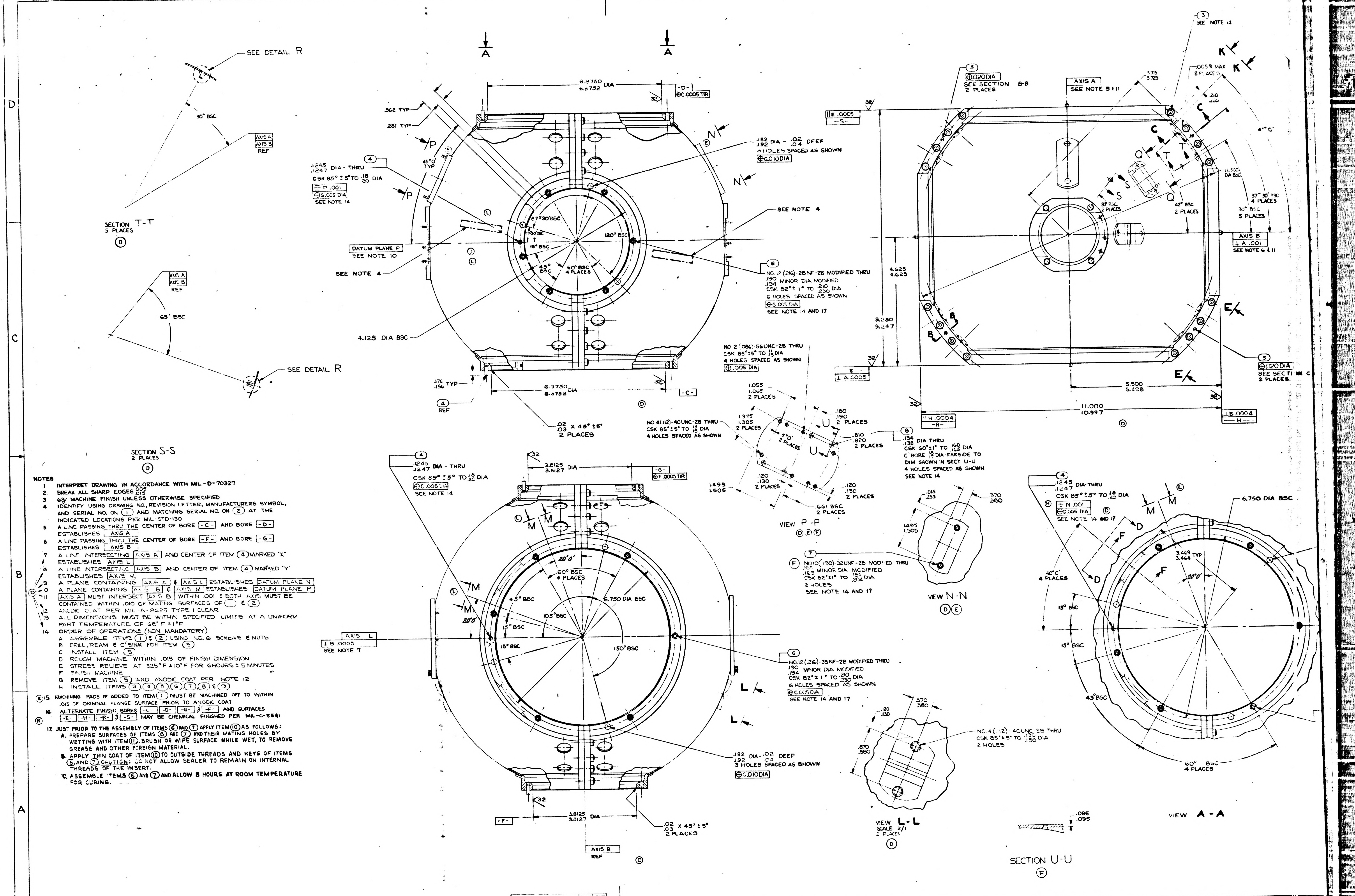


SEE DETAIL J
VIEW K-K
SCALE 2/1
ALL EDGES OF SLOT
NO.4 (.112) 40 NC-2B THRU CSK 85°±5° TO .130/.150 DIA
NO.12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
SEE NOTE 14 AND 17
16 PLACES ONLY
.281 TYP
.562 TYP
45°0' 2 PLACES
.255/.275 DIA SPOTFACE MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO.4 (.112)-40UNC-2B .200 MIN FULL THD CSK 85°±5° TO .130/.150 DIA
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT
VIEW M-M
SCALE 2/1
4 PLACES
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .155/.163 MODIFIED
CSK 82°±1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
K .005 DIA 2 PLACES
SEE NOTE 14 AND 17
J OR K AS APPLICABLE
.134/.138 DIA THRU
CSK 60°±1° TO .160/.165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
45° 0'
37° 30' BSC 4 PLACES
42° BSC 2 PLACES
30° BSC 5 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
.005 R MAX 2 PLACES
K .005 TIR
.1245/.1247 DIA THRU
CSK 85°±5° TO .18/.20 DIA
F .005 DIA
SEE NOTE 14
2.195/2.200 DIA
1.990/1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
15° 0'
15° BSC
45° BSC
60° BSC 4 PLACES
J .005 TIR
4.125 DIA BSC
.182/.192 DIA .02/.04 DEEP
3 HOLES EQUALLY SPACED
F .010 DIA
.090/.096
5.534/5.528
AXIS A REF
11.065/11.059
.020 DIA
SEE SECTION C-C 2 PLACES
⊥ B .0004
28° 0' 2 PLACES
50° BSC 4 PLACES
1.562 2 PLACES
.781 2 PLACES
1.312 R
NO.4 (.112) 40 NC-2B THRU CSK 85°±5° TO .130/.150 DIA 2 HOLES
.307/.317
.120/.130
1.120/1.130
VIEW Q-Q
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
6.750 DIA BSC
3.469/3.464 TYP
20° 0'
.182/.192 DIA - .02/.04 DEEP
3 HOLES EQUALLY SPACED
D .010 DIA
DATUM PLANE N
SEE NOTE 9
NO.12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82°±1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
D .005 DIA
SEE NOTE 14 AND 17
60° BSC 4 PLACES
VIEW A-A
.093/.103
.05/.07 R ALL SHARP EDGES ON SLOT
SECTION H-H
4 PLACES
SCALE 2/1
.010/.020
DETAIL J
SCALE 2/1
TYPICAL INSTALLATION OF ITEMS 6 & 7
.115/.135 × 45° ± 5°
.05/.07 R 2 PLACES
SECTION F-F
4 PLACES
SCALE 2/1
.1255/.1257 DIA THRU ITEM 2
CSK 85°±5° TO .18/.20 DIA FAR SIDE
REF
.1245/.1247 DIA THRU ITEM 1
CSK 85°±5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM 1
SECTION B-B
SCALE 2-1
SEE NOTE 14
NO.4 (.112) 40NC-2B .250 MIN FULL THREAD CSK 85°±5° TO .130 .150 DIA 2 HOLES
.005 DIA
.307/.317 2 PLACES
.112 BSC 2 PLACES
.04/.06 R-TYP
1.255/1.245
.628/.622
1.750 BSC
.875 BSC
VIEW D-D
4 PLACES
SCALE 2/1
SEE DETAIL R
.1245/.1247 DIA THRU ITEM 2
CSK 85°±5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM 2
15° BSC
.1255/.1257 DIA THRU ITEM 1
CSK 85°±5° TO .18/.20 DIA FAR SIDE
SECTION C-C
SCALE 2-1
SEE NOTE 14
.155/.157 DIA THRU
.010 DIA
DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14

1000103 REV M SHT 1

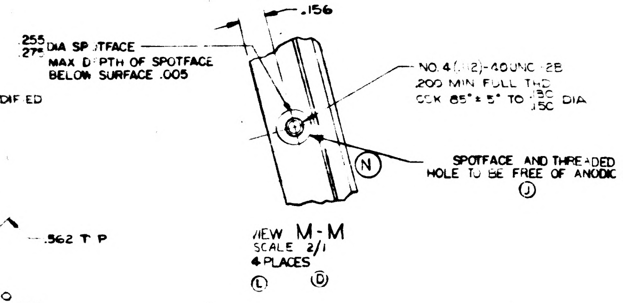
2/1000103


10
9
8
7
D
C
B
A
SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF
SECTION T-T
5 PLACES
(D)
AXIS A
AXIS B
REF
63° BSC
SEE DETAIL R
SECTION S-S
2 PLACES
(D)
A
A
6.3750
6.3752 DIA
-D-
◎C.0005 TIR
32
.562 TYP
.281 TYP
P
P
45°0' TYP
(E)
(4)
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18/.20 DIA
═ P .001
⊕G.005 DIA
SEE NOTE 14
(L)
(J)
(L)
87°30' BSC
17°30' BSC
15° BSC
45° BSC
60° BSC
4 PLACES
120° BSC
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
4.125 DIA BSC
N
N
(E)
.182
.192 DIA - .02/.04 DEEP
3 HOLES SPACED AS SHOWN
⊕G.010 DIA
SEE NOTE 4
(6)
NO.12 (.216) - 28 NF - 2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕G.005 DIA
SEE NOTE 14 AND 17
.176
.156 TYP
(4)
REF
6.3750
6.3752 DIA
-C-
.02
.03 X 45° ±5°
2 PLACES
(D)
NO 2 (.086) - 56UNC - 2B THRU
CSK 85° ± 5° TO .11/.13 DIA
4 HOLES SPACED AS SHOWN
⊕.005 DIA
1.055
1.065
2 PLACES
1.375
1.385
2 PLACES
NO 4 (.112) - 40UNC - 2B THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
.180
.190
2 PLACES
U
U
5°0'
2 PLACES
.810
.820
2 PLACES
1.495
1.505
.120
.130
2 PLACES
.120
.130
2 PLACES
.661 BSC
2 PLACES
VIEW P-P
(D)(E)(F)
(8)
.134
.138 DIA THRU
CSK 60° ± 1° TO .160/.165 DIA
C'BORE .18/.17 DIA - FARSIDE TO
DIM SHOWN IN SECT. U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
(3)
SEE NOTE 14
K
K
.005 R MAX
2 PLACES
5.715
5.725
.210
.220
(5)
⊕.020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
∥E .0005
-S-
32
C
C
Q
Q
T
T
S
S
11.500 DIA BSC
50° BSC
2 PLACES
42° BSC
2 PLACES
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
4°0'
AXIS B
⊥ A .001
SEE NOTE 6 & 11
4.625
4.623
9.250
9.247
B
B
E
E
E
⊥ A .0005
(5)
⊕.020 DIA
SEE SECTION C
2 PLACES
5.500
5.498
11.000
10.997
∥H .0004
-R-
⊥B .0004
-H-
(D)
(4)
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18/.20 DIA
⊕C.005 DIA
SEE NOTE 14
32
3.8125
3.8127 DIA
-G-
◎F .0005 TIR
(L)
M
M
M
M
20°0'
20°0'
60° BSC
4 PLACES
45° BSC
6.750 DIA BSC
105° BSC
15° BSC
15° BSC
150° BSC
"X"
AXIS L
⊥ B .0005
SEE NOTE 7
(6)
NO.12 (.216) - 28NF - 2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .240/.230 DIA
6 HOLES SPACED AS SHOWN
⊕C.005 DIA
SEE NOTE 14 AND 17
L
L
.182
.192 DIA - .02/.04 DEEP
3 HOLES SPACED AS SHOWN
⊕C.010 DIA
32
-F-
3.8125
3.8127 DIA
.02
.03 X 45° ± 5°
2 PLACES
AXIS B
REF
(D)
.245
.255
.370
.380
1.495
1.505
(7)
(F)
NO 10 (.190) - 32UNF - 2B MODIFIED THRU
.165
.169 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
2 HOLES
SEE NOTE 14 AND 17
VIEW N-N
(D)(E)
.120
.130
.370
.380
.870
.880
NO. 4 (.112) - 40UNC - 2B THRU
CSK 85° ± 5° TO .130/.150 DIA
2 HOLES
VIEW L-L
SCALE 2/1
2 PLACES
(D)
.085
.095
SECTION U-U
(F)
(4)
.1245
.1247 DIA - THRU
CSK 85° ± 5° TO .18/.20 DIA
(H)
═ N .001
⊕D.005 DIA
(D)
SEE NOTE 14 AND 17
(L)
M
M
6.750 DIA BSC
D
D
F
F
3.469
3.464 TYP
20°0'
40°0'
4 PLACES
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
VIEW A-A

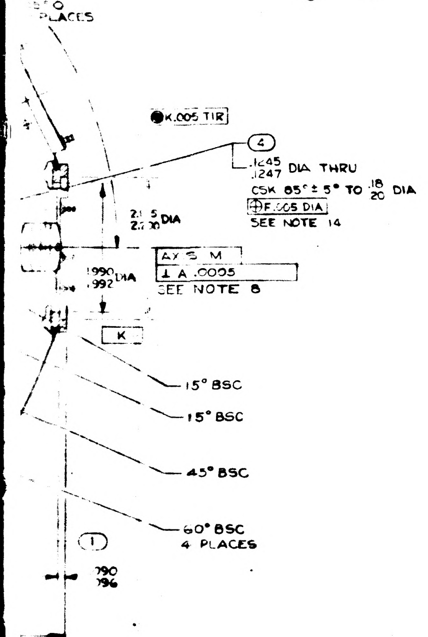
NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005/.015
3 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON (1) AND MATCHING SERIAL NO. ON (2) AT THE INDICATED LOCATIONS PER MIL-STD-130
5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A
6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B
7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM (4) MARKED "X" ESTABLISHES AXIS L
8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM (4) MARKED "Y" ESTABLISHES AXIS M
(D) 9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N
10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P
11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF (1) & (2)
12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1°F
14 ORDER OF OPERATIONS (NON MANDATORY)
   A ASSEMBLE ITEMS (1) & (2) USING NO. 6 SCREWS & NUTS
   B DRILL, REAM & C'SINK FOR ITEM (5)
   C INSTALL ITEM (5)
   D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
   E STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
   F FINISH MACHINE
   G REMOVE ITEM (5) AND ANODIC COAT PER NOTE 12
   H INSTALL ITEMS (3), (4), (5), (6), (7), (8) & (9)
(E) 15. MACHINING PADS IF ADDED TO ITEM (1) MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT
(K) 16. ALTERNATE FINISH: BORES -C- -D- -G- & -F- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541
17. JUST PRIOR TO THE ASSEMBLY OF ITEMS (6) AND (7) APPLY ITEM (10) AS FOLLOWS:
   A. PREPARE SURFACES OF ITEMS (6) AND (7) AND THEIR MATING HOLES BY WETTING WITH ITEM (11). BRUSH OR WIPE SURFACE WHILE WET, TO REMOVE GREASE AND OTHER FOREIGN MATERIAL.
   B. APPLY THIN COAT OF ITEM (10) TO OUTSIDE THREADS AND KEYS OF ITEMS (6) AND (7). CAUTION: DO NOT ALLOW SEALER TO REMAIN ON INTERNAL THREADS OF THE INSERT.
   C. ASSEMBLE ITEMS (6) AND (7) AND ALLOW 8 HOURS AT ROOM TEMPERATURE FOR CURING.

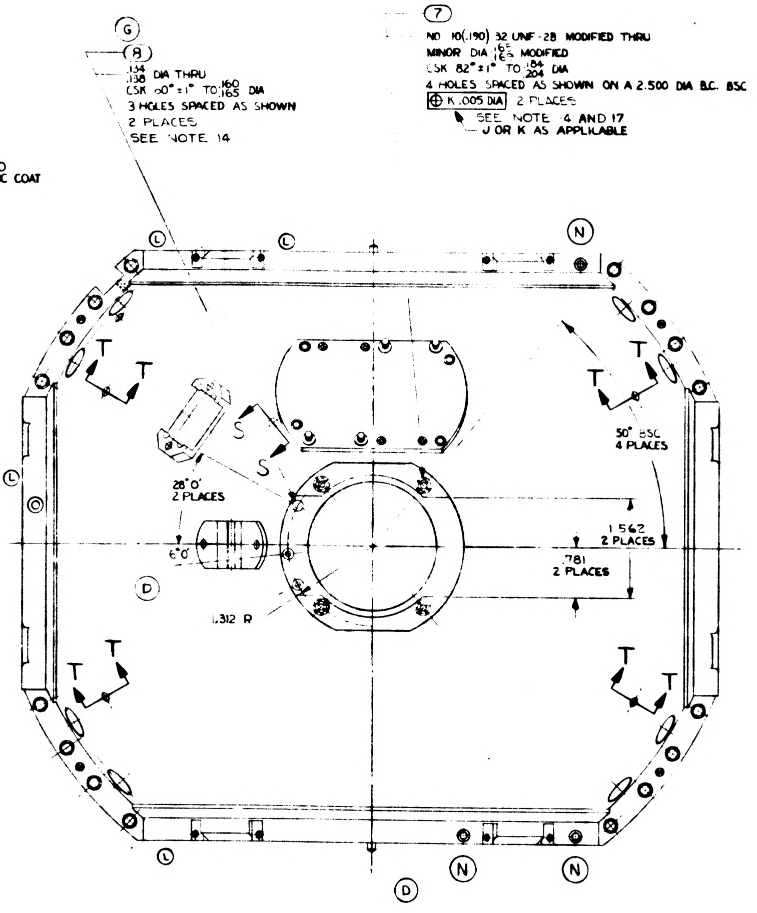
1000103	REV M	SHT 1

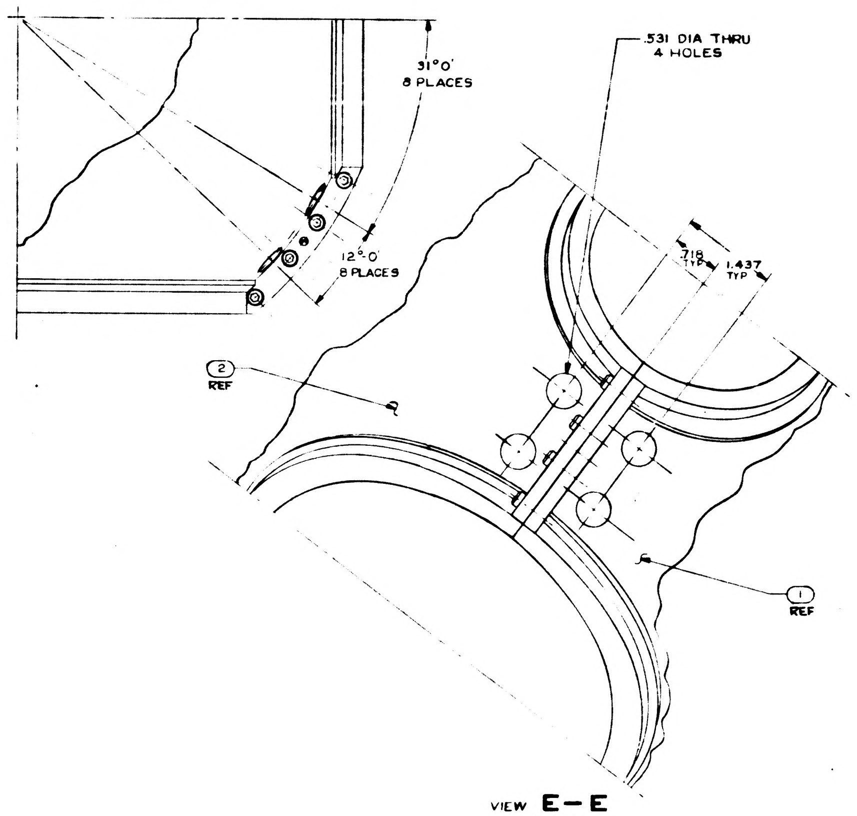
	REV	DESCRIPTION	DATE		
Ⓜ	C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62	ajb	WK
Ⓜ	D	TDRR 00959	4-2-63	ajb	WK
Ⓜ	E	TDRR 01234	5-21-63	ajb	WK
Ⓜ	F	TDRR 01530	6-11-63	ajb	RKB
Ⓜ	G	TDRR 02123	7-23-63	ajb	WK
Ⓜ	H	TDRR 04942	11-19-63		
Ⓜ	J	TDRR 06176	2-4-64		WK
Ⓜ	K	TDRR 06180	2-4-64		WK
Ⓜ	L	REVISED PER TDRR 08062	11 MAY 64	J.G	CP
Ⓜ	M	REVISED PER TDRR 14105	19 NOV 64	JWP	EF
Ⓜ	N	REVISED PER TDRR 15493	21 JAN 65	JWP	


.156
Ⓛ
.255 .275 DIA SPOTFACE
MAX DEPTH OF SPOTFACE
BELOW SURFACE .005
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA
SPOTFACE AND THREADED
HOLE TO BE FREE OF ANODIC COAT
Ⓙ
Ⓝ
.562 T P

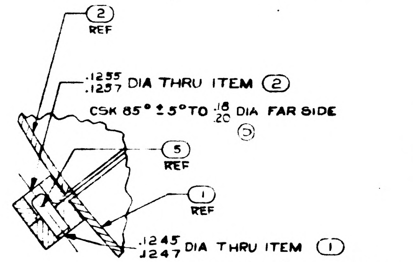
VIEW M-M
SCALE 2/1
4 PLACES
Ⓛ Ⓓ


K.005 TIR
④
.1245 .1247 DIA THRU
CSK 85° ± 5° TO .18 .20 DIA
⊕ F.005 DIA
SEE NOTE 14
2.195 2.200 DIA
1.990 1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
K
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
①
.090 .096

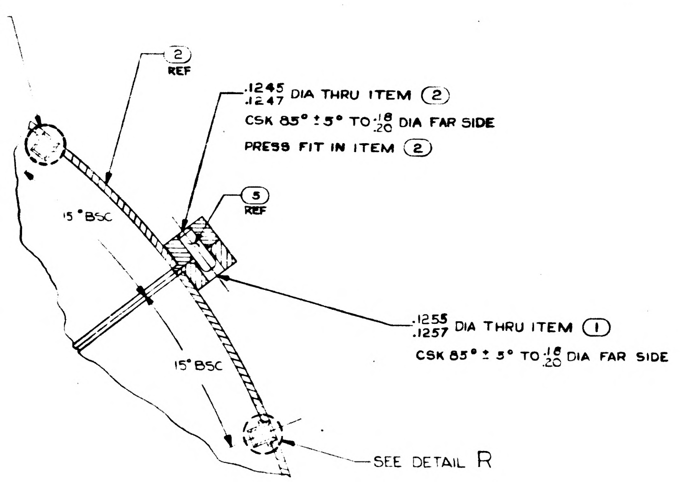

Ⓖ
⑧
.134 .138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165 .169 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 4 AND 17
J OR K AS APPLICABLE
Ⓛ
Ⓝ
T
S
28°0'
2 PLACES
6°0'
1.312 R
50° BSC
4 PLACES
1.562
2 PLACES
.781
2 PLACES
Ⓓ


31°0'
8 PLACES
.531 DIA THRU
4 HOLES
12°0'
8 PLACES
.718
1.437 TYP
②
REF
①
REF

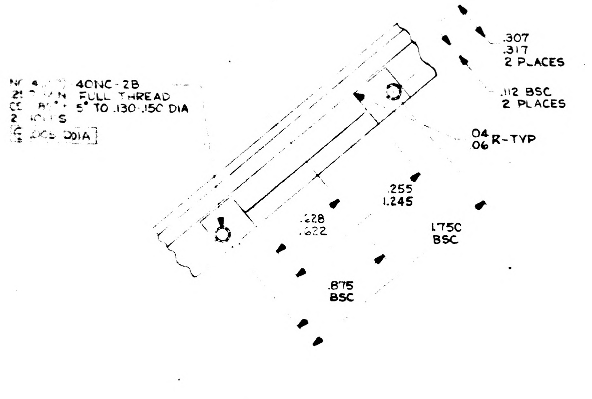
VIEW E-E
4 PLACES


②
REF
.1255 .1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
Ⓓ
⑤
REF
①
REF
.1245 .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ①
Ⓓ

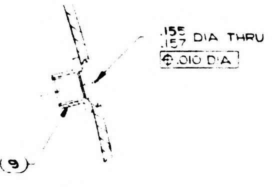
SECTION B — B
SCALE 2-1
SEE NOTE 14
Ⓓ


SEE DETAIL R
②
REF
.1245 .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤
REF
15° BSC
15° BSC
.1255 .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R

SECTION C — C
SCALE 2-1
SEE NOTE 14
Ⓓ


NO 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .005 DIA
.307 .317
2 PLACES
.112 BSC
2 PLACES
.04 .06 R-TYP
.255 1.245
.228 .622
1.750 BSC
.875 BSC

VIEW D-D
4 PLACES
SCALE 2/1


.155 .157 DIA THRU
⊕ .010 DIA
⑨

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ

QTY	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	ITEM NO.
AR	SURFACE PRIMER	GRADE NR	MIL-S-22473		11
AR	SEALING COMPOUND	GRADE AV	MIL-S-22473		10
9	NUT, CLINCH, FLUSH MOUNTED	1000076-1			9
10	TERMINAL, INSULATED	1000100-1			8
10	INSERT, THREADED, SELF LOCKING	1000115-2			7
40	INSERT, THREADED, SELF LOCKING	1000115-3			6
4	PIN, STRAIGHT HEADLESS	MS16555-625			5
4	PIN, LOCATING, STRAIGHT, HEADLESS	1000088-2			4
16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
1	HEMISPHERE ASSY. MOVABLE OUTER GMBL	1000059			2
1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1

LIST OF PARTS AND MATERIALS

REPLACES REV B WITH CHANGE

1000202 DL1000201
1000002 DL1000001

±.005 ±0°-30'
DO NOT SCALE THIS DRAWING

M.I.T. INSTRUMENTATION LAB
RWC 12/11/62
W J Rhine 12-12-62
M.I.T. APPROVAL
12/12/62

HOUSING ASSEMBLY OUTER GIMBAL

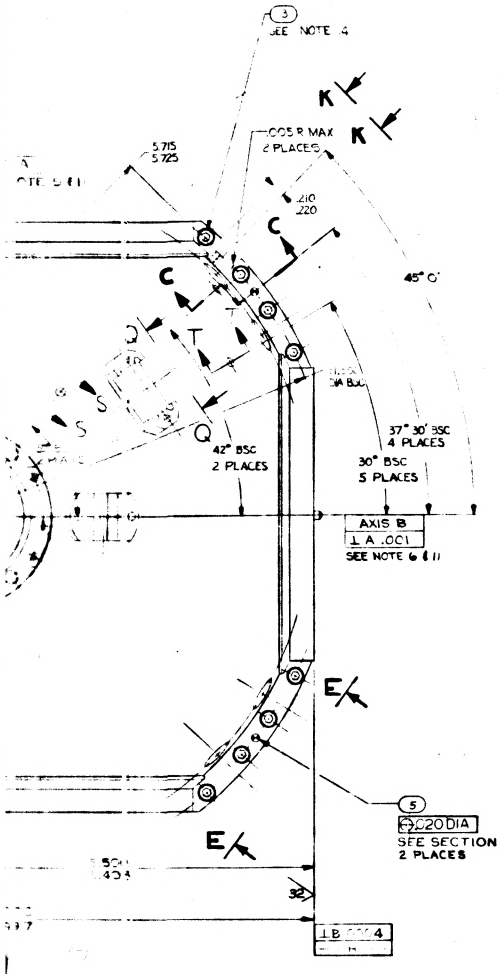
M.I.T. INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER HOUSTON TEXAS

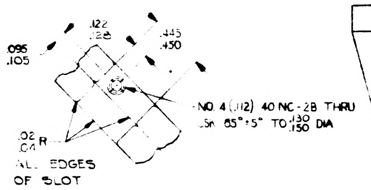
SCALE 1/1

1000103
SHEET 1 OF 1

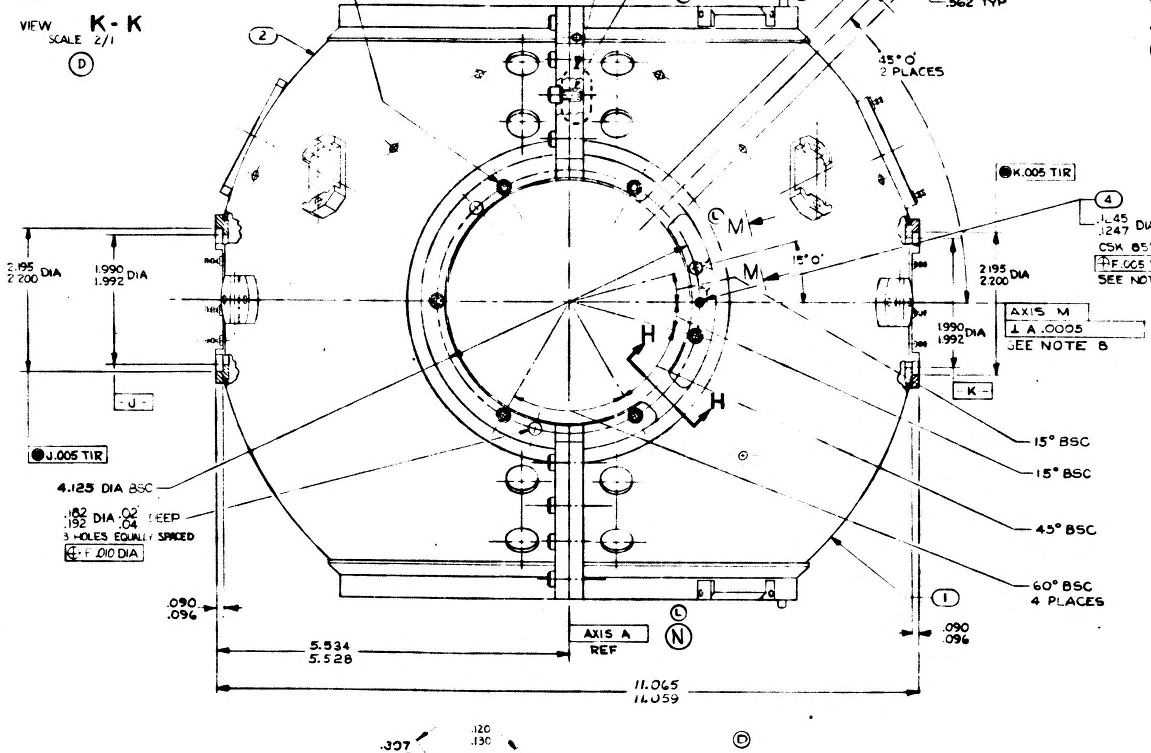
1000103 REV N SHT 1

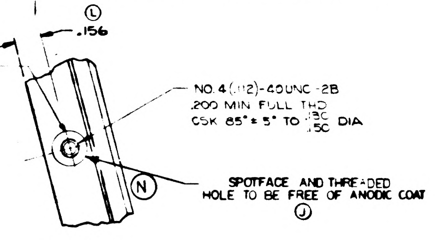
3/1000103


③
SEE NOTE 4
5.715
5.725
.005 R MAX
2 PLACES
K
K
.210
.220
C
C
45° 0'
T
T
S
S
Q
Q
42° BSC
2 PLACES
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
E
E
⑤
⌖.020 DIA
SEE SECTION C-C
2 PLACES
32
⊥B .0004

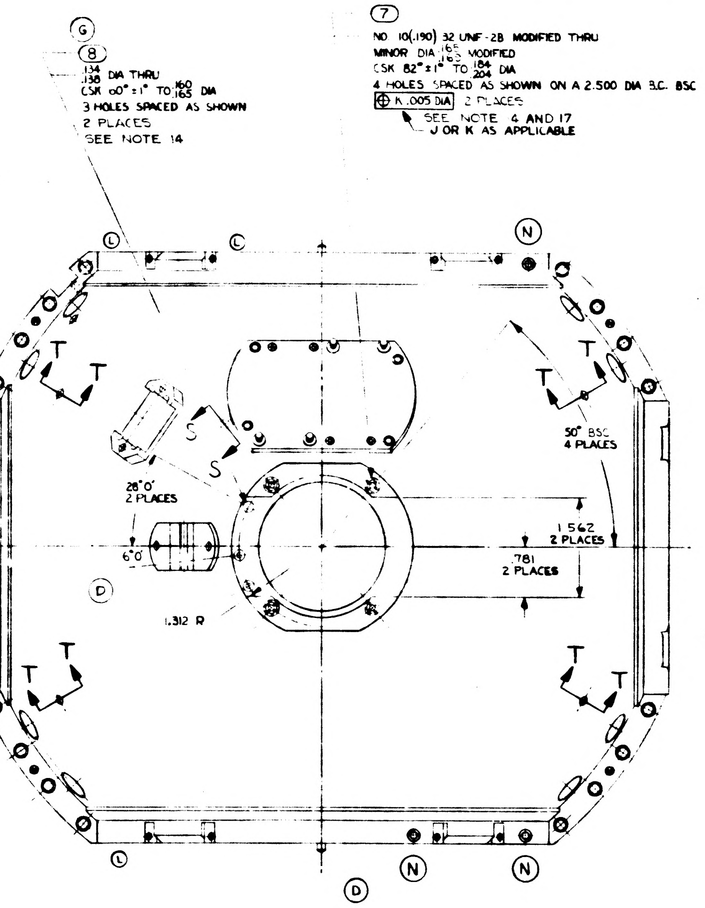

.095
.105
.122
.128
.445
.450
NO. 4 (.112) 40 NC-2B THRU
CSK 85°±5° TO .130 .150 DIA
.02
.04 R
ALL EDGES
OF SLOT

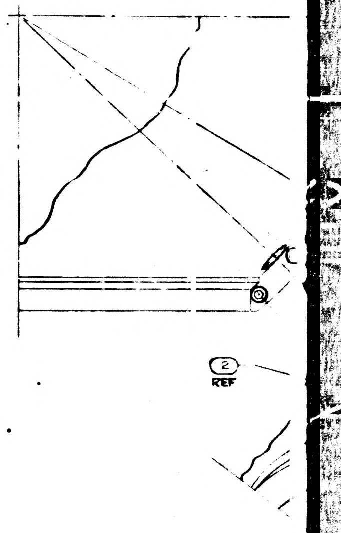
VIEW K-K
SCALE 2/1
Ⓓ

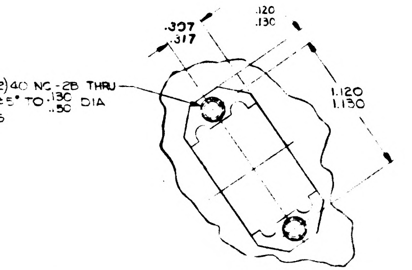

⑥
NC.12 (.216)-28 NF-2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ F .005 DIA
SEE NOTE 14 AND 17
SEE DETAIL J
⑥
NC 12 (.216)-28NF-2B MODIFIED
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
16 PLACES ① ONLY
SEE NOTE 14 AND 17
.281 TYP
.562 TYP
Ⓝ Ⓛ
Ⓝ Ⓛ
②
45° 0'
2 PLACES
● K .005 TIR
④
.1245
.1247 DIA THRU
CSK 85° ± 5° TO .18 .20 DIA
⊕ F .005 DIA
SEE NOTE 14
Ⓛ M
M
15° 0'
H
H
2.195
2.200 DIA
1.990
1.992 DIA
- J -
● J .005 TIR
4.125 DIA BSC
.182
.192 DIA .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ F .010 DIA
2.195
2.200 DIA
1.990
1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
- K -
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
①
.090
.096
.090
.096
AXIS A
REF
Ⓛ
Ⓝ
5.534
5.528
11.065
11.059
Ⓓ


.255
.275 DIA SPOTFACE
MAX DEPTH OF SPOTFACE
BELOW SURFACE .005
Ⓛ
.156
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130 .150 DIA
Ⓝ
SPOTFACE AND THREADED
HOLE TO BE FREE OF ANODIC COAT
Ⓙ

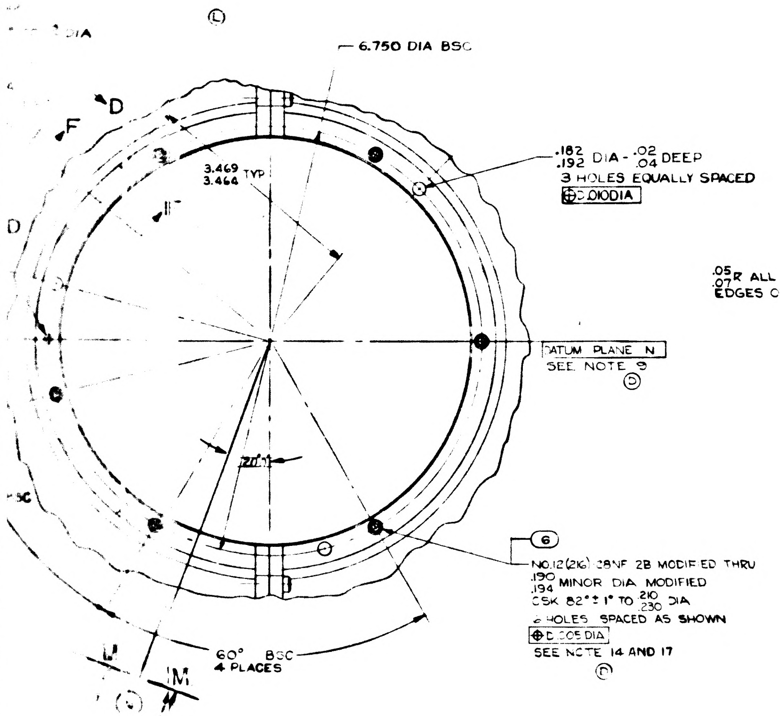
VIEW M-M
SCALE 2/1
4 PLACES
Ⓛ Ⓓ


Ⓖ
⑧
.134
.138 DIA THRU
CSK 60° ± 1° TO .160 .165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO. 10(.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .165 .163 MODIFIED
CSK 82° ± 1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 4 AND 17
J OR K AS APPLICABLE
Ⓛ
Ⓛ
Ⓝ
T
T
T
T
S
S
Ⓛ
28° 0'
2 PLACES
50° BSC
4 PLACES
1.562
2 PLACES
.781
2 PLACES
6° 0'
Ⓓ
1.312 R
T
T
T
T
Ⓛ
Ⓝ
Ⓝ
Ⓓ

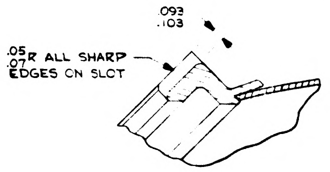



NO.4 (.112) 40 NC-2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
.307
.317
.120
.130
1.120
1.130

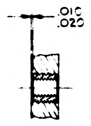
VIEW Q-Q
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
Ⓓ


Ⓛ
6.750 DIA BSC
D
F
D
3.469
3.464 TYP
11°
.182
.192 DIA - .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ D .010 DIA
DATUM PLANE N
SEE NOTE 9
Ⓓ
120°
⑥
NO.12 (.216) 28NF 2B MODIFIED THRU
.190
.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210 .230 DIA
4 HOLES SPACED AS SHOWN
⊕ D .005 DIA
SEE NOTE 14 AND 17
Ⓓ
60° BSC
4 PLACES
M
M

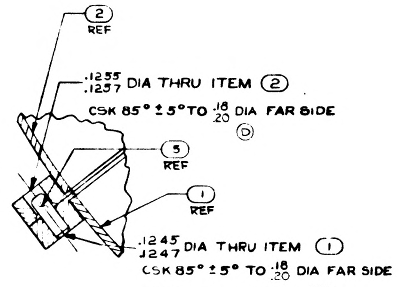
VIEW A-A


.093
.103
.05
.07 R ALL SHARP
EDGES ON SLOT

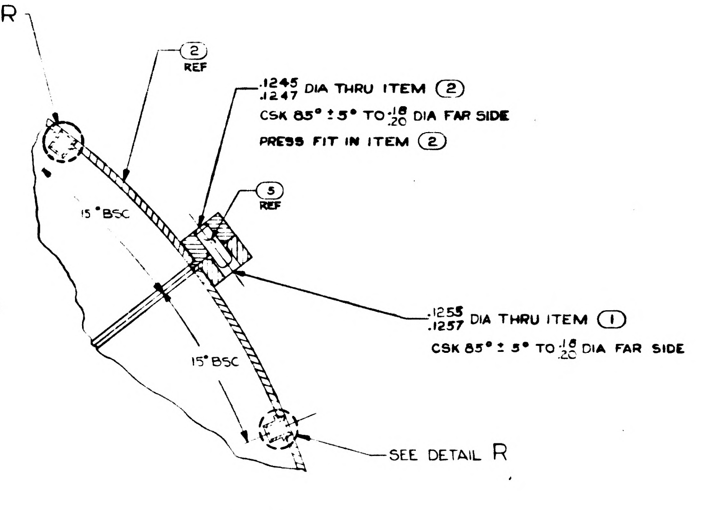
SECTION H-H
4 PLACES
SCALE 2/1



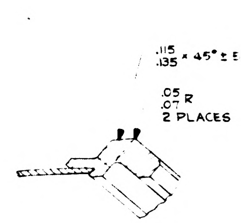
DETAIL J
SCALE 2/1
TYPICAL INSTALLATION
OF ITEMS ⑥ & ⑦


②
REF
.1255
.1257 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
Ⓓ
⑤
REF
①
REF
.1245
.1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ①
Ⓓ

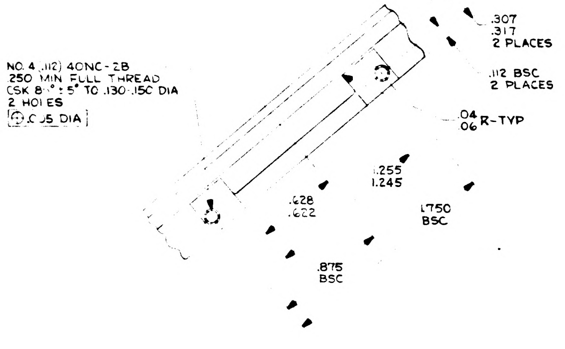
SECTION B-B
SCALE 2-1
SEE NOTE 14
Ⓓ


SEE DETAIL R
②
REF
.1245
.1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤
REF
15° BSC
15° BSC
.1255
.1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R

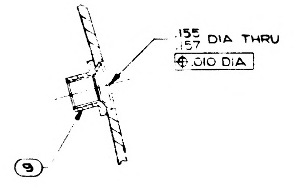
SECTION C-C
SCALE 2-1
SEE NOTE 14
Ⓓ


.115
.135 × 45° ± 5°
.05
.07 R
2 PLACES

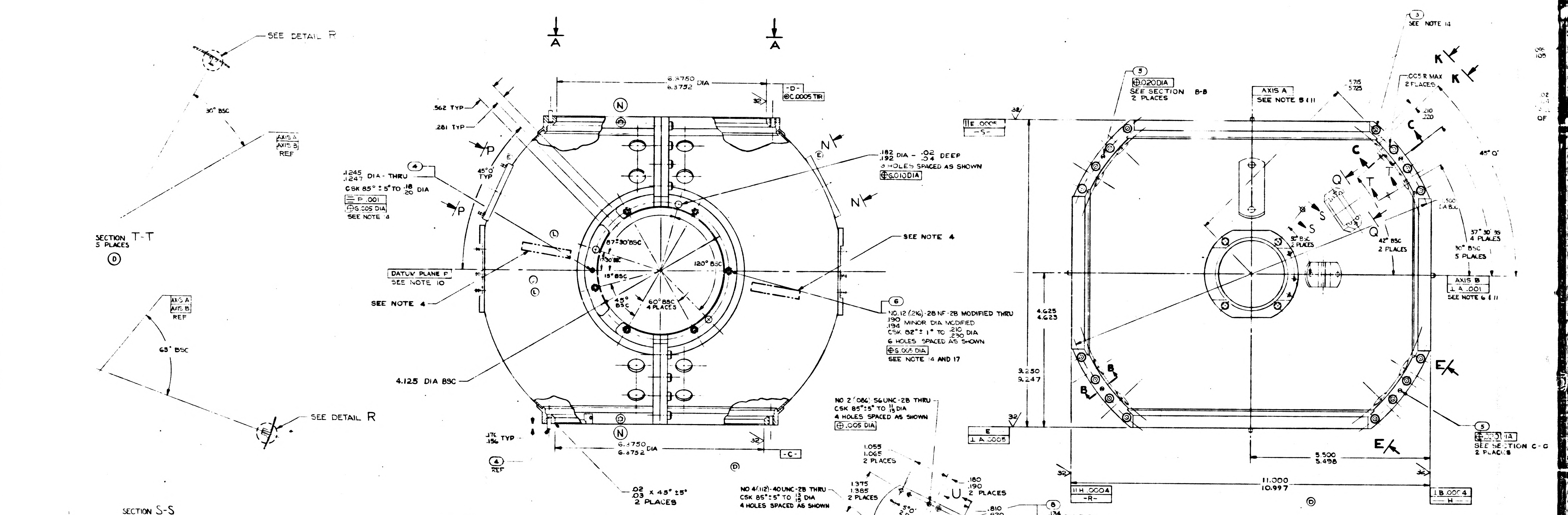
SECTION F-F
4 PLACES
SCALE 2/1


NO. 4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85° ± 5° TO .130-.150 DIA
2 HOLES
⊕ .005 DIA
.307
.317
2 PLACES
.112 BSC
2 PLACES
.04
.06 R-TYP
1.255
1.245
.628
.622
1.750
BSC
.875
BSC

VIEW D-D
4 PLACES
SCALE 2/1


.155
.157 DIA THRU
⊕ .010 DIA
⑨

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
Ⓓ



SEE DETAIL R
30° BSC
AXIS A
AXIS B
REF
SECTION T-T
5 PLACES
(D)
63° BSC
SEE DETAIL R
A
A
6.3750 DIA
6.3752
-D-
⊕C.0005 TIR
.562 TYP
.281 TYP
.1245 DIA - THRU
.1247
CSK 85° ± 5° TO .18/.20 DIA
⊥ P .001
⊕G.005 DIA
SEE NOTE 14
45°0' TYP
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
4.125 DIA BSC
.182 DIA - .02/.04 DEEP
.192
3 HOLES SPACED AS SHOWN
⊕G.010 DIA
SEE NOTE 4
67°30' BSC
120° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
NO.12 (.216)-28 NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕G.005 DIA
SEE NOTE 14 AND 17
.176 .156 TYP
6.3750 DIA
6.3752
-C-
.02 .03 X 45° ± 5°
2 PLACES
⊕.020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
SEE NOTE 14
.005 R MAX
2 PLACES
.210 .220
45° 0'
∥ E .0005
-S-
.5715 .5725
32° BSC 2 PLACES
42° BSC 2 PLACES
37° 30' 35 4 PLACES
30° BSC 5 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
4.625
4.623
9.250
9.247
E
⊥ A .0005
5.500
5.498
11.000
10.997
∥ H .0004
-R-
⊥ B .0004
-H-
SEE SECTION C-C
2 PLACES

SECTION S-S
2 PLACES
(D)

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 BREAK ALL SHARP EDGES $^{.005}_{.015}$

3 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED

4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130

5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A

6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B

7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L

8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M

9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N

10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P

11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②

12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

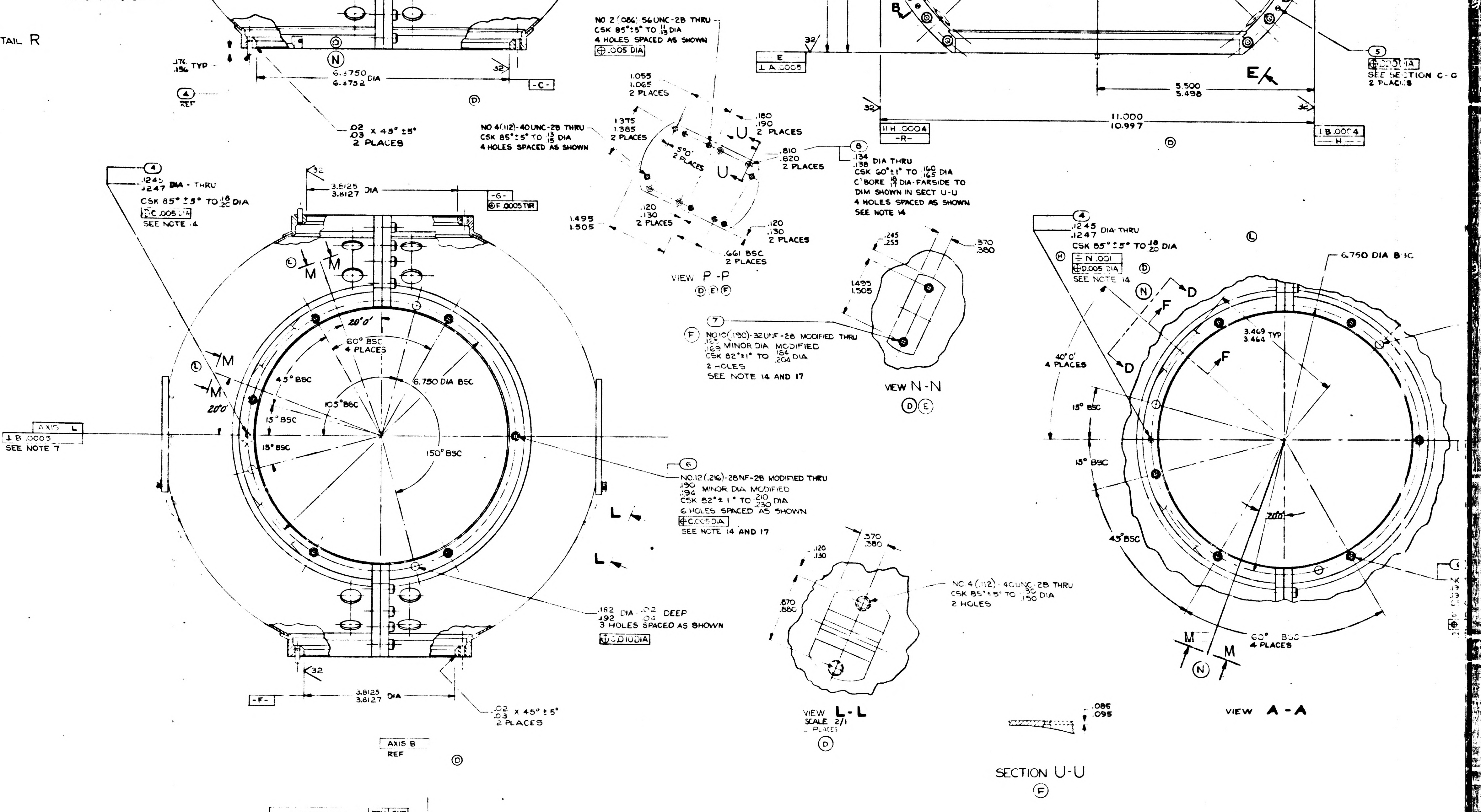
13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F

14 ORDER OF OPERATIONS (NON MANDATORY)
- A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
- B DRILL, REAM & C'SINK FOR ITEM ⑤
- C INSTALL ITEM ⑤
- D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
- E STRESS RELIEVE AT 325° F ± 10° F FOR 6 HOURS ± 5 MINUTES
- F FINISH MACHINE
- G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 2
- H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨

(E) 15. MACHINING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT

16. ALTERNATE FINISH: BORES -C- -D- -G- & -F- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541 (K)

17. JUST PRIOR TO THE ASSEMBLY OF ITEMS ⑥ AND ⑦ APPLY ITEM ⑩ AS FOLLOWS:
- A. PREPARE SURFACES OF ITEMS ⑥ AND ⑦ AND THEIR MATING HOLES BY WETTING WITH ITEM ⑪. BRUSH OR WIPE SURFACE WHILE WET, TO REMOVE GREASE AND OTHER FOREIGN MATERIAL.
- B. APPLY THIN COAT OF ITEM ⑩ TO OUTSIDE THREADS AND KEYS OF ITEMS ⑥ AND ⑦. CAUTION: DO NOT ALLOW SEALER TO REMAIN ON INTERNAL THREADS OF THE INSERT.
- C. ASSEMBLE ITEMS ⑥ AND ⑦ AND ALLOW 8 HOURS AT ROOM TEMPERATURE FOR CURING.

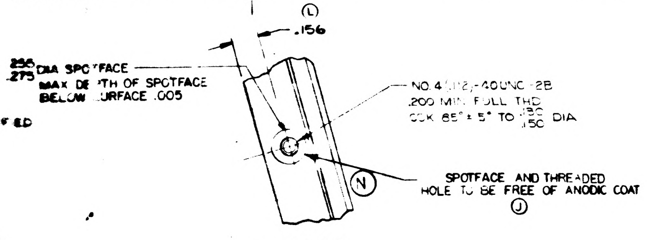


NO 2 (.086)-56UNC-2B THRU
CSK 85° ± 5° TO .11/.13 DIA
4 HOLES SPACED AS SHOWN
⊕.005 DIA
NO 4 (.112)-40UNC-2B THRU
CSK 85° ± 5° TO .13/.15 DIA
4 HOLES SPACED AS SHOWN
1.055 1.065 2 PLACES
1.375 1.385 2 PLACES
.180 .190 2 PLACES
.810 .820 2 PLACES
1.495 1.505
.120 .130 2 PLACES
.661 BSC 2 PLACES
VIEW P-P
(D)(E)(F)
.134 DIA THRU
.138
CSK 60° ± 1° TO .160/.165 DIA
C'BORE .16/.17 DIA-FARSIDE TO DIM SHOWN IN SECT U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
.1245 DIA - THRU
.1247
CSK 85° ± 5° TO .18/.20 DIA
⊥ C.005 DIA
SEE NOTE 14
3.8125 DIA
3.8127
-G-
⊕F.0005 TIR
20°0'
60° BSC 4 PLACES
6.750 DIA BSC
105° BSC
45° BSC
15° BSC
150° BSC
AXIS L
⊥ B .0003
SEE NOTE 7
NO.12 (.216)-28NF-2B MODIFIED THRU
.190/.194 MINOR DIA MODIFIED
CSK 82° ± 1° TO .210/.230 DIA
6 HOLES SPACED AS SHOWN
⊕C.005 DIA
SEE NOTE 14 AND 17
.182 DIA - .02/.04 DEEP
.193
3 HOLES SPACED AS SHOWN
⊕C.010 DIA
3.8125 DIA
3.8127
-F-
.02 .03 X 45° ± 5°
2 PLACES
AXIS B
REF
NO 10 (.190)-32UNF-2B MODIFIED THRU
.159/.163 MINOR DIA MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
2 HOLES
SEE NOTE 14 AND 17
.245 .255
.370 .380
1.495 1.505
VIEW N-N
(D)(E)
.120 .130
.370 .380
.870 .880
NO 4 (.112)-40UNC-2B THRU
CSK 85° ± 5° TO .130/.150 DIA
2 HOLES
VIEW L-L
SCALE 2/1
2 PLACES
.1245 DIA THRU
.1247
CSK 85° ± 5° TO .18/.20 DIA
⊥ N .001
⊕D.005 DIA
SEE NOTE 14
6.750 DIA BSC
3.469 3.464 TYP
40°0' 4 PLACES
15° BSC
15° BSC
45° BSC
60° BSC 4 PLACES
VIEW A-A
.085 .095
SECTION U-U
(F)

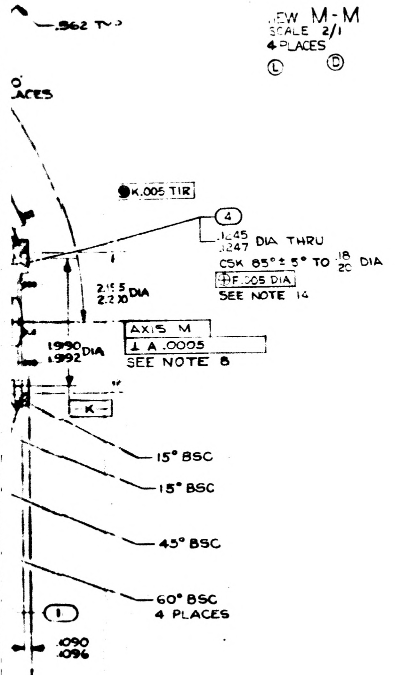
1000103 REV N SHT 1

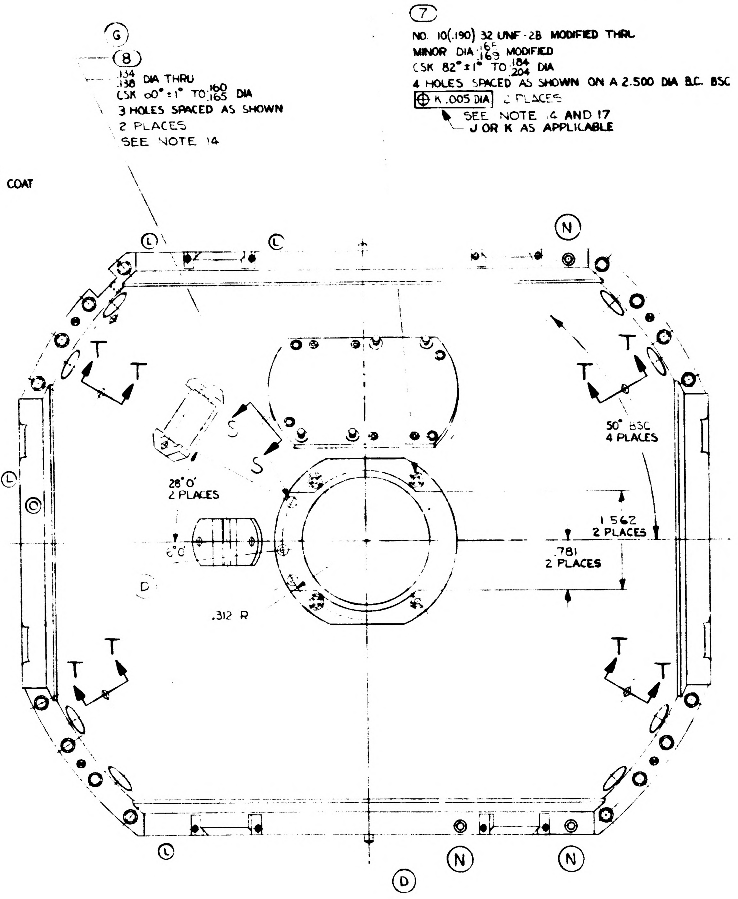
1/1000103

Ⓜ	C	REPLACES REV B WITH CHANGE TDRR 00158	11-29-62		WK
Ⓜ	D	TDRR 00959	4-2-63		WK
Ⓜ	E	TDRR 01234	5-21-63		WK
	F	TDRR 01530	6-11-63		BKB
	G	TDRR 02123	7-23-63		WK
Ⓜ	H	TDRR 04942	11-19-63		
	J	TDRR 06176	2-4-64		WK
Ⓜ	K	TDRR 06180	2-4-64		WK
Ⓜ	L	REVISED PER TDRR 08082	MAY 64	J.G	CP
Ⓜ	M	REVISED PER TDRR 14105	9 NOV 64		EF
Ⓜ	N	REVISED PER TDRR 15493	3 JAN 65		
	P	REVISED PER TDRR 16811	MAR 65		EF

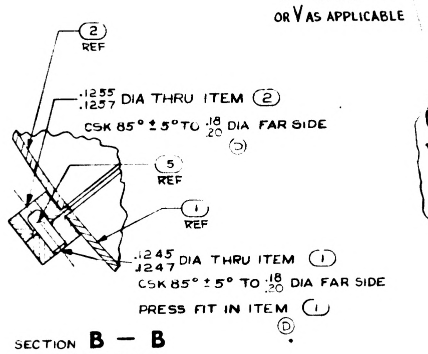

Ⓛ
.156
.256 / .275 DIA SPOTFACE
MAX DEPTH OF SPOTFACE
BELOW SURFACE .005
NO. 4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85° ± 5° TO .130/.150 DIA
Ⓝ
SPOTFACE AND THREADED
HOLE TO BE FREE OF ANODIC COAT
Ⓙ

VIEW M-M
SCALE 2/1
4 PLACES
Ⓛ Ⓓ

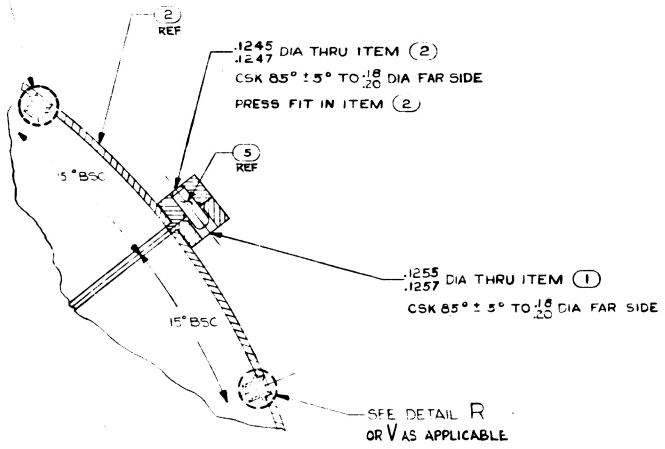

.962 TYP
PLACES
K .005 TIR
④
.1245 / .1247 DIA THRU
CSK 85° ± 5° TO .18/.20 DIA
F .005 DIA
SEE NOTE 14
2.215 / 2.210 DIA
AXIS M
⊥ A .0005
1.990 / 1.992 DIA
SEE NOTE 8
K
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
①
.090 / .096


Ⓖ
⑧
.134 / .138 DIA THRU
CSK 60° ± 1° TO .160/.165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO. 10(.190) 32 UNF-2B MODIFIED THRD
MINOR DIA .165/.169 MODIFIED
CSK 82° ± 1° TO .184/.204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 14 AND 17
J OR K AS APPLICABLE
Ⓛ
Ⓛ
Ⓝ
T
T
S
S
28°0'
2 PLACES
50° BSC
4 PLACES
1.562
2 PLACES
.781
2 PLACES
.312 R
T
T
Ⓛ
Ⓝ
Ⓝ
Ⓓ

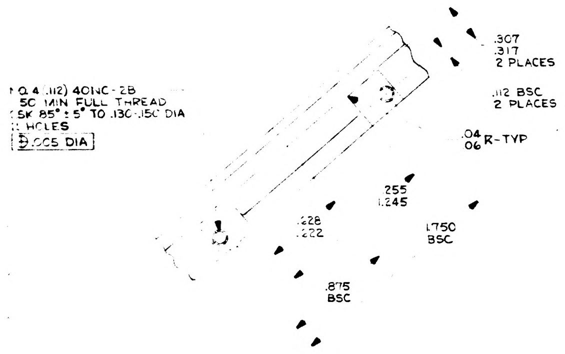
SEE DETAIL R
OR V AS APPLICABLE


②
REF
.1235 / .1237 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
⑤
REF
①
REF
.1245 / .1247 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ①
Ⓓ

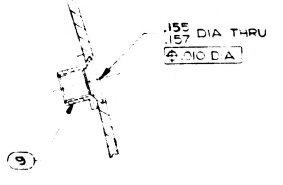
SECTION B — B
SCALE 2-1
SEE NOTE 14


②
REF
.1245 / .1247 DIA THRU ITEM ②
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤
REF
15° BSC
.1255 / .1257 DIA THRU ITEM ①
CSK 85° ± 5° TO .18/.20 DIA FAR SIDE
15° BSC
SEE DETAIL R
OR V AS APPLICABLE

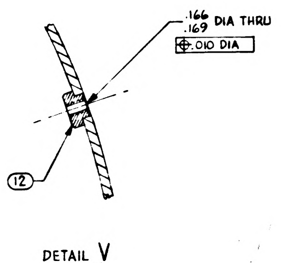
SECTION C - C
SCALE 2-1
SEE NOTE 14
Ⓓ


NO. 4 (.112) 40UNC-2B
.150 MIN FULL THREAD
CSK 85° ± 5° TO .130/.150 DIA
HOLES
.005 DIA
.307 / .317
2 PLACES
.112 BSC
2 PLACES
.04 / .06 R-TYP
.255 / .245
.228 / .222
.1750 BSC
.875 BSC

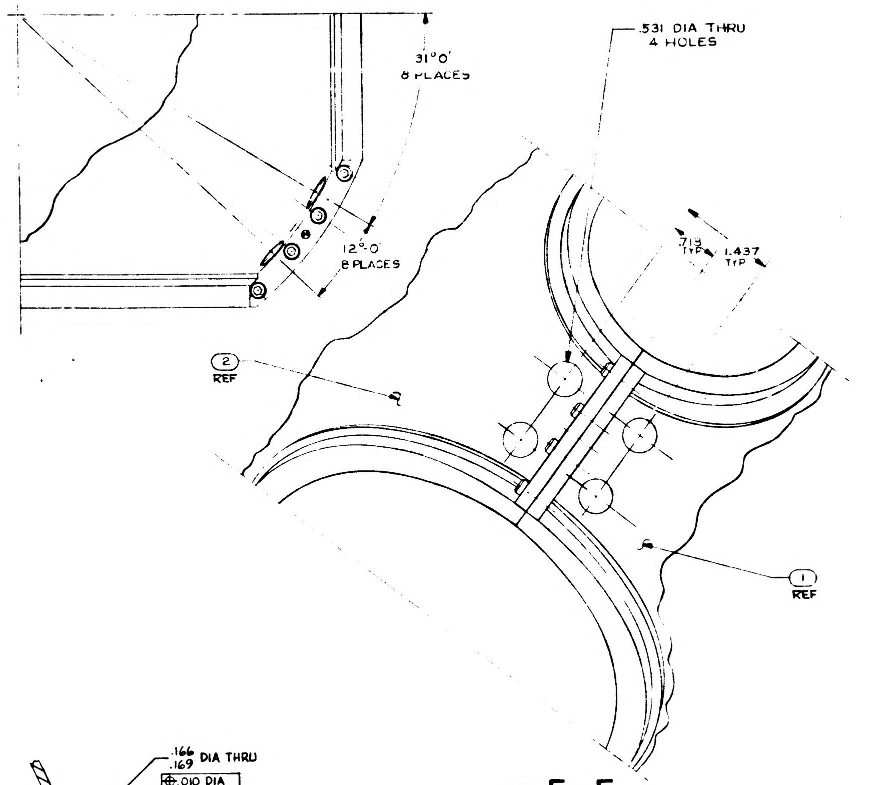
VIEW D-D
4 PLACES
SCALE 2/1


.155 / .157 DIA THRU
⊕ .010 DIA
⑨

DETAIL R
SCALE 4/1
9 PLACES
SEE NOTE 14
1000103-000


.166 / .169 DIA THRU
⊕ .010 DIA
⑫

DETAIL V
SCALE 4/1
9 PLACES
SEE NOTE 14
1000103-011


.531 DIA THRU
4 HOLES
31°0'
8 PLACES
12°0'
8 PLACES
.719 TYP
1.437 TYP
②
REF
①
REF

VIEW E—E
4 PLACES

REPLACES REV B WITH
CHANGE

011	000	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	ITEM NO.
9	—	NUT, PLAIN, CLINCH	1010861-6			12
AR	AR	SURFACE PRIMER	GRADE NR	MIL-S-22473		11
AR	AR	SEALING COMPOUND	GRADE AV	MIL-S-22473		10
—	9	[illegible]	[illegible]			9
10	10	TERMINAL, INSULATED	1000100-1			8
10	10	INSERT, THREADED, SELF LOCKING	1000115-2			7
40	40	INSERT, THREADED, SELF LOCKING	1000115-3			6
4	4	PIN, STRAIGHT HEADLESS	MS16555-225			5
4	4	PIN, LOCATING, STRAIGHT, HEADLESS	1000086-2			4
16	16	SCREW CAP, SOCKET HEAD, HEX	1000110-7			3
1	1	HEMISPHERE ASSY, MOVABLE OUTER GMBL	1000059			2
1	1	HEMISPHERE ASSY, FIXED OUTER GMBL	1000066			1

LIST OF PARTS AND MATERIALS

1000202 DL1000201
1000002 DL1000001

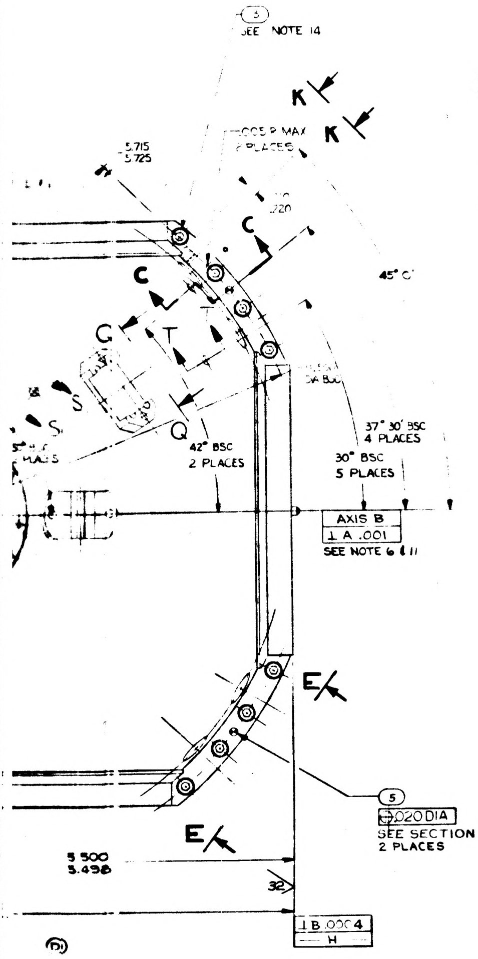
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL

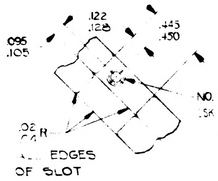
M.I.T.
INSTRUMENTATION LAB
APPROVED G. Boyce 12/11/62
RWC 10-21-62
W J Rhine 12-12-62
M.I.T. APPROVAL
12/12/62

HOUSING ASSEMBLY
OUTER GIMBAL

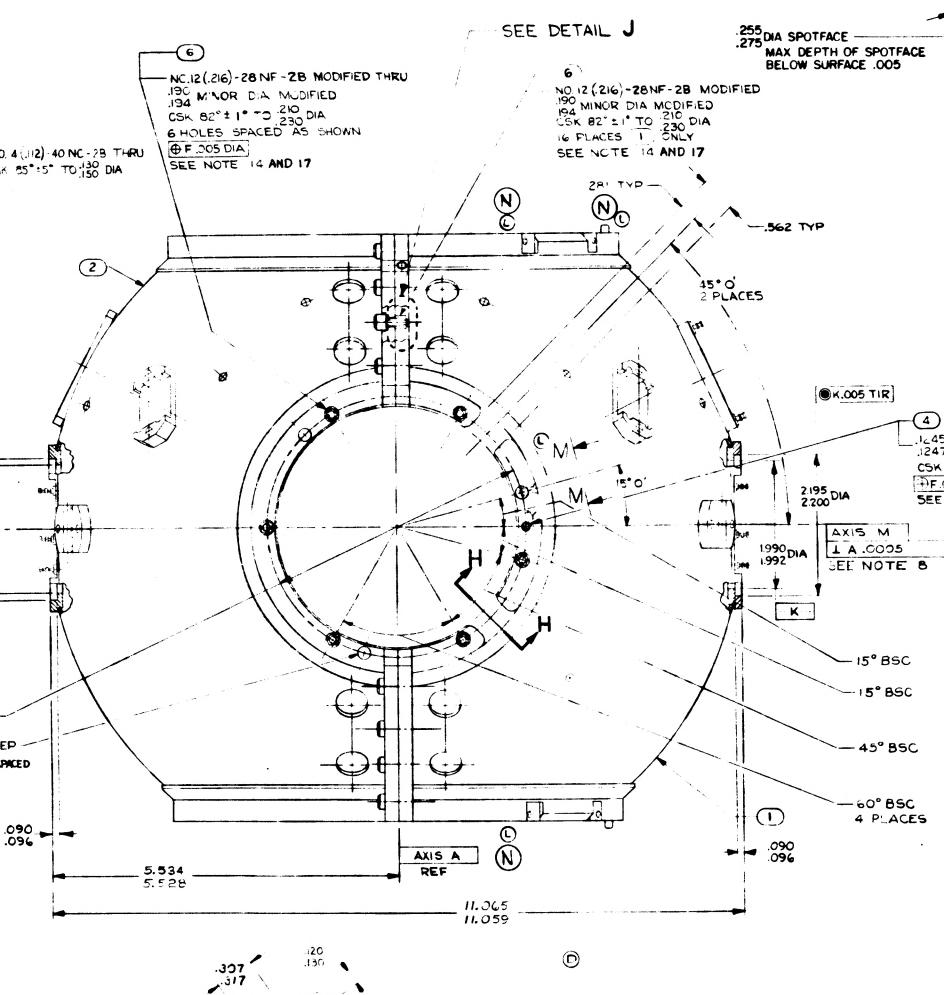
SCALE 1/1
UNIT WT
CODE IDENT

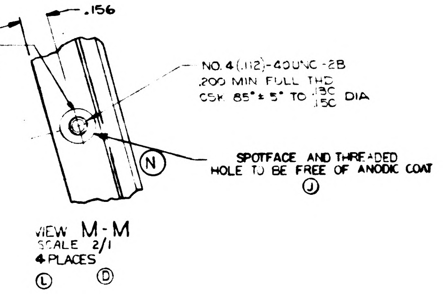
M.I.T.
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
DWG NO
1000103
SHEET 1 OF 1


SEE NOTE 14
K
K
5.715
5.725
.005 R MAX
2 PLACES
C
C
T
Q
S
42° BSC
2 PLACES
45° C
37° 30' BSC
4 PLACES
30° BSC
5 PLACES
AXIS B
⊥ A .001
SEE NOTE 6 & 11
E
E
5.500
5.498
32
⊥ B .0004
H
⑤
.020 DIA
SEE SECTION C-C
2 PLACES

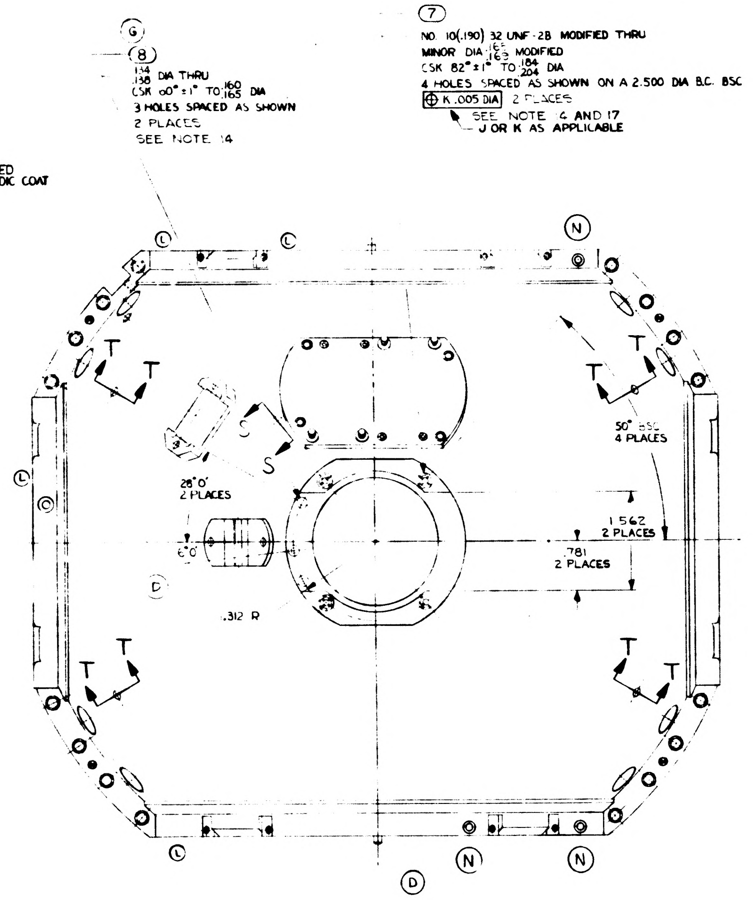

.122
.128
.443
.450
.095
.105
NO.4 (.112) 40 NC-2B THRU
CSK 85°±5° TO .140 .150 DIA
.02 R
ALL EDGES OF SLOT

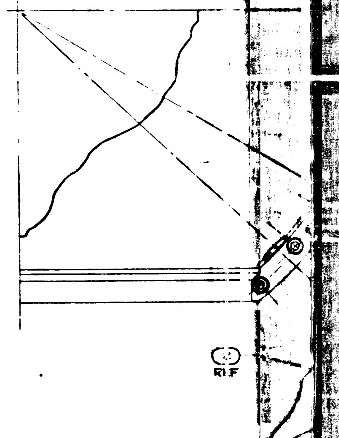
VIEW **K-K**
SCALE 2/1
(D)

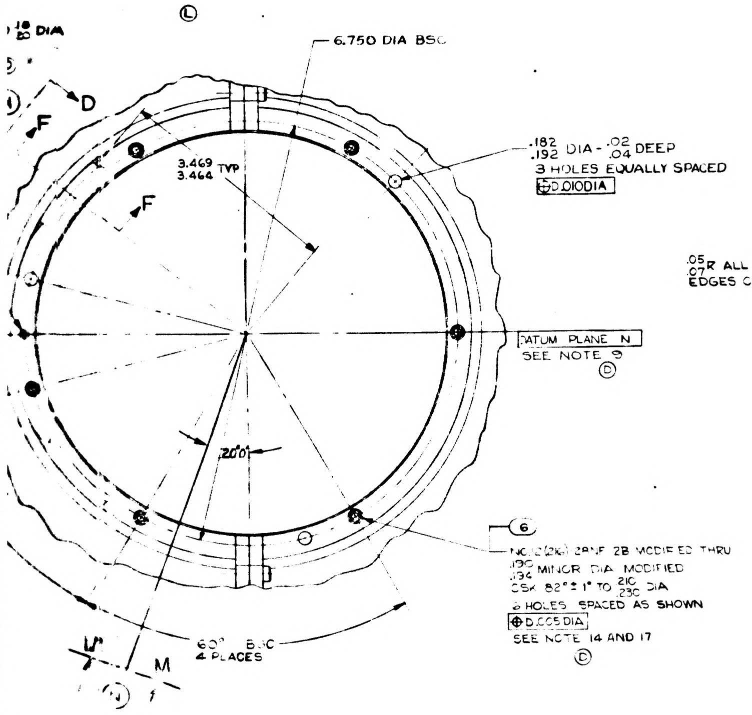

SEE DETAIL J
⑥
NC.12 (.216)-28 NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ F .005 DIA
SEE NOTE 14 AND 17
⑥
NC.12 (.216)-28NF-2B MODIFIED
.190 .194 MINOR DIA MODIFIED
CSK 82°±1° TO .210 .230 DIA
16 PLACES 1 ONLY
SEE NOTE 14 AND 17
②
Ⓝ
.562 TYP
45° 0'
2 PLACES
Ⓚ .005 TIR
④
.1245 .1247 DIA THRU
CSK 85°±5° TO .18 .20 DIA
⊕ F .005 DIA
SEE NOTE 14
2.195 2.200 DIA
1.990 1.992 DIA
AXIS M
⊥ A .0005
SEE NOTE 8
K
M
M
15° 0'
H
H
J
15° BSC
15° BSC
45° BSC
60° BSC
4 PLACES
①
.090 .096
2.195 2.200
1.990 1.992 DIA
J
Ⓙ .005 TIR
4.125 DIA BSC
.182 .192 DIA - .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ .010 DIA
.090 .096
5.534 5.528
AXIS A REF
11.065 11.059
Ⓛ
Ⓝ
Ⓓ


Ⓛ
.156
.255 .275 DIA SPOTFACE
MAX DEPTH OF SPOTFACE BELOW SURFACE .005
NO.4 (.112)-40UNC-2B
.200 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
Ⓝ
SPOTFACE AND THREADED HOLE TO BE FREE OF ANODIC COAT
Ⓙ

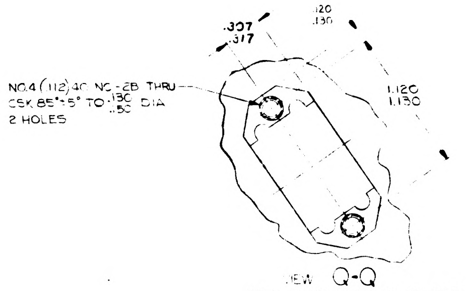
VIEW **M-M**
SCALE 2/1
4 PLACES
Ⓛ Ⓓ


⑥
⑧
.114 .138 DIA THRU
CSK 60°±1° TO .160 .165 DIA
3 HOLES SPACED AS SHOWN
2 PLACES
SEE NOTE 14
⑦
NO. 10 (.190) 32 UNF-2B MODIFIED THRU
MINOR DIA .161 .165 MODIFIED
CSK 82°±1° TO .184 .204 DIA
4 HOLES SPACED AS SHOWN ON A 2.500 DIA B.C. BSC
⊕ K .005 DIA 2 PLACES
SEE NOTE 6 AND 17
J OR K AS APPLICABLE
Ⓛ
Ⓒ
Ⓝ
T
T
T
T
T
T
T
T
S
C
50° BSC
4 PLACES
28° 0'
2 PLACES
1.562
2 PLACES
.781
2 PLACES
.312 R
Ⓓ
Ⓛ
Ⓝ
Ⓝ

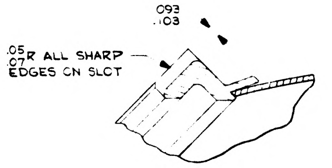



.18 .20 DIA
D
F
F
6.750 DIA BSC
3.469 3.464 TYP
.182 .192 DIA - .02 .04 DEEP
3 HOLES EQUALLY SPACED
⊕ .010 DIA
DATUM PLANE N
SEE NOTE 9
20° 0'
⑥
NC.12 (.216)-28NF-2B MODIFIED THRU
.190 .194 MINOR DIA MODIFIED
CSK 82°±1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
⊕ D .005 DIA
SEE NOTE 14 AND 17
60° BSC
4 PLACES
M
M

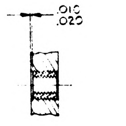
VIEW **A-A**


.307 .317
.120 .130
NO.4 (.112) 40 NC-2B THRU
CSK 85°±5° TO .130 .150 DIA
2 HOLES
1.120 1.130

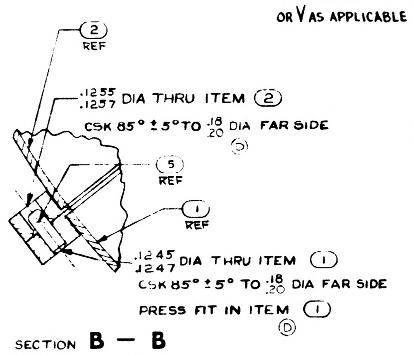
VIEW **Q-Q**
VIEW TAKEN NORMAL TO PAD
SCALE 2/1
2 PLACES
(D)


.093 .103
.05 .07 R ALL SHARP EDGES ON SLOT

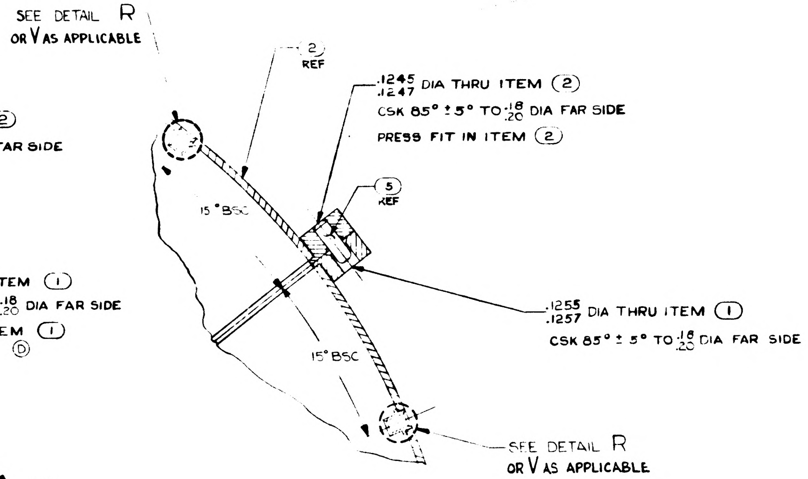
SECTION **H-H**
4 PLACES
SCALE 2/1



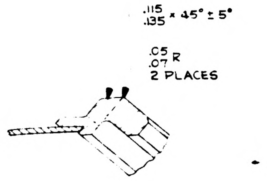
DETAIL **J**
SCALE 2/1
TYPICAL INSTALLATION OF ITEMS ⑥ & ⑦


② REF
.1255 .1257 DIA THRU ITEM ②
CSK 85°±5° TO .18 .20 DIA FAR SIDE
⑤ REF
① REF
.1245 .1247 DIA THRU ITEM ①
CSK 85°±5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ①

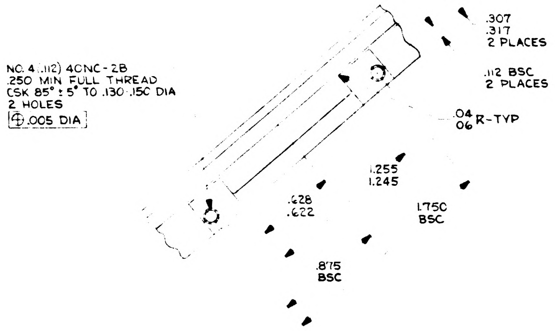
SECTION **B — B**
SCALE 2-1
SEE NOTE 14
(D)


SEE DETAIL R
OR V AS APPLICABLE
② REF
.1245 .1247 DIA THRU ITEM ②
CSK 85°±5° TO .18 .20 DIA FAR SIDE
PRESS FIT IN ITEM ②
⑤ REF
15° BSC
15° BSC
.1255 .1257 DIA THRU ITEM ①
CSK 85°±5° TO .18 .20 DIA FAR SIDE
SEE DETAIL R
OR V AS APPLICABLE

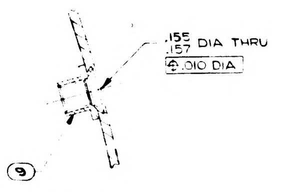
SECTION **C - C**
SCALE 2-1
SEE NOTE 14
(D)


.115 .135 × 45° ± 5°
.05 .07 R
2 PLACES

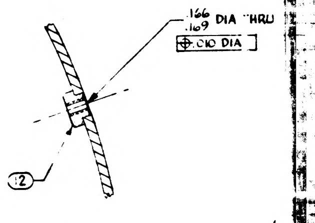
SECTION **F-F**
4 PLACES
SCALE 2/1


.307 .317
2 PLACES
.112 BSC
2 PLACES
.04 .06 R-TYP
NO.4 (.112) 40NC-2B
.250 MIN FULL THREAD
CSK 85°±5° TO .130 .150 DIA
2 HOLES
⊕ .005 DIA
.628 .622
1.255 1.245
1.750 BSC
.875 BSC

VIEW **D-D**
4 PLACES
SCALE 2/1


.155 .157 DIA THRU
⊕ .010 DIA
⑨

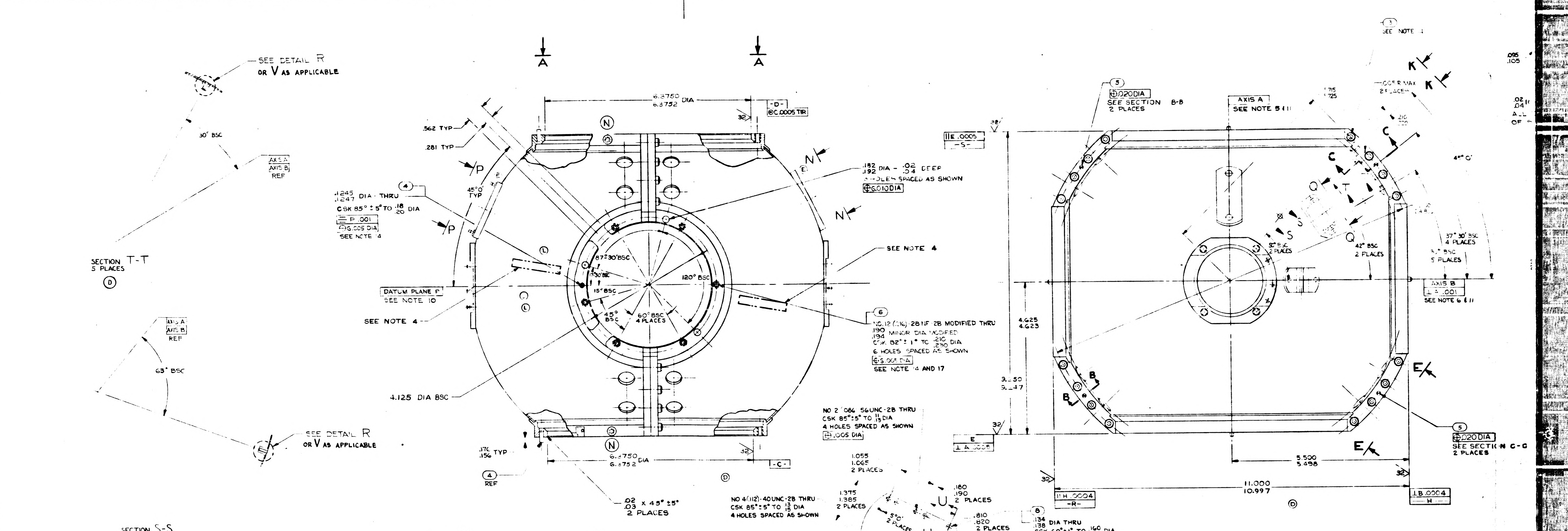
DETAIL **R**
SCALE 4/1
9 PLACES
SEE NOTE 14
1000103-000

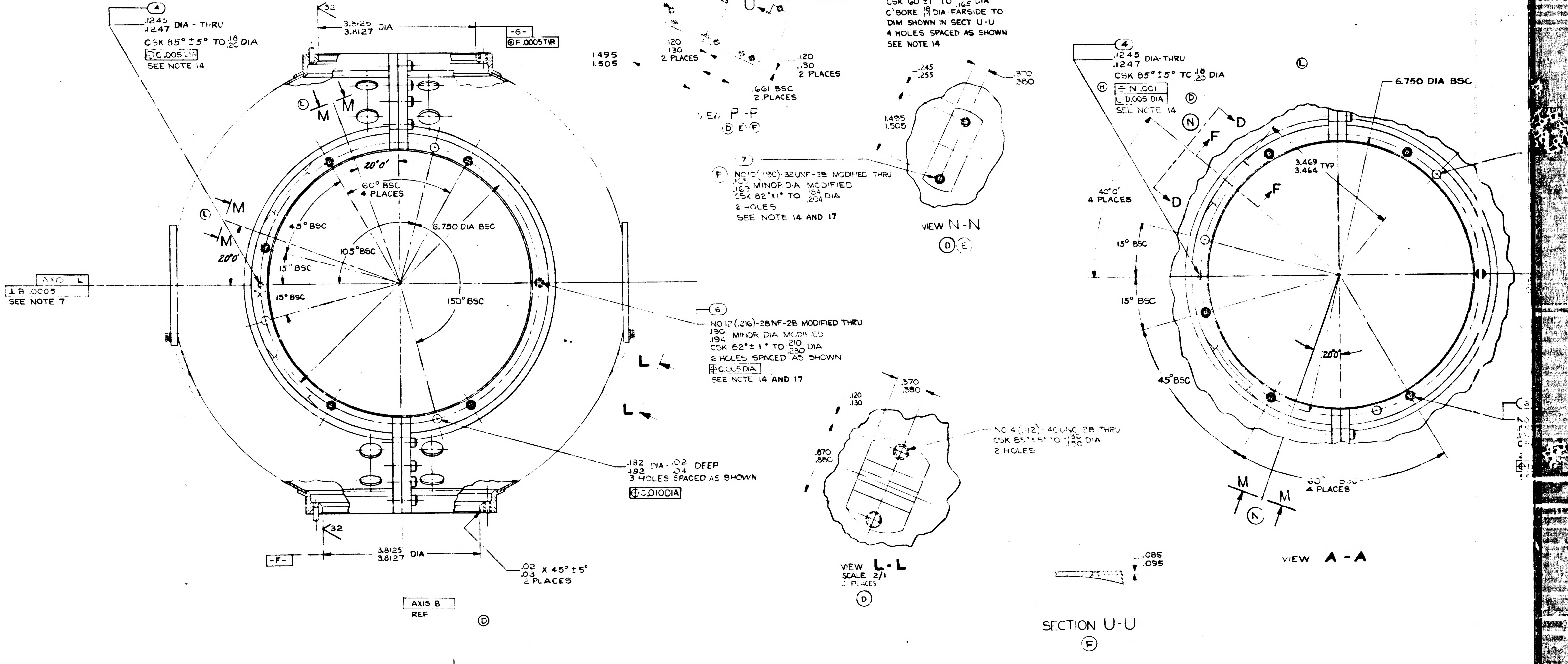

.166 .169 DIA THRU
⊕ .010 DIA
②

DETAIL **V**
SCALE 4/1
3 PLACES
SEE NOTE 14
1000103-011

1000103	REV P	SHT 1

2/1000103


SEE DETAIL R OR V AS APPLICABLE
30° BSC
AXIS A
AXIS B
REF
SECTION T-T
5 PLACES
63° BSC
6.8750 DIA
6.8752
-D-
C .0005 TIR
.562 TYP
.281 TYP
P
N
45°0' TYP
.1245 DIA - THRU
.1247
CSK 85° ±5° TO .18 .20 DIA
SEE NOTE 4
DATUM PLANE P
SEE NOTE 10
SEE NOTE 4
87°30' BSC
15° BSC
120° BSC
60° BSC 4 PLACES
45° BSC
4.125 DIA BSC
.182 DIA - .02 DEEP
.192 .04
3 HOLES SPACED AS SHOWN
.010 DIA
SEE NOTE 4
NO. 12 (.216)-28 NF-2B MODIFIED THRU
.190 MINOR DIA MODIFIED
.194
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
SEE NOTE 14 AND 17
.176 TYP
.156
6.8750 DIA
6.8752
-C-
REF
.02 X 45° ±5°
.03
2 PLACES
A
A
.020 DIA
SEE SECTION B-B
2 PLACES
AXIS A
SEE NOTE 5 & 11
E .0005
-S-
K
K
C
C
Q
T
S
Q
42° BSC
2 PLACES
37° 30' BSC
4 PLACES
5 PLACES
AXIS B
SEE NOTE 6 & 11
4.625
4.623
B
B
E
E
.020 DIA
SEE SECTION G-G
2 PLACES
5.500
5.498
11.000
10.997
H .0004
-R-
B .0004
-H-
A .0005


SECTION S-S
2 PLACES
D
.1245 DIA - THRU
.1247
CSK 85° ±5° TO .18 .20 DIA
C .0005
SEE NOTE 14
3.8125 DIA
3.8127
-G-
F .0005 TIR
M
M
20°0'
60° BSC
4 PLACES
45° BSC
6.750 DIA BSC
105° BSC
15° BSC
15° BSC
150° BSC
AXIS L
B .0005
SEE NOTE 7
NO. 12 (.216)-28NF-2B MODIFIED THRU
.190 MINOR DIA MODIFIED
.194
CSK 82° ± 1° TO .210 .230 DIA
6 HOLES SPACED AS SHOWN
C .005 DIA
SEE NOTE 14 AND 17
L
L
.182 DIA - .02 DEEP
.192 .04
3 HOLES SPACED AS SHOWN
D .010 DIA
-F-
3.8125 DIA
3.8127
.02 X 45° ± 5°
.03
2 PLACES
AXIS B
REF
NO 2 (.086) 56UNC-2B THRU
CSK 85° ±5° TO .11 .13 DIA
4 HOLES SPACED AS SHOWN
.005 DIA
NO 4 (.112)-40UNC-2B THRU
CSK 85° ±5° TO .13 .15 DIA
4 HOLES SPACED AS SHOWN
1.055
1.065
2 PLACES
1.375
1.385
2 PLACES
.180
.190
2 PLACES
.810
.820
2 PLACES
U
U
1.495
1.505
.120
.130
2 PLACES
.661 BSC
2 PLACES
VIEW P-P
.134 DIA THRU
.138
CSK 60° ± 1° TO .166 .162 DIA
C'BORE .18 DIA FARSIDE TO DIM SHOWN IN SECT U-U
4 HOLES SPACED AS SHOWN
SEE NOTE 14
.245
.255
.370
.380
NO. 10 (.190)-32UNF-2B MODIFIED THRU
.157 MINOR DIA MODIFIED
.162
CSK 82° ± 1° TO .194 .204 DIA
2 HOLES
SEE NOTE 14 AND 17
VIEW N-N
.1245 DIA THRU
.1247
CSK 85° ±5° TO .18 .20 DIA
N .001
D .005 DIA
SEE NOTE 14
6.750 DIA BSC
D
F
3.469 TYP
3.464
40°0'
4 PLACES
15° BSC
15° BSC
45° BSC
20°0'
30° BSC
4 PLACES
M
M
VIEW A-A
.120
.130
.370
.380
.870
.880
NO 4 (.112)-40UNC-2B THRU
CSK 85° ± 5° TO .130 .150 DIA
2 HOLES
VIEW L-L
SCALE 2/1
2 PLACES
.085
.095
SECTION U-U

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 BREAK ALL SHARP EDGES $^{.005}_{.015}$

3 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED

4 IDENTIFY USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL, AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT THE INDICATED LOCATIONS PER MIL-STD-130

5 A LINE PASSING THRU THE CENTER OF BORE -C- AND BORE -D- ESTABLISHES AXIS A

6 A LINE PASSING THRU THE CENTER OF BORE -F- AND BORE -G- ESTABLISHES AXIS B

7 A LINE INTERSECTING AXIS A AND CENTER OF ITEM ④ MARKED "X" ESTABLISHES AXIS L

8 A LINE INTERSECTING AXIS B AND CENTER OF ITEM ④ MARKED "Y" ESTABLISHES AXIS M

9 A PLANE CONTAINING AXIS A & AXIS L ESTABLISHES DATUM PLANE N

10 A PLANE CONTAINING AXIS B & AXIS M ESTABLISHES DATUM PLANE P

11 AXIS A MUST INTERSECT AXIS B WITHIN .001 & BOTH AXIS MUST BE CONTAINED WITHIN .010 OF MATING SURFACES OF ① & ②

12 ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

13 ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ± 1°F

14 ORDER OF OPERATIONS (NON MANDATORY)
  A ASSEMBLE ITEMS ① & ② USING NO. 6 SCREWS & NUTS
  B DRILL, REAM & C'SINK FOR ITEM ⑤
  C INSTALL ITEM ⑤
  D ROUGH MACHINE WITHIN .015 OF FINISH DIMENSION
  E STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 5 MINUTES
  F FINISH MACHINE
  G REMOVE ITEM ⑤ AND ANODIC COAT PER NOTE 2
  H INSTALL ITEMS ③, ④, ⑤, ⑥, ⑦, ⑧ & ⑨ OR ⑫.

15. MACHINING PADS IF ADDED TO ITEM ① MUST BE MACHINED OFF TO WITHIN .015 OF ORIGINAL FLANGE SURFACE PRIOR TO ANODIC COAT

16. ALTERNATE FINISH: BORES -C- -D- -G- & -F- AND SURFACES -E- -H- -R- & -S- MAY BE CHEMICAL FINISHED PER MIL-C-5541

17. JUST PRIOR TO THE ASSEMBLY OF ITEMS ⑥ AND ⑦ APPLY ITEM ⑩ AS FOLLOWS:
  A. PREPARE SURFACES OF ITEMS ⑥ AND ⑦ AND THEIR MATING HOLES BY WETTING WITH ITEM ⑪. BRUSH OR WIPE SURFACE WHILE WET, TO REMOVE GREASE AND OTHER FOREIGN MATERIAL.
  B. APPLY THIN COAT OF ITEM ⑩ TO OUTSIDE THREADS AND KEYS OF ITEMS ⑥ AND ⑦. CAUTION: DO NOT ALLOW SEALER TO REMAIN ON INTERNAL THREADS OF THE INSERT.
  C. ASSEMBLE ITEMS ⑥ AND ⑦ AND ALLOW 8 HOURS AT ROOM TEMPERATURE FOR CURING.

1/1000103

1000103

REVISIONS TDRR 00065

SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQD.
1000059	Hemisphere Assy, Movable Outer Gimbal	1
1000066	Hemisphere Assy, Fixed Outer Gimbal	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000002	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/17/62
CHECKED		
DRAWN		

APPROVED FOR MSC
10/17/62
BY DIRECTION MIT Approval
10/17/62

OUTER GIMBAL HOUSING ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

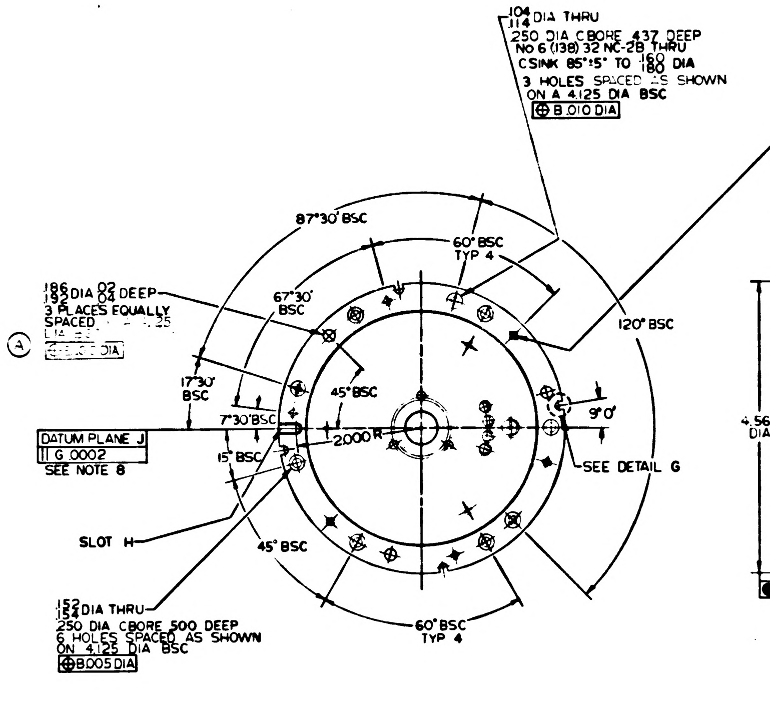
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

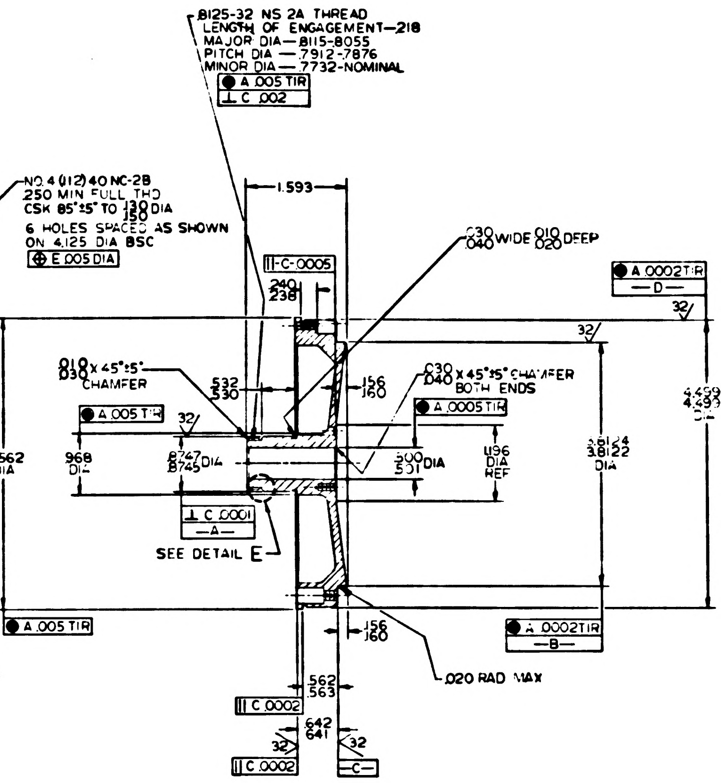
NASA DRAWING NO.
1000103

SHEET OF

REVISIONS TDRR 000				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00270	1-15-63	

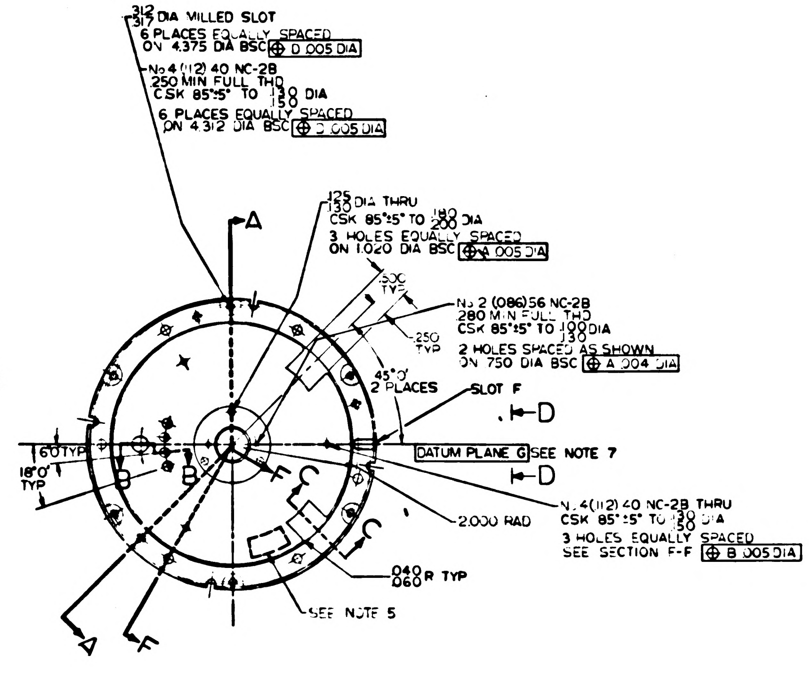


.104 .114 DIA THRU
.250 DIA CBORE .437 DEEP
No 6 (.138) 32 NC-2B THRU
CSINK 85°±5° TO .160 .180 DIA
3 HOLES SPACED AS SHOWN
ON A 4.125 DIA BSC
⊕ B .010 DIA
NO. 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
6 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
⊕ E .005 DIA
87°30' BSC
60° BSC
TYP 4
67°30'
BSC
120° BSC
.186 .192 DIA .02 .04 DEEP
3 PLACES EQUALLY
SPACED
Ⓐ
17°30'
BSC
45° BSC
7°30' BSC
9°0'
DATUM PLANE J
∥ G .0002
SEE NOTE 8
15° BSC
2.000 R
SEE DETAIL G
SLOT H
45° BSC
.152 .154 DIA THRU
.250 DIA CBORE .500 DEEP
6 HOLES SPACED AS SHOWN
ON 4.125 DIA BSC
⊕ B .005 DIA
60° BSC
TYP 4

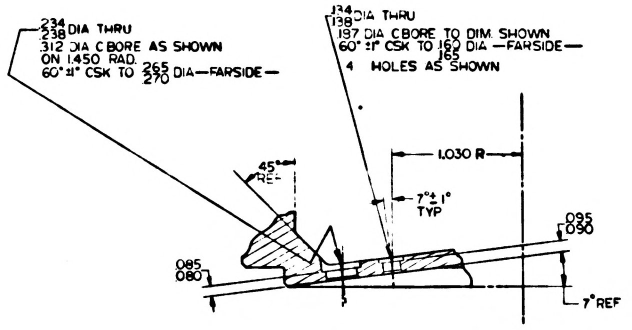


.8125-32 NS 2A THREAD
LENGTH OF ENGAGEMENT—.218
MAJOR DIA—.8115-.8055
PITCH DIA—.7912-.7876
MINOR DIA—.7732-NOMINAL
● A .005 TIR
⊥ C .002
1.593
∥-C-.0005
.240 .238
.030 .040 WIDE .010 .020 DEEP
● A .0002 TIR
—D—
32
.010 .030 X 45°±5° CHAMFER
.532 .530
.156 .160
.030 .040 X 45°±5° CHAMFER BOTH ENDS
● A .005 TIR
● A .0005 TIR
4.562 DIA
.968 DIA
.8747 .8745 DIA
.500 .501 DIA
1.196 DIA REF
3.8124 3.8122 DIA
4.4998 4.4996 DIA
⊥ C .0001
—A—
SEE DETAIL E
● A .005 TIR
.156 .160
● A .0002 TIR
—B—
.020 RAD MAX
.562 .563
∥ C .0002
.642 .641
32
∥ C .0002
—C—

SECTION A-A



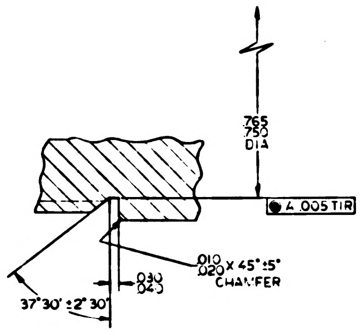
.312 .317 DIA MILLED SLOT
6 PLACES EQUALLY SPACED
ON 4.375 DIA BSC ⊕ D .005 DIA
No 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
6 PLACES EQUALLY SPACED
ON 4.312 DIA BSC ⊕ D .005 DIA
A
.125 .130 DIA THRU
CSK 85°±5° TO .180 .200 DIA
3 HOLES EQUALLY SPACED
ON 1.020 DIA BSC ⊕ A .005 DIA
.500 TYP
.250 TYP
No 2 (.086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100 .130 DIA
2 HOLES SPACED AS SHOWN
ON .750 DIA BSC ⊕ A .004 DIA
45°0'
2 PLACES
SLOT F
D
DATUM PLANE G SEE NOTE 7
D
6°0' TYP
18°0' TYP
B
B
F
C
C
No 4 (.112) 40 NC-2B THRU
CSK 85°±5° TO .130 .150 DIA
3 HOLES EQUALLY SPACED
SEE SECTION F-F ⊕ B .005 DIA
2.000 RAD
.040 .060 R TYP
SEE NOTE 5
A
F



.234 .238 DIA THRU
.312 DIA CBORE AS SHOWN
ON 1.450 RAD.
60°±1° CSK TO .265 .270 DIA—FARSIDE—
.134 .138 DIA THRU
.187 DIA CBORE TO DIM. SHOWN
60°±1° CSK TO .160 .165 DIA —FARSIDE—
4 HOLES AS SHOWN
45° REF
1.030 R
7°±1° TYP
.095 .090
.085 .080
7° REF

SECTION B-B

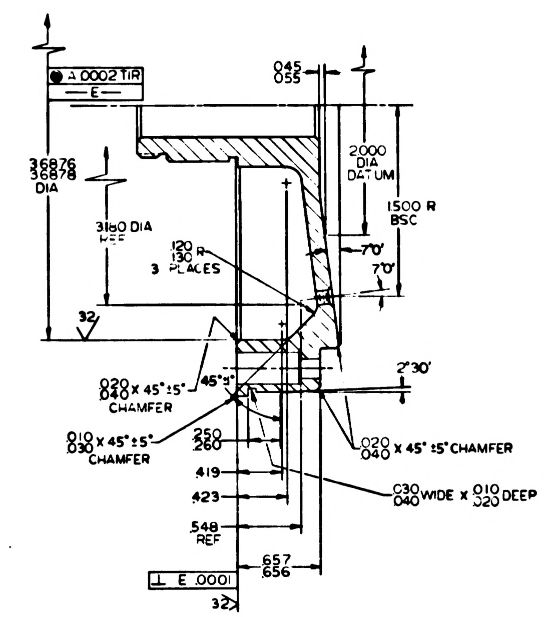
SCALE: 2/1



.765 .750 DIA
● A .005 TIR
.010 .020 X 45°±5° CHAMFER
.030 .040
37°30' ±2°30'

DETAIL E

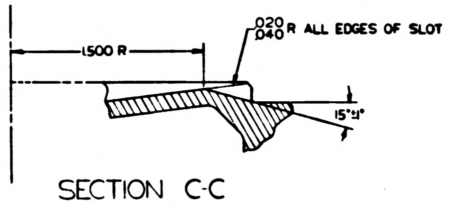
SCALE: 4/1



● A .0002 TIR
—E—
.045 .055
3.6876 3.6878 DIA
2.000 DIA DATUM
1.500 R BSC
3.160 DIA REF
.120 .130 R
3 PLACES
7°0'
7°0'
32
2°30'
.020 .040 X 45°±5° CHAMFER
45°±1°
.010 .030 X 45°±5° CHAMFER
.250 .260
.020 .040 X 45°±5° CHAMFER
.419
.423
.030 .040 WIDE X .010 .020 DEEP
.548 REF
.657 .656
⊥ E .0001
32

SECTION F-F

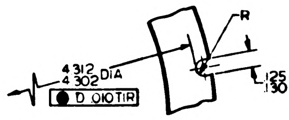
SCALE: 2/1



1.500 R
.020 .040 R ALL EDGES OF SLOT
15°±1°

SECTION C-C

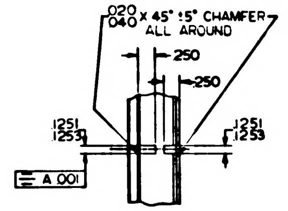
SCALE: 2/1
2 PLACES



R
4.312 4.302 DIA
● D .010 TIR
.125 .130 THRU

DETAIL G

4 PLACES EQUALLY SPACED
WITHIN ±.005
SCALE 2/1



.020 .040 X 45°±5° CHAMFER
ALL AROUND
.250
.250
.1251 .1253
.1251 .1253
⌯ A .001

VIEW D-D

SCALE 1/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005 .015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J

INCHES
PHOTOGRAPHIC SCALE ONLY

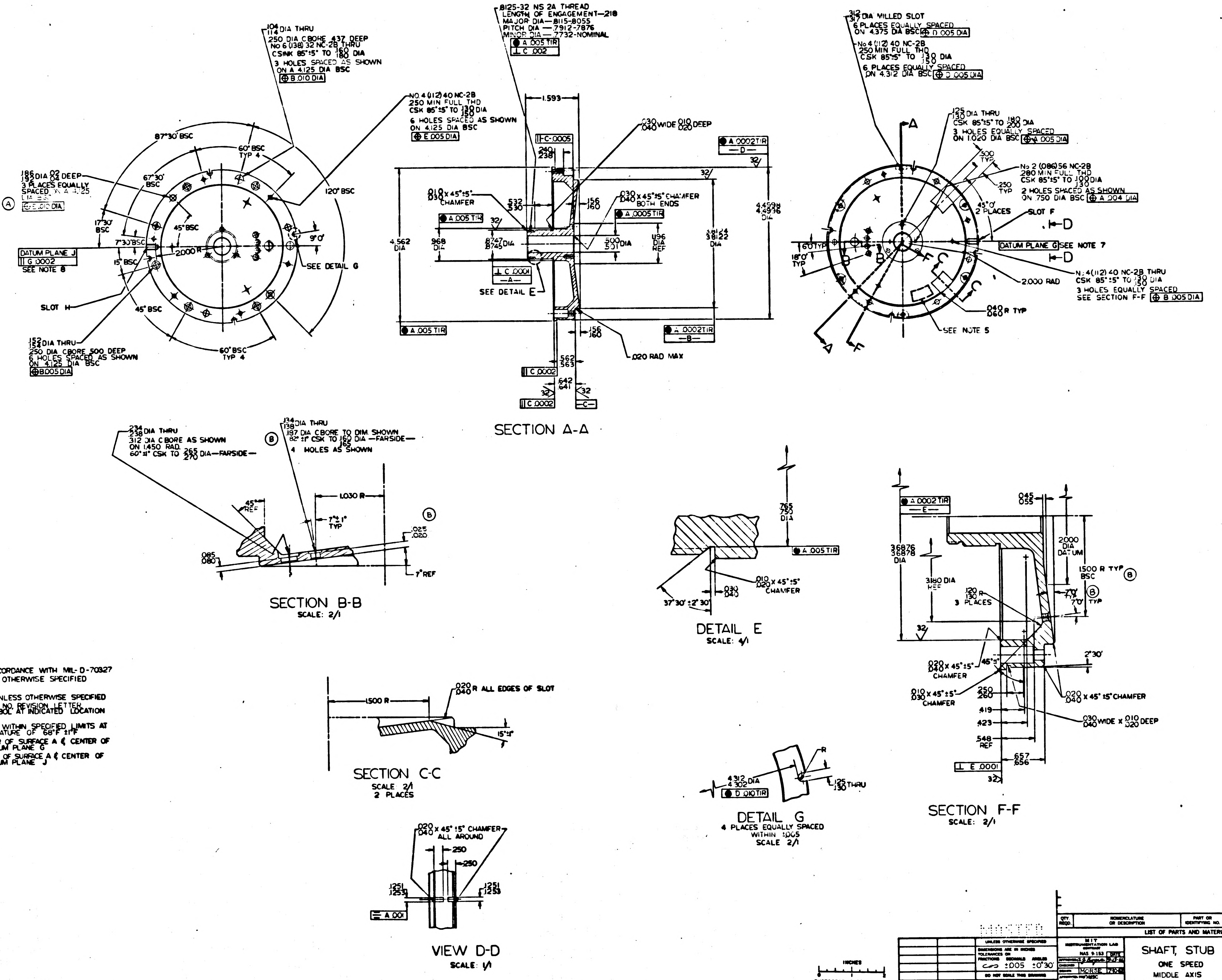
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000008	DL1000001	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30' DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	SHAFT, STUB ONE SPEED MIDDLE AXIS	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
NEXT ASSY	USED ON	MATERIAL: BERYLLIUM— BRUSH SPEC S-200 ALT: SPEC MIL-B-21531	APPROVED 9-13-6 CHECKED DRAWN MORSE 7-10-6 APPROVED FOR MSC BY DIRECTION	SCALE 1/1 UNIT WT. CODE IDENT.	DWG. NO. MANNED SPACECRAFT CENTER HOUSTON TEXAS NASA DRAWING NO 1000105 SHEET 1 OF 1 SHEET
APPLICATION					

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00270	1-15-63	
	B	TDRR C1043	4-30-63	

REVISIONS TDRR 000



SECTION A-A
SECTION B-B
SCALE: 2/1
DETAIL E
SCALE: 4/1
SECTION F-F
SCALE: 2/1
SECTION C-C
SCALE 2/1
2 PLACES
DETAIL G
4 PLACES EQUALLY SPACED
WITHIN ±.005
SCALE 2/1
VIEW D-D
SCALE: 1/1
.8125-32 NS 2A THREAD
LENGTH OF ENGAGEMENT—.218
MAJOR DIA—.8115-.8055
PITCH DIA — .7912-.7876
MINOR DIA — .7732-NOMINAL
DATUM PLANE J
SEE NOTE 8
DATUM PLANE G
SEE NOTE 7
SLOT H
SLOT F
SEE DETAIL G
SEE DETAIL E
SEE NOTE 5
2.000 RAD

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005/.015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000008	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM—BRUSH SPEC S-200
ALT: SPEC MIL-B-21531

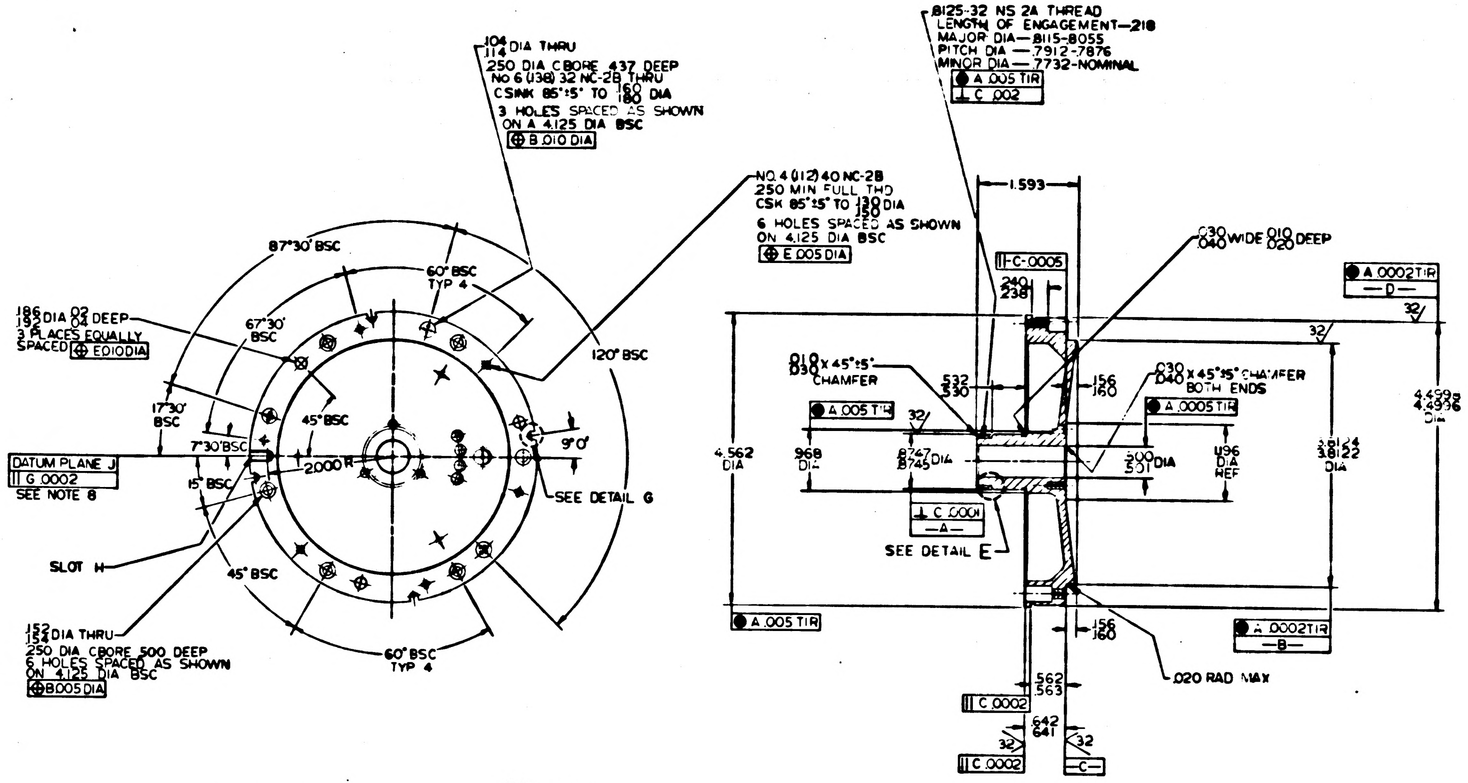
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A.J. Boyce
CHECKED
DRAWN MORSE 7-10-62
APPROVED BY MSC

SHAFT, STUB
ONE SPEED
MIDDLE AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

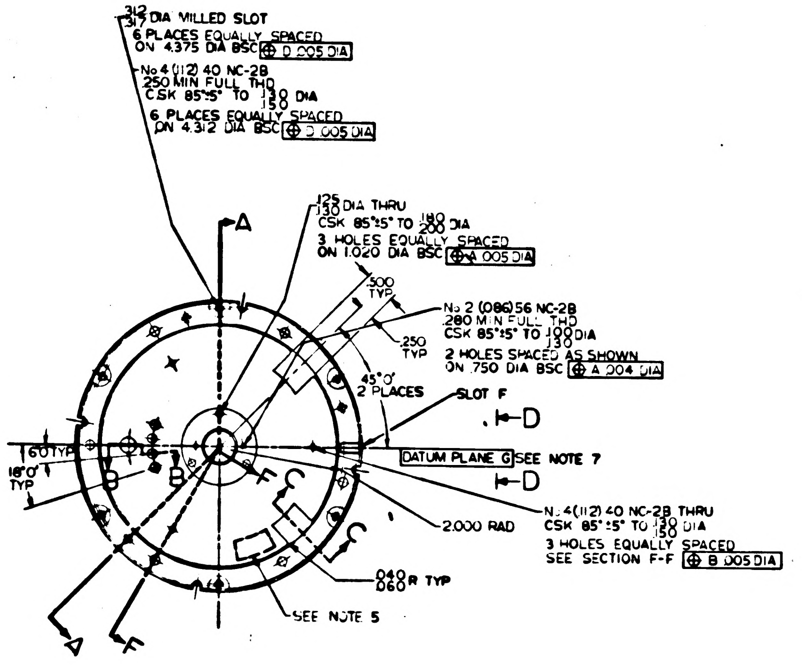
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000105
SHEET 1 OF 1 SHEET

INCHES
PHOTOGRAPHIC SCALE ONLY

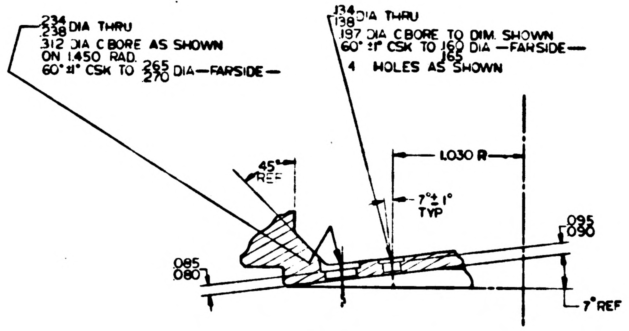


.104 .114 DIA THRU
.250 DIA CBORE .437 DEEP
NO 6 (.138) 32 NC-2B THRU
CSINK 85°±5° TO .160 .180 DIA
3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ B .010 DIA
87°30' BSC
60° BSC TYP 4
67°30' BSC
120° BSC
.186 .192 DIA .02 .04 DEEP
3 PLACES EQUALLY SPACED ⊕ E .010 DIA
17°30' BSC
7°30' BSC
45° BSC
9°0'
2.000 R
DATUM PLANE J
∥ G .0002
SEE NOTE 8
15° BSC
SEE DETAIL G
SLOT H
45° BSC
.152 .154 DIA THRU
.250 DIA CBORE .500 DEEP
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ B .005 DIA
60° BSC TYP 4
NO.4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
6 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕ E .005 DIA
.8125-32 NS 2A THREAD
LENGTH OF ENGAGEMENT—.218
MAJOR DIA—.8115-.8055
PITCH DIA —.7912-.7876
MINOR DIA —.7732-NOMINAL
● A .005 TIR
⊥ C .002
1.593
∥ C .0005
.240 .238
.030 .040 WIDE .010 .020 DEEP
● A .0002 TIR
—D—
.010 .030 X 45°±5° CHAMFER
.532 .530
.156 .160
.030 .040 X 45°±5° CHAMFER BOTH ENDS
● A .005 TIR
● A .0005 TIR
4.562 DIA
.968 DIA
.8747 .8745 DIA
.500 .501 DIA
.196 DIA REF
3.8124 3.8122 DIA
4.499 4.498 DIA
⊥ C .0001
—A—
SEE DETAIL E
● A .005 TIR
.156 .160
● A .0002 TIR
—B—
.020 RAD MAX
.562 .563
∥ C .0002
.642 .641
32
—C—
∥ C .0002

SECTION A-A

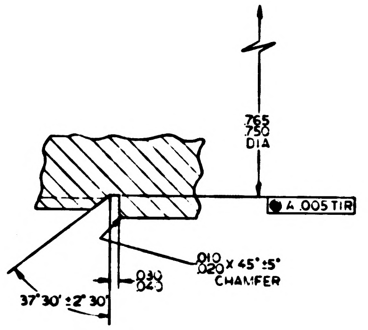


.312 .315 DIA MILLED SLOT
6 PLACES EQUALLY SPACED ON 4.375 DIA BSC ⊕ D .005 DIA
No 4 (.112) 40 NC-2B
.250 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
6 PLACES EQUALLY SPACED ON 4.312 DIA BSC ⊕ D .005 DIA
A
.125 DIA THRU
CSK 85°±5° TO .180 .200 DIA
3 HOLES EQUALLY SPACED ON 1.020 DIA BSC ⊕ A .005 DIA
.500 TYP
No 2 (.086) 56 NC-2B
.280 MIN FULL THD
CSK 85°±5° TO .100 .130 DIA
2 HOLES SPACED AS SHOWN ON .750 DIA BSC ⊕ A .004 DIA
.250 TYP
45°0' 2 PLACES
SLOT F
D
.160 TYP
18°0' TYP
DATUM PLANE G SEE NOTE 7
D
No 4 (.112) 40 NC-2B THRU
CSK 85°±5° TO .130 .150 DIA
3 HOLES EQUALLY SPACED SEE SECTION F-F ⊕ B .005 DIA
2.000 RAD
.040 .060 R TYP
SEE NOTE 5
A
F



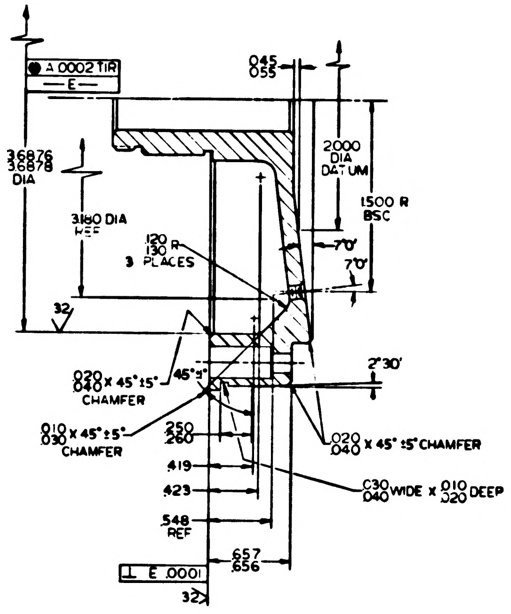
.234 .238 DIA THRU
.312 DIA C BORE AS SHOWN ON 1.450 RAD
60°±1° CSK TO .265 .270 DIA—FARSIDE—
.134 .138 DIA THRU
.197 DIA CBORE TO DIM SHOWN
60°±1° CSK TO .160 .165 DIA —FARSIDE—
4 HOLES AS SHOWN
1.030 R
45° REF
7°±1° TYP
.095 .090
.085 .080
7° REF

SECTION B-B
SCALE: 2/1



.765 .750 DIA
● A .005 TIR
.010 .020 X 45°±5° CHAMFER
.030 .040
37°30'±2°30'

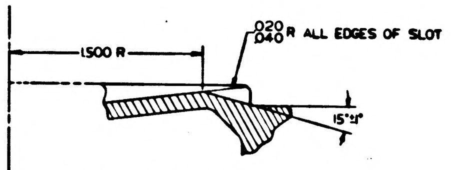
DETAIL E
SCALE: 4/1



● A .0002 TIR
—E—
.045 .055
2.000 DIA DATUM
3.6876 3.6878 DIA
1.500 R BSC
3.180 DIA REF
7°0'
7°0'
.120 .130 R 3 PLACES
32
2°30'
.020 .040 X 45°±5° CHAMFER
45°±5°
.010 .030 X 45°±5° CHAMFER
.020 .040 X 45°±5° CHAMFER
.250 .260
.419
.423
.030 .040 WIDE X .010 .020 DEEP
.548 REF
⊥ E .0001
.657 .656
32

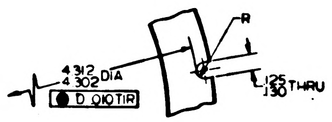
SECTION F-F
SCALE: 2/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK SHARP EDGES .005 .015
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
6. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68°F ±1°F
7. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT F ESTABLISHES DATUM PLANE G
8. LINE PASSING THRU CENTER OF SURFACE A & CENTER OF SLOT H ESTABLISHES DATUM PLANE J



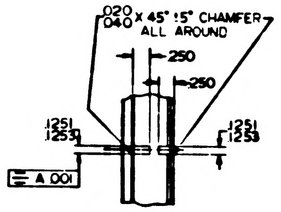
1.500 R
.020 .040 R ALL EDGES OF SLOT
15°±1°

SECTION C-C
SCALE: 2/1
2 PLACES



R
4.312 4.302 DIA
● D .010 TIR
.125 .130 THRU

DETAIL G
4 PLACES EQUALLY SPACED WITHIN ±.005
SCALE 2/1



.020 .040 X 45°±5° CHAMFER ALL AROUND
.250
.250
.1251 .1253
.1251 .1253
= A .001

VIEW D-D
SCALE: 1/1

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000008	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM— BRUSH SPEC S-200 ALT: SPEC MIL-B-21530

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED: 9-13-61
DRAWN: MORSE 7-10-61
APPROVED MSC
BY DIRECTION

SHAFT, STUB
ONE SPEED
MIDDLE AXIS

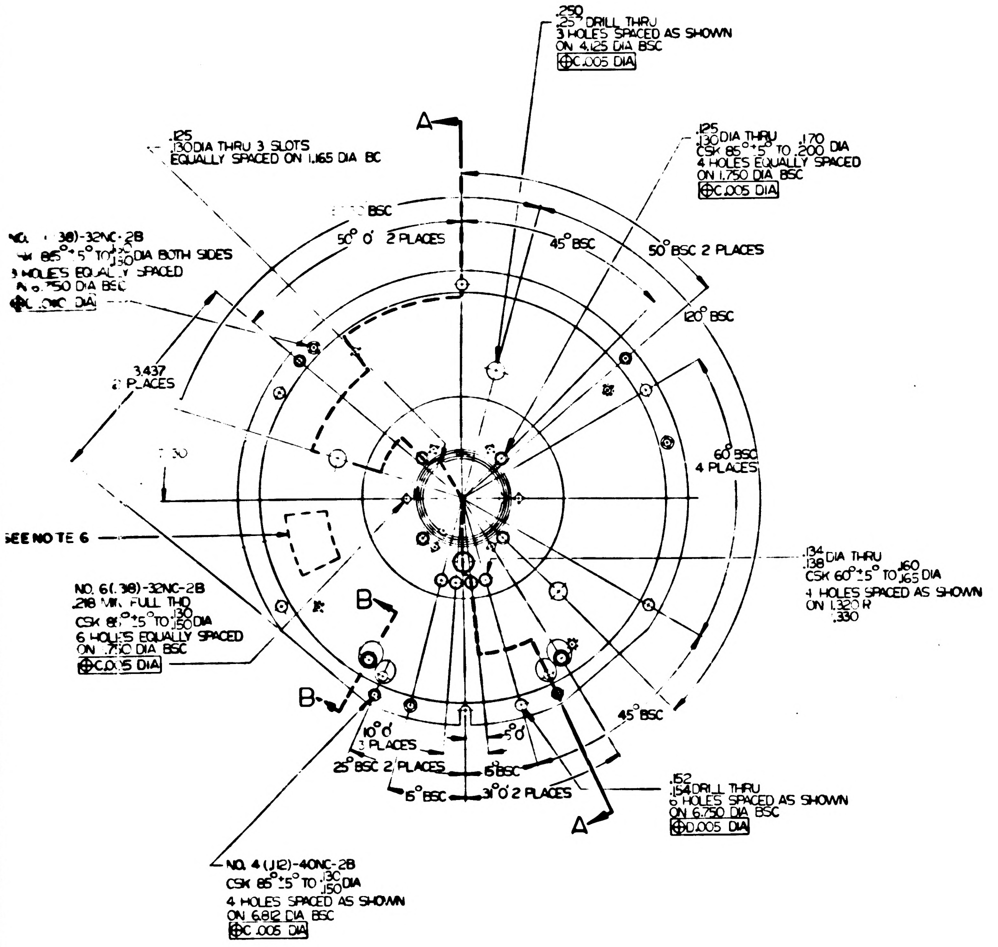
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000105
SHEET 1 OF 1 SHEET

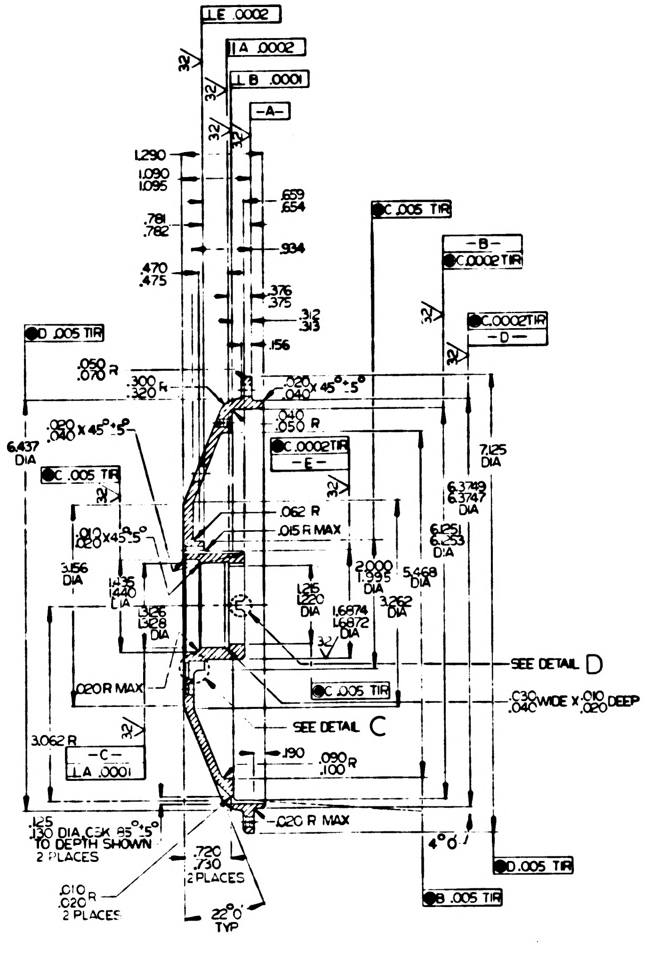
INCHES
PHOTOGRAPHIC SCALE ONLY

1000105

REVISIONS TDRR 0003			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00150		

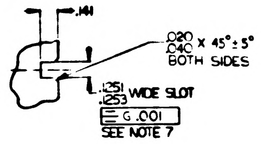


.250 .25 DRILL THRU 3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕C.005 DIA
.125 .130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.125 DIA THRU CSK 85°±5° TO .170 .200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
NO. 6(.138)-32NC-2B CSK 85°±5° TO .130 .150 DIA BOTH SIDES 3 HOLES EQUALLY SPACED ON 6.750 DIA BSC ⊕C.005 DIA
50°0' 2 PLACES
45° BSC
50° BSC 2 PLACES
120° BSC
3.437 2 PLACES
60° BSC 4 PLACES
SEE NOTE 6
A
B
NO. 6(.138)-32NC-2B .218 MIN FULL THD CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
.134 .138 DIA THRU CSK 60°±5° TO .160 .165 DIA 4 HOLES SPACED AS SHOWN ON 1.320 R 1.330
10°0' 2 PLACES
25° BSC 2 PLACES
15° BSC
15° BSC
31°0' 2 PLACES
45° BSC
.152 .154 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕D.005 DIA
NO. 4(.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC ⊕C.005 DIA



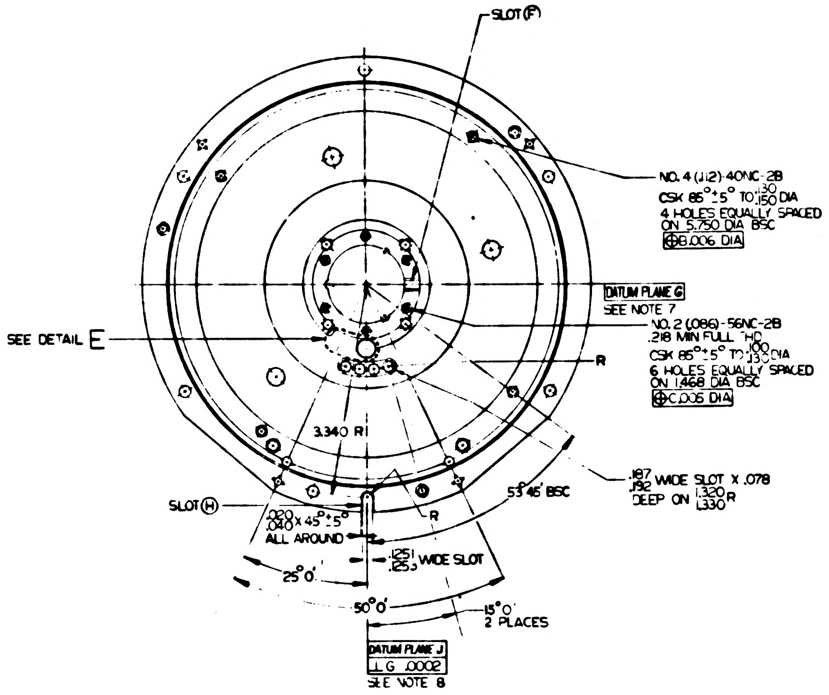
⊥E .0002
∥A .0002
⊥B .0001
-A-
1.290
1.090 1.095
.781 .782
.470 .475
.659 .654
.934
.376 .375
.312 .313
.156
●C.005 TIR
-B-
●C.0002TIR
●C.0002TIR
-D-
●D.005 TIR
.050 .070 R
.300 .320 R
.020 .040 X 45°±5°
.040 .050 R
6.437 DIA
●C.005 TIR
●C.0002TIR
-E-
.062 R
.015 R MAX
.010 .020 X 45°±5°
3.156 DIA
1.435 1.440 DIA
1.325 1.328 DIA
1.215 1.220 DIA
1.6874 1.6872 DIA
2.000 1.995 DIA
3.262 DIA
5.468 DIA
6.125 6.253 DIA
6.3749 6.3747 DIA
7.125 DIA
SEE DETAIL D
.020 R MAX
●C.005 TIR
.030 .040 WIDE X .010 .020 DEEP
3.062 R
-C-
∥A .0001
SEE DETAIL C
.190
.090 .100 R
.020 R MAX
.125 .130 DIA CSK 85°±5° TO DEPTH SHOWN 2 PLACES
.720 .730 2 PLACES
.010 .020 R 2 PLACES
22°0' TYP
4°0'
●D.005 TIR
●B.005 TIR

SECTION A-A

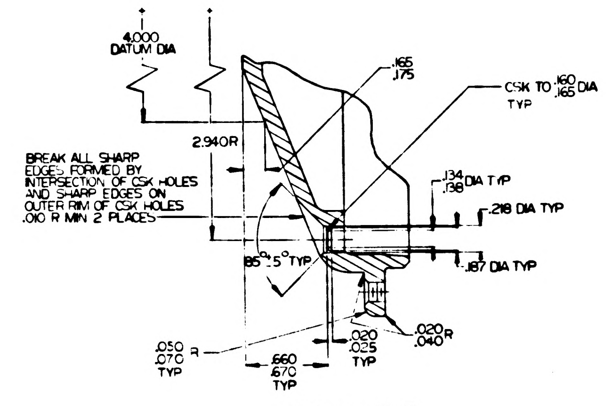


.141
.020 .040 X 45°±5° BOTH SIDES
.1251 .1253 WIDE SLOT
≡G.001
SEE NOTE 7

DETAIL D
SCALE 2/1

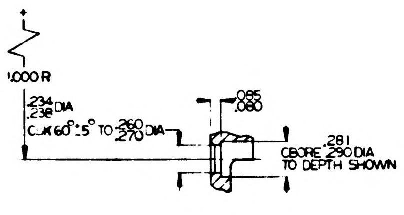


SLOT F
NO. 4(.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC ⊕B.006 DIA
DATUM PLANE G
SEE NOTE 7
NO. 2(.086)-56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .130 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC ⊕C.005 DIA
SEE DETAIL E
R
3.340 R
R
.187 .192 WIDE SLOT X .078 DEEP ON 1.320 1.330 R
53°45' BSC
SLOT H
.020 .040 X 45°±5° ALL AROUND
.1251 .1253 WIDE SLOT
25°0'
50°0'
15°0' 2 PLACES
DATUM PLANE J
⊥G .0002
SEE NOTE 8



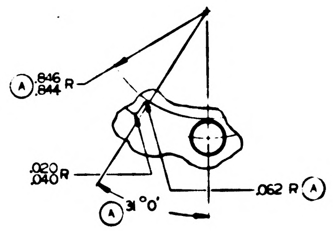
4.000 DATUM DIA
.165 .175
CSK TO .160 .165 DIA TYP
2.940 R
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
.134 .138 DIA TYP
.218 DIA TYP
85°±5° TYP
.187 DIA TYP
.050 .070 R TYP
.660 .670 TYP
.020 .025 TYP
.020 .040 R

SECTION B-B
SCALE 2/1



1.000 R
.234 .238 DIA
CSK 60°±5° TO .260 .270 DIA
.085 .080
.281 CBORE .290 DIA TO DEPTH SHOWN

DETAIL C
SCALE 2/1



Ⓐ .846 .844 R
.020 .040 R
Ⓐ 31°0'
.062 R Ⓐ

DETAIL E
SCALE 2/1

WING IN ACCORDANCE WITH MIL-D-70327.
VER UNLESS OTHERWISE SPECIFIED.
AND BREAK SHARP EDGES $^{.005}_{.015}$.
.010 R UNLESS OTHERWISE

MUST BE WITHIN SPECIFIED LIMITS
ART TEMPERATURE OF 68° F ± 1° F.
DRAWING NO., REVISION LETTER AND
SYMBOL AT THE INDICATED LOCATION

RU CENTER OF BORE -C- AND CENTER OF
HES DATUM PLANE G.
RU CENTER OF BORE -C- AND CENTER OF
CHES DATUM PLANE J

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

10000	DL 1000001	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.005 ANGLES ±0°30' DO NOT SCALE THIS DRAWING	
NEXT ASSY	USED ON	MATERIAL BERYLLIUM BRUSH SPEC S-200 ALT SPEC MIL-B-21531	
APPLICATION			

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN L. MILLS
APPROVED FOR NASA

HOUSING, BEARING
ONE SPEED
MIDDLE AXIS

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS

DWG NO

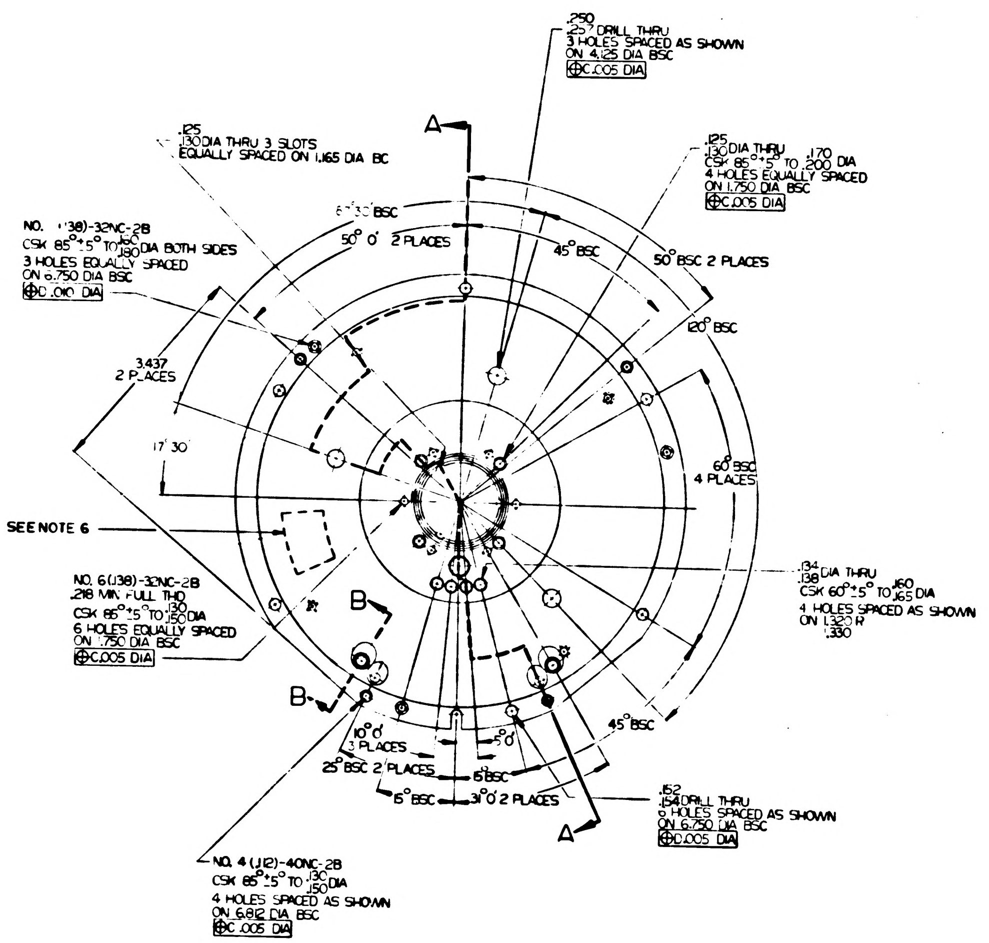
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO
1000

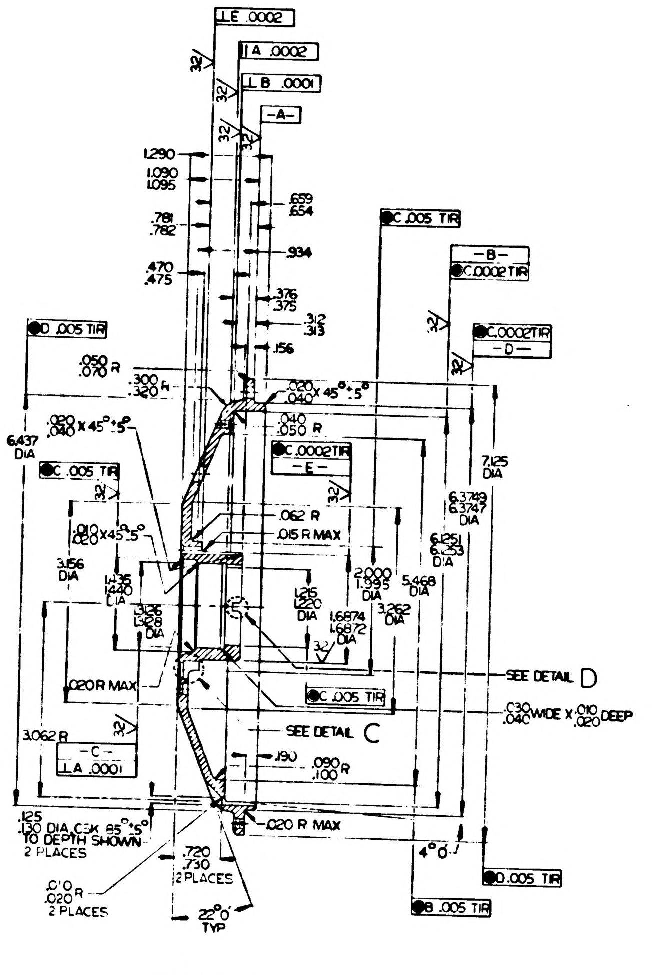
SCALE	UNIT WT	CODE IDENT
1-1	—	—

SHEET 1 OF 1

1000 36 A 1

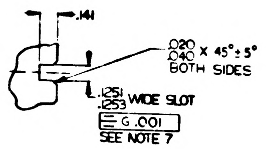


.250 .257 DRILL THRU 3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
⊕C.005 DIA
.125 .130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.125 .130 DIA THRU CSK 85°±5° TO .170 .200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕C.005 DIA
NO. 4 (.138)-32NC-2B CSK 85°±5° TO .130 .150 DIA BOTH SIDES 3 HOLES EQUALLY SPACED ON 6.750 DIA BSC
⊕C.010 DIA
50° 0' 2 PLACES
45° BSC
50° BSC 2 PLACES
120° BSC
3.437 2 PLACES
17° 30'
60° BSC 4 PLACES
SEE NOTE 6
NO. 6(.138)-32NC-2B .218 MIN FULL THD CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC
⊕C.005 DIA
.134 .138 DIA THRU CSK 60°±5° TO .160 .165 DIA 4 HOLES SPACED AS SHOWN ON 1.320 R 1.330
A
B
B
10° 0'
3 PLACES
25° BSC 2 PLACES
15° BSC
45° BSC
5° BSC
3° 0' 2 PLACES
.152 .158 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
⊕C.005 DIA
A
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC
⊕C.005 DIA



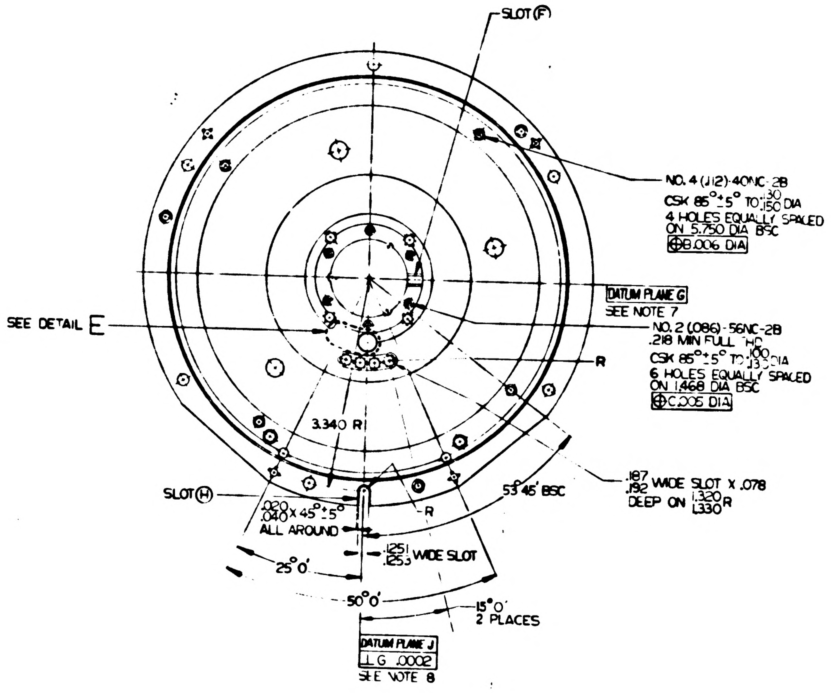
⊥E .0002
⊥A .0002
⊥B .0001
-A-
32
1.290
1.090 1.095
.781 .782
.470 .475
.659 .654
.934
.376 .375
.312 .313
.156
●C.005 TIR
-B-
●C.0002 TIR
●C.0002 TIR
-D-
●D.005 TIR
.050 .070 R
.300 .320 R
.020 .040 X 45°±5°
6.437 DIA
●C.005 TIR
.040 .050 R
●C.0002 TIR
-E-
.010 .020 X 45°±5°
.062 R
.015 R MAX
3.156 DIA
1.435 1.440 DIA
1.326 1.328 DIA
1.125 1.620 DIA
2.000 1.995 DIA
1.6874 1.6872 DIA
3.262 DIA
5.468 DIA
6.251 6.253 DIA
6.3788 6.3747 DIA
7.125 DIA
.020 R MAX
●C.005 TIR
SEE DETAIL D
.030 .040 WIDE X .010 .020 DEEP
3.062 R
-C-
⊥A .0001
SEE DETAIL C
.190
.090 .100 R
.020 R MAX
.125 .130 DIA CSK 85°±5° TO DEPTH SHOWN 2 PLACES
.010 .020 R 2 PLACES
.720 .730 2 PLACES
22° TYP
4° 0'
●D.005 TIR
●B.005 TIR

SECTION A-A



.141
.020 .040 X 45°±5° BOTH SIDES
.1251 .1253 WIDE SLOT
≡G.001
SEE NOTE 7

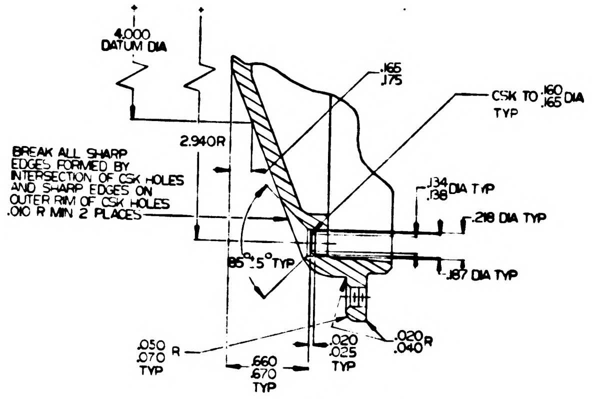
DETAIL D
SCALE 2/1



SLOT Ⓕ
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
⊕B.006 DIA
DATUM PLANE G
SEE NOTE 7
SEE DETAIL E
NO. 2 (.086)-56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .130 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
⊕C.005 DIA
R
3.340 R
R
R
SLOT Ⓗ
.020 .040 X 45°±5° ALL AROUND
53° 45' BSC
.187 .192 WIDE SLOT X .078 DEEP ON 1.320 1.330 R
.1251 .1253 WIDE SLOT
25° 0'
50° 0'
15° 0' 2 PLACES
DATUM PLANE J
⊥G .0002
SEE NOTE 8

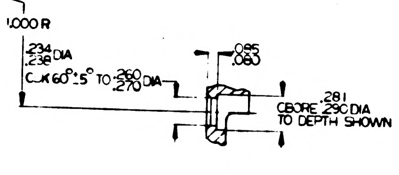
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63√ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. REMOVE BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F.
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
7. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓕ ESTABLISHES DATUM PLANE G.
8. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓗ ESTABLISHES DATUM PLANE J.



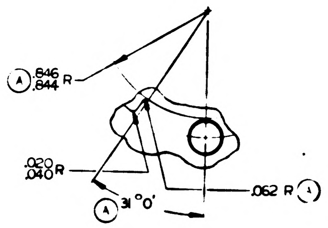
4.000 DATUM DIA
.165 .175
CSK TO .160 .165 DIA TYP
2.940 R
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
.134 .138 DIA TYP
.218 DIA TYP
85°±5° TYP
.187 DIA TYP
.050 .070 R TYP
.660 .670 TYP
.020 .025 TYP
.020 .040 R

SECTION B-B
SCALE 2/1



1.000 R
.234 .238 DIA
CSK 60°±5° TO .260 .270 DIA
.085 .080
CBORE .281 .290 DIA TO DEPTH SHOWN

DETAIL C
SCALE 2/1



Ⓐ .846 .844 R
.020 .040 R
Ⓐ 31° 0'
.062 R Ⓐ

DETAIL E
SCALE 2/1

PHOTOGRAPHIC SCALE ONLY

1000C	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

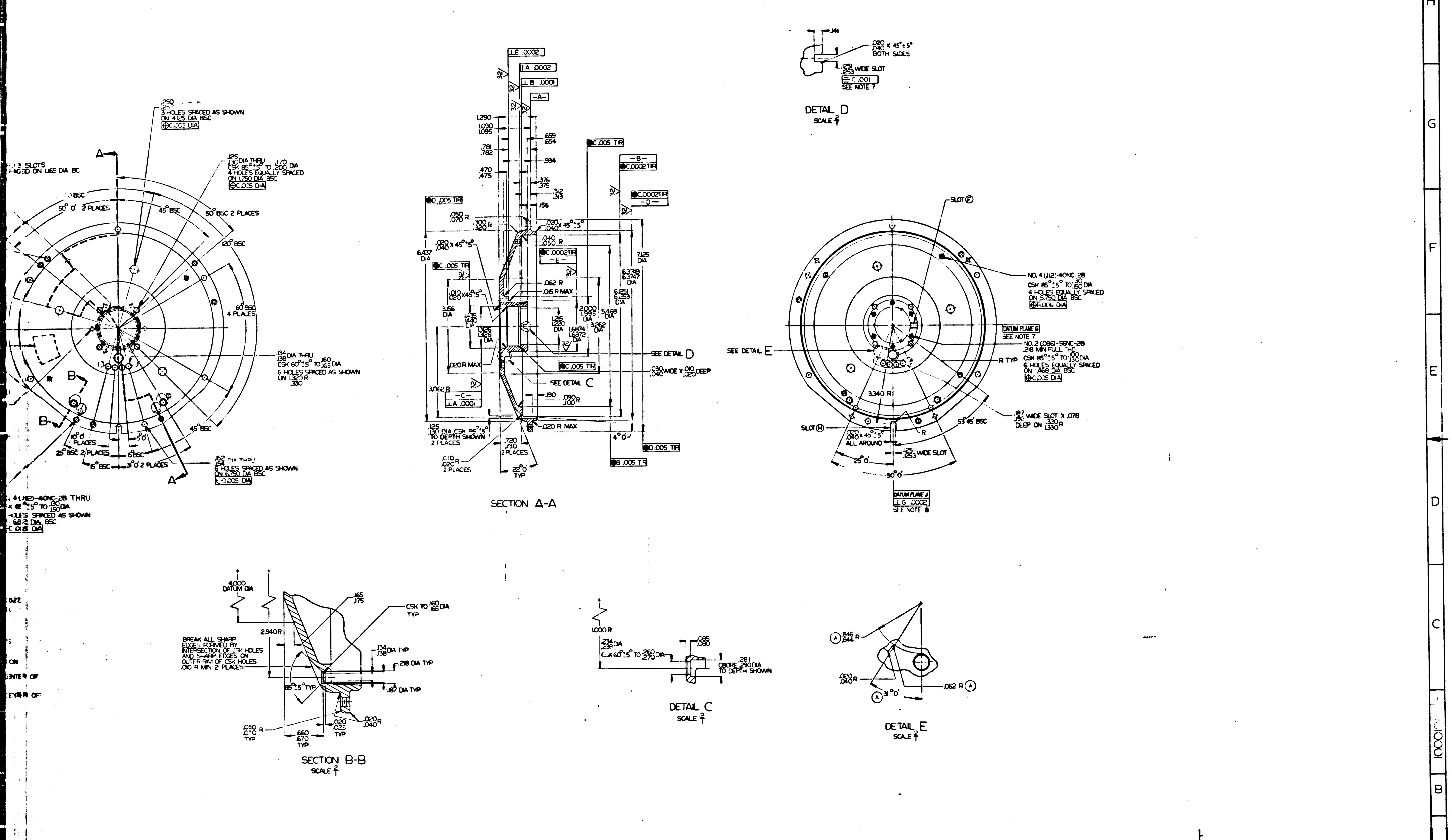
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-E-21531

QTY REQD
NOMENCLATURE OR DESCRIPTION
LIST OF PARTS
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN
HOUSING, BEA
ONE SPE
SCALE 1-1
—

1000106 A 1

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00150	[illegible]	[illegible]
B	TDRR 00459	1-_5-63	WK

REVISIONS TDRR 00[illegible]



3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
SLOTS SPACED ON 1.165 DIA BC
.125 .130 DIA THRU CSK 85°±5° TO .170 .200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
50° BSC 2 PLACES
45° BSC
120° BSC
60° BSC 4 PLACES
.134 .138 DIA THRU CSK 60°±5° TO .160 .165 DIA 6 HOLES SPACED AS SHOWN ON 1.320 R 1.330
.152 .154 DIA THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
.4 (.112)-40NC-2B THRU
HOLES SPACED AS SHOWN
A
B
SEE DETAIL D
SEE DETAIL C
.030 .040 WIDE X .010 .020 DEEP
.020 R MAX
.125 .130 DIA CSK 85°±5° TO DEPTH SHOWN 2 PLACES
22°0' TYP
.141
.020 .040 X 45°±5° BOTH SIDES
.1251 .1253 WIDE SLOT
SEE NOTE 7
SLOT F
SLOT H
SEE DETAIL E
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
DATUM PLANE G SEE NOTE 7
NO. 2 (.086)-56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .120 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC
.187 .192 WIDE SLOT X .078 DEEP ON .320 .330 R
53°45' BSC
3.340 R
.020 .040 X 45°±5° ALL AROUND
.1251 .1253 WIDE SLOT
25°0'
50°0'
DATUM PLANE J
SEE NOTE 8
4.000 DATUM DIA
2.940 R
CSK TO .160 .165 DIA TYP
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
85°±5° TYP
.134 .138 DIA TYP
.218 DIA TYP
.187 DIA TYP
1.000 R
CSK 60°±5° TO .260 .270 DIA
CBORE .281 .290 DIA TO DEPTH SHOWN
.846 .844 R
.062 R
31°0'

SECTION A-A

DETAIL D
SCALE 2/1

SECTION B-B
SCALE 2/1

DETAIL C
SCALE 2/1

DETAIL E
SCALE 2/1

MASTER

PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 100020
1000008	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

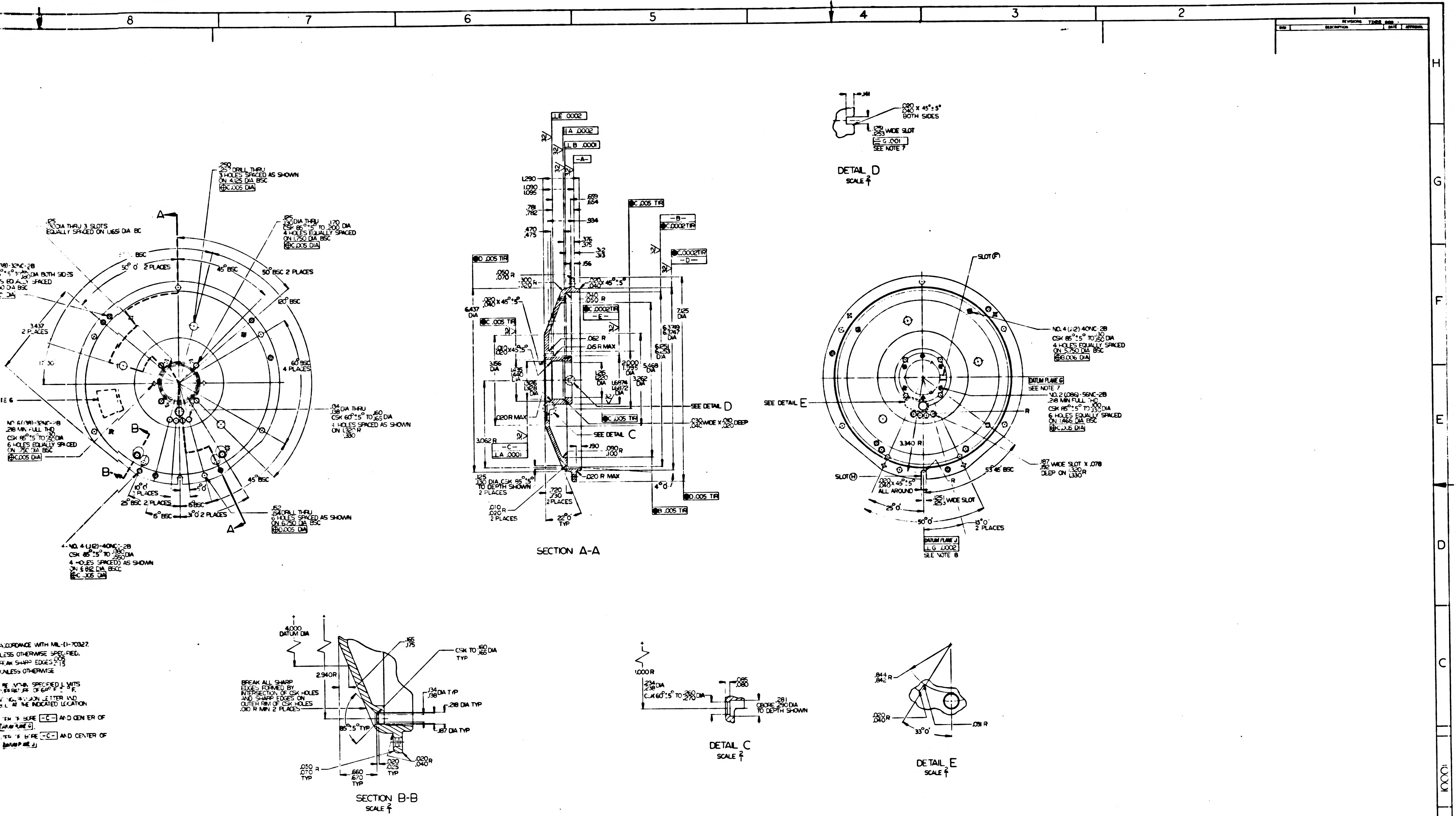
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

HOUSING, BEARING
ONE SPEED
MIDDLE AXIS

SCALE	UNIT WT	CODE IDENT
1-1	—	—

MIT INSTRUMENTATION LABORATORY
Cambridge, Mass.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000106
SHEET 1 OF 1

1000106


SECTION A-A
SECTION B-B
SCALE 2/1
DETAIL C
SCALE 2/1
DETAIL D
SCALE 4/1
DETAIL E
SCALE 4/1
SEE DETAIL D
SEE DETAIL C
SEE DETAIL E
SLOT (F)
SLOT (H)
DATUM PLANE G
SEE NOTE 7
DATUM PLANE J
SEE NOTE 8
.250 .25 DRILL THRU 3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC
.125 .130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.125 .130 DIA THRU CSK 85°±5° TO .170 .200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC
.134 .138 DIA THRU CSK 60°±5° TO .160 .165 DIA 4 HOLES SPACED AS SHOWN ON 1.320 .330 R
.152 .154 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC
4-NO. 4 (.112)-40NC-2B CSK 85°±5° TO .330 .350 DIA 4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC
NO. 6 (.138)-32NC-2B .218 MIN FULL THD CSK 85°±5° TO .150 .150 DIA 6 HOLES EQUALLY SPACED ON .750 DIA BSC
NO. 4 (.112) 40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC
NO. 2 (.086)-56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .110 DIA 6 HOLES EQUALLY SPACED ON 1.465 DIA BSC
.187 .192 WIDE SLOT X .078 DEEP ON 1.320 1.330 R
.125 .130 DIA CSK 95°±5° TO DEPTH SHOWN
.030 .040 WIDE X .010 .020 DEEP
.020 .040 X 45°±5° ALL AROUND
.251 .253 WIDE SLOT
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
CSK TO .160 .165 DIA TYP
.134 .138 DIA TYP
.218 DIA TYP
.187 DIA TYP
4.000 DATUM DIA
2.940 R
CBORE .281 .290 DIA TO DEPTH SHOWN
CSK 60°±5° TO .260 .270 DIA
.020 .040 X 45°±5° BOTH SIDES
.251 .253 WIDE SLOT
SEE NOTE 7

ACCORDANCE WITH MIL-()-70327.
LESS OTHERWISE SPECIFIED.
BREAK SHARP EDGES .005 .015
UNLESS OTHERWISE

RE WITHIN SPECIFIED LIMITS
MPERATURE OF 68° F ± 5° F.

NG. REVISION LETTER AND
L AT THE INDICATED LOCATION

TER OF BORE [-C-] AND CENTER OF
[DATUM PLANE G].
TER OF BORE [-C-] AND CENTER OF
[DATUM PLANE J]

PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING

MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B-21531

10000 | DL 100000
NEXT ASSY | USED ON
APPLICATION

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

HOUSING, BEARING
ONE SPEED
MIDDLE AXIS

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

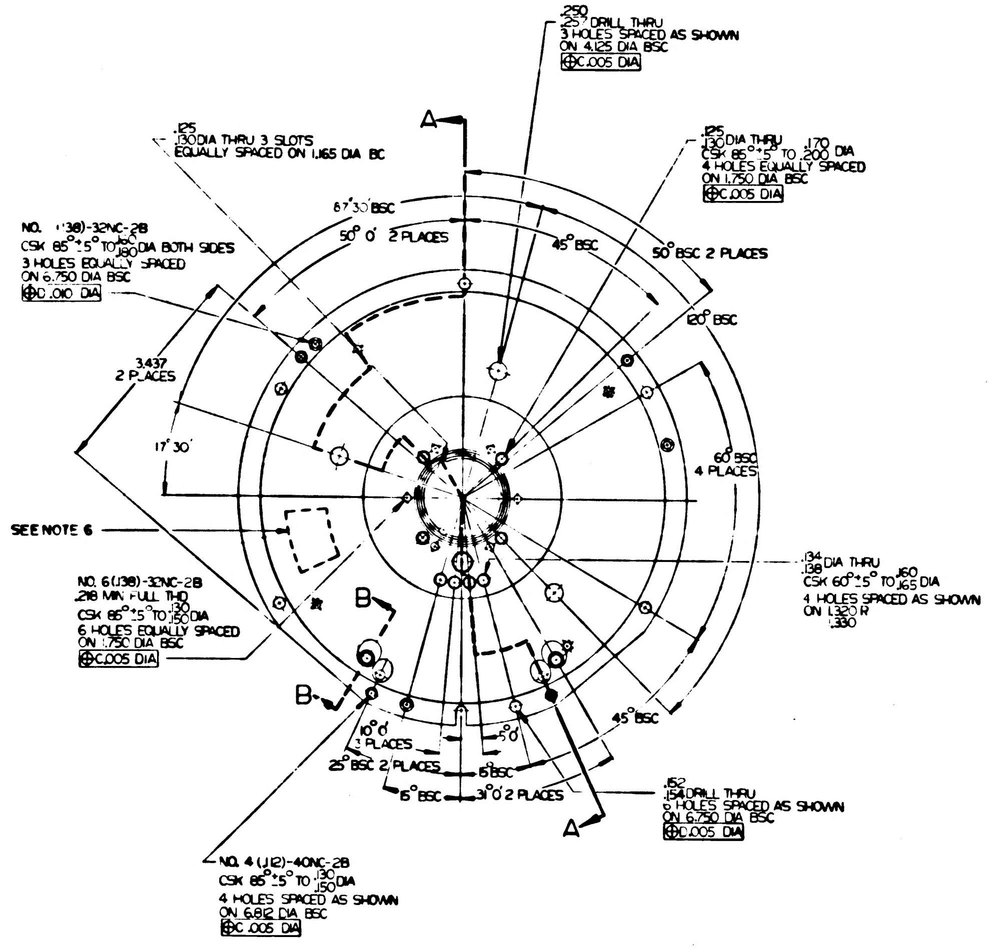
SCALE 1-1
UNIT WT —
CODE IDENT —

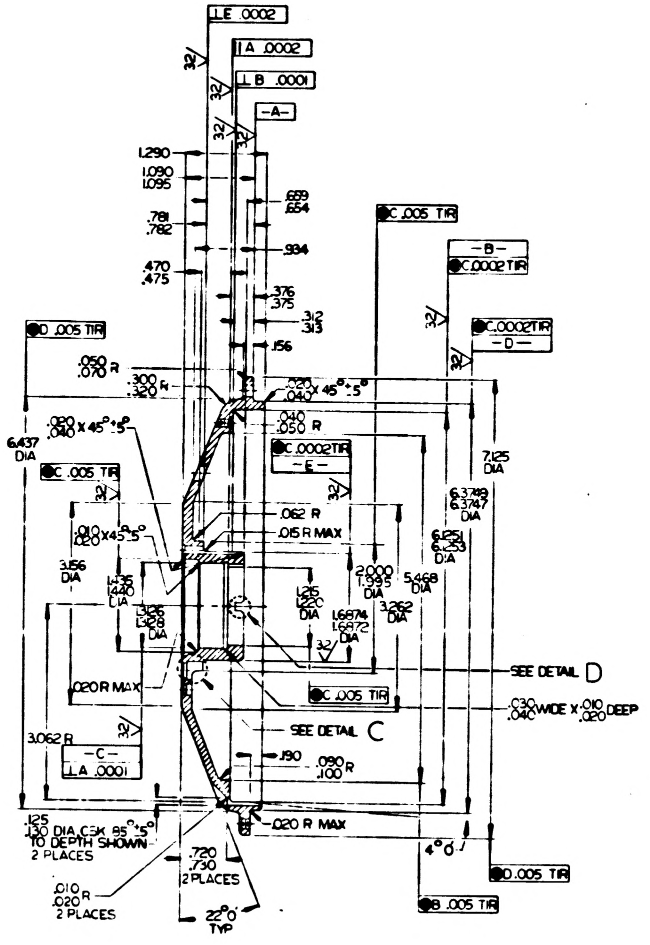
1000

SHEET 1 OF 1

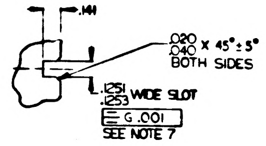
2/24

1000106

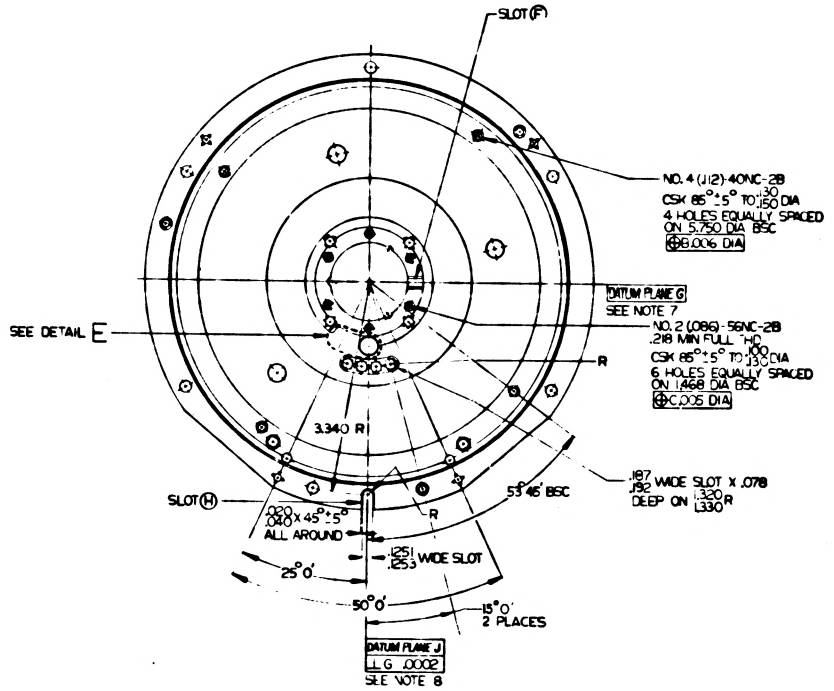

.250 .257 DRILL THRU 3 HOLES SPACED AS SHOWN ON 4.125 DIA BSC ⊕C.005 DIA
.125 .130 DIA THRU 3 SLOTS EQUALLY SPACED ON 1.165 DIA BC
.125 .130 DIA THRU CSK 85°±5° TO .170 .200 DIA 4 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
NO. 6 (.138)-32NC-2B CSK 85°±5° TO .160 .180 DIA BOTH SIDES 3 HOLES EQUALLY SPACED ON 6.750 DIA BSC ⊕C.010 DIA
67°30' BSC
50°0' 2 PLACES
45° BSC
50° BSC 2 PLACES
120° BSC
60° BSC 4 PLACES
3.437 2 PLACES
17°30'
SEE NOTE 6
NO. 6 (.138)-32NC-2B .218 MIN FULL THD CSK 85°±5° TO .130 .150 DIA 6 HOLES EQUALLY SPACED ON 1.750 DIA BSC ⊕C.005 DIA
.134 .138 DIA THRU CSK 60°±5° TO .160 .165 DIA 4 HOLES SPACED AS SHOWN ON 1.320 1.330 R
A
B
B
A
10°0' 2 PLACES
25° BSC 2 PLACES
6° BSC
15° BSC
30° 2 PLACES
45° BSC
.152 .154 DRILL THRU 6 HOLES SPACED AS SHOWN ON 6.750 DIA BSC ⊕C.005 DIA
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES SPACED AS SHOWN ON 6.812 DIA BSC ⊕C.005 DIA

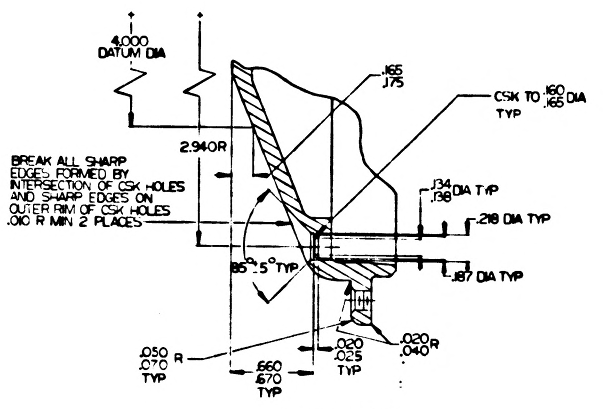

⊥E .0002
⊥A .0002
⊥B .0001
-A-
32
1.290
1.090 1.095
.781 .782
.470 .475
.659 .654
.934
.376 .375
.312 .313
.156
◎C.005 TIR
-B-
◎C.0002 TIR
◎C.0002 TIR
-D-
◎D.005 TIR
.050 .070 R
.300 .320 R
.030 .040 X 45°±5°
.040 .050 R
6.437 DIA
.030 .040 X 45°±5°
◎C.0002 TIR
-E-
◎C.005 TIR
.010 .020 X 45°±5°
.062 R
.015 R MAX
3.156 DIA
1.436 1.440 DIA
1.326 1.328 DIA
1.126 1.120 DIA
2.000 1.995 DIA
1.6874 1.6872 DIA
5.468 DIA
3.262 DIA
6.3749 6.3747 DIA
6.125 6.253 DIA
7.125 DIA
.020 R MAX
◎C.005 TIR
SEE DETAIL D
.030 .040 WIDE X .010 .020 DEEP
SEE DETAIL C
3.062 R
-C-
⊥A .0001
.190
.090 .100 R
.125 .130 DIA CSK 85°±5° TO DEPTH SHOWN 2 PLACES
.020 R MAX
4°0'
◎D.005 TIR
◎B.005 TIR
.720 .730 2 PLACES
.010 .020 R 2 PLACES
22° TYP

SECTION A-A

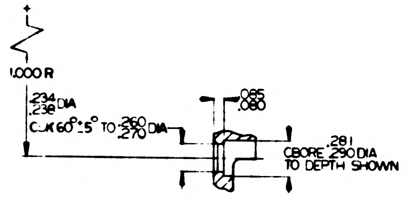

.141
.020 .040 X 45°±5° BOTH SIDES
.1251 .1253 WIDE SLOT
=G.001
SEE NOTE 7

DETAIL D
SCALE 2/1

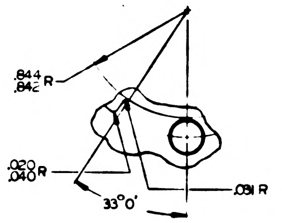

SLOT Ⓕ
NO. 4 (.112)-40NC-2B CSK 85°±5° TO .130 .150 DIA 4 HOLES EQUALLY SPACED ON 5.750 DIA BSC ⊕B.006 DIA
DATUM PLANE G
SEE NOTE 7
NO. 2 (.086)-56NC-2B .218 MIN FULL THD CSK 85°±5° TO .100 .130 DIA 6 HOLES EQUALLY SPACED ON 1.468 DIA BSC ⊕C.005 DIA
SEE DETAIL E
R
3.340 R
.187 .192 WIDE SLOT X .078 DEEP ON 1.320 1.330 R
53°45' BSC
SLOT Ⓗ
.020 .040 X 45°±5° ALL AROUND
R
.1251 .1253 WIDE SLOT
25°0'
50°0'
15°0' 2 PLACES
DATUM PLANE J
⊥G .0002
SEE NOTE 8


4.000 DATUM DIA
.165 .175
CSK TO .160 .165 DIA TYP
2.940 R
BREAK ALL SHARP EDGES FORMED BY INTERSECTION OF CSK HOLES AND SHARP EDGES ON OUTER RIM OF CSK HOLES .010 R MIN 2 PLACES
.134 .138 DIA TYP
.218 DIA TYP
85°±5° TYP
.187 DIA TYP
.050 .070 R TYP
.660 .670 TYP
.020 .025 TYP
.020 .040 R

SECTION B-B
SCALE 2/1


1.000 R
.234 .238 DIA
CSK 60°±5° TO .260 .270 DIA
.085 .080
.281 CBORE .290 DIA TO DEPTH SHOWN

DETAIL C
SCALE 2/1


.844 .842 R
.020 .040 R
33°0'
.031 R

DETAIL E
SCALE 2/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. REMOVE BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 68° F ± 1° F.
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
7. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓕ ESTABLISHES DATUM PLANE G.
8. LINE PASSING THRU CENTER OF BORE -C- AND CENTER OF SLOT Ⓗ ESTABLISHES DATUM PLANE J

1000106

INCHES
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING

10000	DL 100001
NEXT ASSY	USED ON
APPLICATION	

MATERIAL BERYLLIUM
BRUSH SPEC S-200
ALT SPEC MIL-B 21531

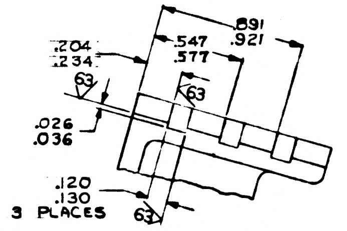
QTY REQD | NOMENCLATURE OR DESCRIPTION | PART OR IDENTIFYING NO.
LIST OF PARTS AND

M I T
INSTRUMENTATION LAB
NAS 9 153

HOUSING, BEAR
ONE SPEED
MIDDLE AXIS

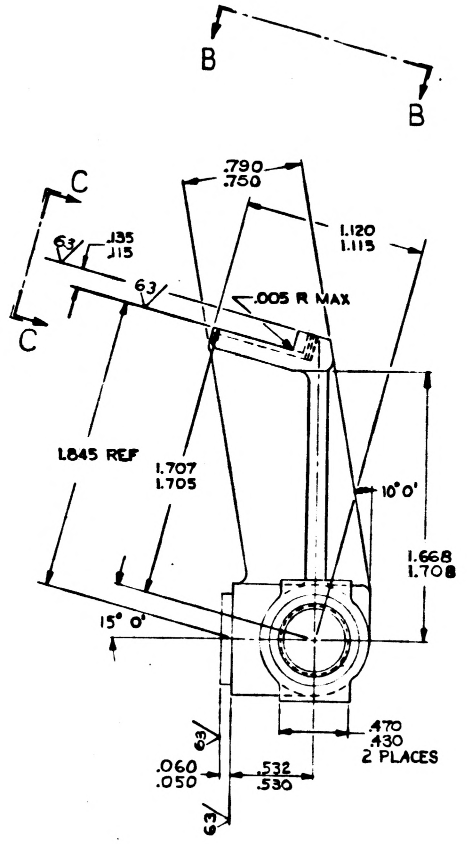
SCALE 1-1

		REVISIONS TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS		ajB

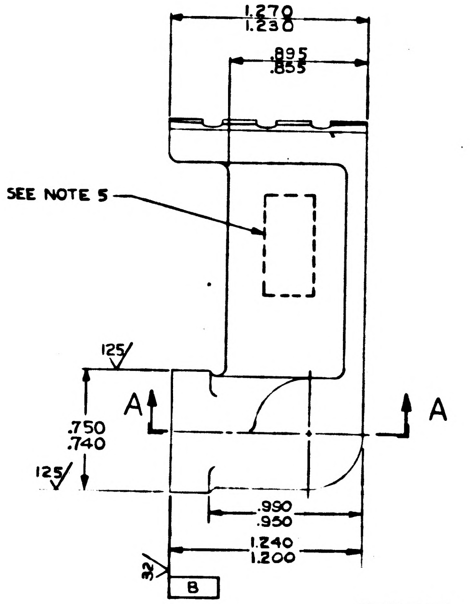


.204
.234
.547
.577
.891
.921
63
63
.026
.036
.120
.130
3 PLACES
63

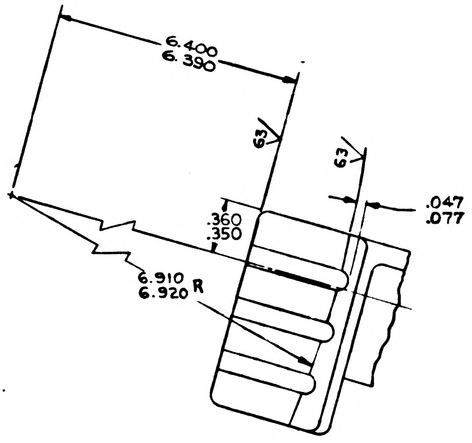
VIEW C-C



B
B
C
C
.790
.750
1.120
1.115
63
.135
.115
63
.005 R MAX
1.845 REF
1.707
1.705
10° 0'
1.668
1.708
15° 0'
63
.060
.050
.532
.530
.470
.430
2 PLACES
63

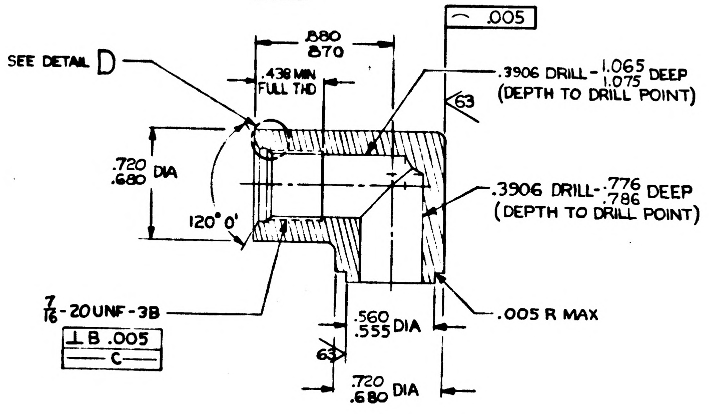


1.270
1.230
.895
.855
SEE NOTE 5
125
A
A
.750
.740
125
.990
.950
1.240
1.200
32
B



6.400
6.390
63
63
.047
.077
.360
.350
6.910
6.920 R

VIEW B-B

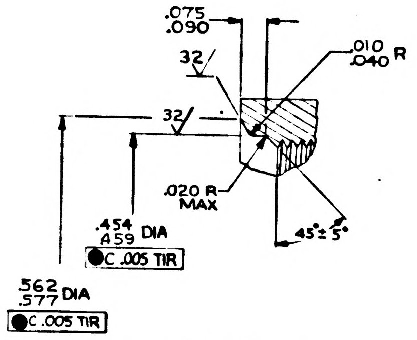


.005
SEE DETAIL D
.880
.870
.438 MIN
FULL THD
.3906 DRILL - 1.065 / 1.075 DEEP
(DEPTH TO DRILL POINT)
63
.720
.680 DIA
120° 0'
.3906 DRILL - .776 / .786 DEEP
(DEPTH TO DRILL POINT)
7/16-20UNF-3B
⊥ B .005
C
.560
.555 DIA
.005 R MAX
63
.720
.680 DIA

SECTION A-A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ROUNDS & FILLETS TO BE $\frac{.040}{.080}$ R
3. 250✓ ALL OVER UNLESS OTHERWISE SPECIFIED
4. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R
5. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. HYDROSTATIC PROOF TEST AT 12C PSI
7. CASTING REQUIREMENTS PER MIL-C-60210, CLASS IIB CASTING
8. MIN. CAST WALL THICKNESS .125 UNLESS OTHERWISE SPECIFIED



.075
.090
.010
.040 R
32
32
.020 R
MAX
45° ± 5°
.454
.459 DIA
● C .005 TIR
.562
.577 DIA
● C .005 TIR

DETAIL D

SCALE 4/1

INCHES

PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000083	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ± 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALLOY
A612-F

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	ajBoyce	11/8/62
CHECKED		
DRAWN	G. QUINN	9/2?/62

APPROVED FOR MSC
BY DIRECTION MIT APPROVAL
V Kupfer 2 Nov 62

BRACKET CONNECTOR
HEAT EXCHANGER
RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS

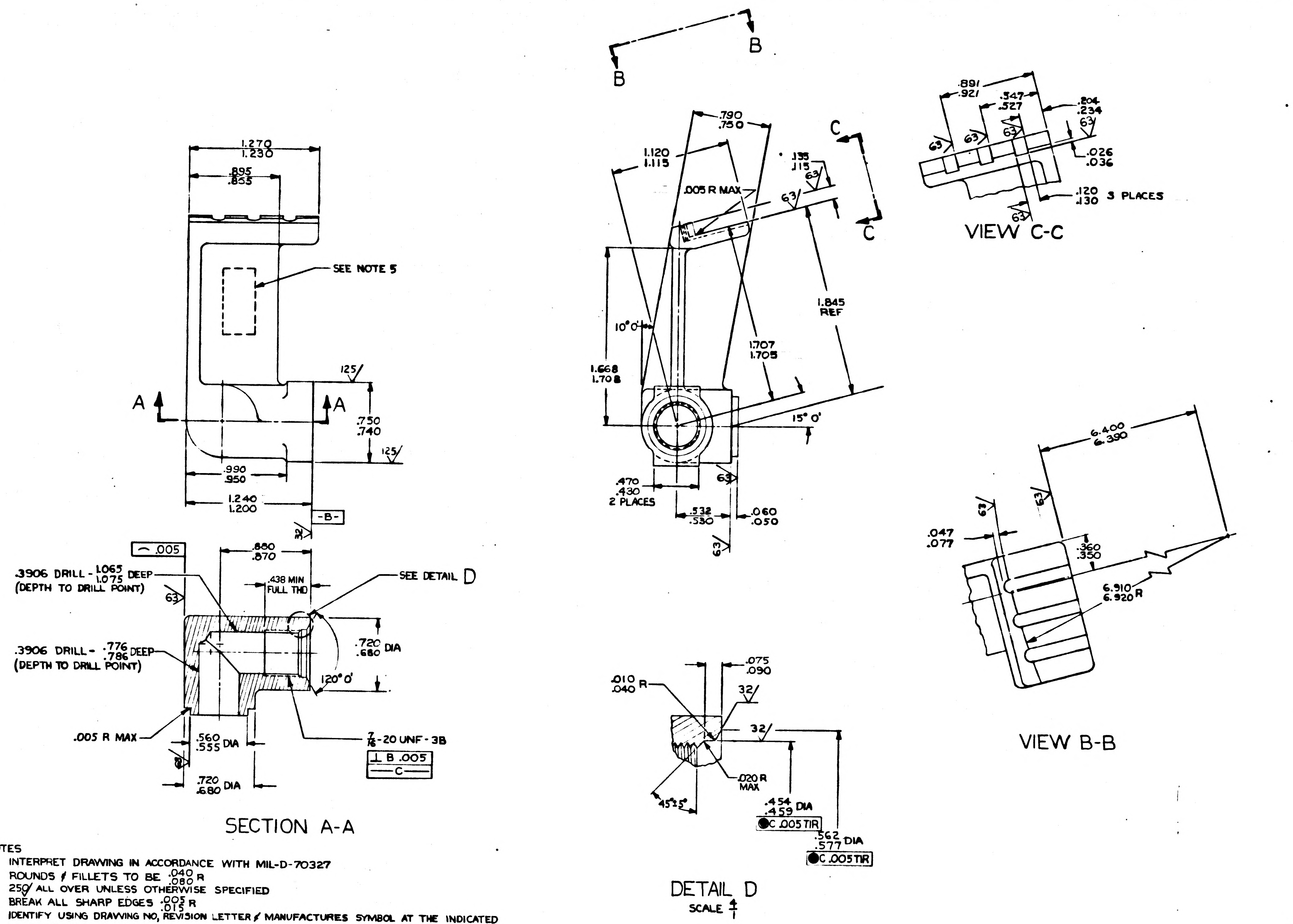
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000107

SHEET 1 OF

REVISIONS TDRR 00105				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS		


B
B
1.270
1.230
.895
.855
SEE NOTE 5
125
A
A
.750
.740
125
.990
.950
1.240
1.200
-B-
32
.005
.880
.870
.3906 DRILL - 1.065 / 1.075 DEEP
(DEPTH TO DRILL POINT)
63
.438 MIN
FULL THD
SEE DETAIL D
.720
.680 DIA
120° 0'
.3906 DRILL - .776 / .786 DEEP
(DEPTH TO DRILL POINT)
.005 R MAX
.560
.555 DIA
7/16-20 UNF-3B
⊥ B .005
—C—
.720
.680 DIA
SECTION A-A
.790
.750
1.120
1.115
C
.135
.115
63
.005 R MAX
63
C
1.845
REF
10° 0'
1.707
1.705
1.668
1.708
15° 0'
63
.470
.430
2 PLACES
.532
.530
.060
.050
63
.891
.921
.547
.527
.204
.234
63
63
63
63
.026
.036
.120
.130 3 PLACES
63
VIEW C-C
6.400
6.390
63
63
.047
.077
.360
.350
6.910
6.920 R
VIEW B-B
.075
.090
.010
.040 R
32
32
.020 R
MAX
45°±5°
.454
.459 DIA
● C .005 TIR
.562
.577 DIA
● C .005 TIR
DETAIL D
SCALE 4/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ROUNDS ∮ FILLETS TO BE $\frac{.040}{.080}$ R
3. 250/ ALL OVER UNLESS OTHERWISE SPECIFIED
4. BREAK ALL SHARP EDGES $\frac{.005}{.015}$ R
5. IDENTIFY USING DRAWING NO, REVISION LETTER ∮ MANUFACTURES SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
6. HYDROSTATIC PROOF TEST AT 120 PSI
7. CASTING REQUIREMENTS PER MIL-C-6021D, CLASS II B CASTING
8. MIN. CAST WALL THICKNESS .125 UNLESS OTHERWISE SPECIFIED.

INCHES
0 1
PHOTOGRAPHIC SCALE ONLY

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALLOY
A 612-F

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Bryan	11/8/62
CHECKED		
DRAWN	G. QUINN	9/27/62

APPROVED FOR MSC
BY DIRECTION MIT APPROVAL
W Kupfer 21 Nov 62

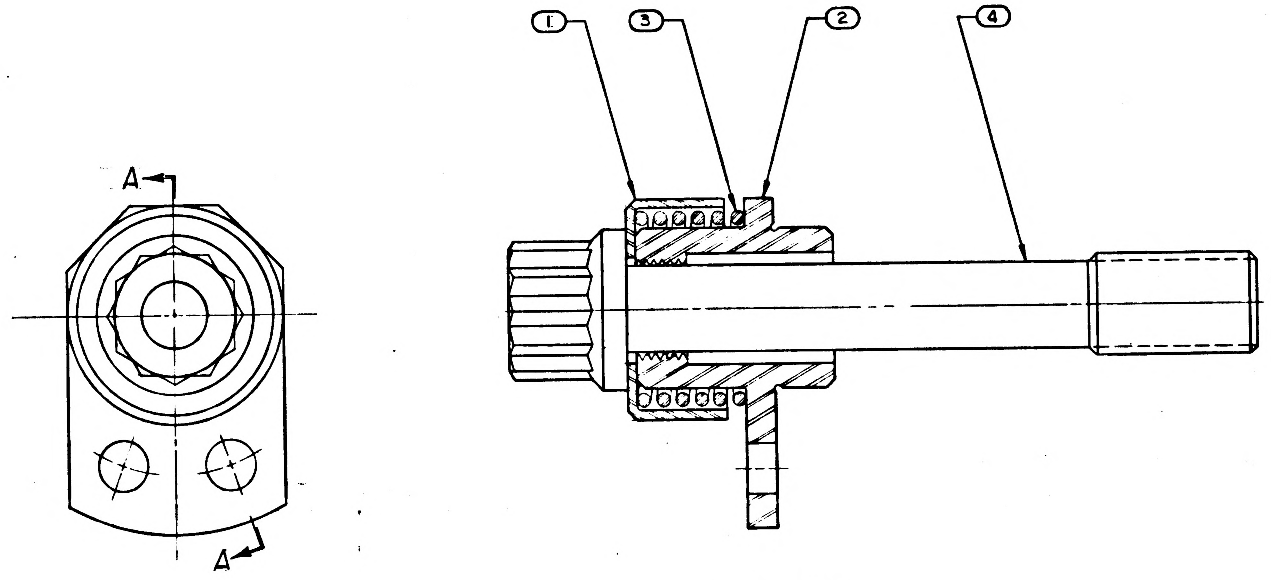
BRACKET CONNECTOR
HEAT EXCHANGER
LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
2/1		

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000108
SHEET OF 1

1000108 A

		REVISIONS	TDRR 00105	
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00335	2/6/63	



SECTION A-A
Ⓐ SHOWN IN RETRACTED POSITION

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS
Ⓐ SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	SCREW, FASTENER	1000188			4
1	SPRING, FASTENER	1000187			3
1	RETAINER, FASTENER	1000186			2
1	COVER, SPRING, FASTENER	1000185			1

Ⓐ LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		11/2/62
CHECKED		
DRAWN	D.M.WHITE	10-3-62

APPROVED FOR MSC
Jack Barnard 11/21/62
BY DIRECTION MIT APPROVAL
W Kupfer 21 NOV 62

Ⓐ FASTENER ASSEMBLY

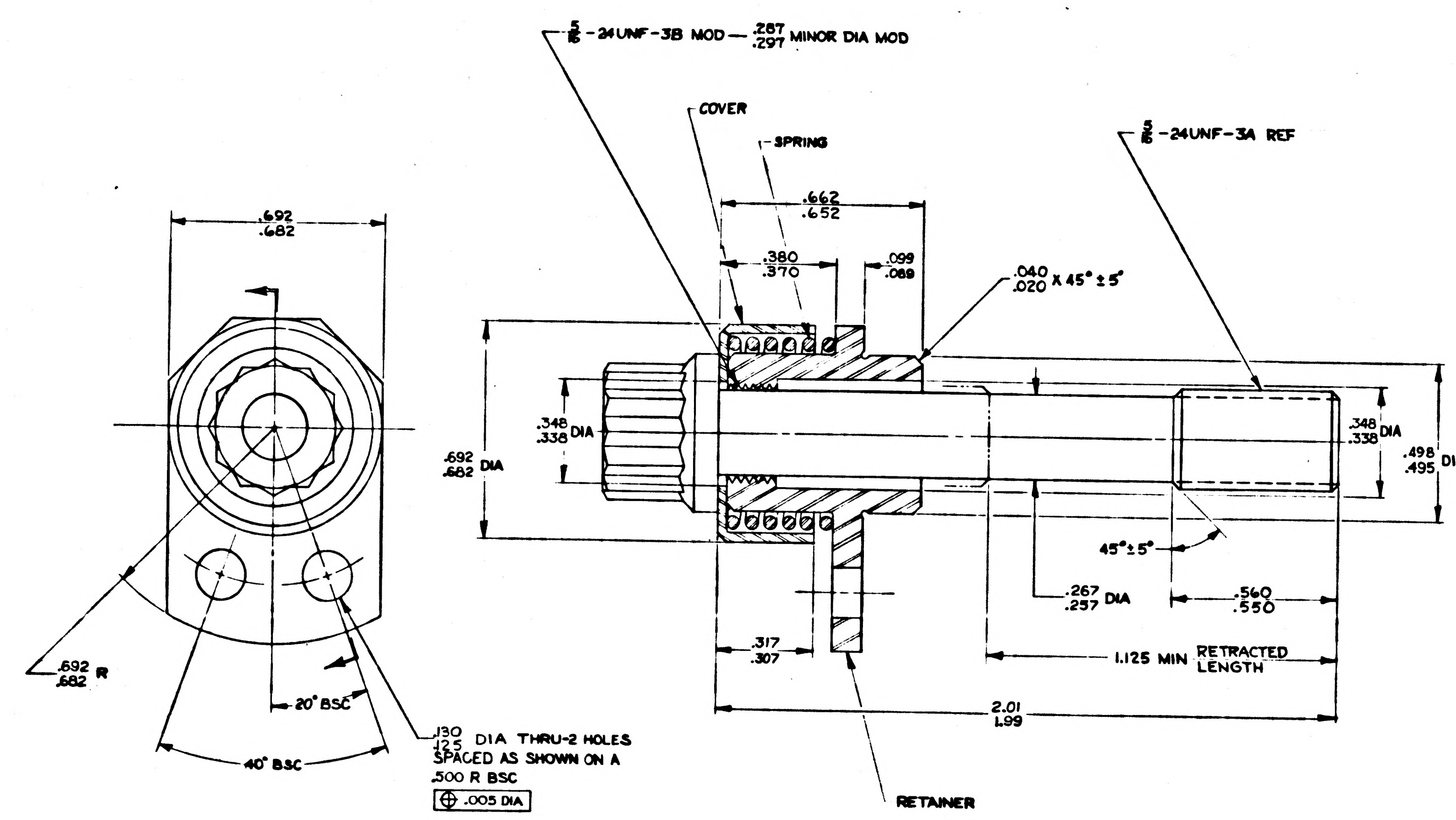
SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000109
SHEET 1 OF 1

1000109 A

REVISIONS TDRR 00105

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



5/16 -24UNF-3B MOD — .287/.297 MINOR DIA MOD
COVER
SPRING
5/16 -24UNF-3A REF
.692/.682
.662/.652
.380/.370
.099/.089
.040/.020 X 45° ± 5°
.348/.338 DIA
.692/.682 DIA
.348/.338 DIA
.498/.495 DIA
45° ± 5°
.267/.257 DIA
.560/.550
.317/.307
1.125 MIN RETRACTED LENGTH
2.01/1.99
.692/.682 R
20° BSC
40° BSC
.130/.125 DIA THRU-2 HOLES SPACED AS SHOWN ON A .500 R BSC
⊕ .005 DIA
RETAINER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL:
   - A. RETAINER
     AISI 4130 OR 4140 ALLOY STEEL ALT SPEC QQ-S-624 COND ANL
   - B. COVER
     CRES, CLASS 301 OR 302, COND A, FORM FLAT, FINISH HOT. SPEC QQ-S-763
   - C. SPRING: STEEL WIRE PER QQ-W-470
   - D. SCREW: MS 21290-26 MOD AS SHOWN
3. HEAT TREAT:
   - A. RETAINER
     160,000 OR 180,000 TENSILE STRENGTH
4. FINISH:
   - A. RETAINER, SPRING, & SCREW
     ZINC PLATED PER QQ-Z-325, TYPE II, CLASS 3
   - B. COVER
     PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
5. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
6. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3

ORIGINAL SOURCE OF SUPPLY
HI-SHEAR CORP.
2600 WEST 247TH STREET
TORRANCE, CALIFORNIA

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED ... 11/21/62
CHECKED
DRAWN D.M.WHITE 10-3-62
APPROVED FOR MSC
11/21/62
BY DIRECTION MIT APPROVAL
W Kupfer 21 NOV 62

ASSEMBLY, FASTENER
SPECIFICATION CONTROL
DRAWING

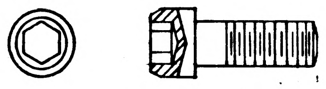
SCALE 4/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000109
SHEET 1 OF 1

1000109

∀ 0110001

REVISIONS TDRR 00077			
SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED BY REV B WITH CHANGES TDRR 01231	5-15-63	AJB · WK



NOTES

1. THIS SERIES OF SCREWS SHALL CONFORM IN ALL RESPECTS TO MS35457 EXCEPT ZINC PLATE MUST BE USED
2. FOR PURPOSES OF IDENTIFICATION OF SCREW, DASH NUMBER ON 1000110 IS THE SAME AS THE DASH NUMBER ON MS35457
3. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3

Ⓐ REPLACED BY REV B WITH CHANGES

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	10/31/62
CHECKED		
DRAWN	JCFUCHS	10/5/62
APPROVED FOR MSC BY DIRECTION	WJ Rhine	10-31-62
MIT APPROVAL		10/31/62

SCREW, CAP, SOCKET HEAD, HEXAGON

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000110

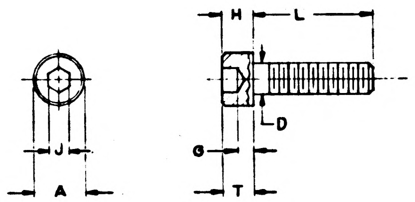
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	B	REPLACES REV A, TDRR 01231	5-15-63	[illegible] W.K.

G	T	J	H		A		D		SCREW SIZE	LENGTH L ±.015							
MIN	MIN		MAX	MIN	MAX	MIN	MAX	MIN		.187	.250	.375	.500	.625	.750	.875	1.000
.028	.038	.078	.086	.083	.140	.134	.086	.0822	2-56UNC-3A	201	202	203	204				
.036	.051	.094	.112	.108	.183	.176	.112	.0975	4-40UNC-3A		1	2	3	4	5		
.044	.064	.109	.138	.134	.226	.218	.138	.1329	6-32UNC-3A		6	7	8	9	10	11	12
.052	.077	.141	.164	.159	.270	.262	.164	.1585	8-32UNC-3A		13	14	15	16	17	18	19



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3
3. MATERIAL: ALLOY STEEL PER FED STD 66
4. FINISH: ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3 EXCEPT MUST MEET 24 HOUR SALT SPRAY TEST
5. UNLESS OTHERWISE SPECIFIED SCREWS MUST MEET REQUIREMENTS OF FF-S-86

REPLACES REV 'A' WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	[illegible]	5/15/63
CHECKED		
DRAWN	MARTIN	5/10/63

APPROVED FOR MSC [illegible] 5/15/63

MIT/IL APPROVAL	DATE
W. Kupfer	[illegible]

SCREW
HEX SOC HD
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000110
SHEET 1 OF 1

1000110 B

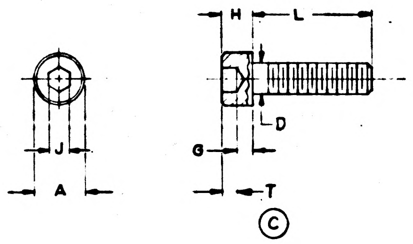
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

G	T	J	H		A		D		SCREW	LENGTH L ±.015								
MIN	MIN		MAX	MIN	MAX	MIN	MAX	MIN	SIZE	.187	.250	.375	.500	.625	.750	.875	1.000	.312
.028	.038	.078	.086	.083	.140	.134	.086	.0822	2-56UNC-3A	201	202	203	204					301
.036	.051	.094	.112	.108	.183	.176	.112	.1075	4-40UNC-3A		1	2	3	4	5			302
.044	.064	.109	.138	.134	.226	.218	.138	.1329	6-32UNC-3A		6	7	8	9	10	11	12	303
.052	.077	.141	.164	.159	.270	.262	.164	.1585	8-32UNC-3A		13	14	15	16	17	18	19	304

Ⓒ

REVISIONS

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	B	REPLACES REV A, TDRR 01231	5-15-63		
	C	TDRR 01680	6-19-63		



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3
3. MATERIAL: ALLOY STEEL PER FED STD 66
4. FINISH: ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3 EXCEPT MUST MEET 24 HOUR SALT SPRAY TEST
5. UNLESS OTHERWISE SPECIFIED SCREWS MUST MEET REQUIREMENTS OF FF-S-86 TYPE VI Ⓒ

REPLACES REV 'A' WITH CHANGES

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

Ⓒ MULTIPLE USAGE

NEXT ASSY	USED ON
MULTIPLE USAGE	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		5/15/63
CHECKED		
DRAWN	MARTIN	5/10/63
APPROVED FOR MSC		5/15/63
MIT/IL APPROVAL	W. Kupfer	DATE

SCREW
HEX SOC HD
SPECIFICATION CONTROL DWG

SCALE	UNIT WT.	CODE IDENT.
—		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

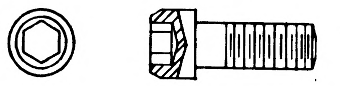
NASA DRAWING NO.
1000110

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

0110001

Ⓜ SYM	REVISIONS TDRR 00077 DESCRIPTION	DATE	APPROVAL



NOTES

1. THIS SERIES OF SCREWS SHALL CONFORM IN ALL RESPECTS TO MS35457 EXCEPT ZINC PLATE MUST BE USED
2. FOR PURPOSES OF IDENTIFICATION OF SCREW, DASH NUMBER ON 1000110 IS THE SAME AS THE DASH NUMBER ON MS35457
3. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: —//—

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	10/31/62
CHECKED		
DRAWN	JCFUCHS	10/5/62

APPROVED FOR MSC
W J Rhine 10-31-62
BY DIRECTION

MIT APPROVAL 10/31/62

SCREW, CAP, SOCKET HEAD, HEXAGON

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

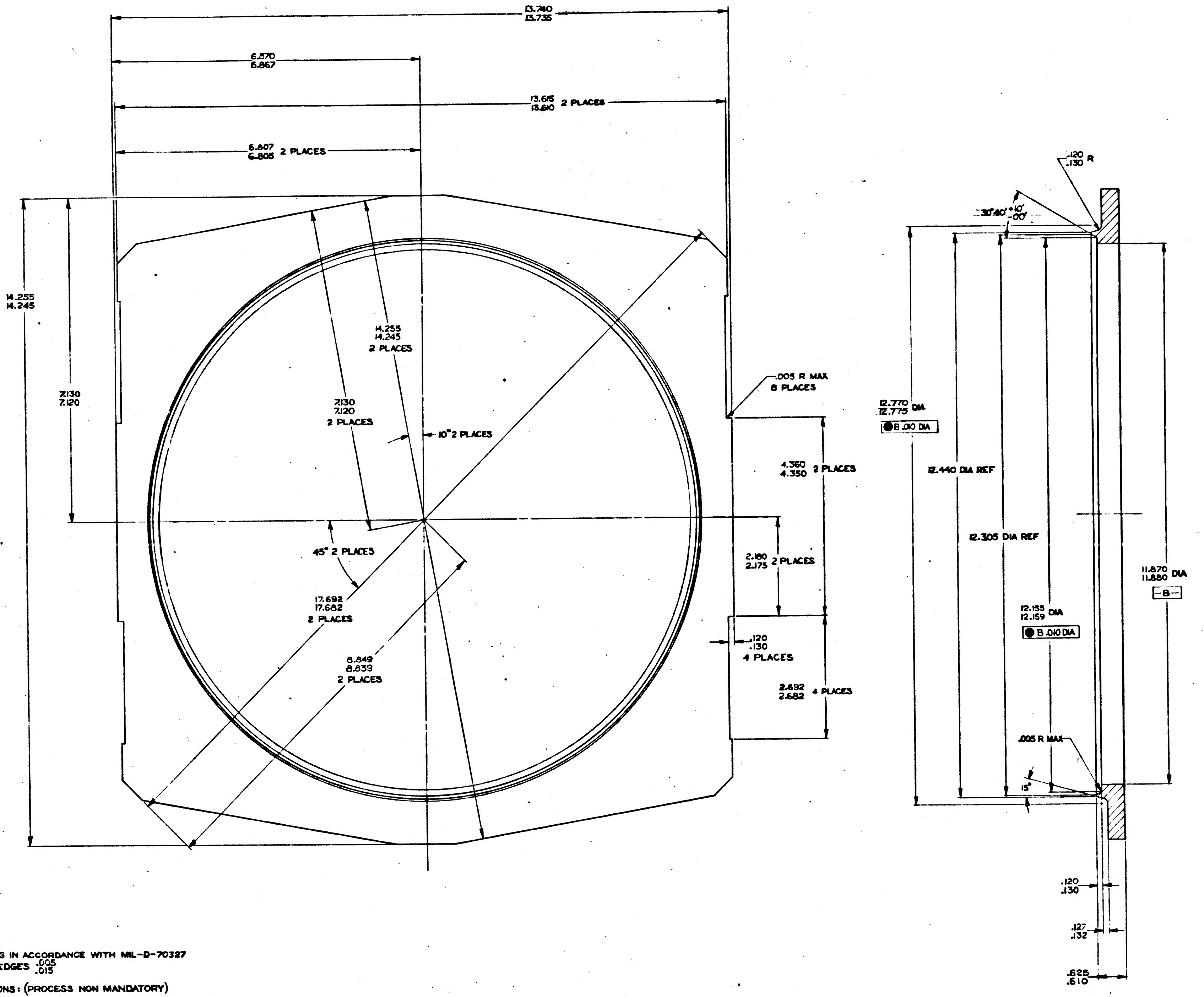
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000110

SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00077		
	A	TDRR 03496	2 Oct 63	


13.740
13.735
6.870
6.867
13.615
13.610 2 PLACES
6.807
6.805 2 PLACES
14.255
14.245
7.130
7.120
14.255
14.245
2 PLACES
7.130
7.120
2 PLACES
10° 2 PLACES
45° 2 PLACES
17.692
17.682
2 PLACES
8.849
8.839
2 PLACES
.005 R MAX
8 PLACES
4.360
4.350 2 PLACES
2.180
2.175 2 PLACES
.120
.130
4 PLACES
2.692
2.682 4 PLACES
.120
.130 R
30°40' +10' -00'
12.770
12.775 DIA
B .010 DIA
12.440 DIA REF
12.305 DIA REF
12.155
12.159 DIA
B .010 DIA
11.870
11.880 DIA
-B-
.005 R MAX
15°
.120
.130
.127
.132
.625
.610

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ ALL OVER
4. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   Ⓐ A. ROUGH MACHINE
   B. STRESS RELIEVE AT 325°F ±10° FOR 6 HOURS ±10 MIN
   C. FINISH MACHINE

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1001500
1001553	DL1000201
1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

Ⓐ

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL 6061
TEMP T6 ALT SPEC
QQ-A-327B TEMP T6

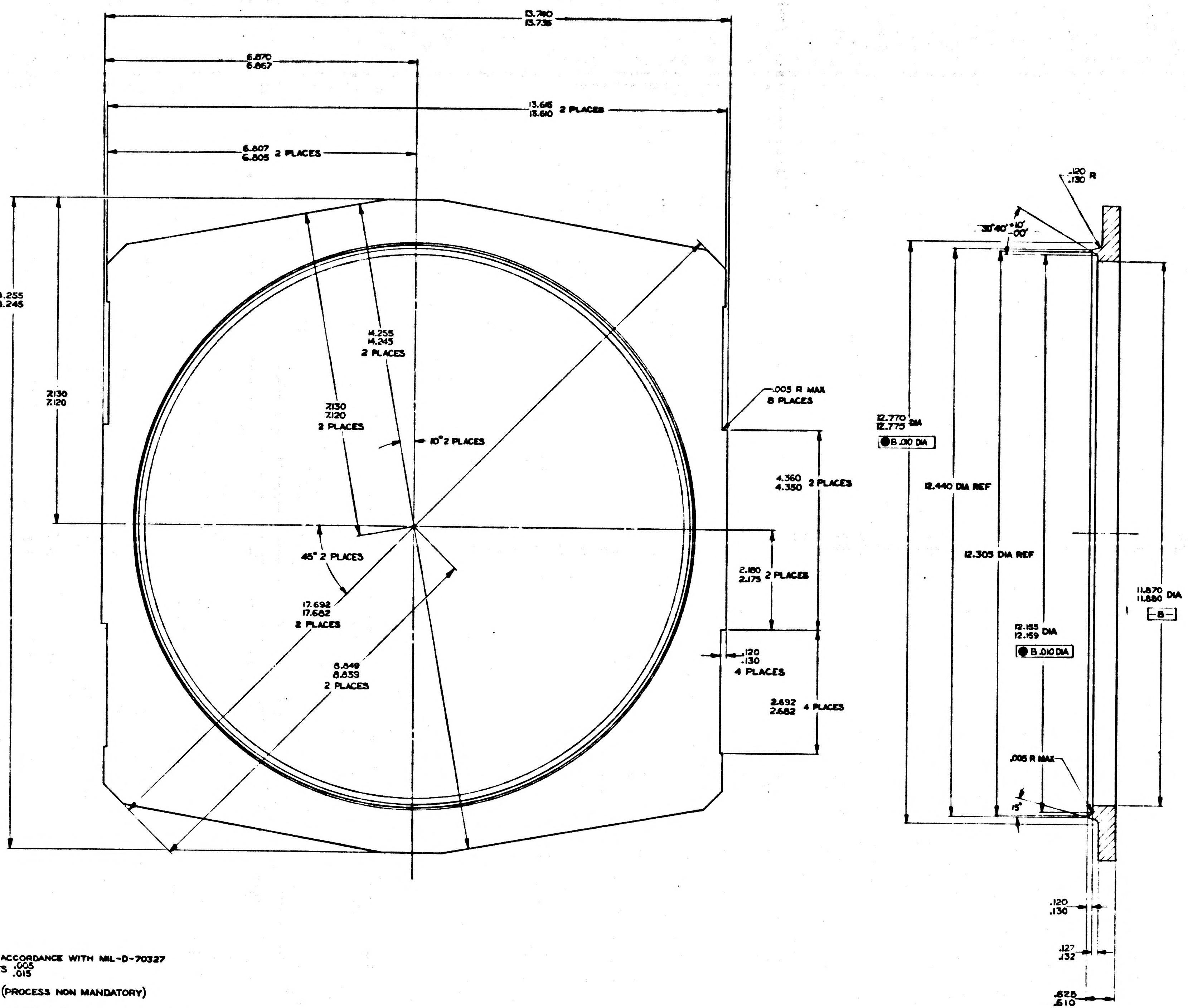
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN D.M.WHITE 10-5-62
APPROVED FOR MSC
10-3-62
BY DIRECTION
MIT
WAK

FLANGE
CASE CENTER MOUNTING

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000111
SHEET 1 OF 1

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


13.740
13.736
6.870
6.867
13.615 2 PLACES
13.610
6.807
6.805 2 PLACES
14.255
14.245
14.255
14.245
2 PLACES
7.130
7.120
7.130
7.120
2 PLACES
10° 2 PLACES
.005 R MAX
8 PLACES
4.360
4.350 2 PLACES
45° 2 PLACES
2.180
2.175 2 PLACES
17.692
17.682
2 PLACES
.120
.130
4 PLACES
8.849
8.839
2 PLACES
2.692
2.682 4 PLACES
.120
.130 R
30°40' +10' -00'
12.770
12.775 DIA
● B .010 DIA
12.440 DIA REF
12.305 DIA REF
11.870
11.880 DIA
-B-
12.155
12.159 DIA
● B .010 DIA
.005 R MAX
15°
.120
.130
.127
.132
.628
.610

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ ALL OVER
4. ORDER OF OPERATIONS: (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 340°F ±10° FOR 5 HOURS ±10 MIN
   - C. FINISH MACHINE

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327B TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D.M.WHITE 10-5-62
APPROVED FOR MSC
10-3-62
BY DIRECTION
MIT

FLANGE
CASE CENTER MOUNTING

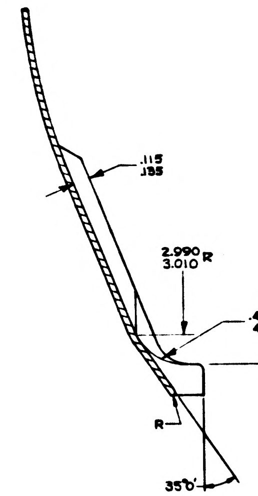
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
Cambridge, Mass.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000111
SHEET 1 OF 1

1000111

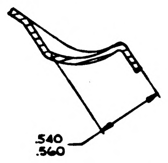
REVISIONS TDRR 00157

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	GENERAL REVISIONS	12-10-62		WR
	B	TDRR 00258	1-16-63	GJS	

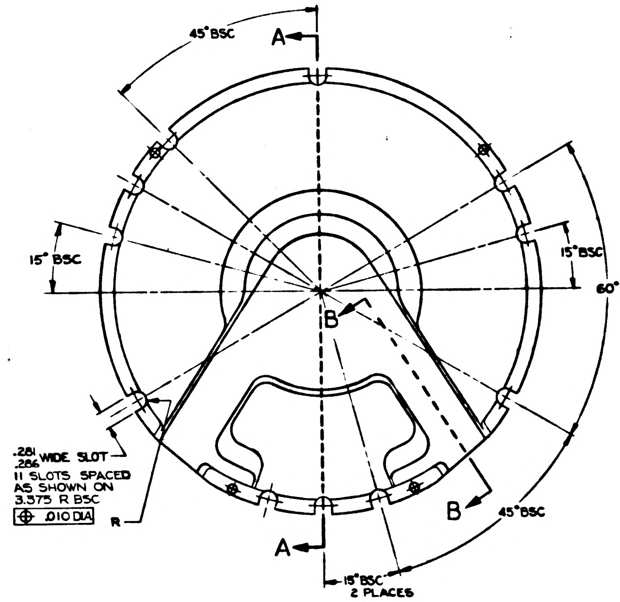


.115
.135
2.990
3.010 R
.460
.480 R
6.460 DIA REF
R
35°0'

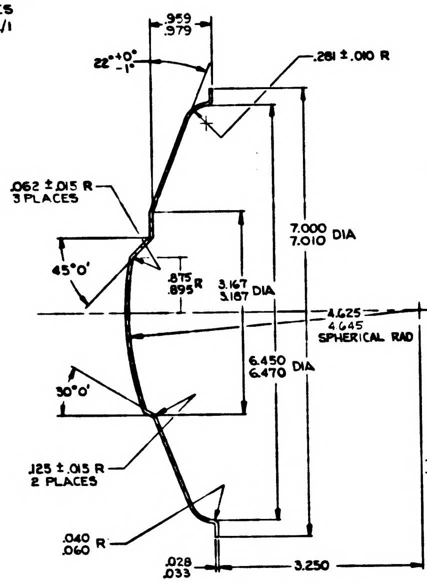
SECTION B-B
2 PLACES
SCALE 2/1



SECTION D-D
2 PLACES
SCALE 2/1

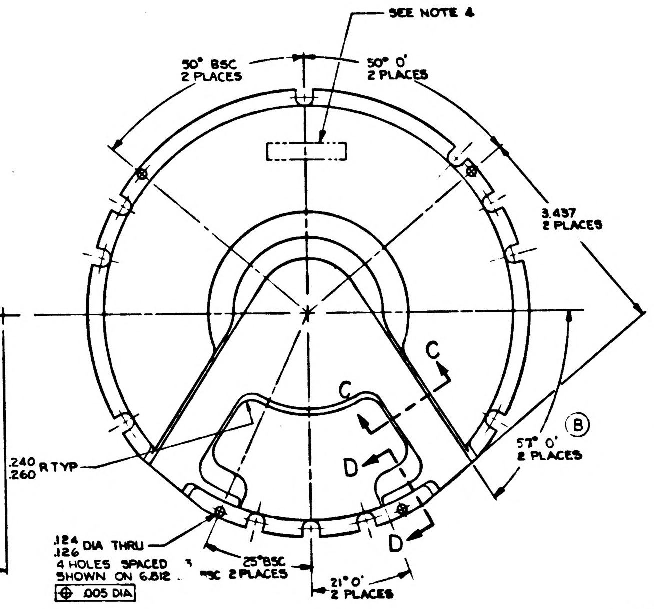


45° BSC
A
15° BSC
15° BSC
60° BSC
B
B
45° BSC
A
15° BSC
2 PLACES
.281
.286 WIDE SLOT
11 SLOTS SPACED
AS SHOWN ON
3.375 R BSC
⊕ .010 DIA
R

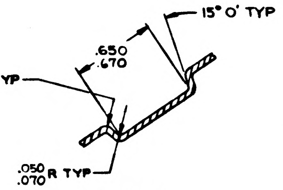


.959
.979
22° +0° -1°
.281 ± .010 R
.062 ± .015 R
3 PLACES
45°0'
.875
.895 R
3.167
3.187 DIA
7.000
7.010 DIA
4.625
4.645
SPHERICAL RAD
6.450
6.470 DIA
30°0'
.125 ± .015 R
2 PLACES
.040
.060 R
.028
.033
3.250

SECTION A-A



SEE NOTE 4
50° BSC
2 PLACES
50° 0'
2 PLACES
3.437
2 PLACES
C
C
D
D
B
57° 0'
2 PLACES
.240
.260 R TYP
.124
.126 DIA THRU
4 HOLES SPACED
SHOWN ON 6.812
⊕ .005 DIA
25° BSC
2 PLACES
21° 0'
2 PLACES



15° 0' TYP
.650
.670
.120
.140 R TYP
.050
.070 R TYP

SECTION C-C
2 PLACES
SCALE 2/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DIMENSIONS APPLY BEFORE TEFLON COAT

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
1000206	
1000011	
1000010	DL1000201
1000009	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ± 0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY SH 3003-O
ALT SPEC QQ-A-359D

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED C J Burgess DATE 12/11/62
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
W J Rhine 12-12-62
BY DIRECTION M.I.T. APPROVAL
W Koffer 12/12/62

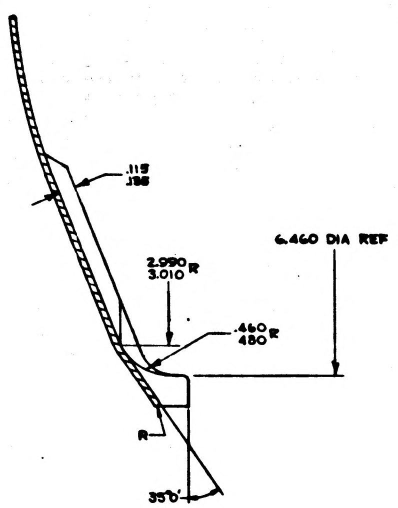
GUIDE, WIRE
BEARING HOUSING
INNER & MIDDLE AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000112
SHEET 1 OF 1

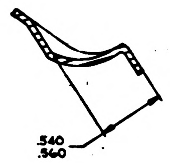
1000112 B

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00157		
	A	GENERAL REVISIONS	12-10-63	
	B	TDRR 00258	1-16-63	
	C	TDRR 01809	6-26-63	

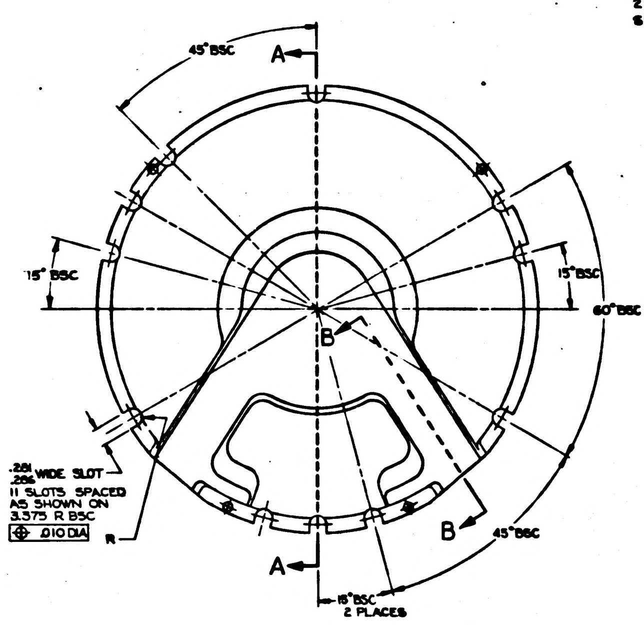


.115
.135
2.990
3.010 R
6.460 DIA REF
.460
.480 R
R
35°0'

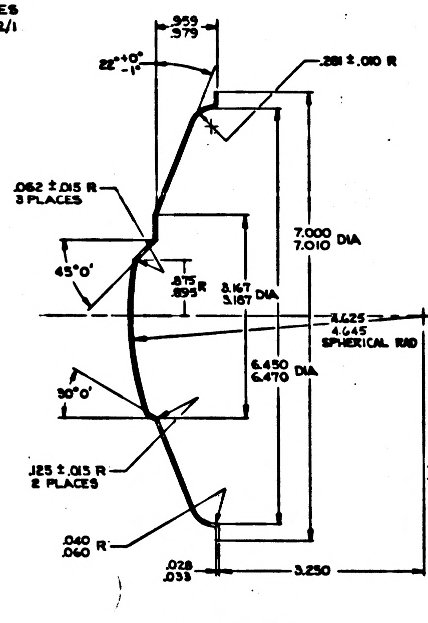
SECTION B-B
2 PLACES
SCALE 2/1



SECTION D-D
2 PLACES
SCALE 2/1

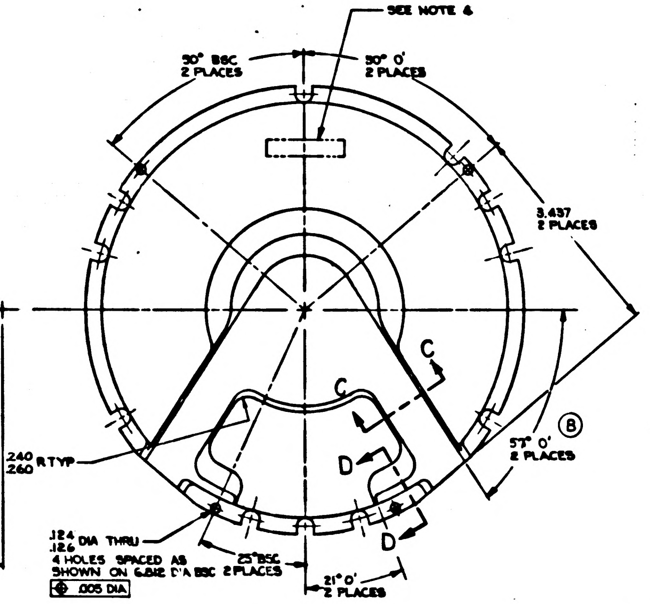


45° BSC
A
15° BSC
15° BSC
60° BSC
B
B
45° BSC
A
15° BSC
2 PLACES
.281
.285 WIDE SLOT
11 SLOTS SPACED
AS SHOWN ON
3.375 R BSC
⌖ .010 DIA
R

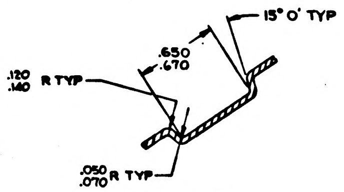


.359
.379
22° +0° -1°
.281 ± .010 R
.062 ± .015 R
3 PLACES
45°0'
.875
.895 R
3.147
3.167 DIA
7.000
7.010 DIA
4.625
4.645 SPHERICAL RAD
6.450
6.470 DIA
30°0'
.125 ± .015 R
2 PLACES
.040
.060 R
.028
.033
3.250

SECTION A-A



SEE NOTE 4
30° BSC
2 PLACES
30° 0'
2 PLACES
3.437
2 PLACES
C
C
D
D
.240
.260 R TYP
53° 0'
2 PLACES
.124
.128 DIA THRU
4 HOLES SPACED AS
SHOWN ON 6.812 DIA BSC
⌖ .005 DIA
25° BSC
2 PLACES
21° 0'
2 PLACES



15° 0' TYP
.650
.670
.120
.140 R TYP
.050
.070 R TYP

SECTION C-C
2 PLACES
SCALE 2/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES .005/.015
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DIMENSIONS APPLY BEFORE TEFLON COAT

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	DL1000201
1000010	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY SH 3003-0
ALT SPEC QQ-A-359D

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED DATE
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
W J Rhine 12-12-63
BY DIRECTION M.I.T. APPROVAL
W Koff 12/12/63

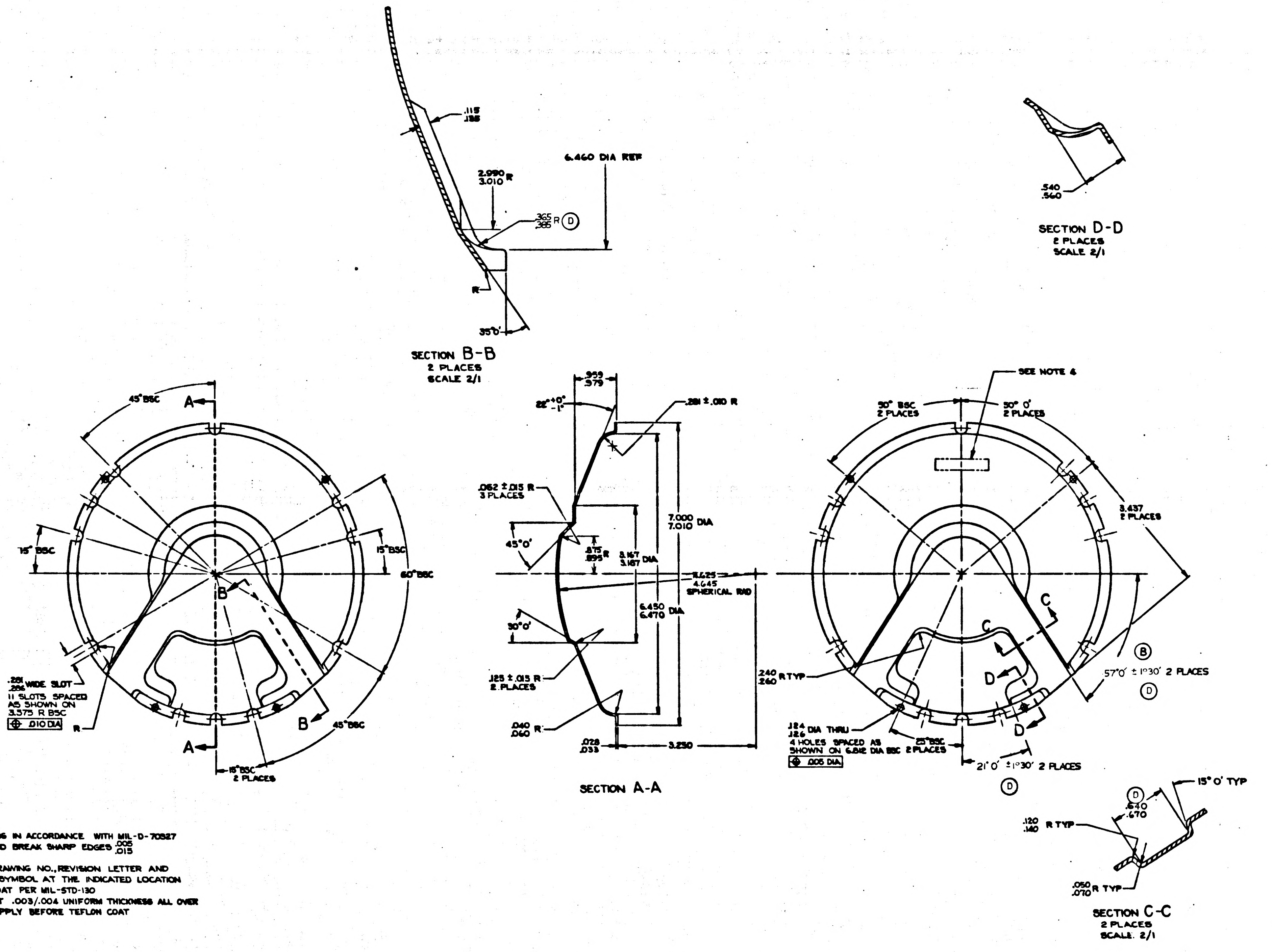
GUIDE, WIRE
BEARING HOUSING
INNER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000112
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00167				
	A	GENERAL REVISIONS	12-10-62	
	B	TDRR 00258	1-16-63	
	C	TDRR 01803	6-26-63	
	D	TDRR 01987		



.115
.135
2.990
3.010 R
6.460 DIA REF
.365
.385 R
D
R
35°0'
SECTION B-B
2 PLACES
SCALE 2/1
.540
.560
SECTION D-D
2 PLACES
SCALE 2/1
45° BSC
A
15° BSC
15° BSC
60° BSC
B
.281
.286 WIDE SLOT
11 SLOTS SPACED
AS SHOWN ON
3.375 R BSC
.010 DIA
R
45° BSC
A
15° BSC
2 PLACES
.369
.379
22° +0° -1°
.281 ± .010 R
.062 ± .015 R
3 PLACES
45°0'
.875
.895 R
3.167
3.187 DIA
7.000
7.010 DIA
4.625
4.645
SPHERICAL RAD
6.450
6.470 DIA
30°0'
.125 ± .015 R
2 PLACES
.040
.060 R
.028
.033
3.250
SECTION A-A
SEE NOTE 4
30° BSC
2 PLACES
30° 0'
2 PLACES
3.437
2 PLACES
.240
.260 R TYP
C
C
D
D
B
57°0' ± 1°30' 2 PLACES
D
.124
.126 DIA THRU
4 HOLES SPACED AS
SHOWN ON 6.516 DIA BSC
.005 DIA
25° BSC
2 PLACES
21° 0' ± 1°30' 2 PLACES
D
D
.640
.670
15° 0' TYP
.120
.140 R TYP
.050
.070 R TYP
SECTION C-C
2 PLACES
SCALE 2/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DIMENSIONS APPLY BEFORE TEFLON COAT

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	DL 1000201
1000010	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY SH 3003-O
ALT SPEC QQ-A-359

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
W J Rhine 12-12-62
BY DIRECTION M.I.T. APPROVAL

GUIDE, WIRE
BEARING HOUSING
INNER AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

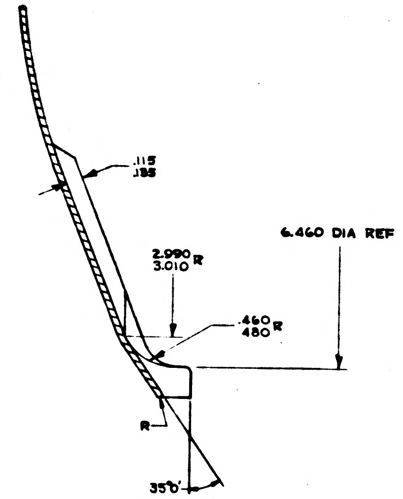
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000112
SHEET 1 OF 1

MASTER

1000112 D

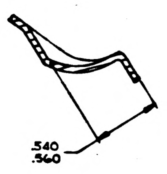
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00157				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS	12-10-68	WK

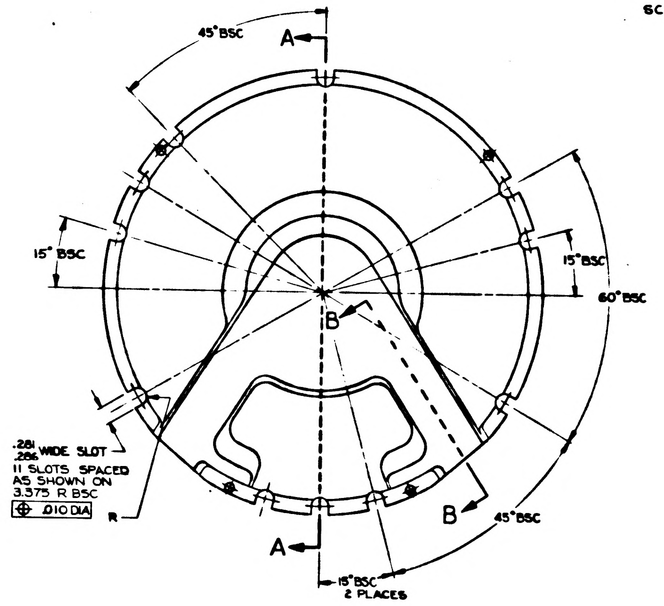


.115
.135
6.460 DIA REF
2.990
3.010 R
.460
.480 R
R
35°0'

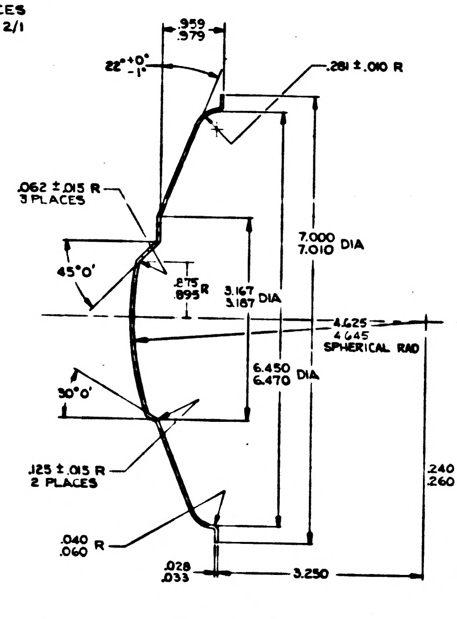
SECTION B-B
2 PLACES
SCALE 2/1



SECTION D-D
2 PLACES
SCALE 2/1

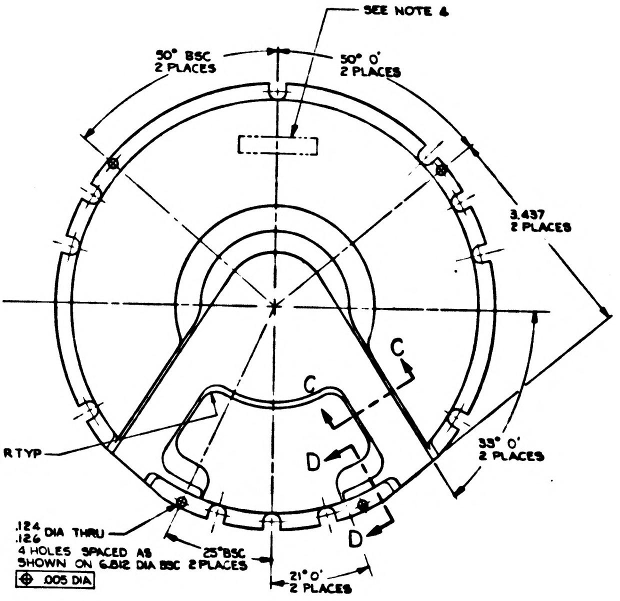


45° BSC
A
15° BSC
15° BSC
60° BSC
B
B
45° BSC
A
.281
.286 WIDE SLOT
11 SLOTS SPACED
AS SHOWN ON
3.375 R BSC
⊕ .010 DIA
R
15° BSC
2 PLACES

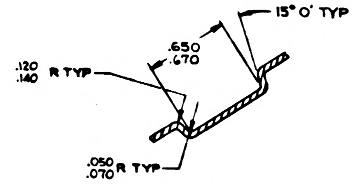


.959
.979
22° +0° -1°
.281 ± .010 R
.062 ± .015 R
3 PLACES
45°0'
.875
.895 R
3.167
3.187 DIA
7.000
7.010 DIA
4.625
4.645
SPHERICAL RAD
6.450
6.470 DIA
30°0'
.125 ± .015 R
2 PLACES
.040
.060 R
.028
.033
3.250

SECTION A-A



SEE NOTE 4
30° BSC
2 PLACES
30° 0'
2 PLACES
3.437
2 PLACES
C
C
D
D
35° 0'
2 PLACES
.240
.260 R TYP
.124
.126 DIA THRU
4 HOLES SPACED AS
SHOWN ON 6.812 DIA BSC
⊕ .005 DIA
25° BSC
2 PLACES
21° 0'
2 PLACES



15° 0' TYP
.650
.670
.120
.140 R TYP
.050
.070 R TYP

SECTION C-C
2 PLACES
SCALE 2/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DIMENSIONS APPLY BEFORE TEFLON COAT

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
1000206	
1000011	
1000010	DL1000201
1000009	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY SH 3003-O
ALT SPEC QQ-A-359D

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Boyce DATE 12/4/68
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
W J Rhine 12-12-68
BY DIRECTION M.I.T. APPROVAL
W Kaffer 12/12/68

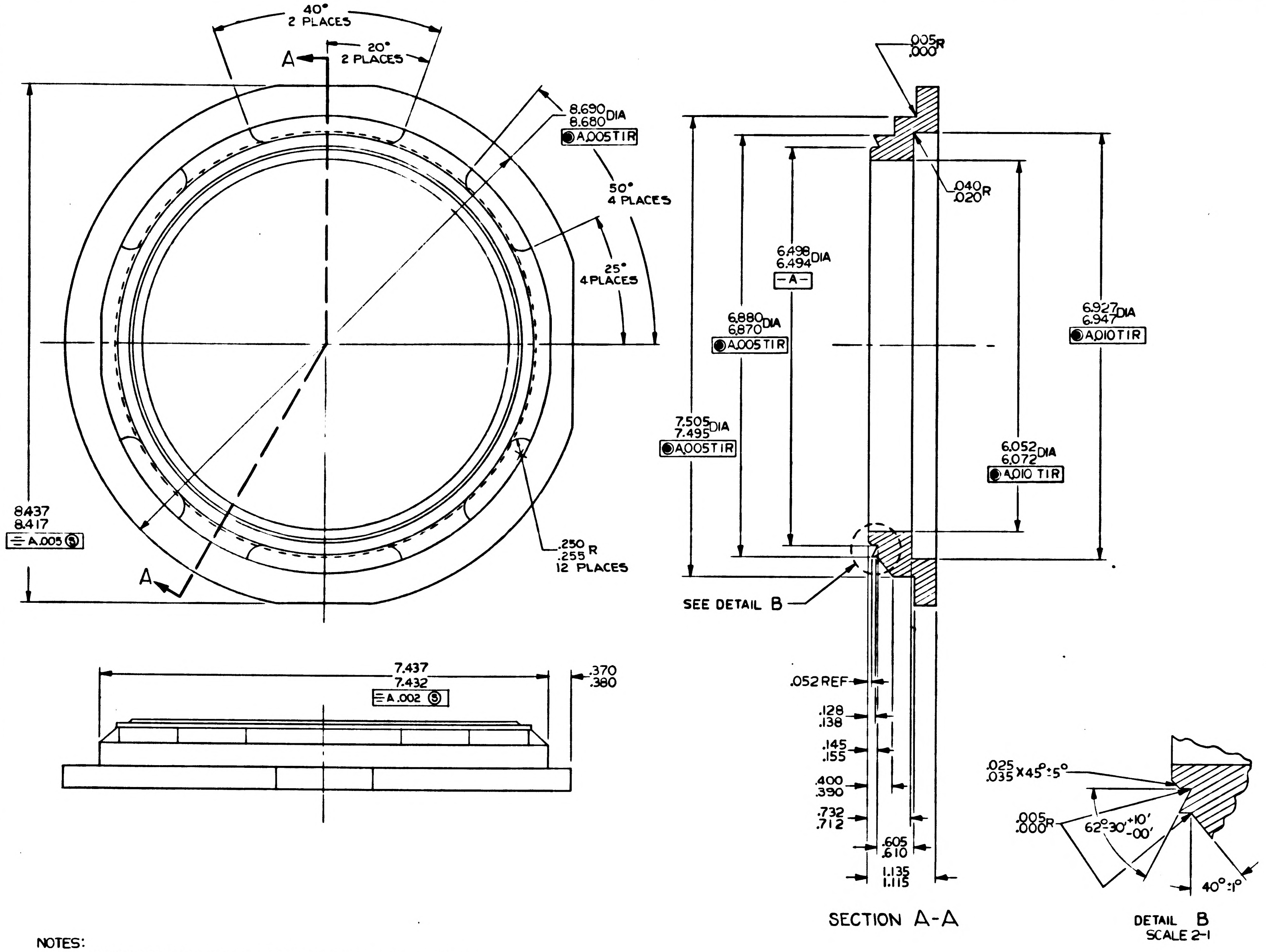
GUIDE, WIRE
BEARING HOUSING
INNER & MIDDLE AXIS

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000112
SHEET 1 OF 1

A
1000112

REVISIONS TDRR 00077				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REPLACED WITH CHANGE BY REV B TDRR 00260	1-8-63	



40°
2 PLACES
20°
2 PLACES
A
8.690
8.680 DIA
A .005 TIR
50°
4 PLACES
25°
4 PLACES
8.437
8.417
A .005 Ⓢ
.250
.255 R
12 PLACES
A
7.437
7.432
A .002 Ⓢ
.370
.380
.005
.000 R
.040
.020 R
6.498
6.494 DIA
-A-
6.880
6.870 DIA
A .005 TIR
7.505
7.495 DIA
A .005 TIR
6.927
6.947 DIA
A .010 TIR
6.052
6.072 DIA
A .010 TIR
SEE DETAIL B
.052 REF
.128
.138
.145
.155
.400
.390
.732
.712
.605
.610
1.135
1.115
SECTION A-A
.025
.035 X 45° ± 5°
.005
.000 R
62° 30' +10' -00'
40° ± 1°
DETAIL B
SCALE 2-1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEF AT 340° F ± 10° FOR 6 HOURS ± 10 MIN
   - C. FINISH MACHINE

REPLACED WITH CHANGE BY REV B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327B TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

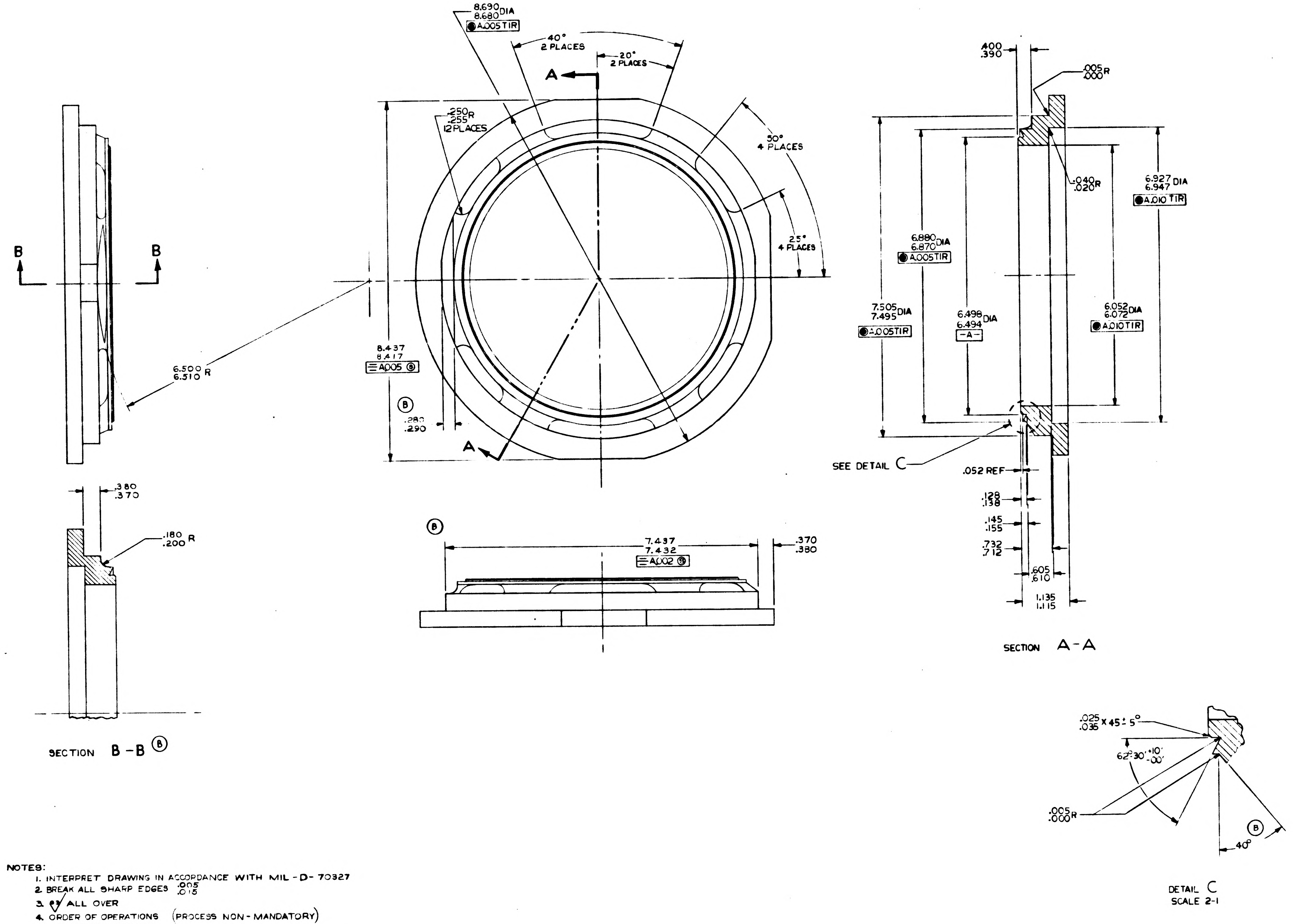
		DATE
APPROVED		10/31/62
CHECKED		
DRAWN	RVC	10-18-62
APPROVED FOR MSC	10-31-62	
BY DIRECTION M.I.T. APPROVAL		10/31/62

FLANGE
CASE
HOUSING BEARING

SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000113
SHEET 1 OF 1

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	B	REPLACES REV A WITH CHANGES TDRR 00263	1-16-63	



8.690 DIA
8.680
A .005 TIR
40°
2 PLACES
20°
2 PLACES
A
.250 R
.255
12 PLACES
30°
4 PLACES
25°
4 PLACES
B
B
6.500 R
6.510
8.437
8.417
A .005
.280
.290
A
.380
.370
.180 R
.200
SECTION B-B
7.437
7.432
A .002
.370
.380
.400
.390
.005 R
.000
.040 R
.020
6.927 DIA
6.947
A .010 TIR
6.880 DIA
6.870
A .005 TIR
7.505 DIA
7.495
A .005 TIR
6.498 DIA
6.494
-A-
6.052 DIA
6.072
A .010 TIR
SEE DETAIL C
.052 REF
.128
.138
.145
.155
.732
.712
.605
.610
1.135
1.115
SECTION A-A
.025
.035 x 45° ± 5°
62°30' +10' -00'
.005 R
.000
40°
DETAIL C
SCALE 2-1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   A. ROUGH MACHINE
   B. STRESS RELIEF AT 340°F ± 10° FOR 6 HOURS ± 10 MIN
   C. FINISH MACHINE
5. Ⓑ IDENTIFY USING DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130.

REPLACES REVISION A WITH CHANGES

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 100000
[illegible]	DL [illegible]
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327 B TEMP T6

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN [illegible] -4-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE

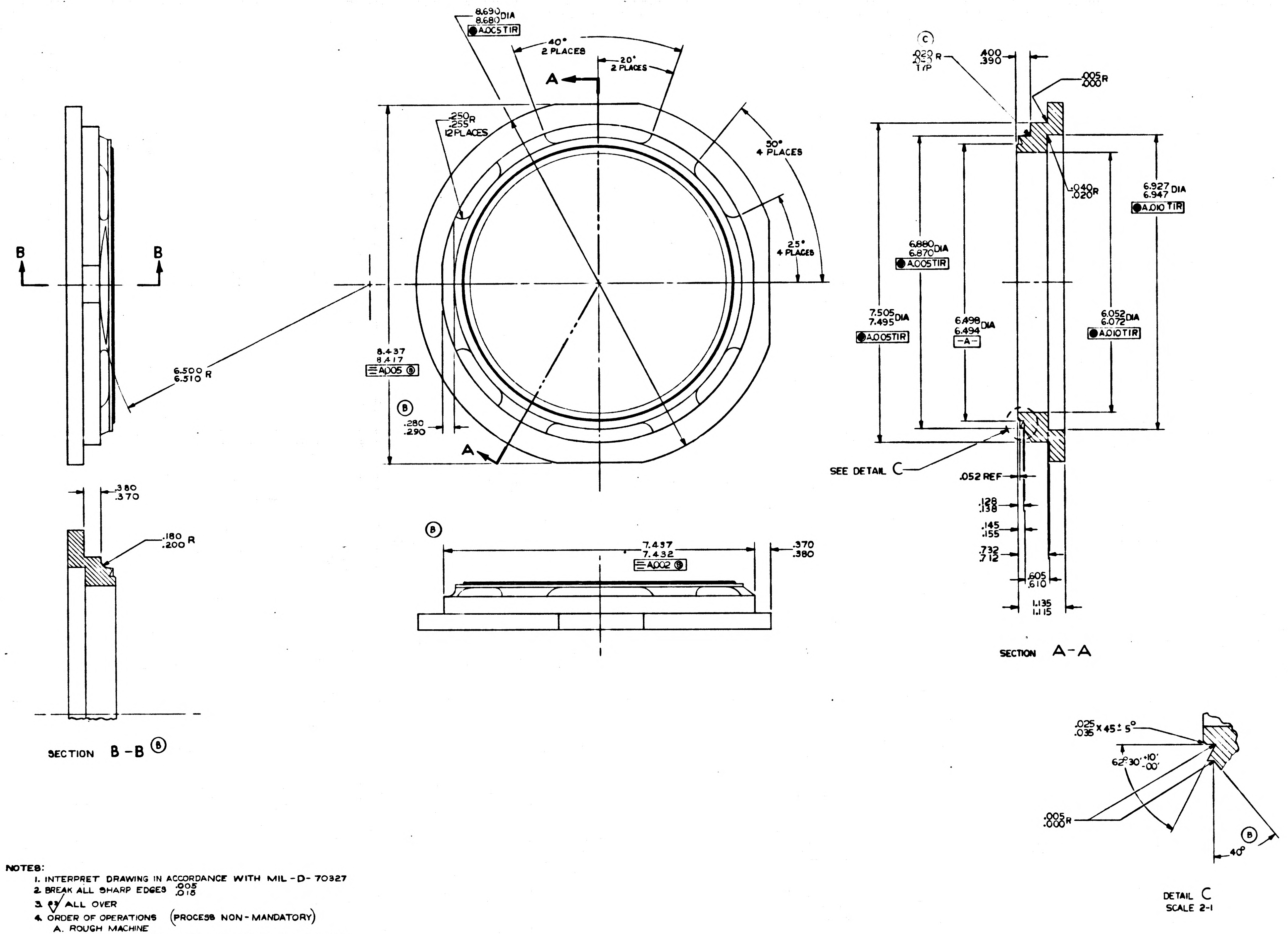
FLANGE
CASE
HOUSING BEARING

SCALE 1-1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000113
SHEET 1 OF

1000113 B

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	B	REPLACES REV A WITH CHANGES TDRR 00260	1-16-63	
	C	TDRR 01681	6-19-63	


8.690 / 8.680 DIA
A.005 TIR
40° 2 PLACES
20° 2 PLACES
A
.250 / .255 R 12 PLACES
50° 4 PLACES
25° 4 PLACES
B
B
6.500 / 6.510 R
8.437 / 8.417
A.005 Ⓜ
.280 / .290
.380 / .370
.180 / .200 R
SECTION B-B Ⓑ
7.437 / 7.432
A.002 Ⓜ
.370 / .380
Ⓒ
.020 / .030 R TYP
.400 / .390
.005 / .000 R
.040 / .020 R
6.927 / 6.947 DIA
A.010 TIR
6.880 / 6.870 DIA
A.005 TIR
7.505 / 7.495 DIA
A.005 TIR
6.498 / 6.494 DIA
-A-
6.052 / 6.072 DIA
A.010 TIR
SEE DETAIL C
.052 REF
.128 / .138
.145 / .155
.732 / .712
.605 / .610
1.135 / 1.115
SECTION A-A
.025 / .035 X 45° ± 5°
62° 30' +10' / -00'
.005 / .000 R
40°
Ⓑ
DETAIL C
SCALE 2-1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. [illegible]√ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   A. ROUGH MACHINE
   B. STRESS RELIEF AT 340° F ± 10° FOR 6 HOURS ± 10 MIN
   C. FINISH MACHINE
Ⓑ 5. IDENTIFY USING DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130.

REPLACES REVISION A WITH CHANGES

MASTER Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000001
1000083	DL 1000201

Ⓑ APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327 B TEMP T6

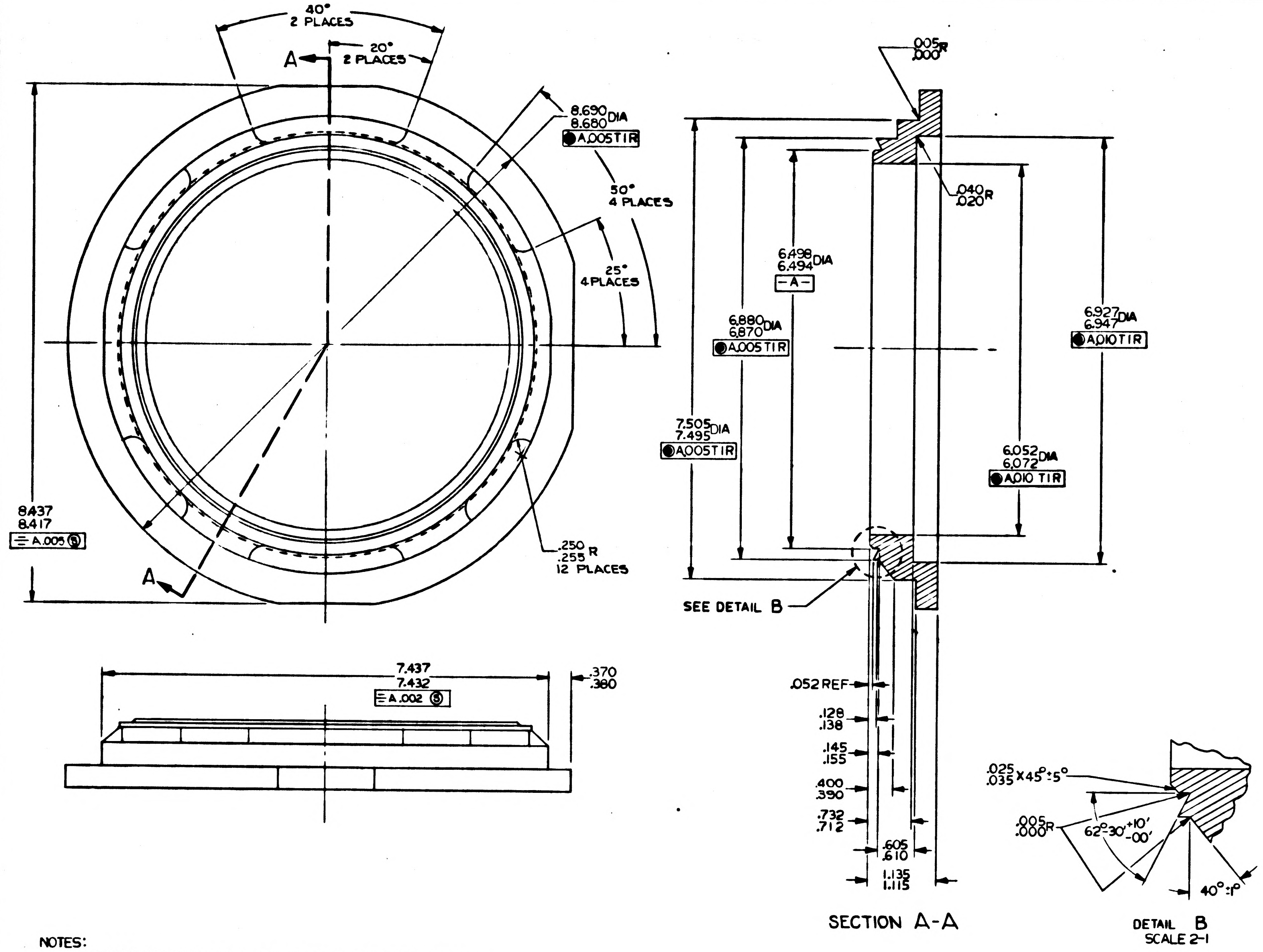
MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED DATE 1-16-63
CHECKED
DRAWN R N C 1-4-63
APPROVED FOR MSC 1/20/63
MIT/IL APPROVAL DATE 1/16/63

FLANGE
CASE
HOUSING BEARING

SCALE 1-1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000113
SHEET 1 OF 1

REVISIONS	TDRR 00077			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



40° 2 PLACES
20° 2 PLACES
A
8.690 8.680 DIA
A.005 TIR
50° 4 PLACES
25° 4 PLACES
.250 .255 R 12 PLACES
8.437 8.417
A.005 S
A
7.437 7.432
A.002 S
.370 .380
.005 .000 R
.040 .020 R
6.498 6.494 DIA
-A-
6.880 6.870 DIA
A.005 TIR
7.505 7.495 DIA
A.005 TIR
6.927 6.947 DIA
A.010 TIR
6.052 6.072 DIA
A.010 TIR
SEE DETAIL B
.052 REF
.128 .138
.145 .155
.400 .390
.732 .712
.605 .610
1.135 1.115
SECTION A-A
.025 .035 X45°±5°
.005 .000 R
62°30' +10' -00'
40°±1°
DETAIL B
SCALE 2-1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEF AT 340° F ± 10° FOR 6 HOURS ± 10 MIN
   - C. FINISH MACHINE

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

1000083	DL100000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327B TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

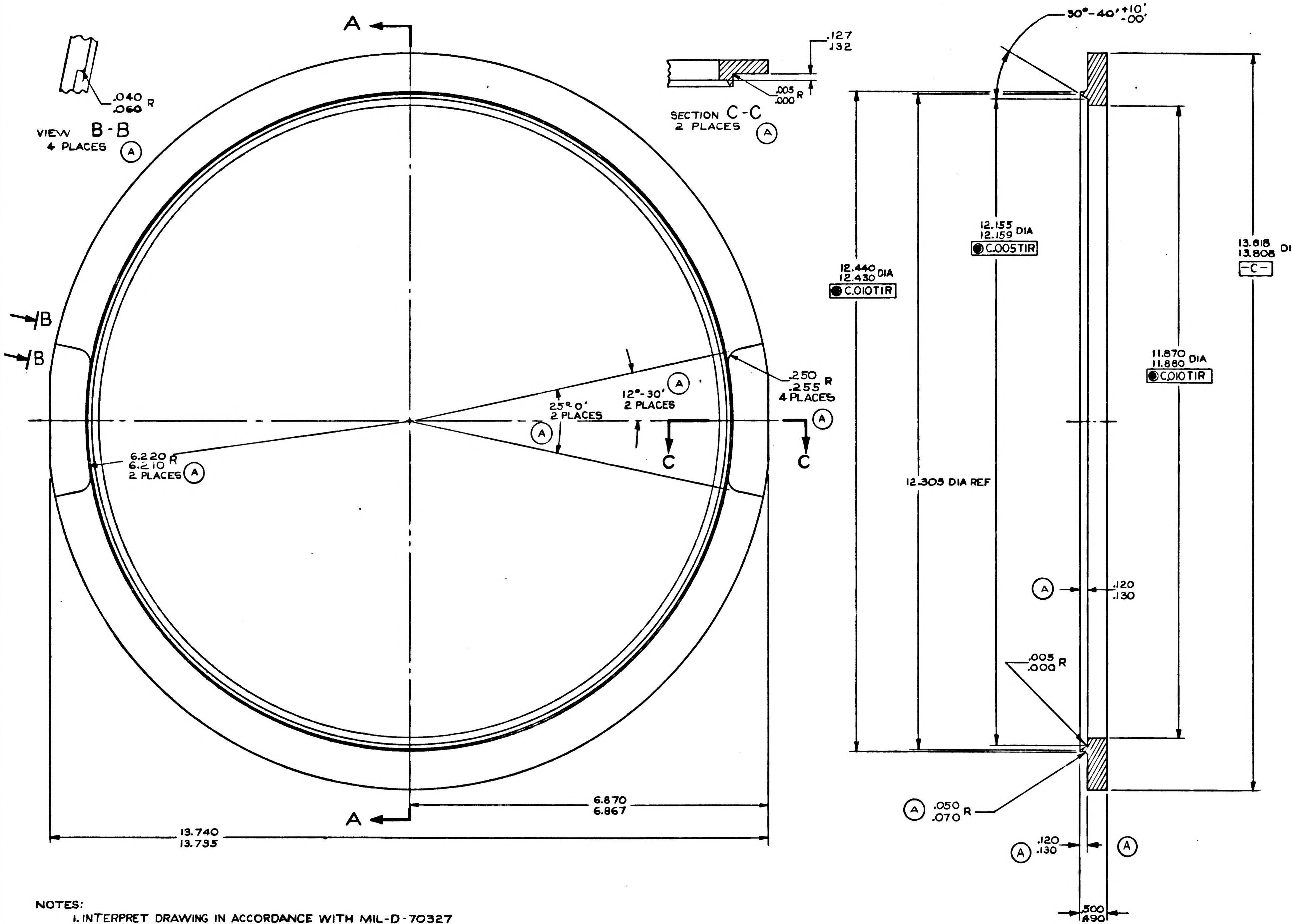
		DATE
APPROVED		10/31/62
CHECKED		
DRAWN	R.F.C.	10-19-62
APPROVED FOR MSC	W. J. Rhine	10-31-62
BY DIRECTION M.I.T. APPROVAL		10/31/62

FLANGE
CASE
HOUSING BEARING

SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000 13
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00077				
	A	TDRR 00261	1-7-63	


A
A
.040
.060 R
VIEW B-B
4 PLACES (A)
.127
.132
.005
.000 R
SECTION C-C
2 PLACES (A)
B
B
6.220
6.210 R
2 PLACES (A)
25° 0'
2 PLACES (A)
12°-30'
2 PLACES (A)
.250
.255 R
4 PLACES (A)
C
C
6.870
6.867
13.740
13.735
30°-40' +10' -00'
12.440
12.430 DIA
◉ C.010TIR
12.155
12.159 DIA
◉ C.005TIR
12.305 DIA REF
11.870
11.880 DIA
◉ C.010TIR
13.818
13.808 DIA
-C-
(A) .120
.130
.005
.000 R
(A) .050
.070 R
(A) .120
.130
(A)
.500
.490
(A) SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. $\sqrt{63}$ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   A. ROUGH MACHINE
   B. STRESS RELIEVE AT 340° F ± 10° FOR 6 HOURS ± 10 MIN
   C. FINISH MACHINE
(A) 5. IDENTIFY USING DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

(A)

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000083	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ± 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL-6061 TEMP T6 ALT SPEC QQ-A-327B TEMP T6

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A. J. Boyce	10/31/62
CHECKED		
DRAWN	RWC	10-17-62

APPROVED FOR MSC
W J [illegible] 10-24-62
BY DIRECTION
MIT APPROVAL [illegible] 12/31/62

FLANGE
CASE CENTER

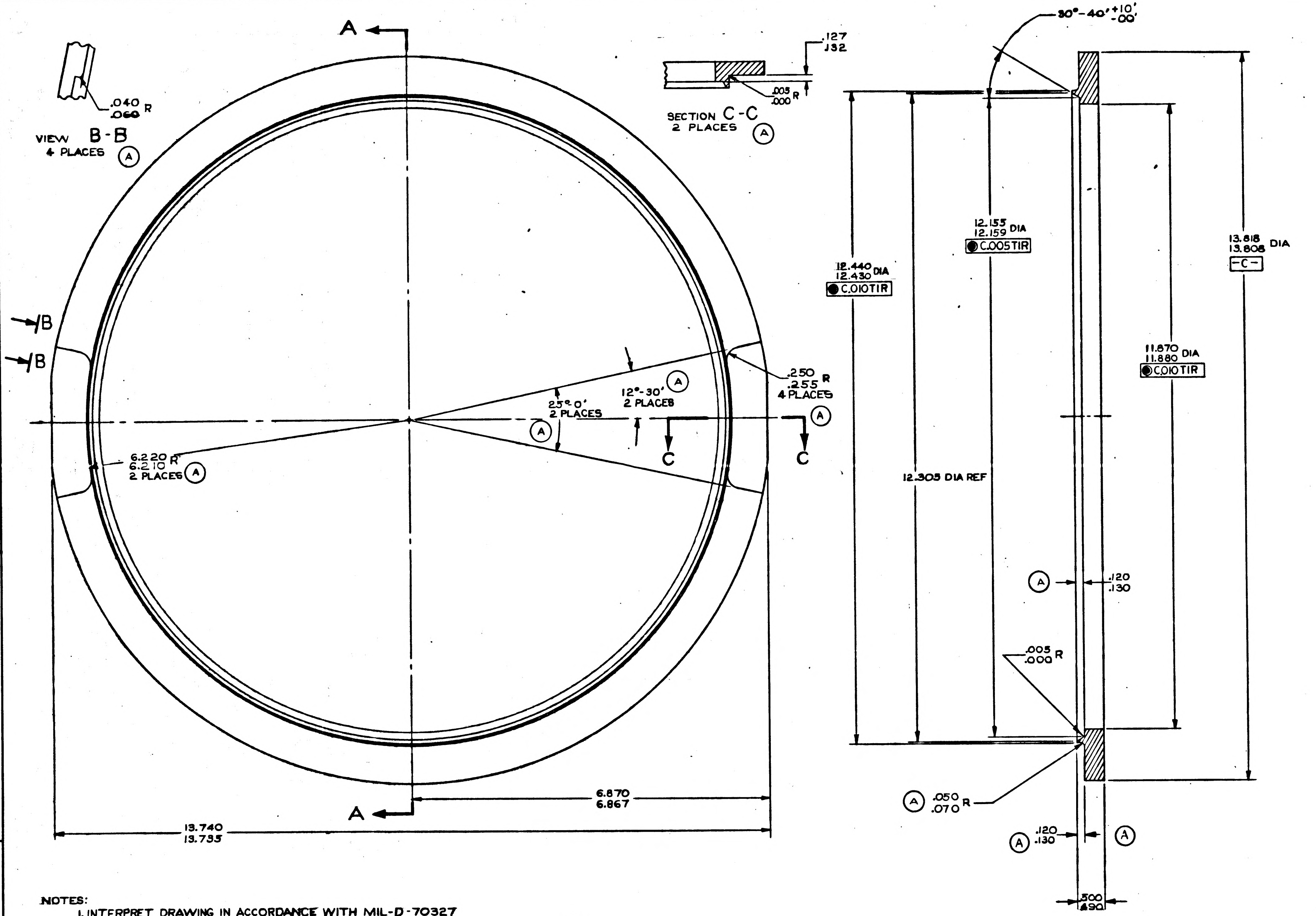
SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000114
SHEET 1 OF 1

1000114 A

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	▲	TDRR 00261	1-7-63		
	B	TDRR 03501	20 OCT 63		

REVISIONS TDRR 00077



A
A
VIEW B-B
4 PLACES (A)
.040 R
.060
SECTION C-C
2 PLACES (A)
.127
.132
.003 R
.000
B
B
.250 R
.255
4 PLACES
12°-30'
2 PLACES
25°-0'
2 PLACES
6.220 R
6.210
2 PLACES
C
C
6.870
6.867
13.740
13.735
30°-40' +10' -00'
12.155
12.159 DIA
C.005TIR
12.440
12.430 DIA
C.010TIR
13.818
13.808 DIA
-C-
11.870
11.880 DIA
C.010TIR
12.305 DIA REF
.120
.130
.005 R
.000
.050 R
.070
.120
.130
.500
.490

(A) SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63✓ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   - A. ROUGH MACHINE
   - (B) B. STRESS RELIEVE AT 325° F ± 10° FOR 6 HOURS ± 10 MIN
   - C. FINISH MACHINE
5. (A) IDENTIFY USING DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

(B)		
(A)		DL1001500
	1001553	DL1000201
	1000083	DL1000001
	NEXT ASSY	USED ON
	APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL-6061 TEMP T6 ALT SPEC QQ-A-327B TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

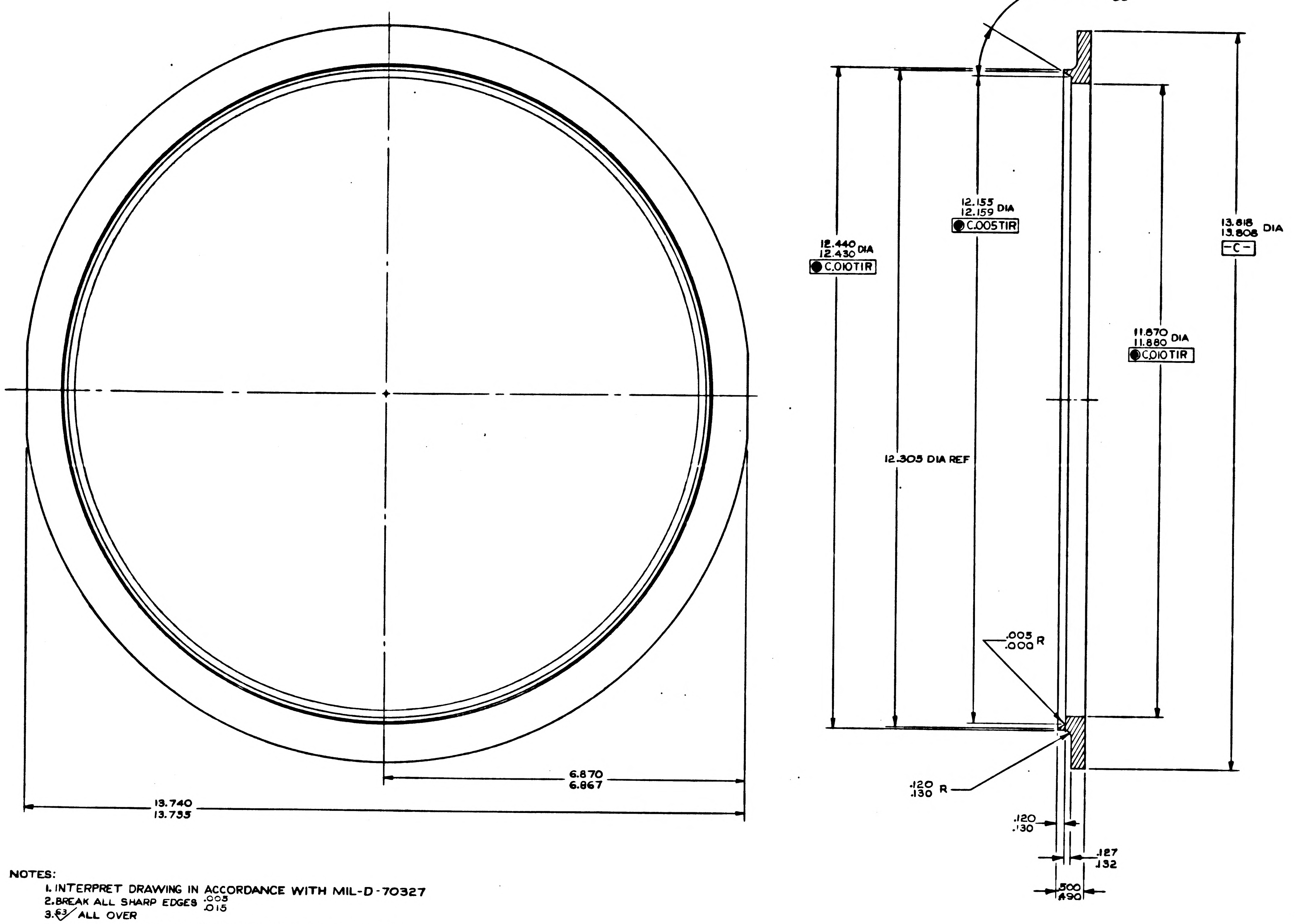
		DATE
APPROVED	A. J. Boyce	10/31/63
CHECKED		
DRAWN	R W C	10-17-63
APPROVED FOR MSC	W. J. [illegible] 10-31-63	
BY DIRECTION		
MIT APPROVAL	[illegible]	10/31/63

FLANGE
CASE CENTER

SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000114
SHEET 1 OF 1

REVISIONS TDRR 00077				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


30°-40′ +10′ -00′
12.440 12.430 DIA
● C .010 TIR
12.155 12.159 DIA
● C .005 TIR
13.818 13.808 DIA
-C-
11.870 11.880 DIA
● C .010 TIR
12.305 DIA REF
.005 .000 R
.120 .130 R
.120 .130
.127 .132
.500 .490
6.870 6.867
13.740 13.735

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005 .015
3. 63√ ALL OVER
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 340° F ± 10° FOR 6 HOURS ± 10 MIN
   - C. FINISH MACHINE

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000083	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL-6061 TEMP T6 ALT SPEC QQ-A-327B TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	C. J. Boyce	10/31/68
CHECKED		
DRAWN	R W C	10-17-68
APPROVED FOR MSC	W. J. [illegible]	10-31-68
BY DIRECTION		
MIT APPROVAL	[illegible]	10/31/68

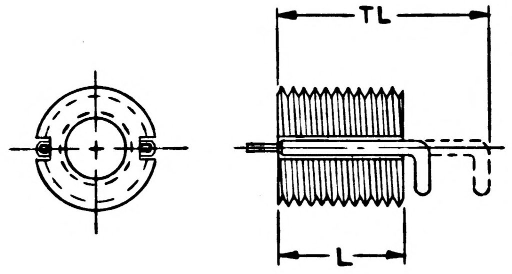
FLANGE
CASE CENTER

SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000114
SHEET 1 OF 1

REVISIONS		TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01324 ETD 5-22-63	5-21-63	AJB WK

PART NO.	INTERNAL THREAD	NEWTON INSERT PART NUMBER	EXTERNAL THREAD	TL MAX	L ±.010	Ⓐ
1000115-1	2-56UNC-3B	KCL 0256	8-32 UNC -2A	7/32	.12	
1000115-2	4-40UNC-3B	KCL 0440	10-32 UNF - 2A	9/32	.16	
1000115-3	6-32UNC-3B	KCL 0632	12-28 UNF - 2A	5/16	.18	Ⓐ
1000115-4	2-56UNC- 3B	KCCL 0256	6- 32 UNC-2A MOD	7/32	.10	Ⓐ
1000115-5	8-32UNC- 3B	KCL 0832	1/4-28UNF-2A MOD	11/32	.18	Ⓐ



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., APPLICABLE DASH NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

Ⓐ ~~3. TOLERANCE ON ALL DIMENSIONS ±.010~~

4. FINISH: PASSIVATE PER MIL-S-5002
5. INTERNAL THREADS TO CONFORM TO MIL-S-7742
6. LOCKING TORQUE PER MIL-N-25027
7. DRY FILM LUBRICANT PER MIL-L-25504
8. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3

ORIGINAL SOURCE OF SUPPLY
NEWTON INSERT COMPANY
6500 AVALON BLVD.
LOS ANGELES 3, CALIFORNIA
NEWTON INSERT PART NO. SEE TABLE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
303 CRES STEEL
MIL-S-7720 COND B

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		11/24/62
CHECKED		
DRAWN	R.G.S.	

APPROVED FOR MSC
11/24/62
BY DIRECTION M.I.T. APPROVAL
21 NOV 62

INSERT, THREADED
SELF LOCKING
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000115
SHEET 1 OF 1

1000115

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

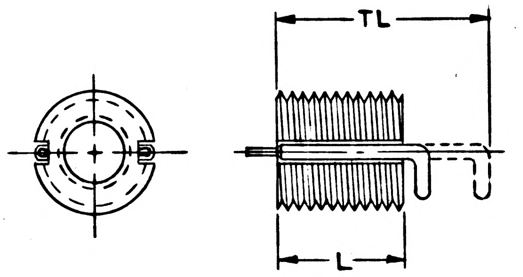
REVISIONS		TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01324 ERD 5-22-63	5-21-63	AJB WK
	B	REVISED PER TDRR 13963	1-12-64	WK

PART NO.	INTERNAL THREAD	NEWTON INSERT PART NUMBER	EXTERNAL THREAD	TL MAX	L ±.010	T ±.010	TYPE
1000115-1	2-56UNC-3B	KCL 0256	8-32 UNC -2A	7/32	.12	–	I
1000115-2	4-40UNC-3B	KCL 0440	10-32 UNF - 2A	9/32	.16	–	I
1000115-3	6-32UNC-3B	KCL 0632	12-28 UNF - 2A	5/16	.18	.13	II
1000115-4	2-56UNC- 3B	KCCL 0256	6- 32 UNC-2A MOD	7/32	.10	–	I
1000115-5	8-32UNC- 3B	KCL 0832	1/4-28UNF-2A MOD	11/32	.18	.13	II

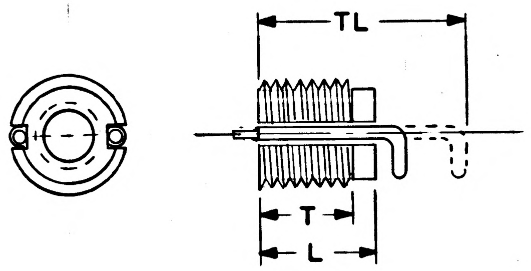
REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3.
   - C. MARKING: IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NO., REV LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.
2. INSPECTION & ACCEPTANCE:
   - A. DIMENSIONS AS SHOWN.
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: CORROSION RESISTANT STEEL PER MIL-S-7720, CLASS 303, CONDITION B.
     - (1) FINISH: PASSIVATE PER MIL-S-5002.
   - B. INTERNAL THREADS TO CONFORM TO MIL-S-7742.
   - C. LOCKING TORQUE PER MIL-N-25027.
   - D. DRY FILM LUBRICANT PER MIL-L-25504.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



TYPE I



TYPE II

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED A J Boyce 11/21/62
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
Jack Barnard 11/24/62
BY DIRECTION M.I.T. APPROVAL
W Ruffer 21 NOV 62

INSERT, THREADED
SELF LOCKING
SPECIFICATION CONTROL DRAWING

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000115
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

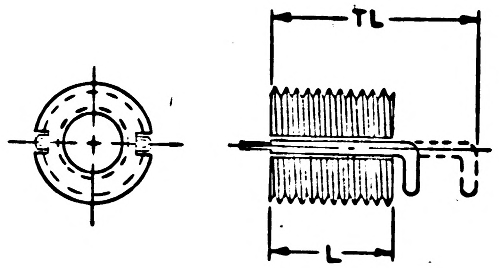
PART NO.	INTERNAL THREAD	NEWTON INSERT PART NUMBER	EXTERNAL THREAD	TL MAX	L ±.010	T ±.010	TYPE
1000115-1	2-56UNC-3B	KCL 0256	8-32 UNC - 2A	7/32	.12	–	I
1000115-2	4-40UNC-3B	KCL 0440	10-32 UNF - 2A	9/32	.16	–	I
1000115-3	6-32UNC-3B	KCL 0632	12-28 UNF - 2A	5/16	.18	.13	II
1000115-4	2-56UNC- 3B	KCCL 0256	6- 32 UNC-2A MOD	7/32	.10	–	I
1000115-5	8-32UNC- 3B	KCL 0832	1/4-28UNF-2A MOD	11/32	.18	.13	II

REVISIONS		TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01324 6TO 5-22-63	5-21-63	AJB WIC
	B	REVISED PER TDRR 13963	11-11-64	WIC
	C	REVISED PER TDRR 16799	3-8-65	WIC

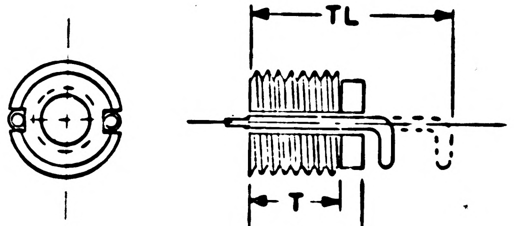
REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3.
   - C. MARKING: IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NO., REV LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.
2. INSPECTION & ACCEPTANCE:
   - A. DIMENSIONS AS SHOWN.
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: CORROSION RESISTANT STEEL PER MIL-S-7720, CLASS 303, CONDITION B.
     - (1) FINISH: PASSIVATE PER MIL-S-5002.
   - B. INTERNAL THREADS TO CONFORM TO MIL-S-7742.
   - C. LOCKING TORQUE PER MIL-N-25027.
   - D. DRY FILM LUBRICANT PER MIL-L-8937, FORM A

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



TYPE I



TYPE II

DUPLICATE MASTER

REPLACED WITHOUT CHANGE
BY REV "D" PER TDRR 30732

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED 11/21/62
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
BY DIRECTION M.I.T. APPROVAL
21 '62

INSERT, THREADED
SELF LOCKING
SPECIFICATION CONTROL DRAWING

SCALE UNIT WT. CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000115
SHEET 1 OF 1

PART NO.	INTERNAL THREAD	NEWTON INSERT PART NUMBER	EXTERNAL THREAD	TL MAX	L ±.010	T ±.010	TYPE
1000115-1	2-56UNC-3B	KCL 0256	8-32UNC-2A	7/32	.12	-	I
1000115-2	4-40UNC-3B	KCL 0440	10-32UNF-2A	9/32	.16	-	I
1000115-3	6-32UNC-3B	KCL 0632	12-28UNF-2A	5/16	.18	.13	II
1000115-4	2-56UNC-3B	KCCL 0256	6-32 UNC-2A MOD	7/32	.10	-	I
1000115-5	8-32UNC-3B	KCL 0832	1/4-28UNF-2A MOD	11/32	.18	.13	II

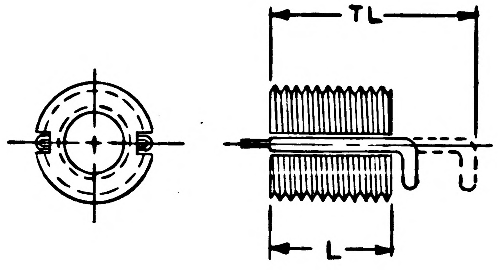
REVISIONS TDRR 00105

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D		REPLACES REV "C" WITHOUT CHANGE PER TDRR 30732		13 JUL 66	MTY

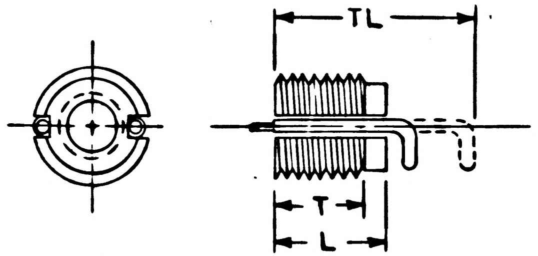
REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3
   - C. MARKING: IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NO., REV LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS AS SHOWN.
3. DESIGN REQUIREMENTS:
   - A. MATERIAL: CORROSION RESISTANT STEEL PER MIL-S-7720, CLASS 303, CONDITION B.
     - (1) FINISH: PASSIVATE PER MIL-S-5002.
   - B. INTERNAL THREADS TO CONFORM TO MIL-S-7742.
   - C. LOCKING TORQUE PER MIL-N-25027.
   - D. DRY FILM LUBRICANT PER MIL-L-8937, FORM A

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.



TYPE I



TYPE II

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9 - 153

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN R.G.S DATE
CHECKED
APPROVAL AJ BOYCE 21 NOV 62
APPROVAL
JACK BARNARD 11/21/62
NASA APPROVAL
MIT APPROVAL W. KUPFER 21 NOV 62

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

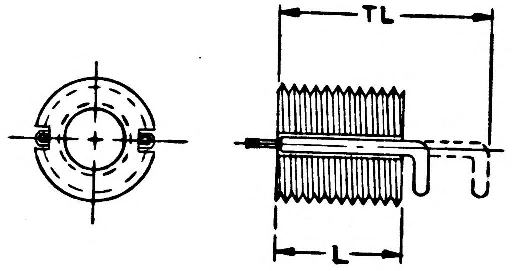
INSERT, THREADED SELF LOCKING

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
1000115
SCALE
SHEET 1 OF 1

REVISIONS		TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	INTERNAL THREAD	NEWTON INSERT PART NUMBER	EXTERNAL THREAD	TL	L
1000115-1	2-56UNC-3B	KCL 0256	8-32 UNC - 2A	7/32	.12
1000115-2	4-40UNC-3B	KCL 0440	10-32 UNC - 2A	9/32	.16
1000115-3	6-32UNC-3B	KCL 0632	12-28 UNF - 2A	5/16	.19



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., APPLICABLE DASH NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130
3. TOLERANCE ON ALL DIMENSIONS ±.010
4. FINISH: PASSIVATE PER MIL-S-5002
5. INTERNAL THREADS TO CONFORM TO MIL-S-7742
6. LOCKING TORQUE PER MIL-N-25027
7. DRY FILM LUBRICANT PER MIL-L-25504
8. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3

ORIGINAL SOURCE OF SUPPLY
NEWTON INSERT COMPANY
6500 AVALON BLVD.
LOS ANGELES 3, CALIFORNIA
NEWTON INSERT PART NO. SEE TABLE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
303 CRES STEEL
MIL-S-7720 COND B

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN	R.G.S.	

APPROVED FOR MSC
Jack Barnard 11/21/62
BY DIRECTION M.I.T. APPROVAL
W [illegible] 21 NOV 62

INSERT, THREADED
SELF LOCKING
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

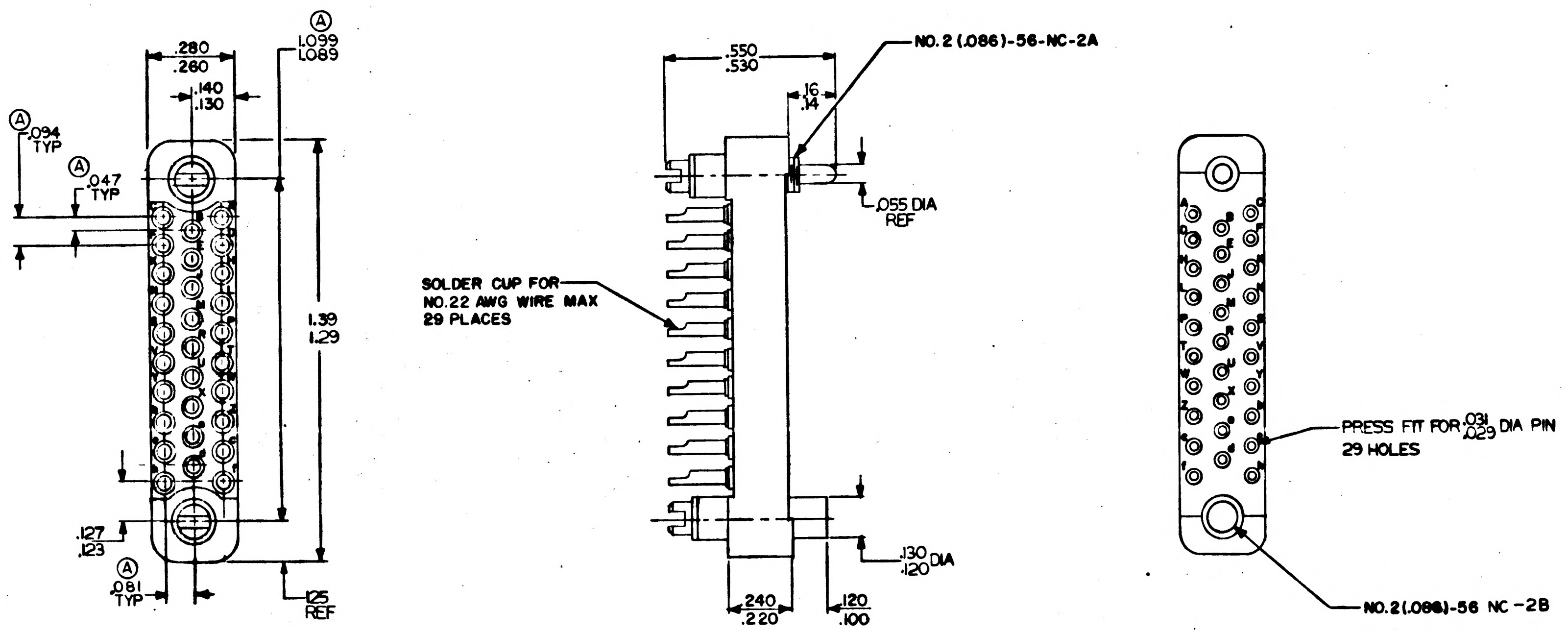
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000115

SHEET 1 OF 1

REVISIONS TDRR 00077					
Ⓜ ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 03478	10-15-63		WK



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000117
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1001508	
1001507	DL1001500
Ⓐ 1000206	DL1000201
1000008	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		
CHECKED		
DRAWN	JCFUCHS	10-18-62
APPROVED FOR MSC		10-3-62
BY DIRECTION		
MIT APPROVAL		

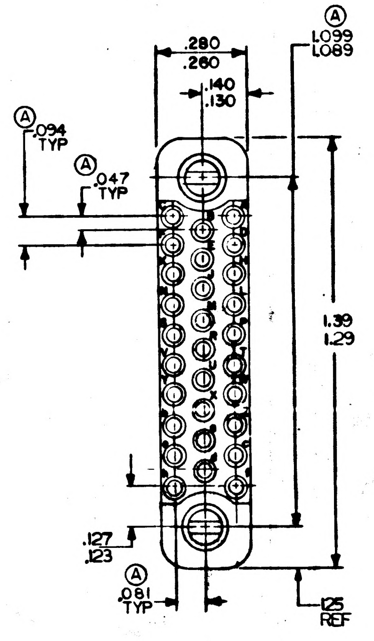
CONNECTOR, ELECTRICAL, RECEPTACLE
29 CONTACTS
SPECIFICATION CONTROL DRAWING

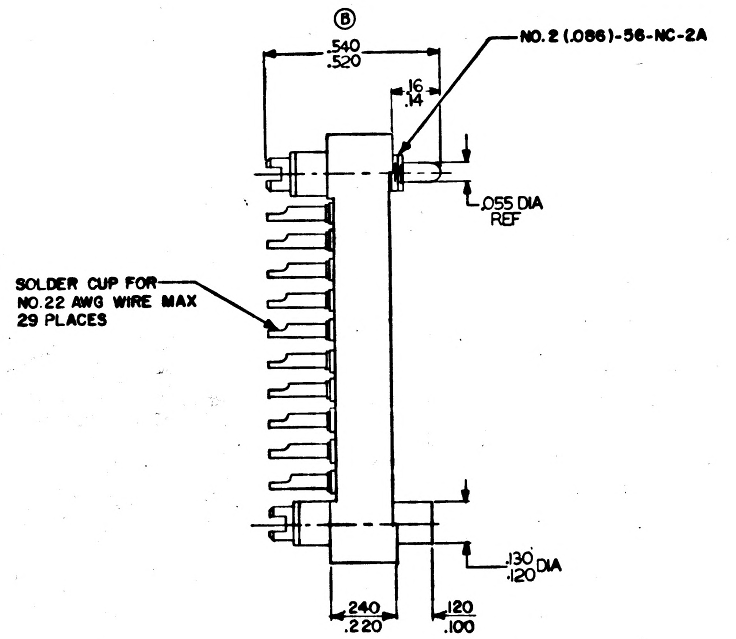
SCALE	UNIT WT.	CODE IDENT.
4/1		

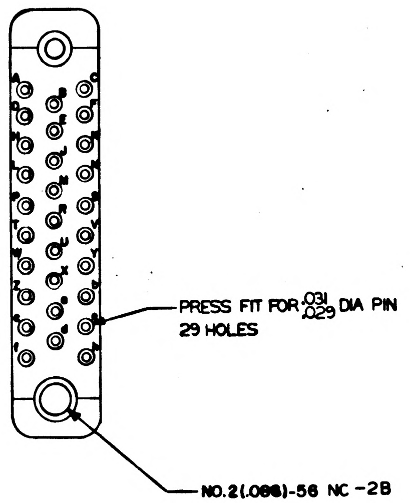
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000116
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

			REVISIONS TDRR 00077	
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03478	10-15-63	
	B	TDRR 04046	10-23-63	







REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000117
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	NEXT ASSY	USED ON
	1001508	
	1001507	DL1001500
Ⓐ	1000206	DL1000201
	1000008	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
—	±.002	—

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2A1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/2/63
CHECKED		
DRAWN	JCFUCHS	10-18-62

APPROVED FOR MSC
W J Rhine 10-3-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL,
RECEPTACLE
29 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

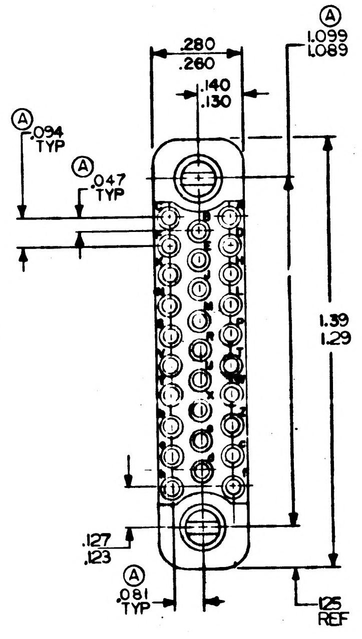
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

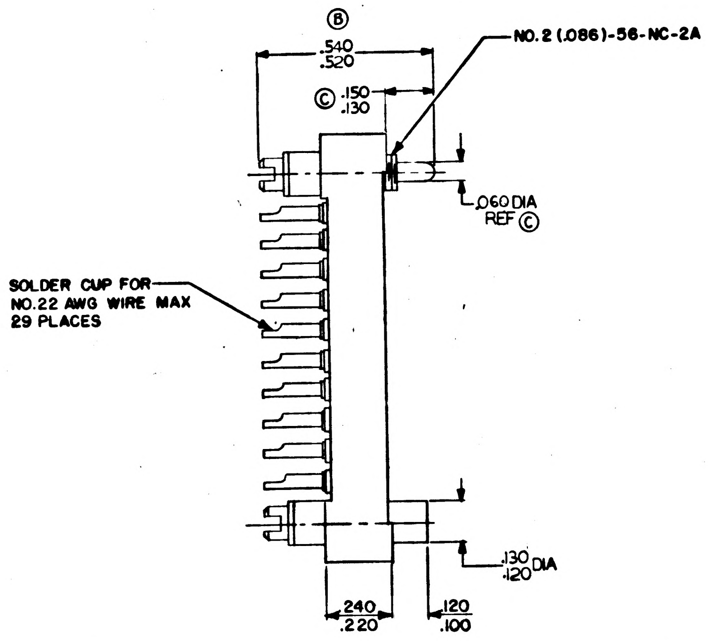
NASA DRAWING NO.
1000116

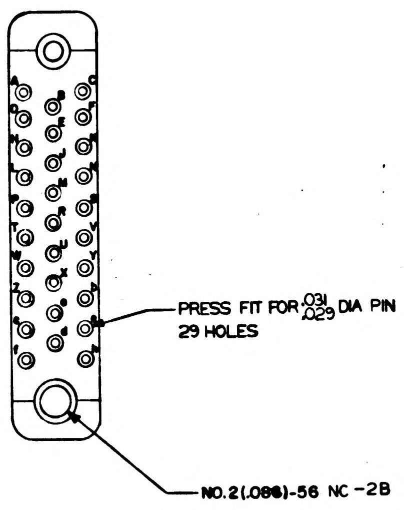
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00077				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03478	10-15-63	
	B	TDRR 04046	10-23-63	
	C	TDRR 05948	2-3-64	







REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000117
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
1001508	
1001507	DL1001500
Ⓐ 1000206	DL1000201
1000008	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED A J Boyce 10/24/62
CHECKED
DRAWN JCFUCHS 10-18-62
APPROVED FOR MSC W J Rhine 10-31-62
BY DIRECTION
MIT APPROVAL 10/31/62

CONNECTOR, ELECTRICAL, RECEPTACLE 29 CONTACTS

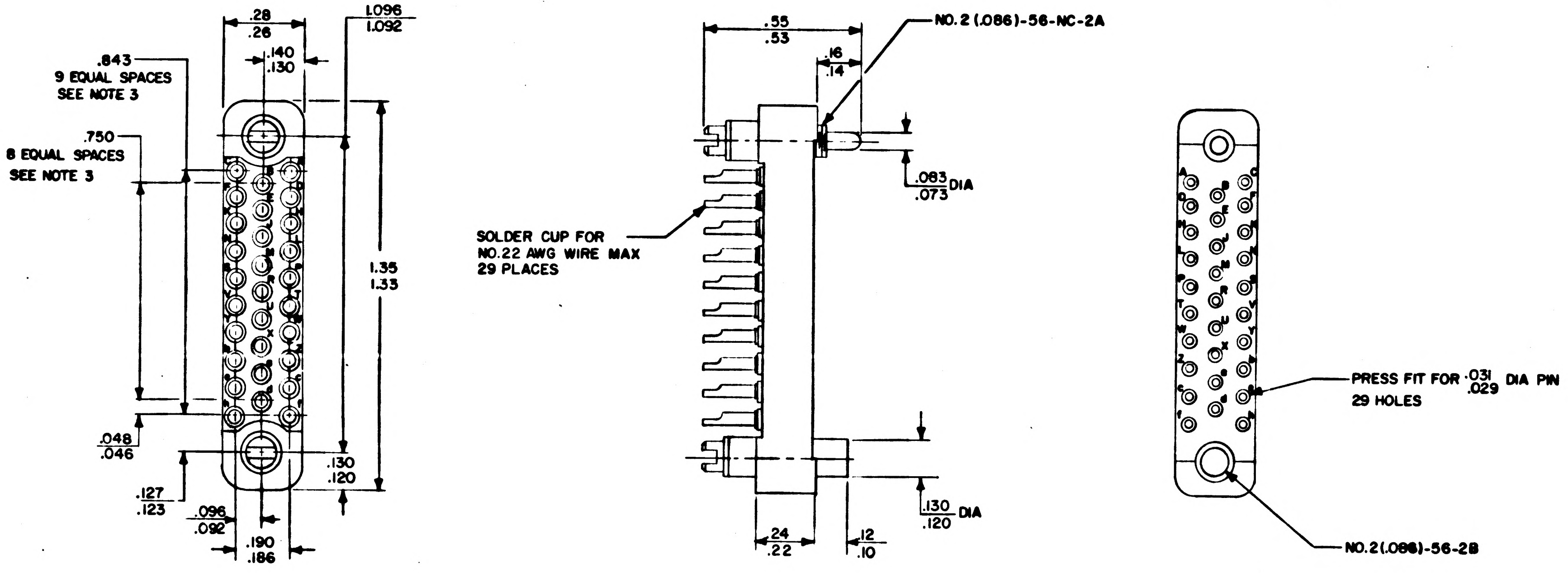
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000116
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 00077



.28
.26
1.096
1.092
.140
.130
.843
9 EQUAL SPACES
SEE NOTE 3
.750
8 EQUAL SPACES
SEE NOTE 3
1.35
1.33
.048
.046
.130
.120
.127
.123
.096
.092
.190
.186
.55
.53
.16
.14
NO. 2 (.086)-56-NC-2A
.083
.073
DIA
SOLDER CUP FOR
NO.22 AWG WIRE MAX
29 PLACES
.130
.120
DIA
.24
.22
.12
.10
PRESS FIT FOR .031 .029 DIA PIN
29 HOLES
NO.2(.086)-56-2B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE 1000117
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS ±.002
4. MATL: GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM TO MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP
45-01 NORTHERN BLVD
LONG ISLAND CITY 1, N.Y.
ITEM NO. MM29-22-SGDSL

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	E J Boyce	10/31/62
CHECKED		
DRAWN	JCFUCHS	10-18-62

APPROVED FOR MSC
W J Rhine 10-31-62
BY DIRECTION
MIT APPROVAL 10/31/62

CONNECTOR, ELECTRICAL,
RECEPTACLE
29 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO.

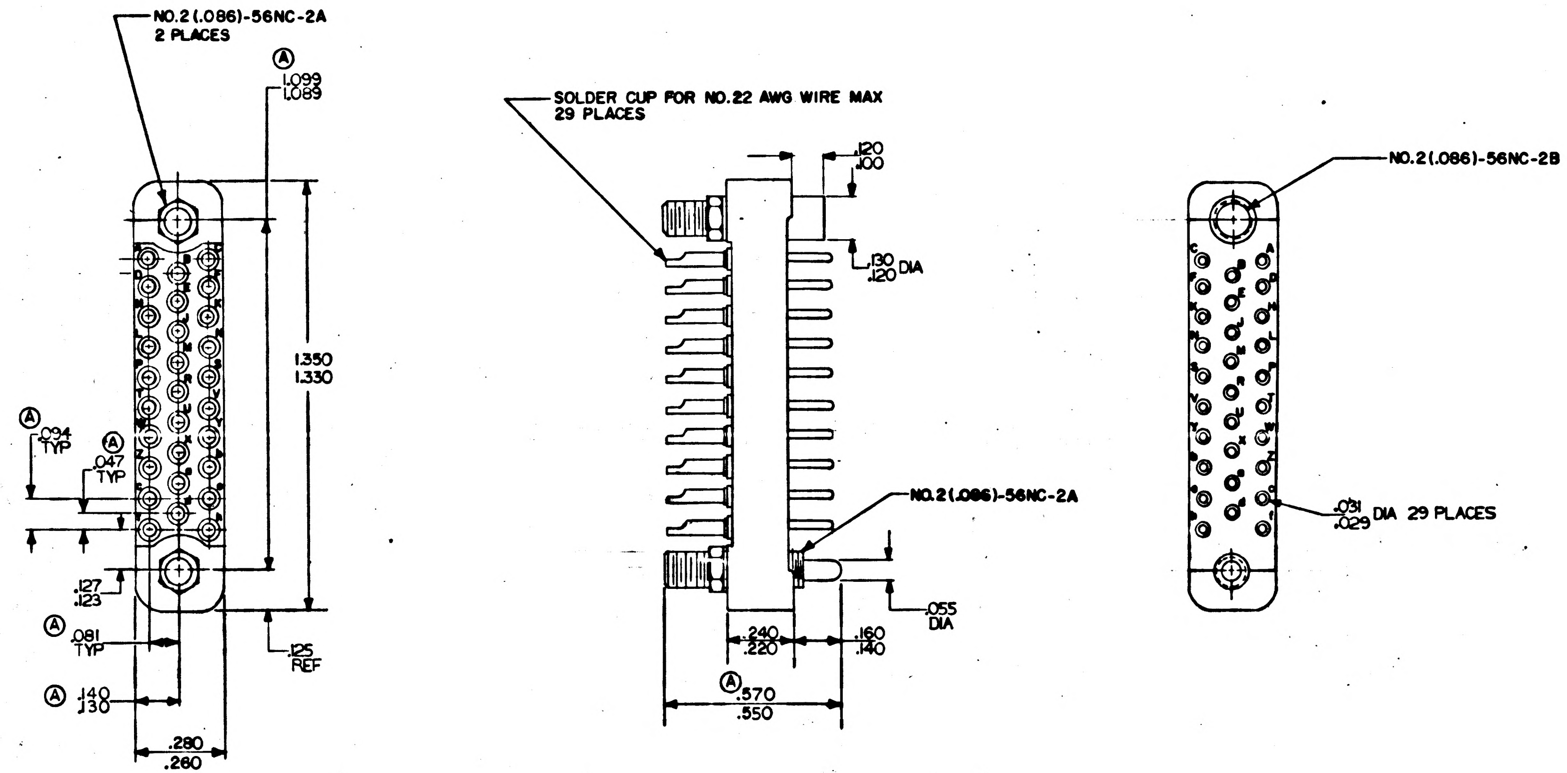
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000116

SHEET 1 OF 1

1000116

REVISIONS TDRR 00077				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A 12	TDRR 03479	10-15-63	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000117
   - B.. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND10Q2034 FOR THIS DRAWING.

3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

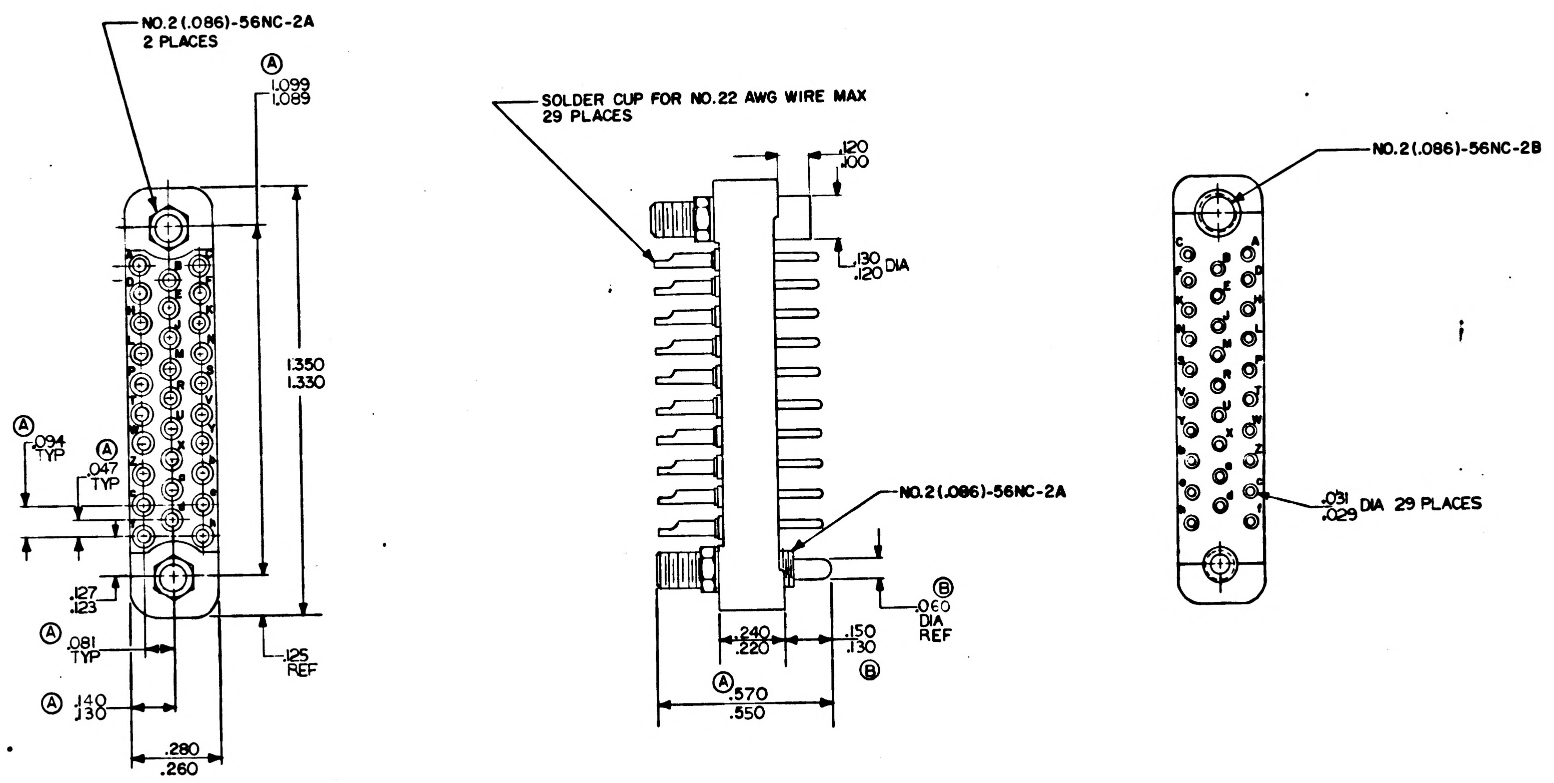
Ⓐ MULTIPLE	DL1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±002 ANGLES —	DO NOT SCALE THIS DRAWING
USAGE	DL1000001	MATERIAL: SEE NOTE 2A1	
NEXT ASSY	USED ON		
APPLICATION			

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE	CONNECTOR, ELECTRICAL, PLUG 29 CONTACTS	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
APPROVED	10/24/62		DWG. NO.
CHECKED			MANNED SPACECRAFT CENTER HOUSTON TEXAS
DRAWN JCFUCHS	10/23/62	SPECIFICATION CONTROL DRAWING	NASA DRAWING NO. 1000117
APPROVED FOR MSC 10-31-62		SCALE 4/1	UNIT WT.	CODE IDENT.
BY DIRECTION			SHEET 1 OF 1
MIT APPROVAL			

1000117 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00077		
	A 12	TDRR 03479	10-15-63	
	B	TDRR 05948	2-3-64	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000117
   - B.. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		10/31/62
CHECKED		
DRAWN	JCFUCHS	10/23/62
APPROVED FOR MSC		10-31-62
BY DIRECTION		
MIT APPROVAL		10/31/62

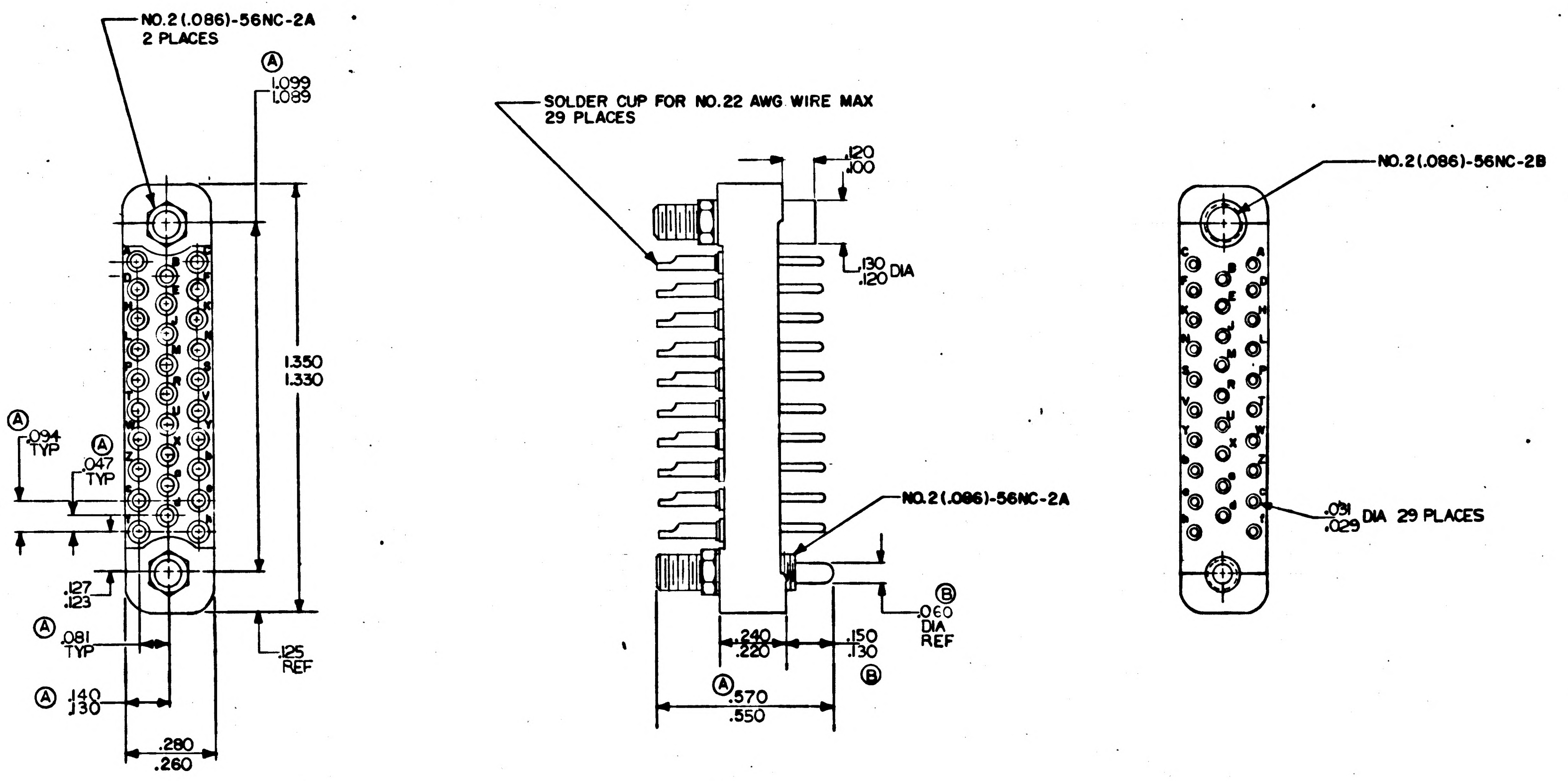
CONNECTOR, ELECTRICAL,
PLUG
29 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000117
SHEET 1 OF 1

REVISIONS TDRR 00077				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A12	TDRR 03479	10-15-63	WR
	B	TDRR 05948	2-3-64	WR
	C	TDRR 12631	9-15-64	WR
	D	TDRR 12686	9-15-64	WR



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR BRONZE, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 2 OVER COPPER FLASH
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000116
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVE
     140 VRMS AT 70,000 F
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D.1) CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - .2) CONTACT RESISTANCE; 25 MICROVOLTS MAX AT 250 MICROAMPS DC AFTER 500 INSERTIONS AND WITHDRAWALS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002
   - G. MATING TORQUE: UNIT SHALL WITHSTAND A MATING TORQUE OF 2 1/2 IN-LBS MAXIMUM WITHOUT DEGRADATION OF PERFORMANCE

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ	MULTIPLE	DL1000201
	USAGE	DL1000001
	NEXT ASSY	USED ON
	APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		
CHECKED		
DRAWN	JCFUCHS	10/23/62
APPROVED FOR MSC	10-31-62	
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL,
PLUG
29 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

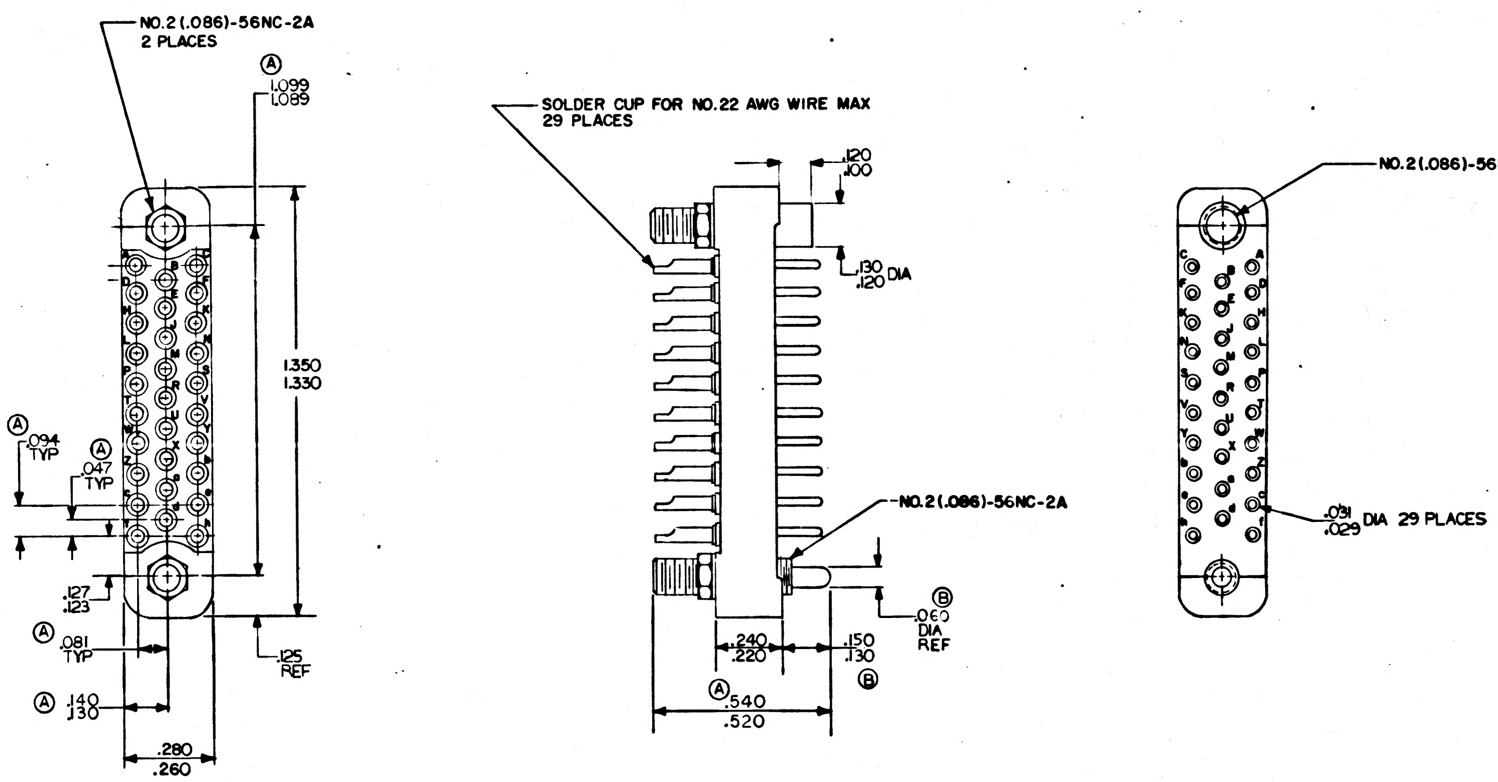
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000117
SHEET 1 OF 1

1000117

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A 12	TDRR 03479	10-15-63	
	B	TDRR 05948	2-3-64	
	C	TDRR 12631	9-15-64	
	D	TDRR 12686	9-5-64	
	E	REVISED PER TDRR 14727	12/15/64	

REVISIONS TDRR 00077



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR BRONZE, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 2 OVER COPPER FLASH
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000116
   - B.. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D.1) CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - .2) CONTACT RESISTANCE; 25 MICROVOLTS MAX AT 250 MICROAMPS DC AFTER 500 INSERTIONS AND WITHDRAWALS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002
   - G. MATING TORQUE: UNIT SHALL WITHSTAND A MATING TORQUE OF 2 1/2 IN-LBS MAXIMUM WITHOUT DEGRADATION OF PERFORMANCE

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED [illegible] DATE 10/[illegible]/62
CHECKED
DRAWN JCFUCHS 10/23/62
APPROVED FOR MSC 10-31-62
BY DIRECTION
MIT APPROVAL [illegible] 3/31/64

CONNECTOR, ELECTRICAL, PLUG
29 CONTACTS

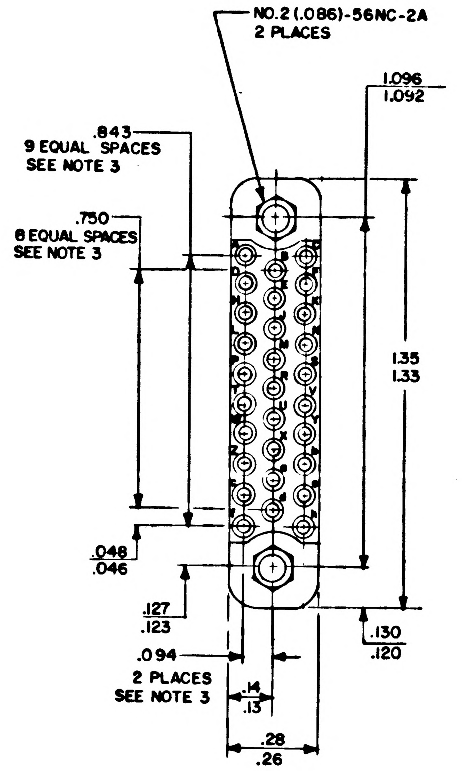
SPECIFICATION CONTROL DRAWING

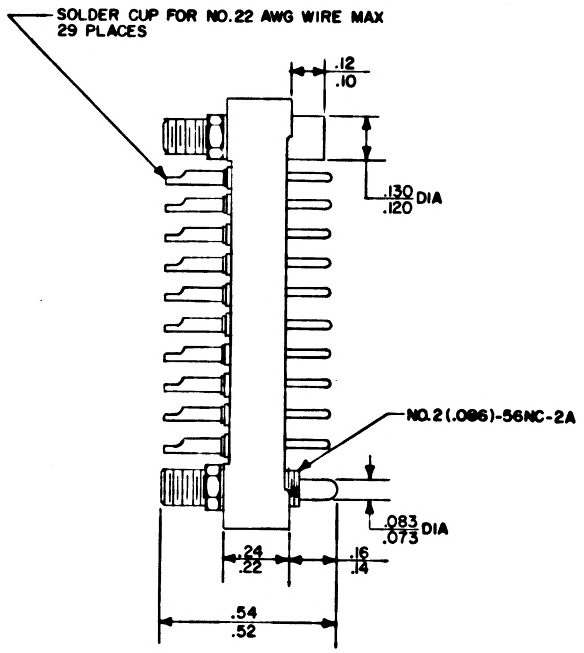
SCALE 4/1
UNIT WT.
CODE IDENT.

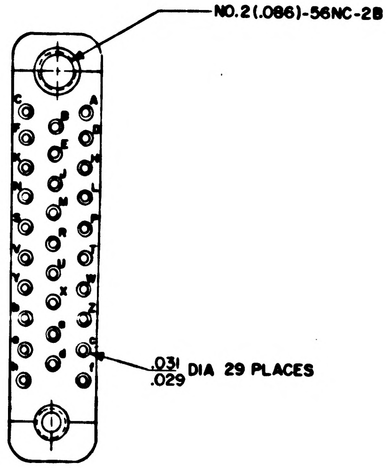
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000117
SHEET 1 OF 1

REVISIONS TDRR 00077

ZONE	SYM	DESCRIPTION	DATE	APPROVAL


NO.2 (.086)-56NC-2A
2 PLACES
1.096
1.092
.843
9 EQUAL SPACES
SEE NOTE 3
.750
8 EQUAL SPACES
SEE NOTE 3
1.35
1.33
.048
.046
.127
.123
.130
.120
.094
2 PLACES
SEE NOTE 3
.14
.13
.28
.26


SOLDER CUP FOR NO.22 AWG WIRE MAX
29 PLACES
.12
.10
.130
.120 DIA
NO.2 (.086)-56NC-2A
.083
.073 DIA
.24
.22
.16
.14
.54
.52


NO.2 (.086)-56NC-2B
.031
.029 DIA 29 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000116
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS ±.002
4. GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY

CONTINENTAL CONNECTOR CORP.
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY 1, NEW YORK

ITEM NO. MM 29-22PGDS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	R J Boyce	10/31/62
CHECKED		
DRAWN	JCFUCHS	10/23/62
APPROVED FOR MSC	W J Rhine 10-31-62	
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL,
PLUG
29 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000117

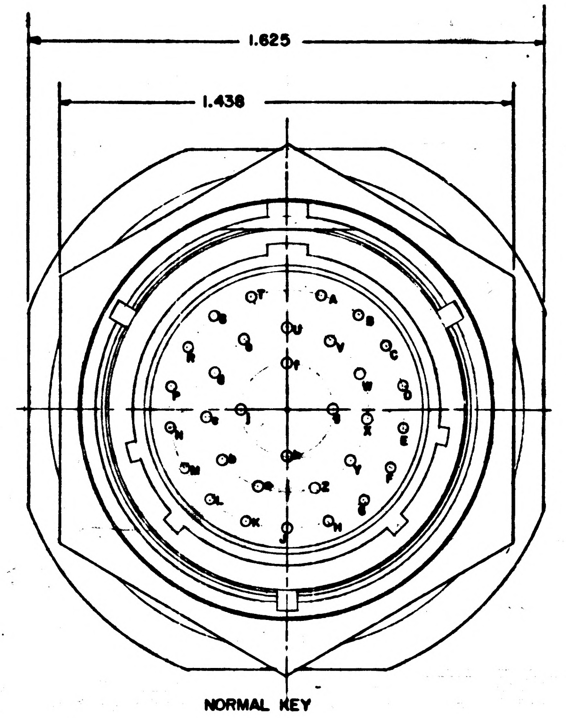
SHEET 1 OF 1

1000117

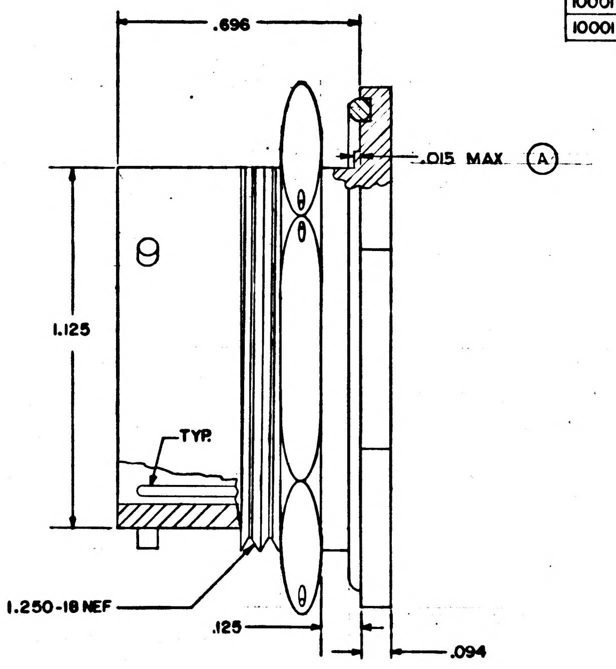
DASH NO.	BENDIX PART NO.
1000118-1	PT07H-18-32P
1000118-2	PT07H-18-32PX
1000118-3	PT07H-18-32PY
1000118-4	PT07H-18-32PZ

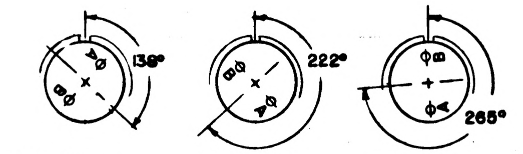
REVISIONS TDRR 00077

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01977	9 Jun 63	AJB WK



NORMAL KEY





POSITION X POSITION Y POSITION Z

ALTERNATE KEYING

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR LATER
3. SAME AS MS3114 WITH EXCEPTION OF BEING HERMETICALLY SEALED
4. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIRMENTS OF MIL-C-8384
5. IDENTIFY USING DWG NO., APPLICABLE DASH NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
6. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

Ⓐ PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓐ 1000205	
1000006	DL1000201
1000007	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	10/31/62
CHECKED		
DRAWN	JCFUCHS	10/29/62
APPROVED FOR MSC	W J Pollins	10-31-62
BY DIRECTION		
MIT APPROVAL		10/31/62

CONNECTOR, ELECTRICAL, HERMETIC JAM NUT, RECEPTACLE
32 PINS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
	4/1	

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000118

SHEET 1 OF 1

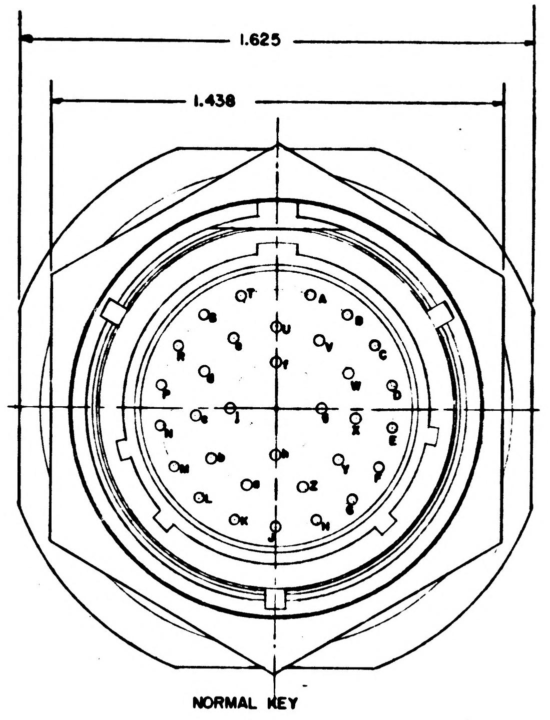
1000118 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

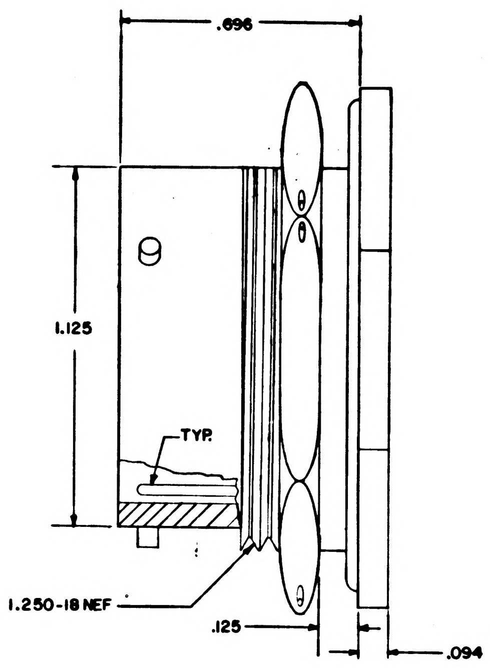
DASH NO.	BENDIX PART NO.
1000118-1	PT07H-18-32P
1000118-2	PT07H-18-32PX
1000118-3	PT07H-18-32PY
1000118-4	PT07H-18-32PZ

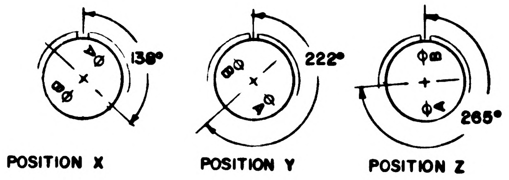
REVISIONS TDRR 00077

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NORMAL KEY





POSITION X

POSITION Y

POSITION Z

ALTERNATE KEYING

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR LATER
3. SAME AS MS3114 WITH EXCEPTION OF BEING HERMETICALLY SEALED
4. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIRMENTS OF MIL-C-8384
5. IDENTIFY USING DWG NO., APPLICABLE DASH NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
6. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
SCINTILLA DIVISION
THE BENDIX CORPORATION
SIDNEY, NEW YORK

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000006	
1000007	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		
CHECKED		
DRAWN	JCFUCHS	10/29/62

APPROVED FOR MSC 10-31-62
BY DIRECTION
MIT APPROVAL 10/31/62

CONNECTOR, ELECTRICAL,
HERMETIC JAM NUT,
RECEPTACLE
32 PINS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO.

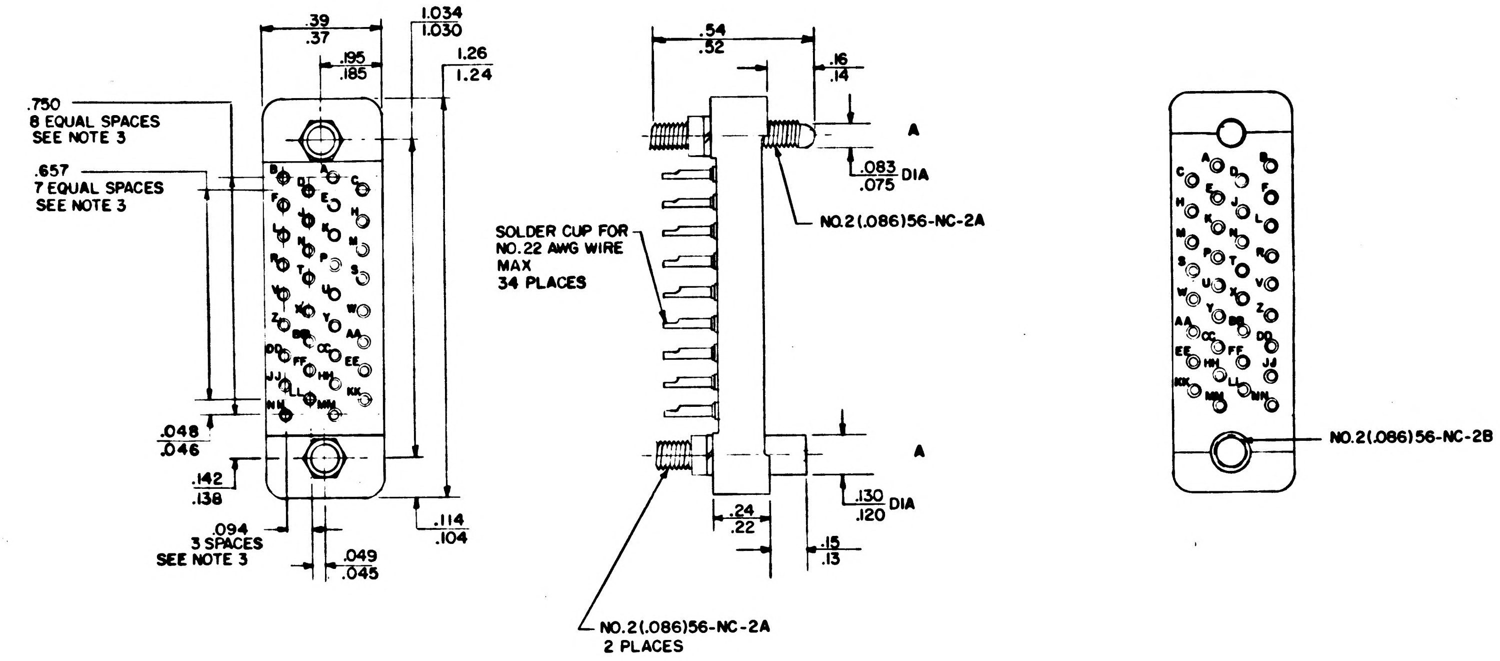
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000118

SHEET 1 OF 1

1000118

REVISIONS TDRR 00086				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00233	1-3-63	



.39
.37
1.034
1.030
.195
.185
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
.657
7 EQUAL SPACES
SEE NOTE 3
.048
.046
.142
.138
.094
3 SPACES
SEE NOTE 3
.049
.045
.114
.104
.54
.52
.16
.14
A
.083
.075 DIA
NO.2(.086)56-NC-2A
SOLDER CUP FOR
NO.22 AWG WIRE
MAX
34 PLACES
A
.130
.120 DIA
.24
.22
.15
.13
NO.2(.086)56-NC-2A
2 PLACES
NO.2(.086)56-NC-2B

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000120
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS .002
4. MAT'L GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG. NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
ITEM MM34-22SGDSL

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ 1000207	
1000010	DL1000201
1000011	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SFE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED AJ Boyce 11/8/62
CHECKED
DRAWN JCFUCHS 11-5-62
APPROVED FOR MSC
WJ Rhine 11-8-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL,
RECEPTACLE,
34 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000119
SHEET 1 OF 1

1000119

REVISIONS TDRR 00086				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
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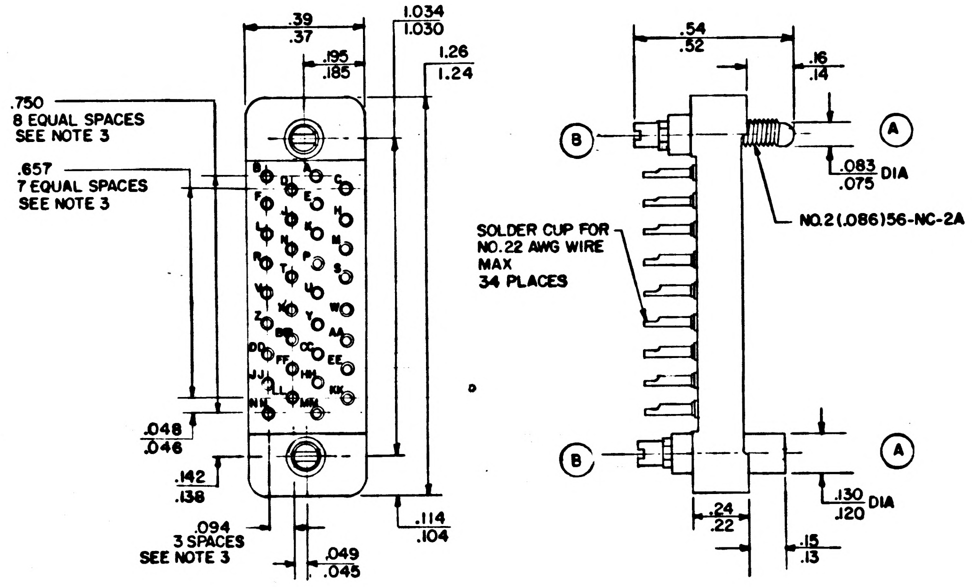
	B	TDRR 00360	7-2-63	



.39
.37
.195
.185
1.034
1.030
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
.657
7 EQUAL SPACES
SEE NOTE 3
.048
.046
.142
.138
.094
3 SPACES
SEE NOTE 3
.049
.045
.114
.104
A
B
C
D
E
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H
J
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M
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Y
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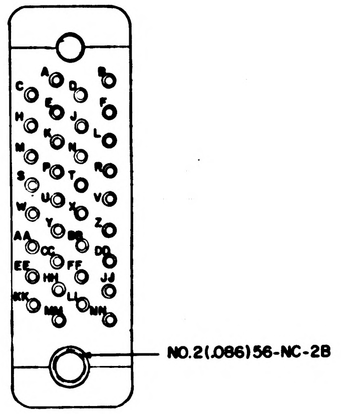
AA
BB
CC
DD
EE
FF
HH
JJ
KK
LL
MM
NN
.54
.52
.16
.14
B
A
.083
.075 DIA
NO.2 (.086) 56-NC-2A
SOLDER CUP FOR
NO.22 AWG WIRE
MAX
34 PLACES
.130
.120 DIA
.24
.22
.15
.13



NO.2 (.086) 56-NC-2B

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000120
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS .002
4. MAT'L GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG. NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
(B) ITEM MM34-22 SGDSL

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

(A)	1000207	
	1000010	DL1000201
	1000011	DL1000001
	NEXT ASSY	USED ON
	APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	11/8/62
CHECKED		
DRAWN	JCFUCHS	11-5-62
APPROVED FOR MSC	WJ Rhine	11-8-62
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL,
RECEPTACLE,
34 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

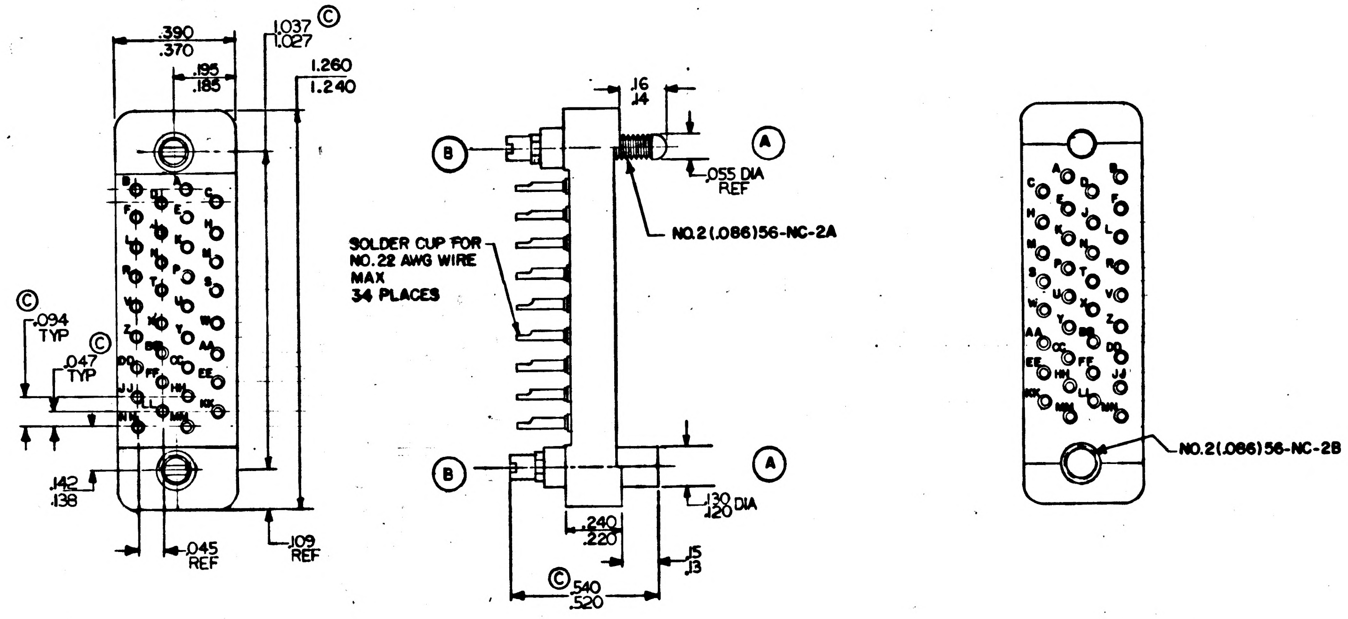
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000119

SHEET 1 OF 1

1000119

		REVISIONS TDRR 00086			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 00233	1-3-63		WK
Ⓜ	B	TDRR 00360	7-2-63		WK
	C	TDRR 03480	10-15-63		WK



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE ~~REQUIREMENTS~~ OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYLPHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTGR, NASA PART NO.1000120
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
Ⓐ 1000207	DL1001500
1000010	DL1000201
1000011	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	11/ /62
CHECKED		
DRAWN	JCFUCHS	11-5-62
APPROVED FOR MSC	WJ Rhine 11-8-62	
BY DIRECTION		
MIT APPROVAL	W Kupfer	6/ /64

CONNECTOR, ELECTRICAL, RECEPTACLE, 34 CONTACTS

SPECIFICATION CONTROL DRAWING

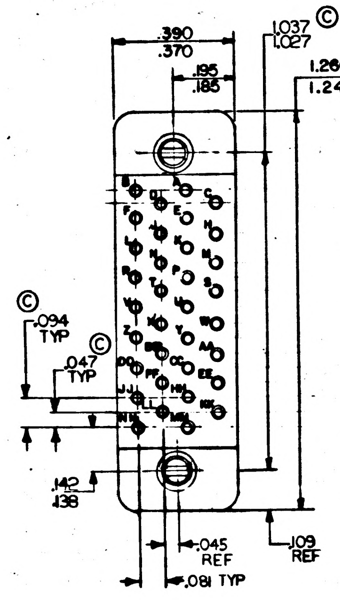
SCALE	UNIT WT.	CODE IDENT.
4/1		

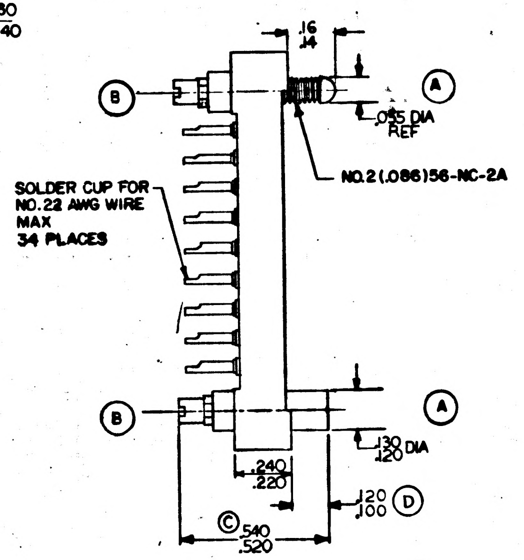
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000119
SHEET 1 OF 1

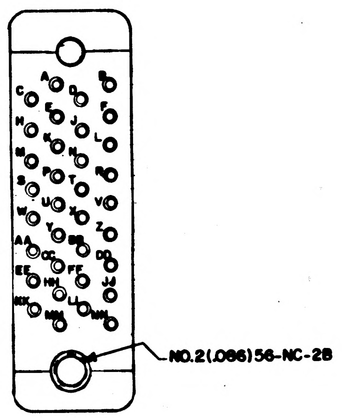
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00086

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00233	1-3-63		WK
	B	TDRR 00360	7-2-63		WK
	C	TDRR 03480	10-15-63		WK
	D	TDRR 04047	10-23-63		WK







REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING

2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYLPHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000120
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ 1000207	DL1001500
1000010	DL1000201
1000011	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED 11/4/63
CHECKED
DRAWN JCFUCHS 11-5-62
APPROVED FOR MSC W J Rhine 11-8-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL, RECEPTACLE, 34 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

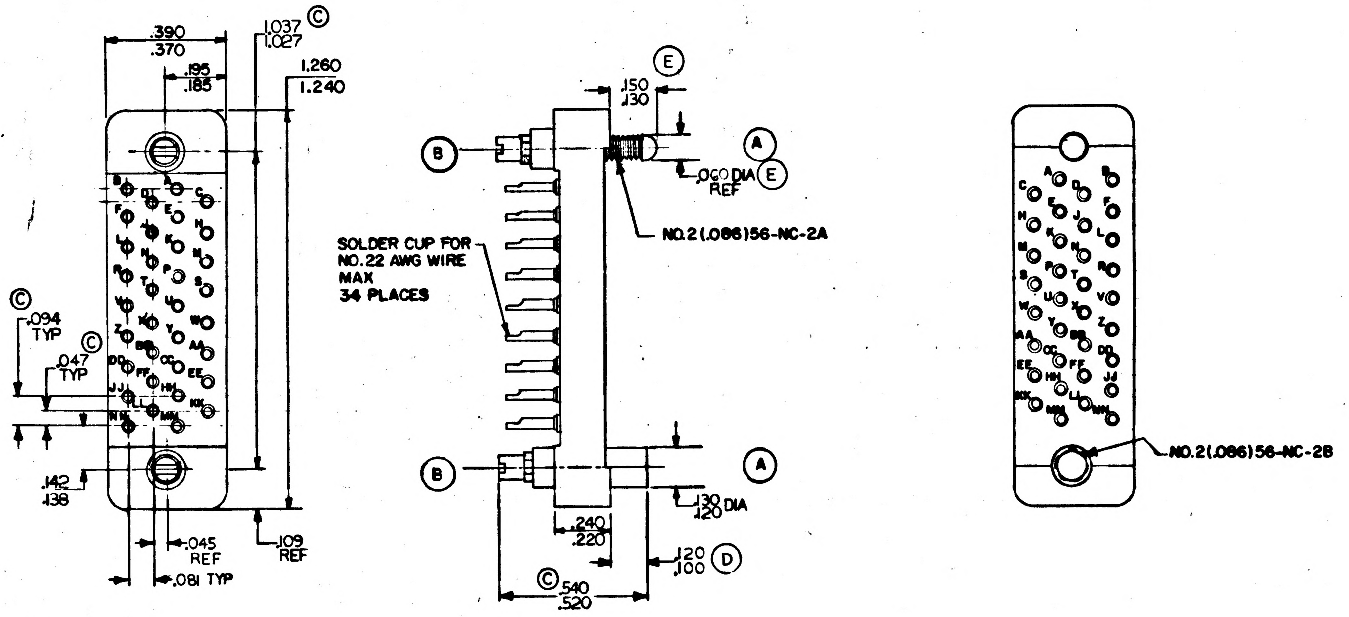
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000119
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000119

REVISIONS TDRR 00086

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00233	1-3-63		WK
	B	TDRR 00360	7-2-63		WK
	C	TDRR 03480	10-15-63		WK
	D	TDRR 04047	10-23-63		WK
	E	TDRR 05948	2-3-64		WK



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYLPHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000120
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	DL1001500
1000010	DL1000201
1000011	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A.J. Boyce DATE 11/8/62
CHECKED
DRAWN JCFUCHS 11-5-62
APPROVED FOR MSC W.J. Rhine 11-8-62
BY DIRECTION
MIT APPROVAL W.K.

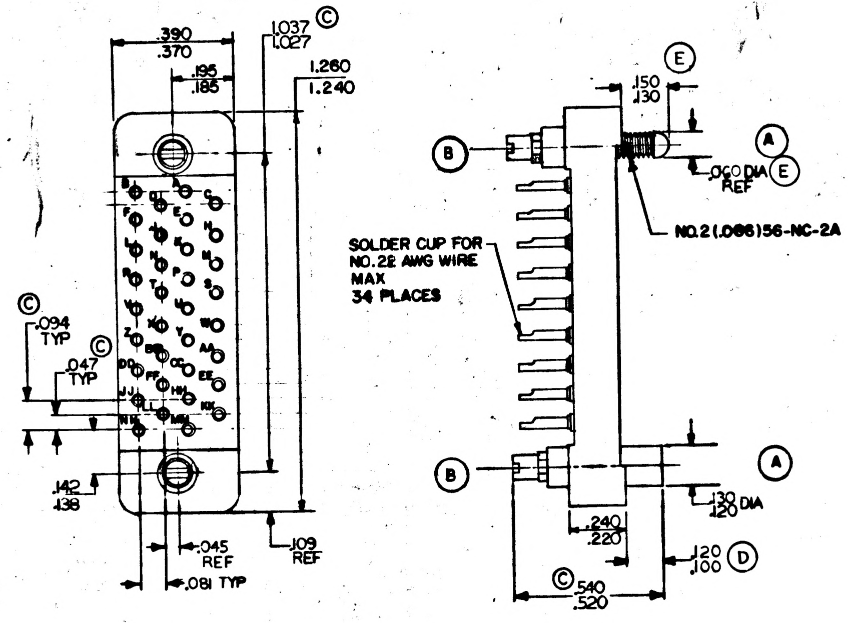
CONNECTOR, ELECTRICAL, RECEPTACLE, 34 CONTACTS

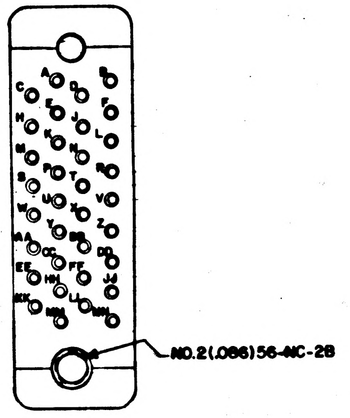
SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000119
SHEET 1 OF 1

				REVISIONS TDRR 00086	
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00233	1-3-63		WK
	B	TDRR 00360	7-2-63		WK
	C	TDRR 03480	10-15-63		WK
	D	TDRR 04047	10-23-63		WK
	E	TDRR 05948	2-3-64		WK
	F	TDRR 12520	9-14-64		





REQUIREMENTS:

1. GENERAL

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2

C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING

D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.

E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING

2. INSPECTION & ACCEPTANCE

A. MECHANICAL REQUIREMENTS:

1) MATERIAL: CONTACTS; PHOSPHOR, BRONZE, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 2 OVER COPPER FLASH
SCREWS; STAINLESS STEEL, PASSIVATED
BODY; GLASS FILLED DIALLYLPHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)

2) DIMENSIONS: AS SHOWN ON DRAWING

3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000120

B. ELECTRICAL REQUIREMENTS:

1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC

2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

3. DESIGN REQUIREMENTS:

A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT

B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT

C. CONTACT RATINGS; 3 AMPS

D.1) CONTACT RESISTANCE; 20 MV AT 3 AMPS

2) CONTACT RESISTANCE; 25 MICROVOLTS MAX AT 250 MICROAMPS DC AFTER 500 INSERTIONS AND WITHDRAWALS

E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR

F. CONTACT CENTER TO CENTER; 3/32 ± .002

G. MATING TORQUE; UNIT SHALL WITHSTAND A MATING TORQUE OF 2 1/2 IN-LBS MAXIMUM WITHOUT DEGRADATION OF PERFORMANCE

F. CONTACT CENTER TO CENTER [illegible] 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ	1000207	DL1001500	
	1000010	DL1000201	
	1000011	DL1000001	
	NEXT ASSY	USED ON	
	APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		11/62
CHECKED		
DRAWN	JCFUCHS	1-0-62
APPROVED FOR MSC		11-62
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL, RECEPTACLE, 34 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000119
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00086

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00233	1-3-63		WK
	B	TDRR 00360	7-2-63		WK
	C	TDRR 03480	10-15-63		WK
	D	TDRR 04047	10-23-63		WK
	E	TDRR 05948	2-3-64		WK
	F	TDRR 12520	9-14-64		WK
	G	TDRR 13160	6 OCT 64		WK

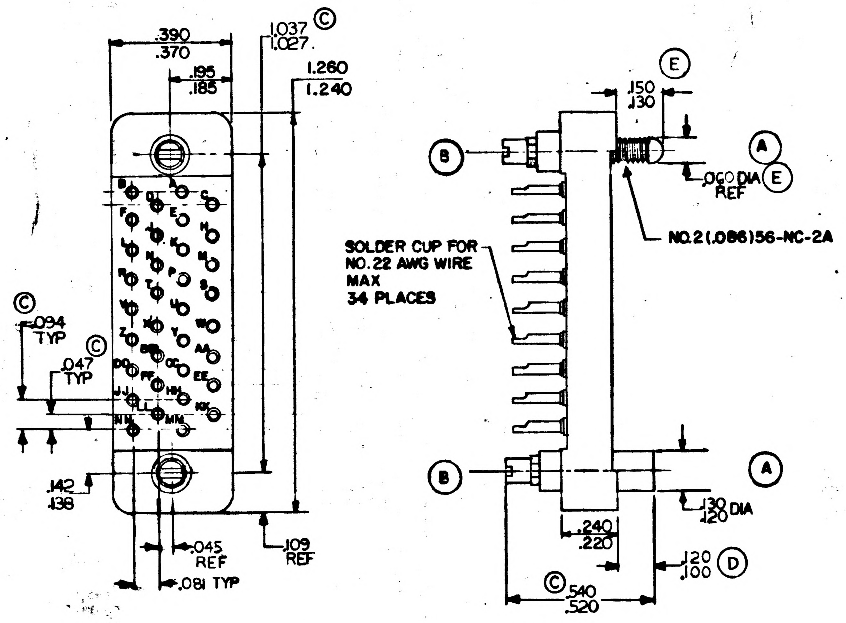


FIGURE 1

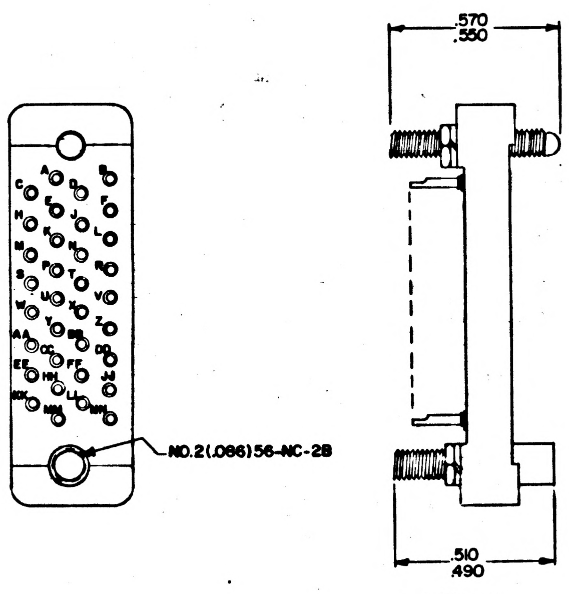


FIGURE 2

REQUIREMENTS:

1. GENERAL

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2

C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING

D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.

E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING

2. INSPECTION & ACCEPTANCE

A. MECHANICAL REQUIREMENTS:

1) MATERIAL: CONTACTS; PHOSPHOR, BRONZE, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 2 OVER COPPER FLASH

SCREWS; STAINLESS STEEL, PASSIVATED

BODY; GLASS FILLED DIALLYLPHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)

2) DIMENSIONS: AS SHOWN ON DRAWING

3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000120

B. ELECTRICAL REQUIREMENTS:

1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC

2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

3. DESIGN REQUIREMENTS:

A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT

B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT

C. CONTACT RATINGS; 3 AMPS

D.1) CONTACT RESISTANCE; 20 MV AT 3 AMPS

2) CONTACT RESISTANCE; 25 MICROVOLTS MAX AT 250 MICROAMPS DC AFTER 500 INSERTIONS AND WITHDRAWALS

E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR

F. CONTACT CENTER TO CENTER; 3/32 ± .002

G. MATING TORQUE; UNIT SHALL WITHSTAND A MATING TORQUE OF 2 1/2 IN-LBS MAXIMUM WITHOUT DEGRADATION OF PERFORMANCE

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

NASA PART NO.	MOUNTING CONFIG
1000119-000	FIGURE 1
1000119-001	FIGURE 2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓐ 1000207	DL1001500
1000010	DL1000201
1000011	DL1000001

APPLICATION

INCHES
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
—	±.002	—

DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		11/ /62
CHECKED		
DRAWN	JCFUCHS	11-5-62
APPROVED FOR MSC	11-8-62	
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL,
RECEPTACLE,
34 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000119

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00086			
	A	TDRR 00233	1-3-63		WK
	B	TDRR 00360	7-2-63		WK
	C	TDRR 03480	10-15-63		WK
	D	TDRR 04047	10-23-63		WK
	E	TDRR 05948	2-3-64		WK
	F	TDRR 12520	9-14-64		
	G	TDRR 13160			WK
	H	REVISED PER TDRR 17197	18 Mar 65		WK

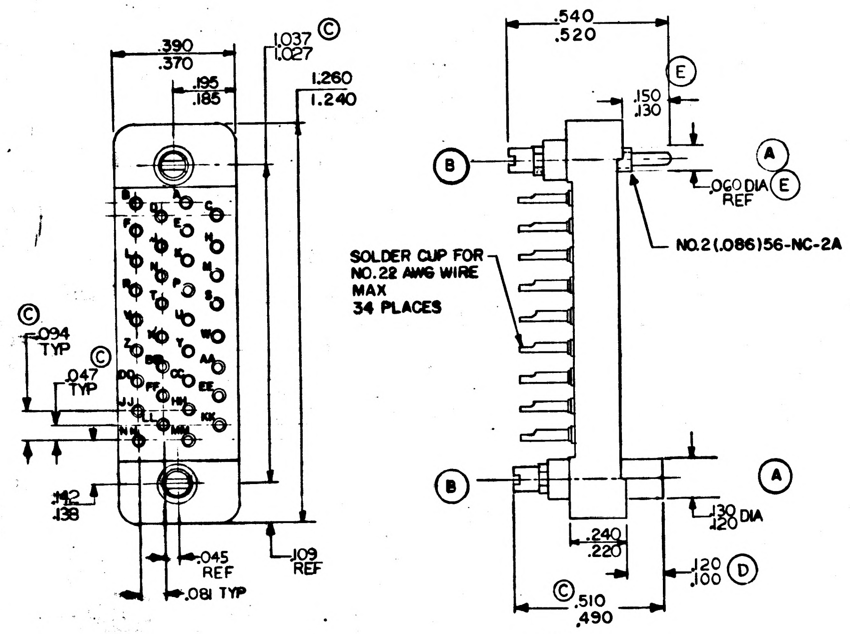


FIGURE 1

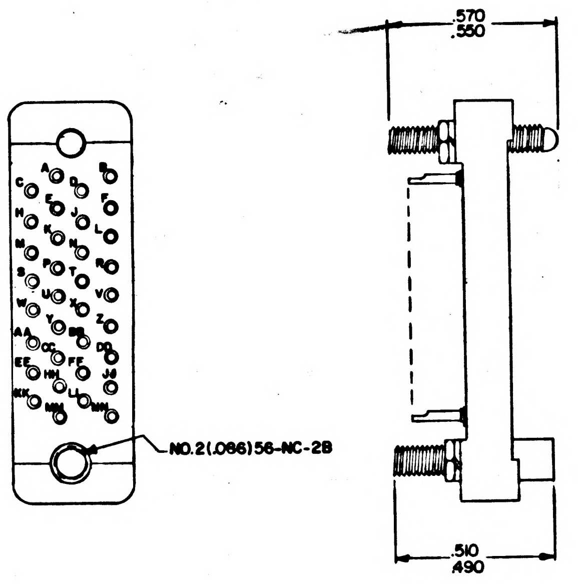


FIGURE 2

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER ND 1002019.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
   - F. PACKAGING TO BE IN ACCORDANCE WITH ND1002215 CLASS I
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR BRONZE, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 2 OVER COPPER FLASH
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYLPHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000120
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D.1) CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - 2) CONTACT RESISTANCE; 25 MICROVOLTS MAX AT 250 MICROAMPS DC AFTER 500 INSERTIONS AND WITHDRAWALS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002
   - G. MATING TORQUE; UNIT SHALL WITHSTAND A MATING TORQUE OF 2 1/2 IN-LBS MAXIMUM WITHOUT DEGRADATION OF PERFORMANCE
   - H LOCKWASHER: CRES PER QQ-S-763, COMP 302,303 OR 304
   - I NUT: CRES, PER QQ-S-763, COMP 302,303,OR 304

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

NASA PART NO.	MOUNTING CONFIG
1000119-000	FIGURE I
1000119-001	FIGURE 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
Ⓐ 1000207	DL1001500
1000010	DL1000201
1000011	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2AI

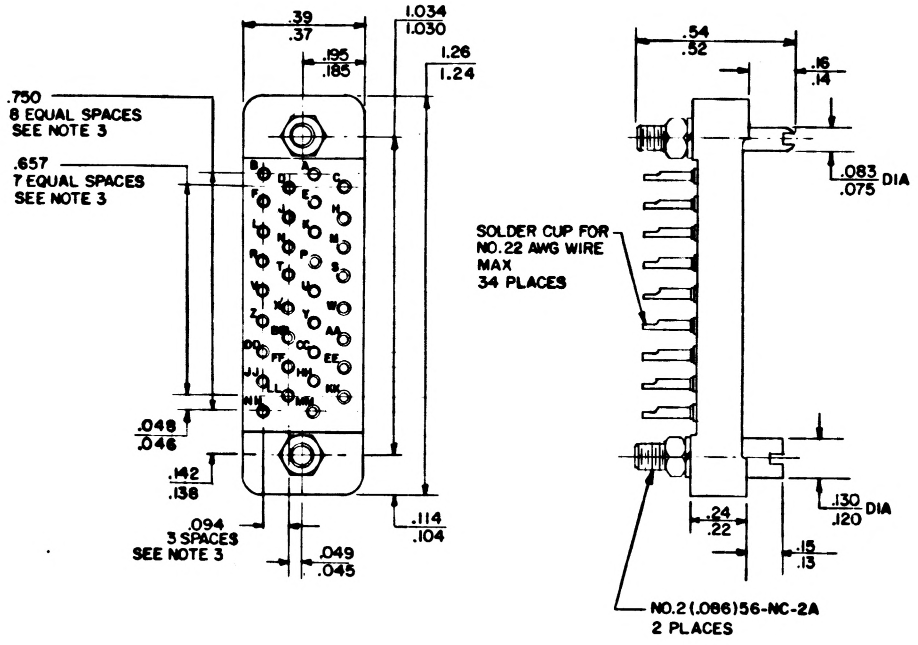
MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED A.J. Boyce DATE 11/8/62
CHECKED
DRAWN JCFUCHS 11-5-62
APPROVED FOR MSC W.J. Rhine 11-8-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL, RECEPTACLE, 34 CONTACTS
SPECIFICATION CONTROL DRAWING

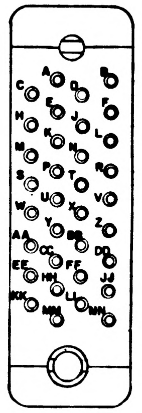
SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000119
SHEET 1 OF 1

REVISIONS TDRR 00086				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



.39
.37
1.034
1.030
.195
.185
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
.657
7 EQUAL SPACES
SEE NOTE 3
.048
.046
.142
.138
.094
3 SPACES
SEE NOTE 3
.049
.045
.114
.104
.54
.52
.16
.14
.083
.075 DIA
SOLDER CUP FOR
NO.22 AWG WIRE
MAX
34 PLACES
.130
.120 DIA
.24
.22
.15
.13
NO.2 (.086) 56-NC-2A
2 PLACES



A
B
C
D
E
F
H
J
K
L
M
N
P
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S
T
U
V
W
X
Y
Z
AA
BB
CC
DD
EE
FF
HH
JJ
KK
LL
MM
NN

NOTES

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000120
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS .002
4. MAT'L GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG. NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
ITEM MM34-22 SGD

1000119

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
1000010		DO NOT SCALE THIS DRAWING
1000011	DL100001	MATERIAL: SEE NOTE 4
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE
APPROVED AJ Boyce	11/8/62
CHECKED	
DRAWN JCFUCHS	11-5-62
APPROVED FOR MSC W.J. Rhine 11-8-62	
BY DIRECTION	
MIT APPROVAL W.K. [illegible]	

CONNECTOR, ELECTRICAL,
RECEPTACLE,
34 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

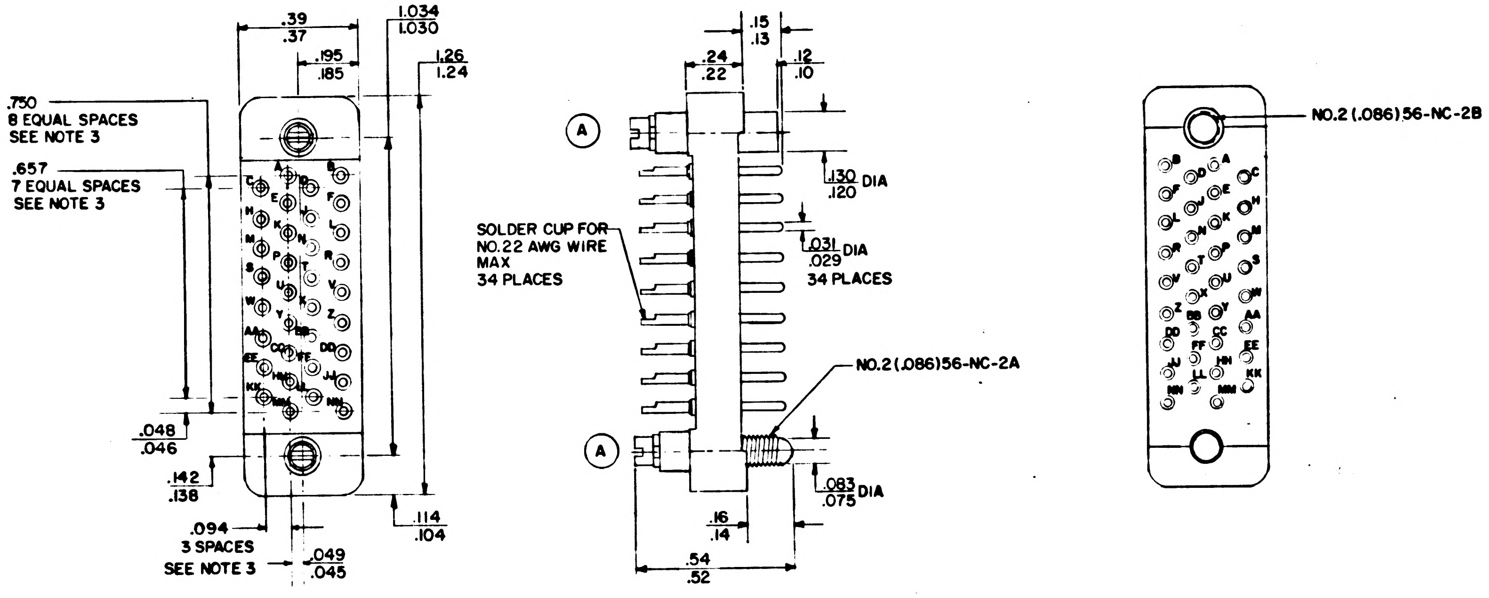
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000119

SHEET 1 OF 1

REVISIONS TDRR 00086				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00234	1-3-63	



.39
.37
.195
.185
1.034
1.030
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
.657
7 EQUAL SPACES
SEE NOTE 3
.048
.046
.142
.138
.094
3 SPACES
SEE NOTE 3
.049
.045
.114
.104
.15
.13
.24
.22
.12
.10
A
.130
.120
DIA
SOLDER CUP FOR NO.22 AWG WIRE MAX 34 PLACES
.031
.029
DIA
34 PLACES
NO.2 (.086) 56-NC-2A
.083
.075
DIA
.16
.14
.54
.52
NO.2 (.086) 56-NC-2B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000119
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS ± .002
4. MAT'L GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP.
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
ITEM MM34-22PGDSL

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
	DL1000201	DO NOT SCALE THIS DRAWING
1000137	DL1000001	MATERIAL: SEE NOTE 4
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE	
APPROVED	11/8/62	
CHECKED		
DRAWN JC FUCHS	11-1-62	
APPROVED FOR MSC W J Ahern 11-8-62 BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL.
PLUG,
34 PINS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000120

SHEET 1 OF 1

1000120

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00086		
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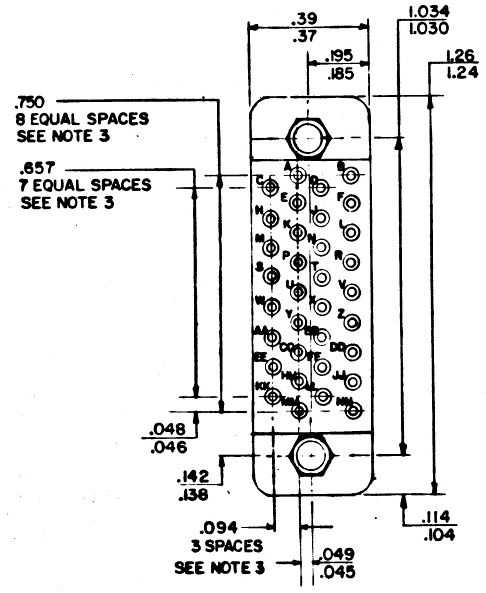
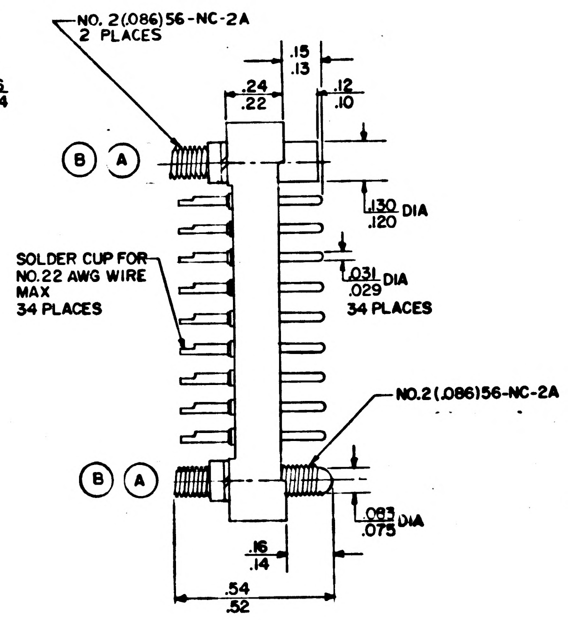
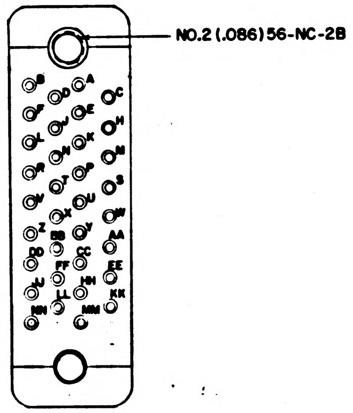
	B	TDRR 00361	2-7-63	



.39 / .37
.195 / .185
1.034 / 1.030
1.26 / 1.24
.750 8 EQUAL SPACES SEE NOTE 3
.657 7 EQUAL SPACES SEE NOTE 3
.048 / .046
.142 / .138
.094 3 SPACES SEE NOTE 3
.049 / .045
.114 / .104
A B C D E F H J K L M N P R S T U V W X Y Z AA BB CC DD EE FF HH JJ KK LL MM NN



NO. 2(.086)56-NC-2A 2 PLACES
.15 / .13
.24 / .22
.12 / .10
B A
.130 / .120 DIA
SOLDER CUP FOR NO.22 AWG WIRE MAX 34 PLACES
.031 / .029 DIA 34 PLACES
NO.2(.086)56-NC-2A
B A
.083 / .075 DIA
.16 / .14
.54 / .52



NO.2(.086)56-NC-2B
A B C D E F H J K L M N P R S T U V W X Y Z AA BB CC DD EE FF HH JJ KK LL MM NN

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000119
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS ± .002
4. MAT'L GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP.
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
(B) ITEM MM34-22PGDS

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

(A)

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	JC FUCHS	11-1-62

APPROVED FOR MSC
W J Atkins 11-8-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL.
PLUG,
34 PINS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

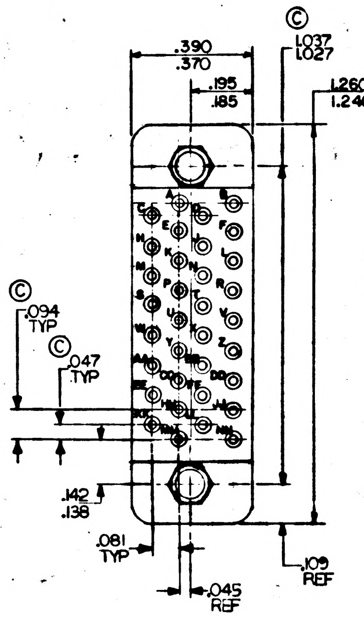
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000120

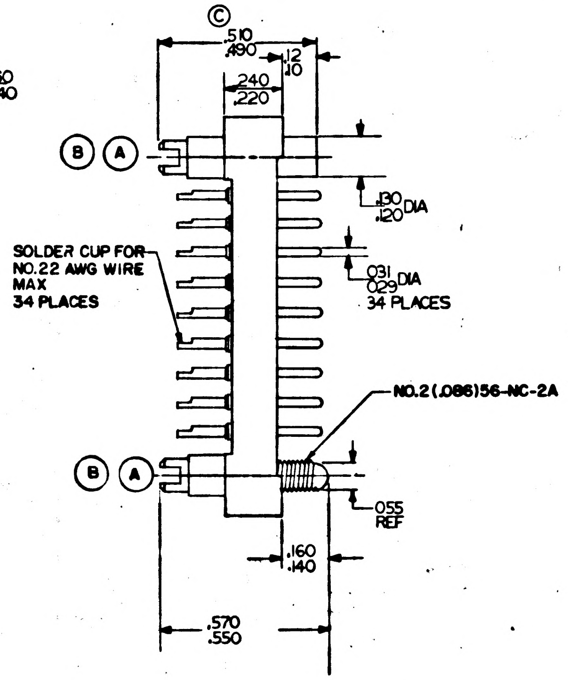
SHEET 1 OF 1

1000120

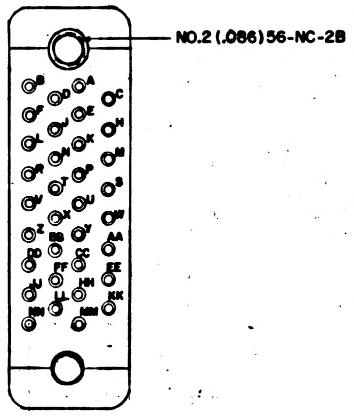
		REVISIONS TDRR 00086		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ	A	TDRR 00234	1-3-63	
Ⓜ	B	TDRR 00361	2-7-63	
	C10	TDRR 03481	10-15-63	



Ⓒ
.390
.370
.195
.185
Ⓒ
1.037
1.027
1.260
1.240
A B C D E F H J K L M N P R S T U V W X Y Z AA BB CC DD EE FF HH JJ KK LL MM NN
Ⓒ
.094
TYP
Ⓒ
.047
TYP
.142
.138
.081
TYP
.045
REF
.109
REF



Ⓒ
.510
.490
.12
.10
.240
.220
Ⓑ Ⓐ
.130
.120 DIA
SOLDER CUP FOR
NO.22 AWG WIRE
MAX
34 PLACES
.031
.029 DIA
34 PLACES
NO.2(.086)56-NC-2A
Ⓑ Ⓐ
.055
REF
.160
.140
.570
.550



NO.2(.086)56-NC-2B
A B C D E F H J K L M N P R S T U V W X Y Z AA BB CC DD EE FF HH JJ KK LL MM NN

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000119
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	LIST OF PARTS AND MATERIALS				

Ⓐ

NEXT ASSY	USED ON
	DL1001500
1001554	DL1000201
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2A1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		11/8/62
CHECKED		
DRAWN	JC FUCHS	11-1-62

APPROVED FOR MSC
11-8-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL,
PLUG,
34 PINS
SPECIFICATION CONTROL DRAWING

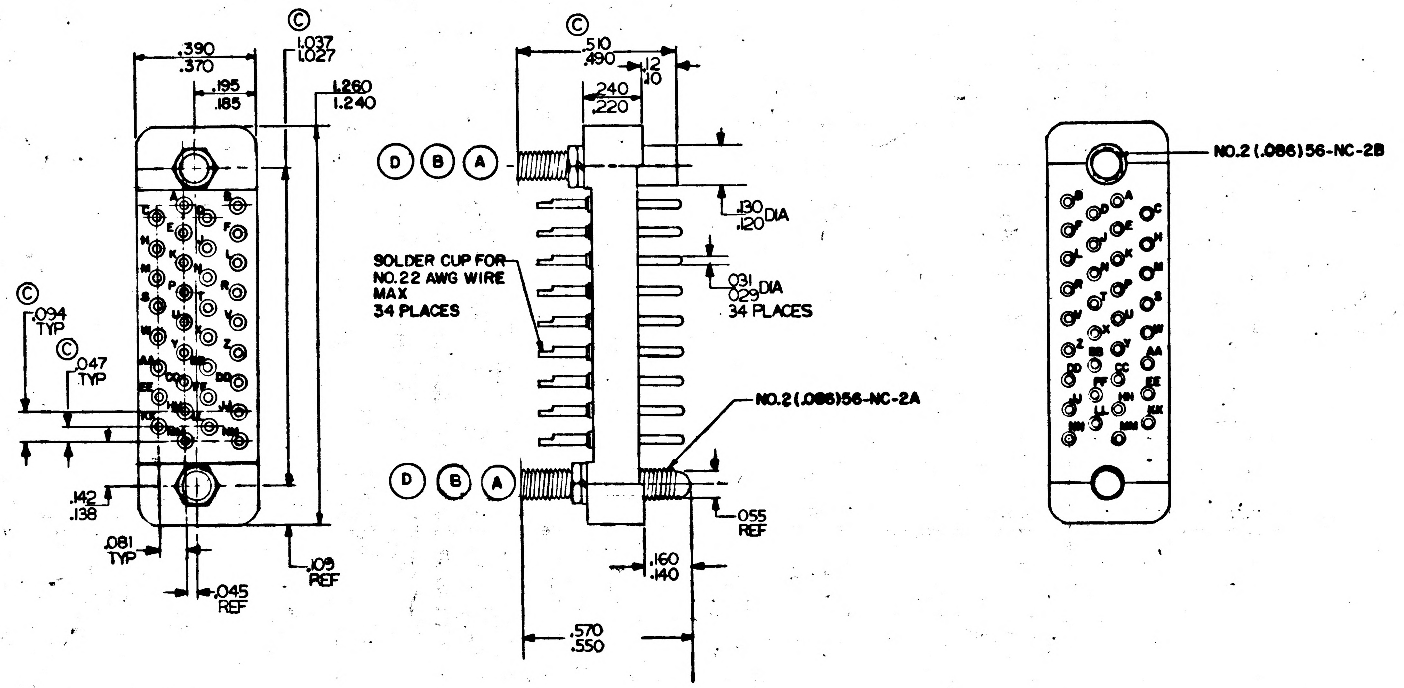
SCALE	UNIT WT.	CODE IDENT.
4/1		—

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000120
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

		REVISIONS TDRR 00086		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ	A	TDRR 00234	1-3-63	
Ⓜ	B	TDRR 00361	2-7-63	
	C10	TDRR 03481	10-15-63	
	D	TDRR 05607	12-17-63	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000119
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

	DL1001500
1001554	DL1000201
1000137	DL1000001
NEXT ASSY	USED ON
APPLICATION	

Ⓐ

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		11/8/62
CHECKED		
DRAWN	JC FUCHS	11-1-62
APPROVED FOR MSC	11-8-62	
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL.
PLUG,
34 PINS
SPECIFICATION CONTROL DRAWING

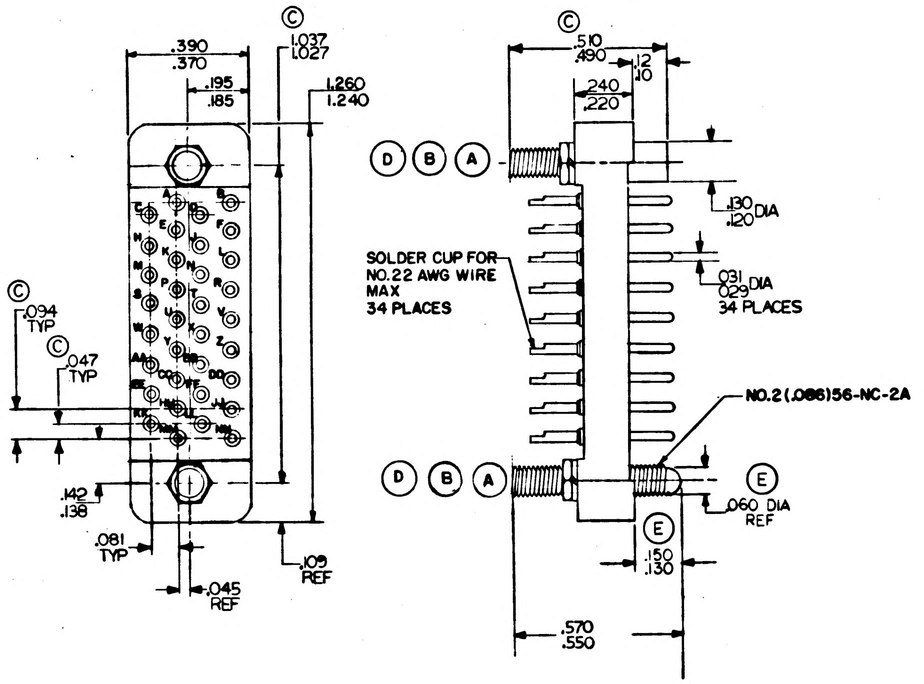
SCALE	UNIT WT.	CODE IDENT.
4/1		

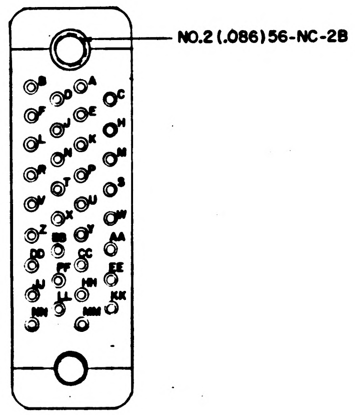
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000120
SHEET 1 OF 1

1000120 D

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

		REVISIONS TDRR 00086		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00234	1-3-63	WK
	B	TDRR 00361	2-7-63	WK
	C10	TDRR 03401	10-15-63	WK
	D	TDRR 05607	12-17-63	WK
	E	TDRR 05948	1/2c 64	WK.





REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED ~~IN ND~~1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000119
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1001500
1001554	DL1000201
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED A J Boyce 11/8/62
CHECKED
DRAWN JC FUCHS 11-1-62
APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL
PLUG,
34 PINS
SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000120
SHEET 1 OF 1

REVISIONS TDRR 00086					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00234	1-3-63		
	B	TDRR 00361	2-7-63		WK
	C10	TDRR 03401	10-15-63		WK
	D	TDRR 05607	12-17-63		WK
	E	TDRR 05948	1/29/64		WK.
	F	TDRR 12631	9-15-64		WK
	G	TDRR 13159	6 Oct 64		WK

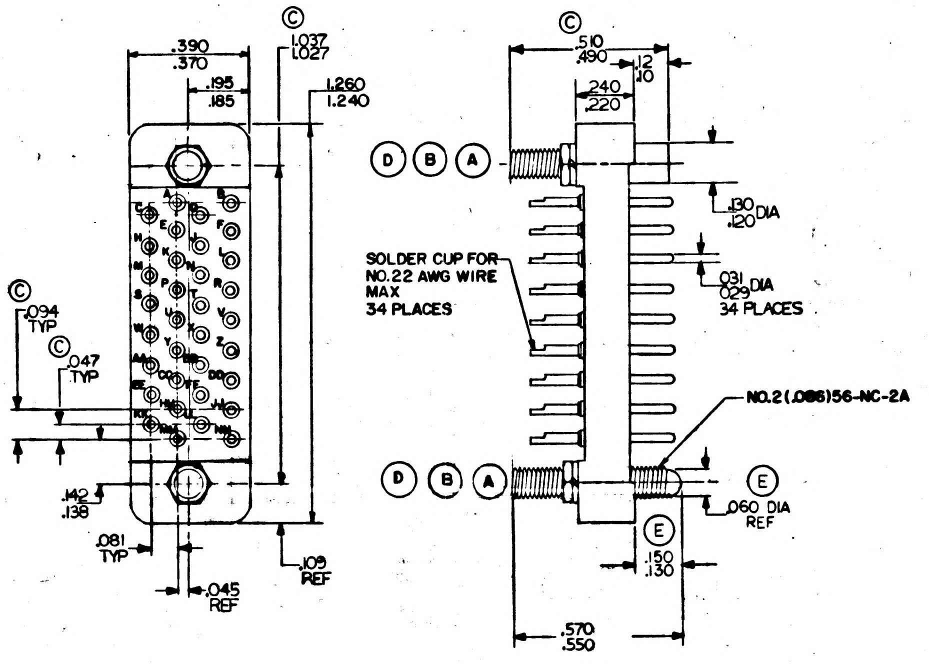


FIGURE 1

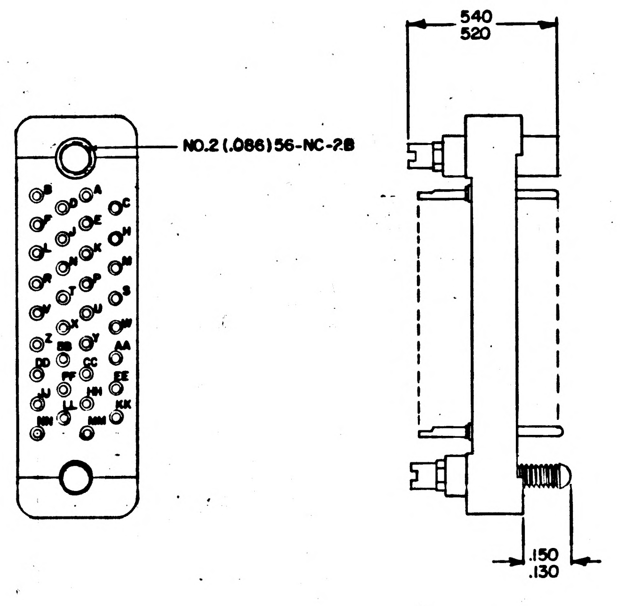


FIGURE 2

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED ~~IN~~ ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR BRONZE, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 2 OVER COPPER FLASH
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000119
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D.1) CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - D.2) CONTACT RESISTANCE; 25 MICROVOLTS MAX AT 250 MICROAMPS DC AFTER 500 INSERTIONS AND WITHDRAWALS
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002
   - G. MATING TORQUE; UNIT SHALL WITHSTAND A MATING TORQUE OF 2 1/2 IN-LBS MAXIMUM WITHOUT DEGRADATION OF PERFORMANCE

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

NASA PART NO.	MOUNTING CONFIG
1000120-000	FIGURE 1
1000120-001	FIGURE 2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

Ⓐ

	DL1001500
1001554	DL1000201
1000137	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT
NAS 9-153

		DATE
APPROVED		11/8/62
CHECKED		
DRAWN	JC FUCHS	11-1-62
APPROVED FOR MSC		11-8-62
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL,
PLUG,
34 PINS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

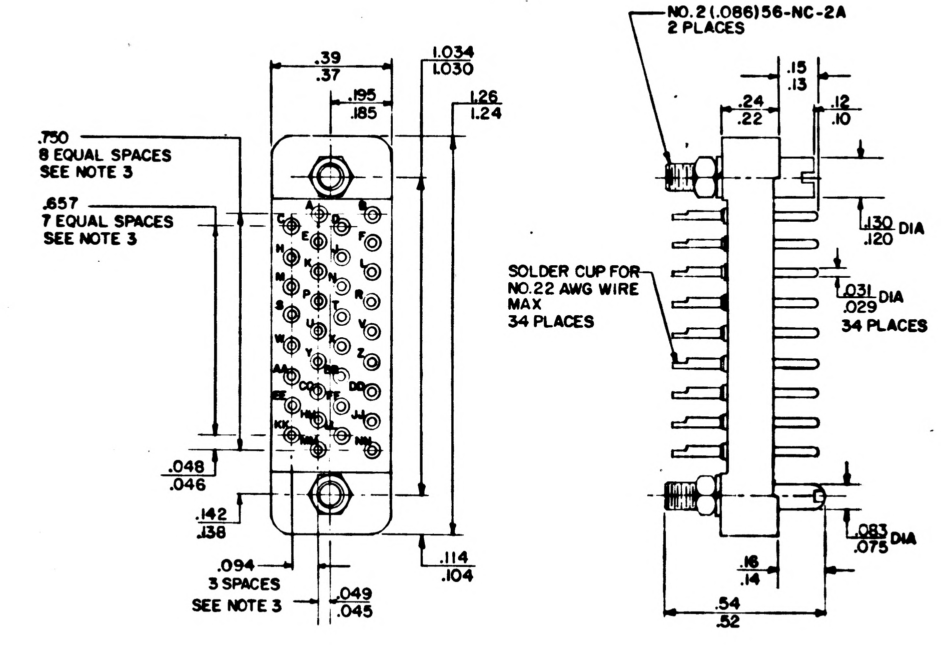
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

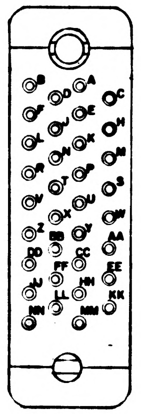
NASA DRAWING NO.
1000120

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00086				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


.39
.37
.195
.185
1.034
1.030
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
.657
7 EQUAL SPACES
SEE NOTE 3
.048
.046
.142
.138
.094
3 SPACES
SEE NOTE 3
.049
.045
.114
.104
NO. 2 (.086) 56-NC-2A
2 PLACES
.15
.13
.24
.22
.12
.10
.130
.120 DIA
SOLDER CUP FOR
NO.22 AWG WIRE
MAX
34 PLACES
.031
.029 DIA
34 PLACES
.083
.075 DIA
.16
.14
.54
.52



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000119
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS ± .002
4. MAT'L GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP.
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
ITEM MM34-22PGD

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000137	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	JC FUCHS	11-1-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL.
PLUG,
34 PINS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

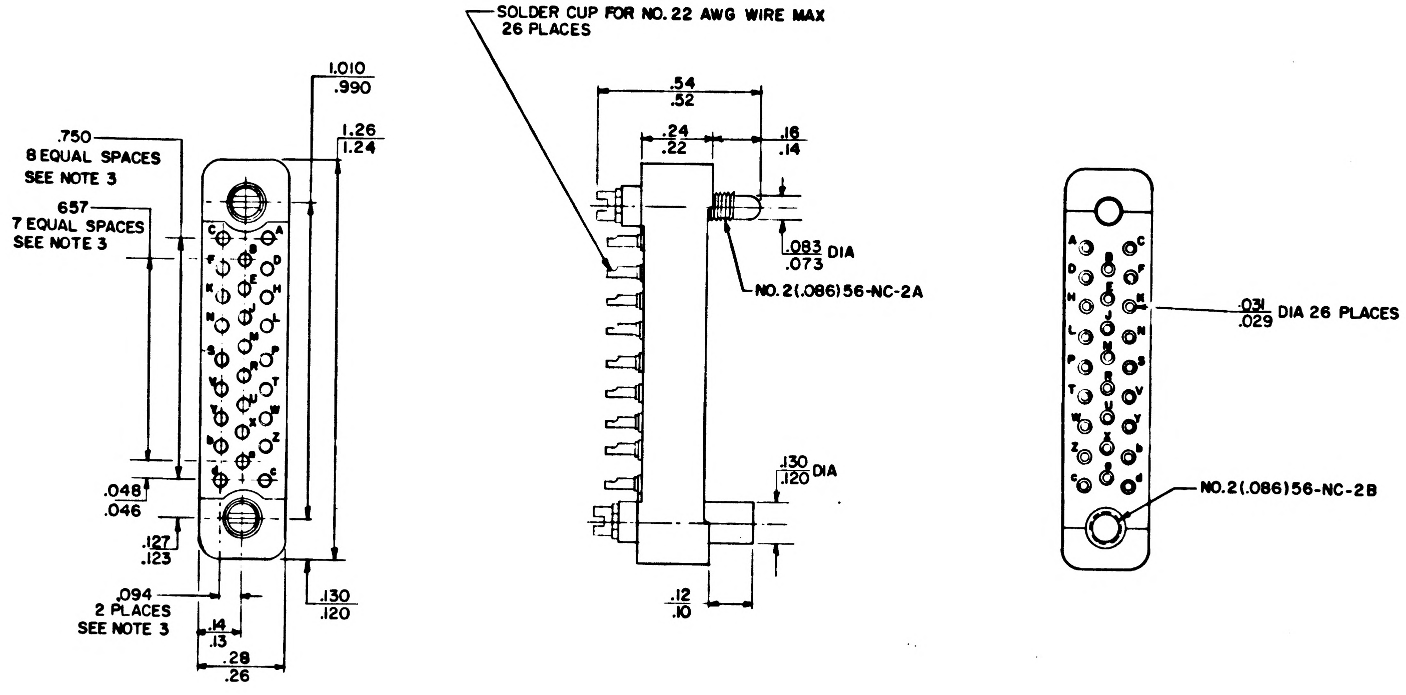
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000120

SHEET 1 OF

1000120

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00105				
	A	TDRR 00156	2-12-62	WK



SOLDER CUP FOR NO. 22 AWG WIRE MAX
26 PLACES
1.010
.990
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
.657
7 EQUAL SPACES
SEE NOTE 3
.048
.046
.127
.123
.094
2 PLACES
SEE NOTE 3
.14
.13
.28
.26
.130
.120
.54
.52
.24
.22
.16
.14
.083
.073
DIA
NO. 2(.086)56-NC-2A
.130
.120
DIA
.12
.10
.031
.029
DIA 26 PLACES
NO.2(.086)56-NC-2B

NOTES

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. Ⓐ FOR MATING CONNECTOR SEE DWG 1000012.
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS .002
4. GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP.
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
Ⓐ ITEM MM26-22SGDSL

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153

		DATE
APPROVED	A. J. Boyce	11/21/62
CHECKED		
DRAWN	JCFUCHS	11-9-62
APPROVED FOR MSC		
BY DIRECTION		
MIT APPROVAL		21 Nov 62

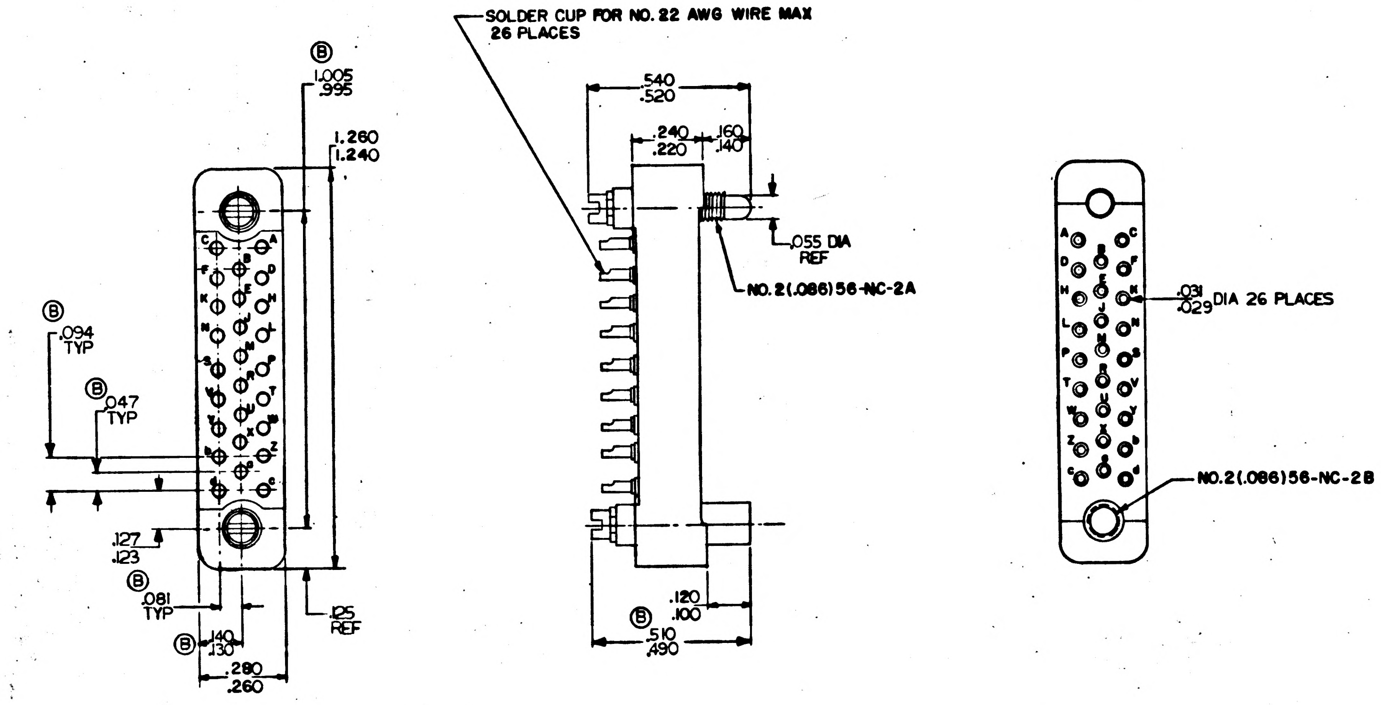
CONNECTOR, ELECTRICAL,
RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000121
SHEET 1 OF 1

1000121 A

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00105		
	A2	TDRR 00156	12-12-62	WK
	B12	TDRR 03482	10-15-63	WK



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO: 1000012
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1001500 (B)
1001554	DL1000201
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.002 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN JCFUCHS 11-9-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

CONNECTOR, ELECTRICAL, RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000121
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

		REVISIONS TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
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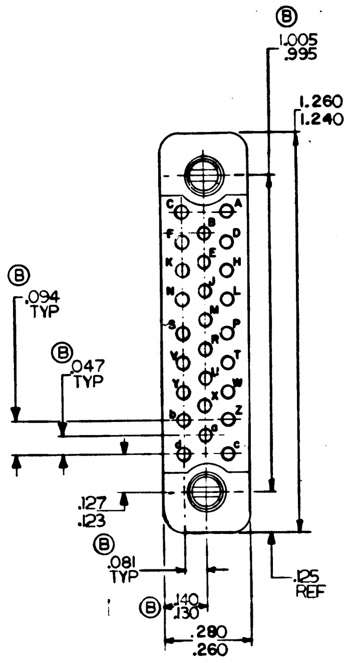
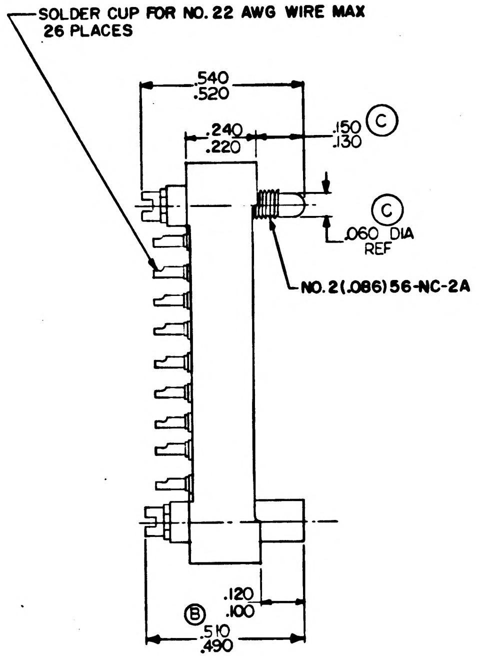
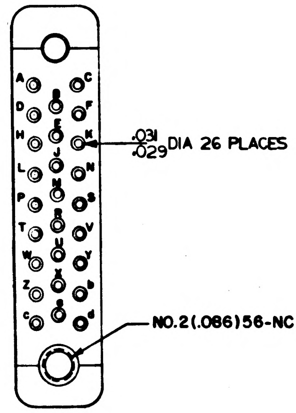
	B12	TDRR 03482	10-15-63	WK
	C	TDRR 05948	1 29 64	WK







REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000012
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓑ	DL1001500
1001554	DL1000201
1000137	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.002 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

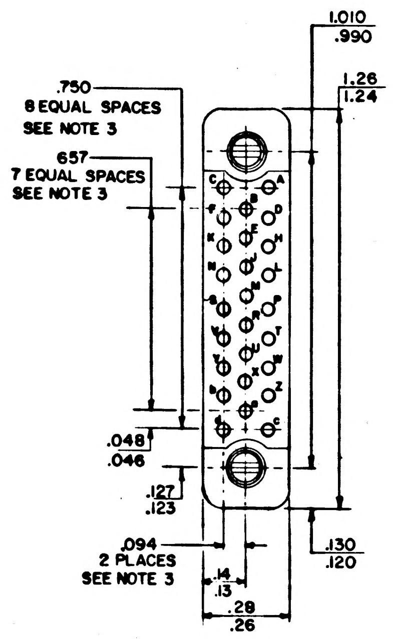
MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED 11/21/62
CHECKED
DRAWN J C FUCHS 11-9-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 21 Nov 62

CONNECTOR, ELECTRICAL, RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

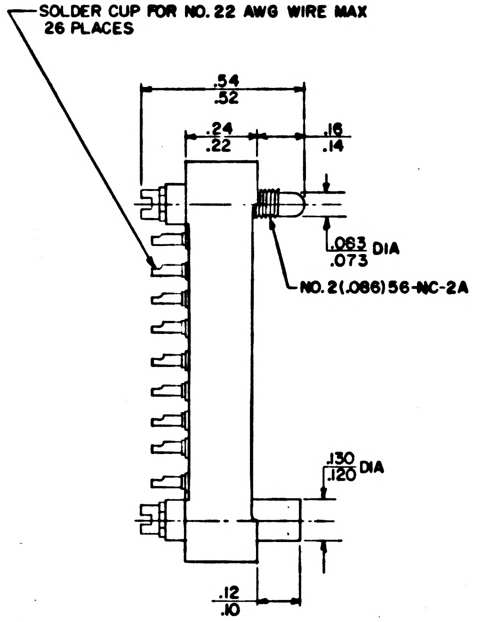
SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000121
SHEET 1 OF 1

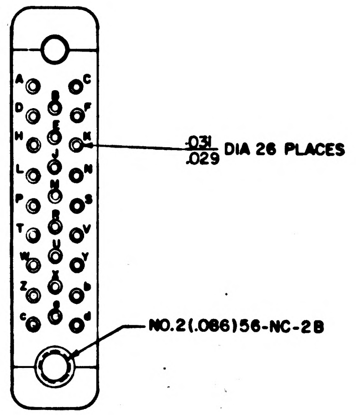
REVISIONS TDRR 00105				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



1.010
.990
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
657
7 EQUAL SPACES
SEE NOTE 3
.048
.046
.127
.123
.094
2 PLACES
SEE NOTE 3
.14
.13
.28
.26
.130
.120
A B C D E F H J K L M N P R S T U V W X Y Z a b c d



SOLDER CUP FOR NO. 22 AWG WIRE MAX
26 PLACES
.54
.52
.24
.22
.16
.14
.083
.073 DIA
NO. 2(.086)56-NC-2A
.130
.120 DIA
.12
.10



A B C D E F H J K L M N P R S T U V W X Y Z a b c d
.031
.029 DIA 26 PLACES
NO.2(.086)56-NC-2B

NOTES

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWGS 1000012 & 1000013
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS .002
4. GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP.
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
ITEM MM26-22SGD

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
DATE
APPROVED
CHECKED
DRAWN JCFUCHS 11-9-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

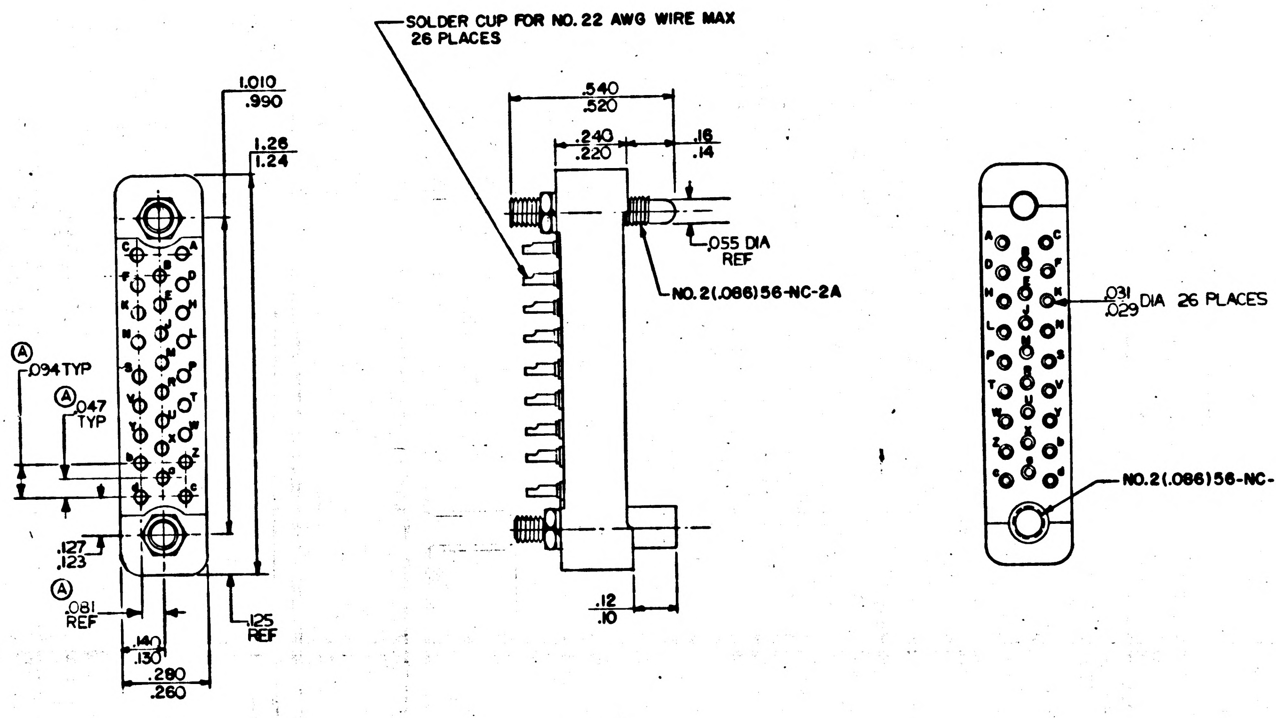
CONNECTOR, ELECTRICAL, RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000121
SHEET 1 OF 1

1000121

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00157				
	A8	TDRR 03483	10-15-63	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS: STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000013
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.002 ANGLES — DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE
1000137	DL1000001	MATERIAL: SEE NOTE 2A1	APPROVED	11/2/62
NEXT ASSY	USED ON		CHECKED	
APPLICATION			DRAWN JCFUCHS	11-9-62
			APPROVED FOR MSC W J Rhine	12-12-62
			BY DIRECTION	
			MIT APPROVAL	

CONNECTOR, ELECTRICAL,
RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

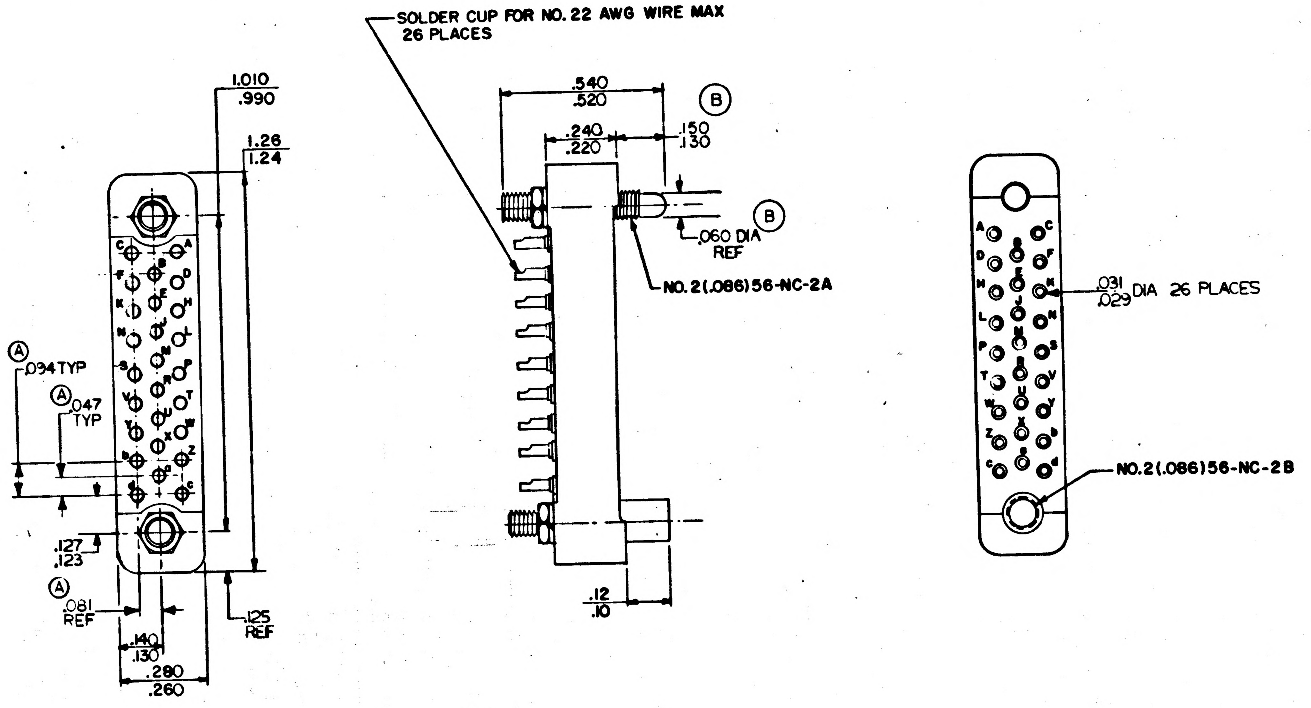
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000122
SHEET 1 OF 1

1000122 A

		REVISIONS TDRR 00157		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A8	TDRR 03483	6-5-63	
	B	TDRR 05948	29-64	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS: STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000013
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

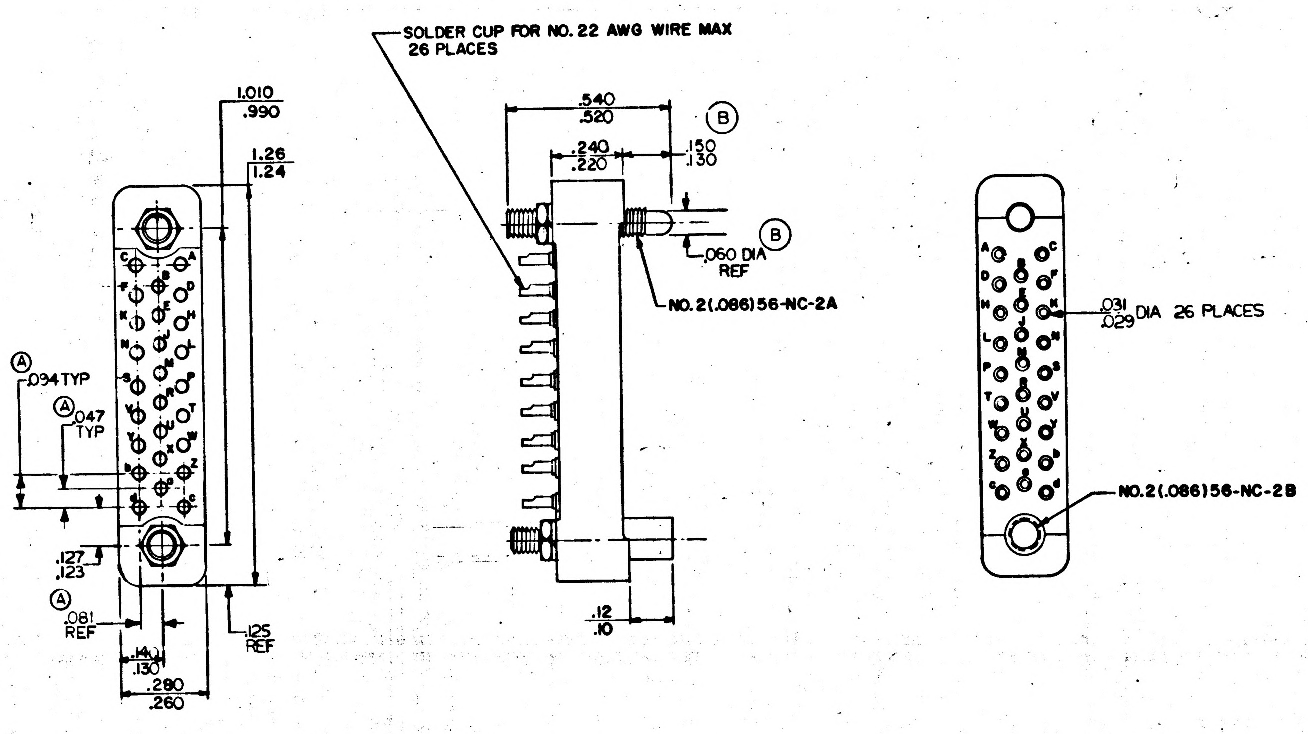
		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN	J C FUCHS	11-9-62
APPROVED FOR MSC	W J Rhine	12-12-62
BY DIRECTION		
MIT APPROVAL		

CONNECTOR, ELECTRICAL, RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000122
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00157				
	A8	TDRR 03483	6-15-63	
	B	TDRR 05948	[illegible]	
	C	TDRR 12631	9-15-64	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-6364 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR BRONZE, GOLD PLATED PER MIL-G-45204, TYPE II, CLASS 2 OVER COPPER FLASH
       SCREWS: STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000013
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. 1) CONTACT RESISTANCE; 20 MV AT 3 AMPS
     2) CONTACT RESISTANCE; 25 MICROVOLTS MAX AT 250 MICROAMPS DC AFTER 500 INSERTIONS AND WITHDRAWALS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002
   - G. MATING TORQUE; UNIT SHALL WITHSTAND A MATING TORQUE OF 2 1/2 IN-LBS MAXIMUM WITHOUT DEGRADATION OF PERFORMANCE

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
	DL1000201
1000137	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED — DATE
CHECKED
DRAWN J C FUCHS 11-9-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

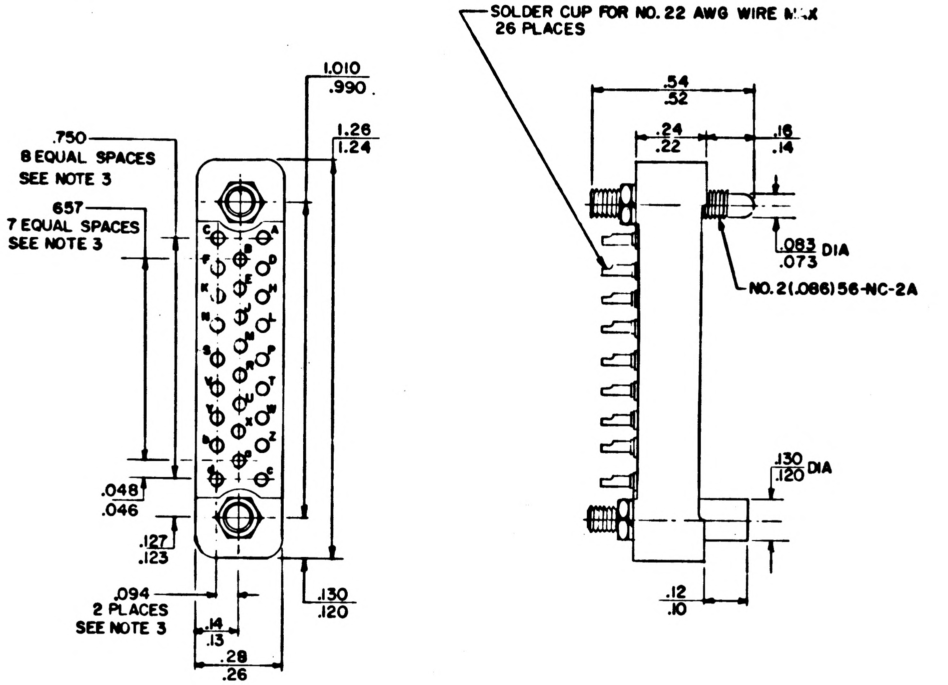
CONNECTOR, ELECTRICAL, RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

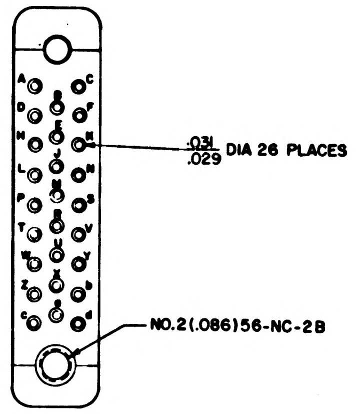
SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000122
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR CC157				


.750
8 EQUAL SPACES
SEE NOTE 3
657
7 EQUAL SPACES
SEE NOTE 3
1.010
.990
1.26
1.24
.048
.046
.127
.123
.094
2 PLACES
SEE NOTE 3
.14
.13
.28
.26
.130
.120
SOLDER CUP FOR NO. 22 AWG WIRE MAX
26 PLACES
.54
.52
.24
.22
.16
.14
.083
.073 DIA
NO. 2(.086)56-NC-2A
.130
.120 DIA
.12
.10


.031
.029 DIA 26 PLACES
NO.2(.086)56-NC-2B

NOTES

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000013
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS .002
4. GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP.
45-01 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK
ITEM MM26-22SGDS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000137	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A. J. Boyce	11/21/62
CHECKED		
DRAWN	J C FUCHS	11-9-62

APPROVED FOR MSC
W. J. Rhine 12-12-62
BY DIRECTION
MIT APPROVAL 12-12-62

CONNECTOR, ELECTRICAL, RECEPTACLE,
26 CONTACTS
SPECIFICATION CONTROL DRAWING

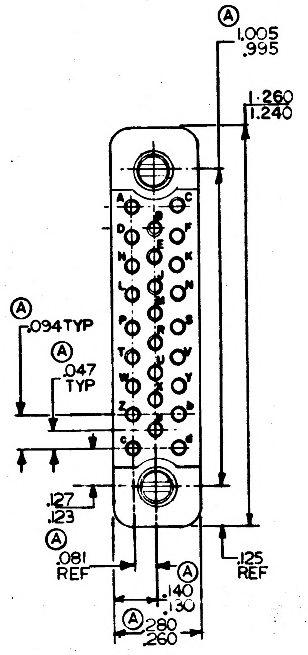
SCALE	UNIT WT	CODE IDENT
4/1		

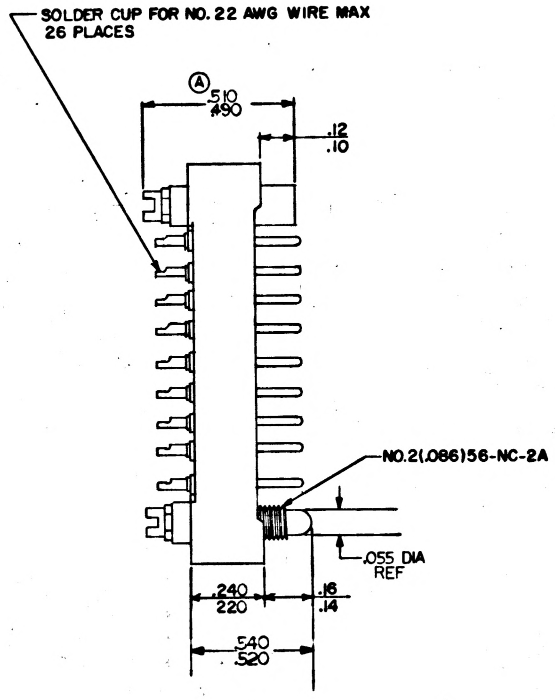
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO

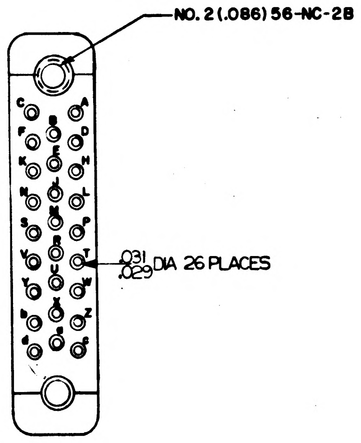
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000122
SHEET 1 OF 1

1000122

REVISIONS TDR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A13	TDRR 03484	10-15-63	







REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIEIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000122
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APP VED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

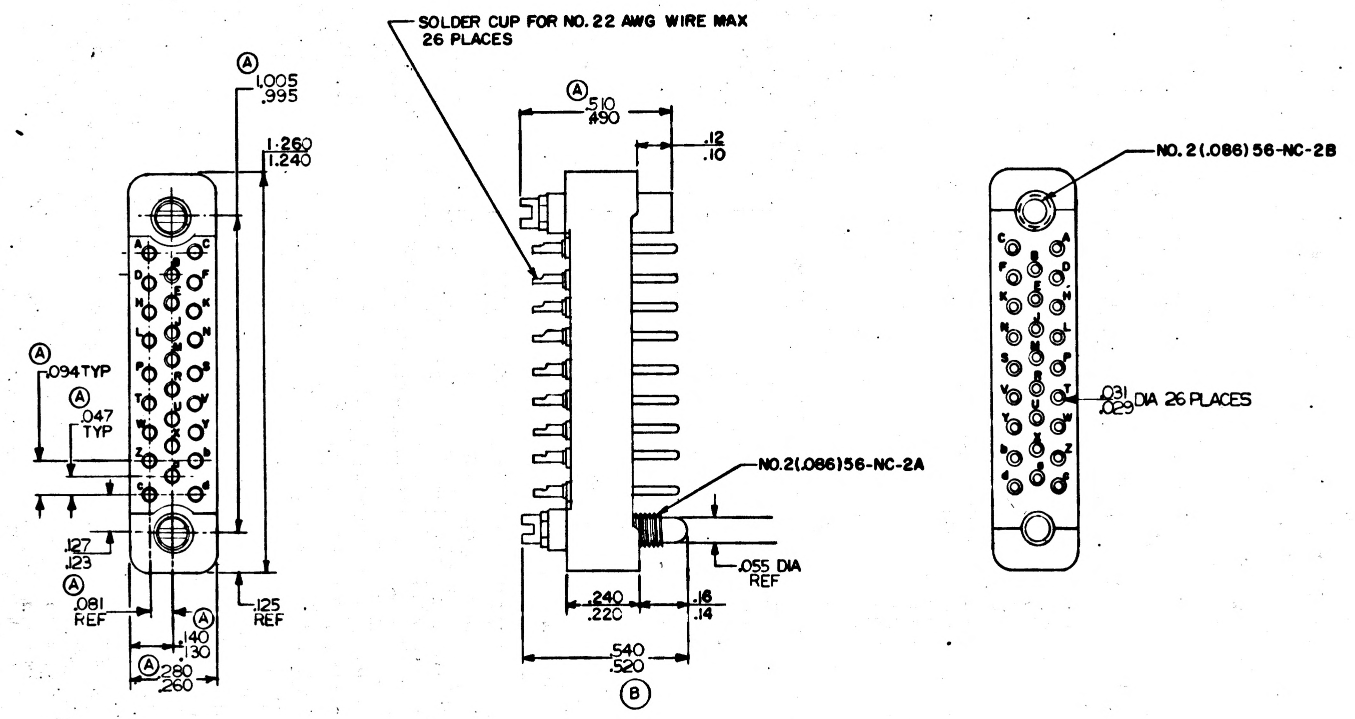
QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS — ANGLES —
Ⓐ		DL1000201	DO NOT SCALE THIS DRAWING
	1000013	DL1000001	MATERIAL: SEE NOTE 2A1
	NEXT ASSY	USED ON	
	APPLICATION		

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE	CONNECTOR, ELECTRICAL, PLUG 26 CONTACTS		MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
APPROVED A J Boyce	2/6/63			DWG. NO.
CHECKED				MANNED SPACECRAFT CENTER HOUSTON TEXAS
DRAWN J FUCHS	12-31-62	SPECIFICATION CONTROL DRAWING		NASA DRAWING NO.
APPROVED FOR MSC William J.		SCALE 4/1	UNIT WT.	CODE IDENT.
MIT/IL APPROVAL W Kupfer	DATE			1000123
				SHEET 1 OF 1

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

REVISIONS TDR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A 13	TDRR 03484	10-15-63	
	B	TDRR 04444	11-15-63	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIEIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000122
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ	DL1000201
1000013	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED A J Boyce 2/4/63
CHECKED
DRAWN J FUCHS 12-31-62
APPROVED FOR MSC
MIT/IL APPROVAL DATE
W Kupfer

CONNECTOR, ELECTRICAL,
PLUG
26 CONTACTS

SPECIFICATION CONTROL DRAWING

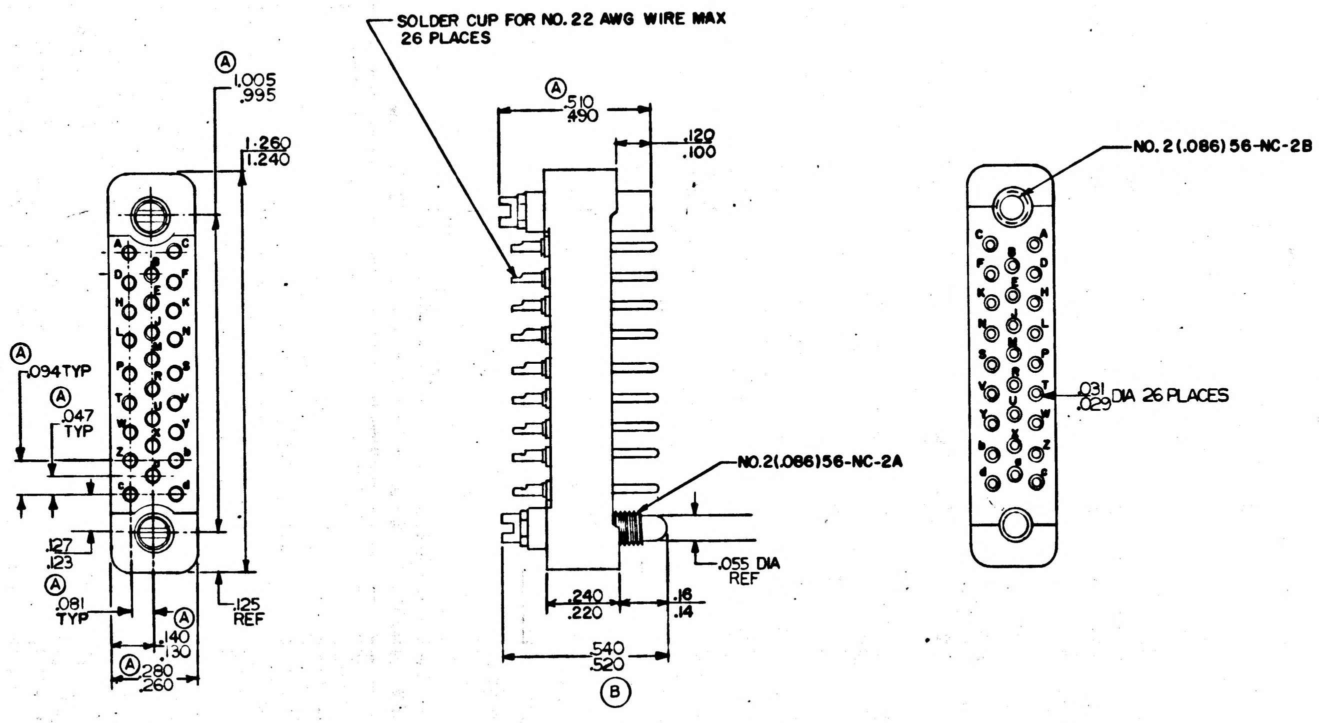
SCALE 4/1
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000123
SHEET OF

1000123 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDR 00331		
	A_{13}	TDRR 03484	10-15-63	
	B	TDRR 04444	11-15-63	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIEIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO. 1000122
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	LIST OF PARTS AND MATERIALS				

	DL1000201 Ⓐ
1000013	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED C. J. Boyce DATE 2/4/63
CHECKED
DRAWN J FUCHS 12-31-62
APPROVED FOR MSC William T. Swingle
MIT/IL APPROVAL W Kupfer DATE

CONNECTOR, ELECTRICAL, PLUG
26 CONTACTS

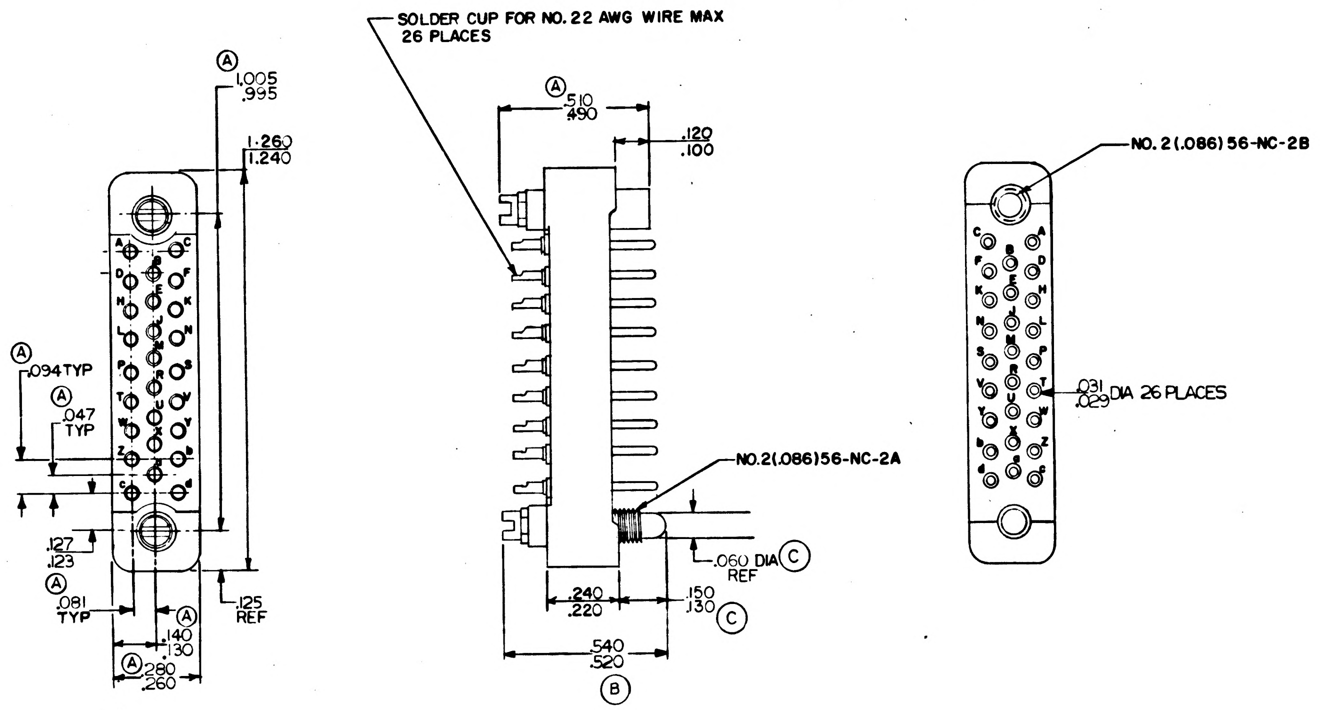
SPECIFICATION CONTROL DRAWING
SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000123
SHEET 1 OF 1

1000123 B

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A13	TDRR 03484	10-15-63	
	B	TDRR 04444	11-15-63	
	C	TDRR 05948	1/29/64	



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIEIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000122
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL 140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ	DL1000201
1000013	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED A J Boyce DATE 2/6/63
CHECKED
DRAWN J FUCHS 12-31-62
APPROVED FOR MSC
MIT/IL APPROVAL DATE

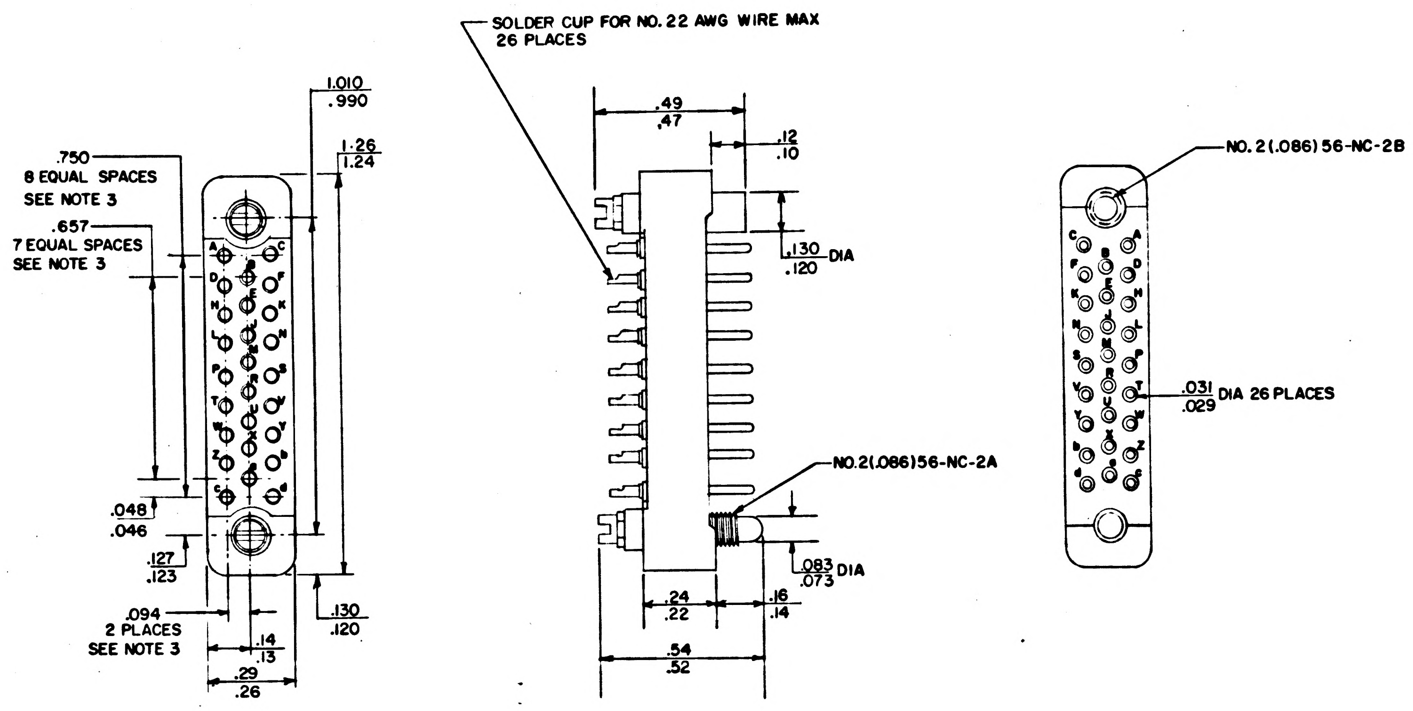
CONNECTOR, ELECTRICAL, PLUG
26 CONTACTS

SPECIFICATION CONTROL DRAWING
SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000123
SHEET 1 OF 1

REVISIONS TDR 0033

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



SOLDER CUP FOR NO. 22 AWG WIRE MAX
26 PLACES
1.010
.990
1.26
1.24
.750
8 EQUAL SPACES
SEE NOTE 3
.657
7 EQUAL SPACES
SEE NOTE 3
.49
.47
.12
.10
.130
.120
DIA
NO. 2(.086) 56-NC-2A
.048
.046
.127
.123
.094
2 PLACES
SEE NOTE 3
.14
.13
.29
.26
.130
.120
.24
.22
.16
.14
.54
.52
.083
.073
DIA
NO. 2(.086) 56-NC-2B
.031
.029
DIA 26 PLACES

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000122
3. MAXIMUM TOLERANCE BETWEEN ANY TWO MOLDED CENTERS IS ± .002
4. GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION 1015404 CLASS 2

ORIGINAL SOURCE OF SUPPLY
CONTINENTAL CONNECTOR CORP
45-01 NORTHERN BLVD
LONG ISLAND CITY 1, NEW YORK
ITEM NO. MM26-22 PGDSL

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000013	DL1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	2/6/63
CHECKED		
DRAWN	J FUCHS	2/
APPROVED FOR MSC	William J. Swing	
MIT/IL APPROVAL		DATE
	W. Kupfer	2/63

CONNECTOR, ELECTRICAL,
PLUG
26 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000123

SHEET 1 OF 1

1000123

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
[illegible]	[illegible]	A	REVISED [illegible]	[illegible]	[illegible]

WIRING HARNESS "C"

OUTER AXIS

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.

SCALE

REVISION A

SHEET [illegible] OF [illegible]

TAPE, [illegible]

CLASS 2 BLACK

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION A

NASA DRAWING NO.

SHEET [illegible]

---

1. TWISTED CONDUCTORS ARE TO CONSIST OF [illegible] FULL TURNS PER INCH (MINIMUM)
2. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER.
3. "Y" or "N" IN THIRD COLUMN INDICATES YES OR NO.
4. DIMENSIONS ARE IN INCHES & [illegible] PLACE DECIMALS
5. SOLDER PER MIL-STD-[illegible] USING ITEM [illegible]
6. LACE CABLE USING ITEM [illegible]
7. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-[illegible].
8. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:

   [illegible] INDICATES GRAY
   [illegible] INDICATES BROWN
   R INDICATES RED
   V INDICATES VIOLET

9. [illegible]
10. [illegible]
11. [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION A

NASA DRAWING NO.

SHEET [illegible]

APPLICATION		REVISIONS TDRR 01841			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
1000202	DL1000201	A	REVISED TDRR 04296	11-6	WAR

REV					
SHEET					
REV STATUS	A	A	A	-	-
OF SHEETS SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL:

		DATE
APPROVED		7/2/63
CHECKED	WINBERG	6-21-63
DRAWN	THENO	6-7-63
APPROVED FOR MSC		7/2/63
BY DIRECTION		

WIRING HARNESS "C"
OUTER AXIS

SCALE
REVISION A

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000124
SHEET 1 OF 5

TDRR 01841

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION	TOTAL LGTH
1	1	MIL-W-16878 E28	WIRE, 28 AWG RED	5.25IN.
2	1	→	→ BRN	5.00IN.
3	1	→	→ VIO	10.50IN.
4	1	→	→ GY	10.25IN.
5	6	1006776 -18	INSULATION, SLEEVING 5/16 Long	
6	1	1000222	CONNECTOR-PLUG (J27)	
7	AR	QQ-S-571 (SN60WARP2)	SOLDER	
8	AR	MIL-T-713 TYPE P CLASS 2 BLACK	TAPE, NYLON, WAXED	

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HOUSTON TEXAS

REVISION A

NASA DRAWING NO. 1000124
SHEET 2 of 5

TDRR 01841

NOTES

1. TWISTED CONDUCTORS ARE TO CONSIST OF 4 FULL TURNS PER INCH. MINIMUM
2. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER.
3. "Y" or "N" IN TINNED COLUMN INDICATES YES OR NO.
4. DIMENSIONS ARE IN INCHES & 2 PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 7
6. LACE CABLE USING ITEM 8
7. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
8. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:

E	INDICATES GRAY
N	INDICATES BROWN
R	INDICATES RED
V	INDICATES VIOLET

9. MARK CHARACTERS ON CONNECTOR $\substack{.10\\.14}$ HIGH, COLOR BLACK PER ND1002019 AT LOCATION SHOWN
10. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING
11. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

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SPACECRAFT CENTER
HOUSTON TEXAS

REVISION A

NASA DRAWING NO. 1000124
SHEET 3 of 5

APPLICATION		REVISIONS TDRR 01841			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
1000202	DL1000201	A	REVISED TDRR 04296	11-6	
		B	REVISED NOTE 1 ON SHT 3 PER TDRR 06237	2-19	

REV						
SHEET						
REV STATUS	REV	B	A	B	-	-
OF SHEETS	SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL:

		DATE
APPROVED	Stamm	7/2/63
CHECKED	WINBERG	6-21-63
DRAWN	THENO	6-7-63

APPROVED FOR MSC
7/2/63

BY DIRECTION
W Kupfer 2 July 63

WIRING HARNESS "C"

OUTER AXIS

SCALE

REVISION
B

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000124

SHEET 1 OF 5

TDRR 01841

NOTES

1. TWISTED CONDUCTORS ARE TO CONSIST OF 2 FULL TURNS PER INCH MIN TO 4 FULL TURNS PER INCH MAX.
2. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER.
3. "Y" or "N" IN TINNED COLUMN INDICATES YES OR NO.
4. DIMENSIONS ARE IN INCHES & 2 PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 7
6. LACE CABLE USING ITEM 8
7. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
8. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:

E	INDICATES GRAY
N	INDICATES BROWN
R	INDICATES RED
V	INDICATES VIOLET

9. MARK CHARACTERS ON CONNECTOR $\substack{.10\\.14}$ HIGH, COLOR BLACK PER ND1002019 AT LOCATION SHOWN
10. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING
11. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

	MANNED SPACECRAFT CENTER HOUSTON TEXAS	REVISION B	NASA DRAWING NO. 1000124 SHEET 3 of 5

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

APPLICATION	
NEXT ASSY	USED ON
1000202	DL1000201

REVISIONS TDRR 01841

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED TDRR 04296	11-6	WAS
B	REVISED NOTE 1 ON SHT 3 PER TDRR 06237	2-19	WK
C	REVISED PER TDRR 11889	1 SEP 64	JWP EF

REV STATUS OF SHEETS	REV	C	C	B	C	C
	SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL:

		DATE
APPROVED	Slamens	7/2/63
CHECKED	W. VBERG	6-21-63
DRAWN	HENO	6-7-63
APPROVED FOR MSC		7/2/63
BY DIRECTION	W K	2 July 63

WIRING HARNESS "C"

OUTER AXIS

SCALE

REVISION C

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000124

SHEET 1 OF 5

TDRR 01841

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION	TOTAL LGTH
1	1	MIL-W-16878 E28	WIRE, 28 AWG RED	4.00 IN.
2	1	↓	BRN	4.25 IN.
3	1	↓	VIO	8.81 IN.
4	1	↓	GY	9.06 IN.
5	6	1006776 -18	INSULATION, SLEEVING 5/16 Long	
6	1	1000222	CONNECTOR-PLUG (J27)	
7	AR	QQ-S-571 (SN60WARP2)	SOLDER	
8	AR	MIL-T-713 TYPE P CLASS 2 BLACK	TAPE, NYLON, WAXED	

MANNED
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HOUSTON TEXAS

REVISION C

NASA DRAWING NO. 1000124

SHEET 2 of 5

TDRR 01841

NOTES

1. TWISTED CONDUCTORS ARE TO CONSIST OF 2 FULL TURNS PER INCH MIN TO 4 FULL TURNS PER INCH MAX.
2. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER.
3. "Y" or "N" IN TINNED COLUMN INDICATES YES OR NO.
4. DIMENSIONS ARE IN INCHES & 2 PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 7
6. LACE CABLE USING ITEM 8
7. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
8. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:

E INDICATES GRAY
N INDICATES BROWN
R INDICATES RED
V INDICATES VIOLET

9. MARK CHARACTERS ON CONNECTOR $\frac{.10}{.14}$ HIGH, COLOR BLACK PER ND1002019 AT LOCATION SHOWN
10. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING
11. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION B

NASA DRAWING NO. 1000124

SHEET 3 of 5

TDRR 01841

CONDUCTOR			FROM						TO					
NUMBER	FIND NO.	INDIVIDUAL LENGTH	CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	Y/N	TERMINATION FIND NO.	SPEC	NO.	CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	Y/N	TERMINATION FIND NO.	SPEC	NO.
C1 R	1	4 00	J27 A	10	Y		5	1	A13 1	13	Y			4
C1 N	2	4 25	J27 B	10	Y		5	1	A13 2	13	Y			5
C2 V	3	4 75	J27 C	10	Y		5	1	A13 4	13	Y			7
C2 E	4	4 50	J27 D	10	Y		5	1	A13 3	13	Y			6
C3 E	4	4 56	J27 E	10	Y		5	1	E13	13	Y			3
C3 V	3	4 06	J27 H	10	Y		5	1	E15	13	Y			2

MANNED
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REVISION C

NASA DRAWING NO. 1000124

SHEET 4 of 5

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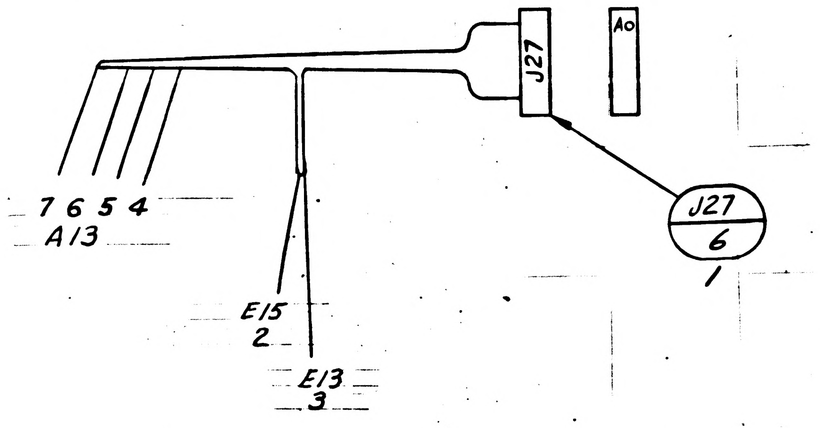
1000124 C

REVISIONS 01841

SYM	DESCRIPTION	DATE	APPROVAL
C	REVISED PER TDRR 11889	SEP 64	JWP EF



THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1000202	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN THENO DATE 6-7-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL W. Stameris
NASA APPROVAL 7-1-63
MIT APPROVAL W. Taffer 2 July 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

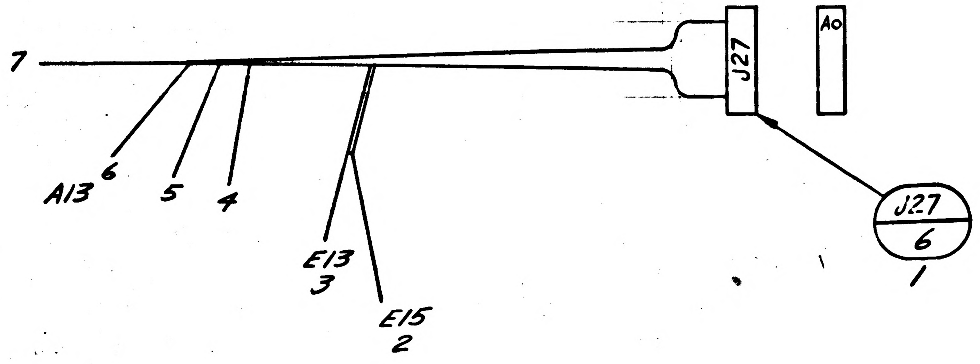
WIRING HARNESS "C"
OUTER AXIS

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000124
SCALE 1-1
WT
SHEET 5 OF 5

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1000124

REVISIONS 01841			
SYM	DESCRIPTION	DATE	APPROVAL



THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1000202	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN THENO DATE 6-7-63
CHECKED WINBERG
APPROVAL A. E. Winberg
APPROVAL W. Stameris
NASA APPROVAL 7-1-63
MIT APPROVAL W Kupfer 2 July 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "C"
OUTER AXIS

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000124
SCALE 1-1
WT
SHEET 5 OF 5

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

APPLICATION	
NEXT ASSY	USED ON
1000202	DL1000201

REVISIONS TDRR 01841

SYM	DESCRIPTION	DATE	APPROVAL

REV STATUS OF SHEETS	REV	–	–	–	–	–
	SHEET	1	2	3	4	5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

MATERIAL:

		DATE
APPROVED	Stamerin	7/2/63
CHECKED	WINBERG	6-21-63
DRAWN		

APPROVED FOR MSC

BY DIRECTION

WIRING HARNESS "C"

OUTER AXIS

SCALE

REVISION

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000124

SHEET 1 OF 5

LIST OF MATERIAL

FIND NO.	QTY.	PART NO. OR IDENTIFICATION NO.	DESCRIPTION	TOTAL LGTH
1	1	MIL-W-16878 E28	WIRE, 28 AWG RED	5.25IN.
2	1	↓	↓ BRN	5.00IN.
3	1		VIO	10.50IN.
4	1		GY	10.25IN.
5	6	1006776 -18	INSULATION, SLEEVING 5/16 Long	
6	1	1000222	CONNECTOR-PLUG (J27)	
7	AR	QQ-S-571 (SN60WARP2)	SOLDER	
8	AR	MIL-T-713 TYPE P	TWINE, NYLON, WAXED	

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HOUSTON TEXAS

REVISION

NASA DRAWING NO.
1000124
SHEET 2 of 5

NOTES

1. TWISTED CONDUCTORS ARE TO CONSIST OF 4 FULL TURNS PER INCH.
2. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER.
3. "Y" or "N" IN TINNED COLUMN INDICATES YES OR NO.
4. DIMENSIONS ARE IN INCHES & 2 PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 7
6. LACE CABLE USING ITEM 8
7. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
8. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:

E	INDICATES GRAY
N	INDICATES BROWN
R	INDICATES RED
V	INDICATES VIOLET

9. MARK CHARACTERS ON CONNECTOR $^{.10}_{.14}$ HIGH, COLOR BLACK PER ND1002019 AT LOCATION SHOWN
10. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING
11. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

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HOUSTON TEXAS

REVISION

NASA DRAWING NO.
1000124
SHEET 3 of 5

TDRR 01841

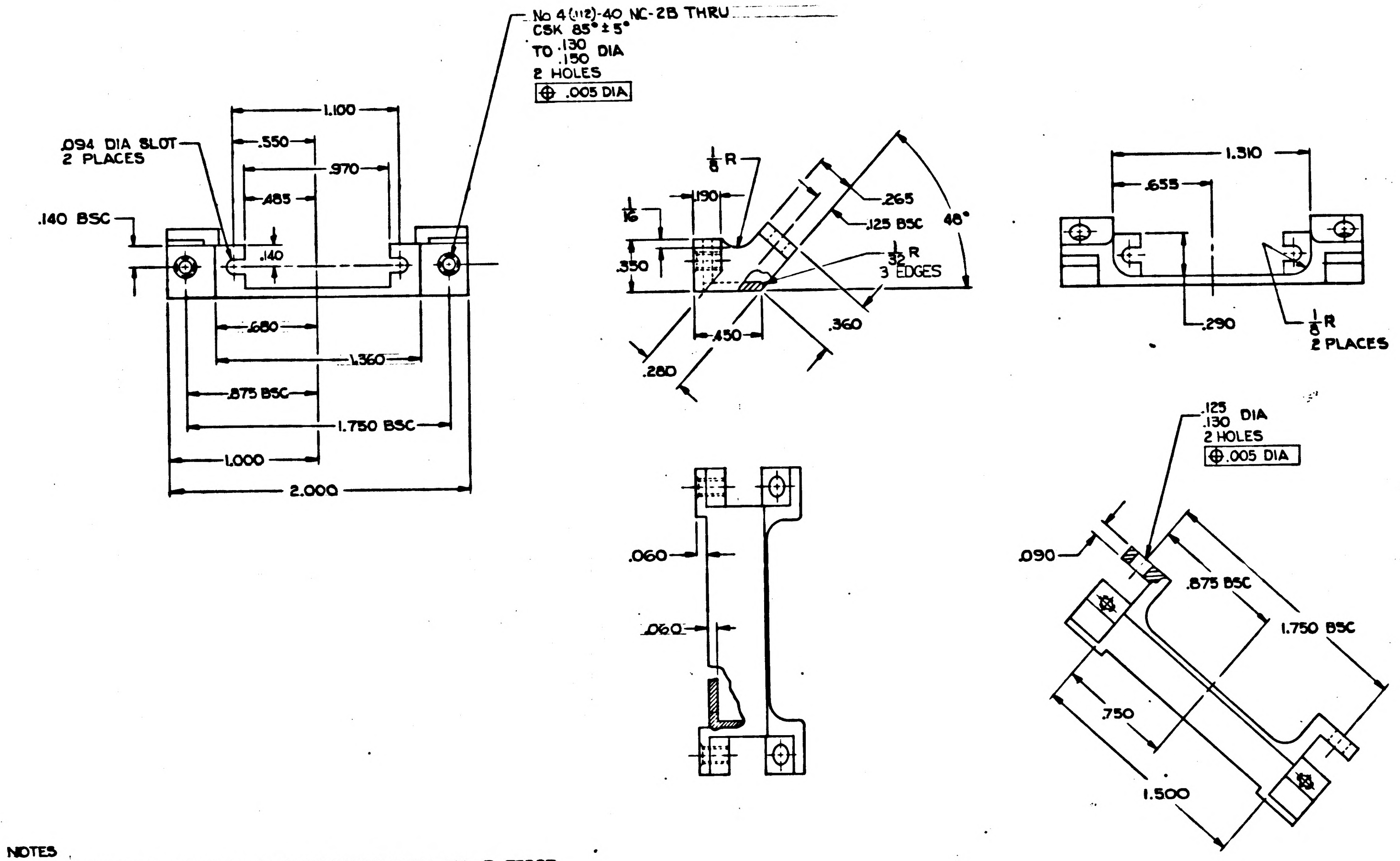
CONDUCTOR			FROM						TO					
NUMBER	FIND NO.	INDIVIDUAL LENGTH	CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	Y/N	TERMINATION FIND NO.	SPEC	NO.	CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	Y/N	TERMINATION FIND NO.	SPEC	NO.
C1 R	1	5.25	J27 A	10	Y		5	1	A13 1	13	Y			4
C1 N	2	5.00	J27 B	10	Y		5	1	A13 2	13	Y			[illegible]
C2 V	3	5.50	J27 C	10	Y		5	1	A13 4	13	Y			[illegible]
C2 E	4	5.75	J27 D	10	Y		5	1	A13 3	13	Y			[illegible]
C3 E	4	4.50	J27 E	10	Y		5	1	E13	13	Y			[illegible]
C3 V	3	5.00	J27 H	10	Y		5	1	E15	13	Y			[illegible]

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION

NASA DRAWING NO.
1000124
SHEET 4 of 5

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS	4-9-63	a J B WK



No 4 (.112)-40 NC-2B THRU
CSK 85° ± 5°
TO .130 .150 DIA
2 HOLES
⊕ .005 DIA
.094 DIA SLOT
2 PLACES
.140 BSC
1.100
.550
.970
.485
.140
.680
1.360
.875 BSC
1.750 BSC
1.000
2.000
1/8 R
1/16
.190
.350
.265
.125 BSC
48°
1/32 R
3 EDGES
.450
.360
.280
1.310
.655
.290
1/8 R
2 PLACES
.125 .130 DIA
2 HOLES
⊕ .005 DIA
.060
.060
.090
.875 BSC
1.750 BSC
.750
1.500

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ ALL OVER
4. INSIDE CORNERS .010 R MAX UNLESS OTHERWISE SPECIFIED
5. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
6. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS FIBER BASE, PER MIL-P-18177 TYPE GEE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
1000206	
1000008	DL1000201
1000010	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 6

M I T INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Boyce DATE 4-9-63
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC 4-10-63
BY DIRECTION M.I.T. APPROVAL WK 10 Apr 63

BRACKET, CONNECTOR
INTERGIMBAL SUBASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

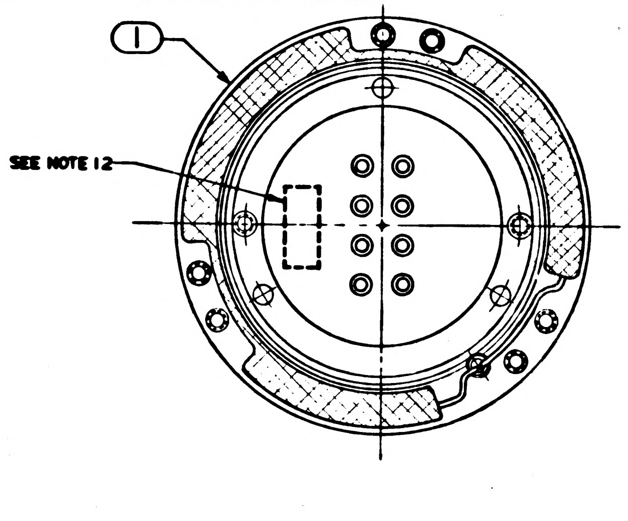
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000125
SHEET 1 OF 1

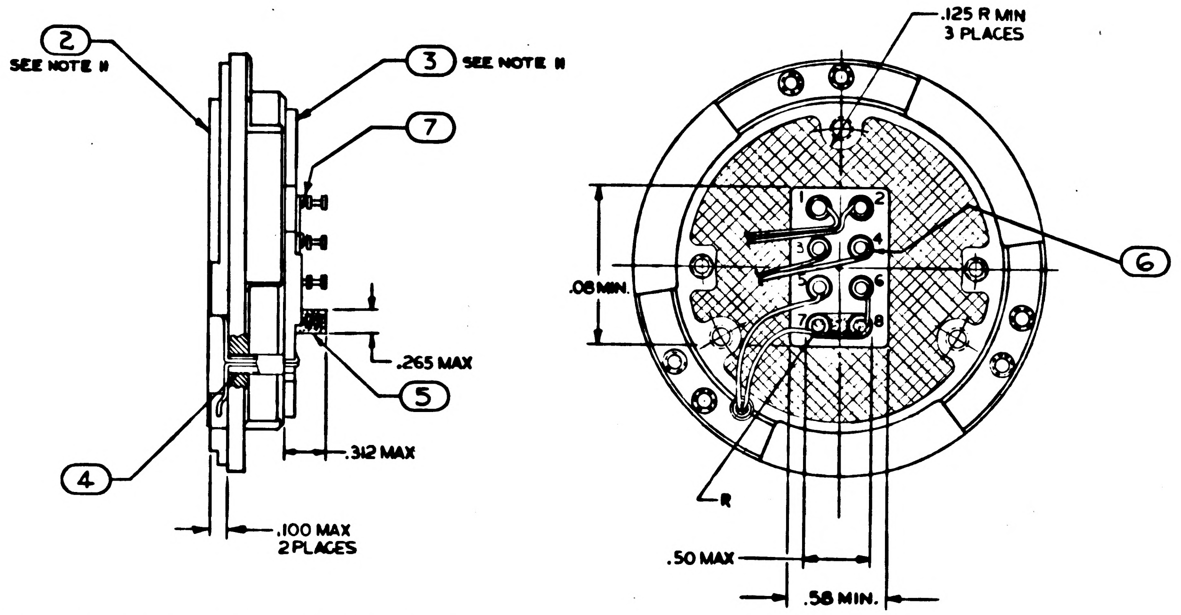
1000125 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS	·462	

WIRING LEGEND				
WIRE NO.	FROM	TO	COLOR	FIND NO.
1	SNS	TERM. 5	RED	8
2	SNS	TERM 7 OR 8	PINK	9
3	HTR	TERM. 1	BLU	10
4	HTR	TERM. 2	BLU	10
5	TERM 7 OR 8	TERM 6	BARE	11
6	HTR	TERM 3	YEL	12
7	HTR	TERM 4	YEL	12





NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. HEATERS AND SENSOR SHALL CONFORM TO OS 8683
3. HEATER SHALL HAVE THE FOLLOWING CHARACTERISTICS
   VOLTAGE: 30 VDC MAX
   RESISTANCE 2480 Ω ± 3% AT 133°F ± 1°F
   POWER CONSUMPTION .375 WATTS MAX
4. HEATER TO BE WOUND WITH WIRE WITH TEMP COEFF OF .000072 Ω/Ω/°F MAX
5. TEMP SENSOR ITEM ② TO HAVE A RESISTANCE OF 126.7 Ω ±.1 Ω AT 133°F ± 1°F USING 10 MA ± 2 % CURRENT WHEN MEASURED BETWEEN TERMINALS 5 & 6 PADDING RESISTANCE 7.4 Ω MAX
6. HEATER AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND
7. SENSORS TO BE WOUND WITH A WIRE TEMP COEFF OF .0025 Ω/Ω/°F ± 4%
8. CARE SHOULD BE TAKEN NOT TO UNSOLDER CONNECTION AT TERMINAL 7 OR 8 DO NOT TAMPER WITH PINK WIRE (ITEM ⑨) OR POTTING (ITEM ⑤) ON TERMINAL 7 OR 8
9. MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD
10. ALL SOLDERED CONNECTIONS TO BE PER MIL-STD-440 USING ITEM ⑦
11. METHOD OF FABRICATING THE HEATER AND SENSOR, AND THE BONDING OF SAME TO THE TAPERED MOUNT IS A PROPRIETARY PROCESS OF COX AND CO, INC
12. ENGRAVE DRAWING NO, REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL, AT THE INDICATED LOCATION BEFORE ASSEMBLING HEATER AND SENSOR (ITEMS ② AND ③) TO ITEM ① PER MIL-STD-130
13. HEATER, SENSOR AND BONDING OUTLINE IS OPTIONAL EXCEPT WHERE NOTED BUT THEY ARE NOT TO EXCEED OUTLINE OF METAL PART OR TO ENTER TAPPED OR CLEARANCE HOLES. WIRE ROUTING IS TO BE CLEAR OF TAPPED OR CLEARANCE HOLES
14. SUPPLIER OF HEATERS AND SENSORS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2
15. HEATERS TO BE INTERWOVEN. ALTERNATE: HEATERS MAY BE PLACED ONE ABOVE THE OTHER EXCEPT PRIMARY HEATER (BLUE LEADS) MUST BE IN CONTACT WITH ITEM ①

ORIGINAL SOURCE OF SUPPLY
COX AND CO, INC
NEW YORK 1, NEW YORK

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQD	WIRE, ELECTRICAL E-30 19 STRAND, YELLOW		MIL-W-16878		12
AS REQD	WIRE, ELECTRICAL, NO. 30		MIL-W-3861 TYPE S, S CTD		11
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, BLUE		MIL-W-16878		10
AS REQD	WIRE, ELECTRICAL, E32, 7 STRAND, PINK				9
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, RED		MIL-W-16878		8
AS REQD	SOLDER, COMP SN 10, WARP 2		QQ-S-571		7
8	TERMINAL, INSULATED	1000100-3			6
AS REQD	INSULATING COMPOUND	1000144			5
AS REQD	INSULATION, ELECTRICAL, SIZE NO 18, WHITE, FORM V		MIL-I-2212		4
2	HEATER ASSEMBLY				3
1	SENSOR ASSEMBLY				2
1	MOUNT, TAPERED, 25 IRIG, MOD 1	1000039			1

LIST OF PARTS AND MATERIALS

1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153

		DATE
APPROVED		1/21/62
CHECKED		
DRAWN	L MILLS	8-1-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL W Ka 2 Nov 62

HEATER AND TAPERED MOUNT ASSEMBLY 25 IRIG

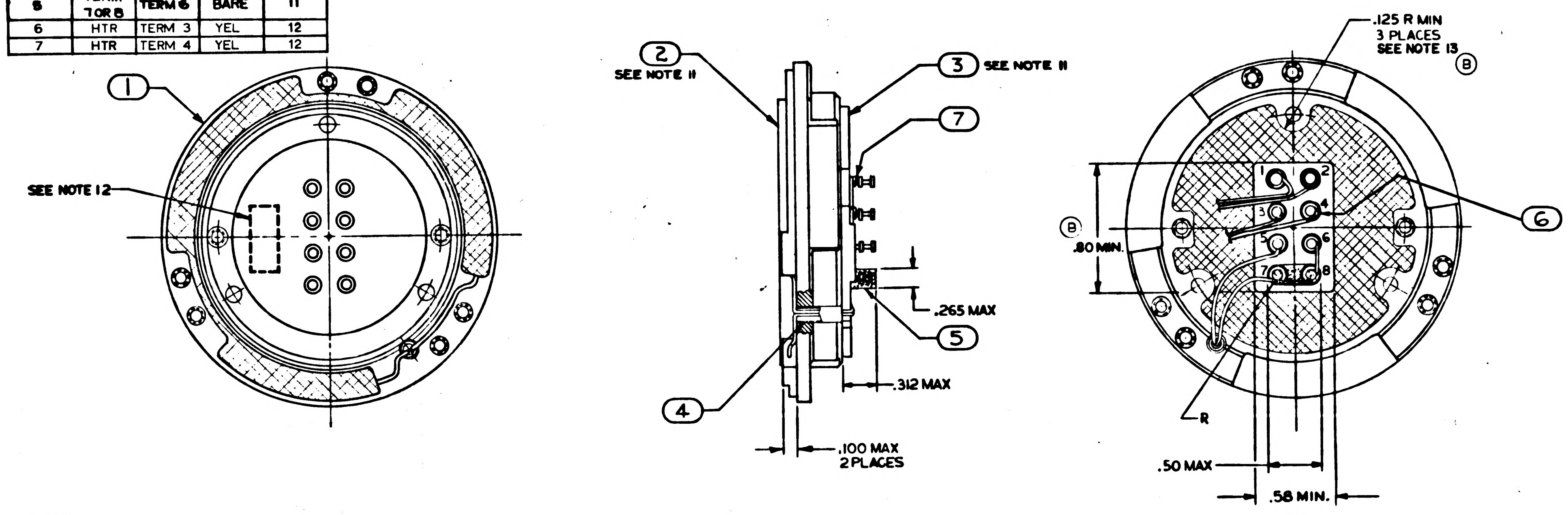
SCALE	UNIT WT	CODE IDENT
2/1	—	—

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO D-94414
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000126
SHEET 1 OF 1

1000126 A

REVISIONS TDRR [illegible]			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS	-4-62	MK
B	TDRR 00300	-30-63	MK

WIRING LEGEND				
WIRE NO.	FROM	TO	COLOR	FIND NO.
1	SNS	TERM. 5	RED	8
2	SNS	TERM 7 OR 8	PINK	9
3	HTR	TERM. 1	BLU	10
4	HTR	TERM. 2	BLU	10
5	TERM 7 OR 8	TERM 6	BARE	11
6	HTR	TERM 3	YEL	12
7	HTR	TERM 4	YEL	12



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
Ⓑ 2. HEATERS AND SENSOR SHALL CONFORM TO PS1000126
3. HEATER SHALL HAVE THE FOLLOWING CHARACTERISTICS
   VOLTAGE: 30 VDC MAX
   RESISTANCE 2480 Ω ± 3% AT 133°F ± 1°F
   POWER CONSUMPTION 3.75 WATTS MAX
4. HEATER TO BE WOUND WITH WIRE WITH TEMP COEFF OF .000072 Ω/Ω/°F MAX
5. TEMP SENSOR ITEM ② TO HAVE A RESISTANCE OF 126.7 Ω ±.1 Ω AT 133°F ± 1°F USING 10 MA ± 2 % CURRENT WHEN MEASURED BETWEEN TERMINALS 5 & 6 PADDING RESISTANCE 7.4 Ω MAX
6. HEATER AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND
7. SENSORS TO BE WOUND WITH A WIRE TEMP COEFF OF .0025 Ω/Ω/°F ± 4%
8. CARE SHOULD BE TAKEN NOT TO UNSOLDER CONNECTION AT TERMINAL 7 OR 8 DO NOT TAMPER WITH PINK WIRE (ITEM ⑨) OR POTTING (ITEM ⑤) ON TERMINAL 7 OR 8
9. MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD
10. ALL SOLDERED CONNECTIONS TO BE PER MIL-STD-440 USING ITEM ⑦
11. METHOD OF FABRICATING THE HEATER AND SENSOR, AND THE BONDING OF SAME TO THE TAPERED MOUNT IS A PROPRIETARY PROCESS OF COX AND CO, INC
Ⓑ 12. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL, AT THE INDICATED LOCATION BEFORE ASSEMBLING HEATER AND SENSOR (ITEMS ② AND ③) TO ITEM ① PER MIL-STD-130
13. HEATER, SENSOR AND BONDING OUTLINE IS OPTIONAL EXCEPT WHERE NOTED BUT THEY ARE NOT TO EXCEED OUTLINE OF METAL PART OR TO ENTER TAPPED OR CLEARANCE HOLES. WIRE ROUTING IS TO BE CLEAR OF TAPPED OR CLEARANCE HOLES
14. SUPPLIER OF HEATERS AND SENSORS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND1015404 SECTION 2
15 HEATERS TO BE INTERWOVEN.
   ALTERNATE: HEATERS MAY BE PLACED ONE ABOVE THE OTHER EXCEPT PRIMARY HEATER (BLUE LEADS) MUST BE IN CONTACT WITH ITEM ①

ORIGINAL SOURCE OF SUPPLY
COX AND CO, INC
Ⓑ 115 EAST 23 ST.
NEW YORK 1, N.Y.

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO	
AS REQD	WIRE, ELECTRICAL E-30 19 STRAND, YELLOW		MIL-W-16878		12	
AS REQD	WIRE, ELECTRICAL, NO. 30		QQ-W-343 TYPE S, S CTD		11	Ⓑ
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, BLUE		MIL-W-16878		10	
AS REQD	WIRE, ELECTRICAL, E32, 7 STRAND, PINK		MIL-W-16878		9	Ⓑ
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, RED		MIL-W-16878		8	
AS REQD	SOLDER, COMP SN 10, WARP2		QQ-S-571		7	
8	TERMINAL, INSULATED	1000100-3			6	
AS REQD	INSULATING COMPOUND	1000144			5	
AS REQD	INSULATION, SLEEVING, ELECTRICAL	1006776-18			4	Ⓑ
2	HEATER ASSEMBLY			SEE NOTE 11	3	Ⓑ
1	SENSOR ASSEMBLY			SEE NOTE 11	2	Ⓑ
1	MOUNT, TAPERED, 25 IRIG, MOD I	1000039			1	

LIST OF PARTS AND MATERIALS

	DL1000201	Ⓑ
1000005	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153

		DATE
APPROVED	[illegible]	1/21/62
CHECKED		
DRAWN	L MILLS	8-1-62

APPROVED FOR MSC
[illegible]
BY DIRECTION
MIT APPROVAL W Kupfer 2 Nov 62

HEATER AND TAPERED MOUNT ASSEMBLY 25 IRIG

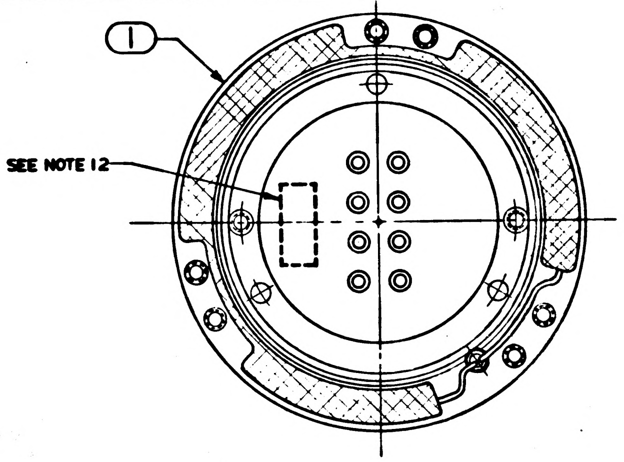
SCALE	UNIT WT	CODE IDENT
2/1	—	—

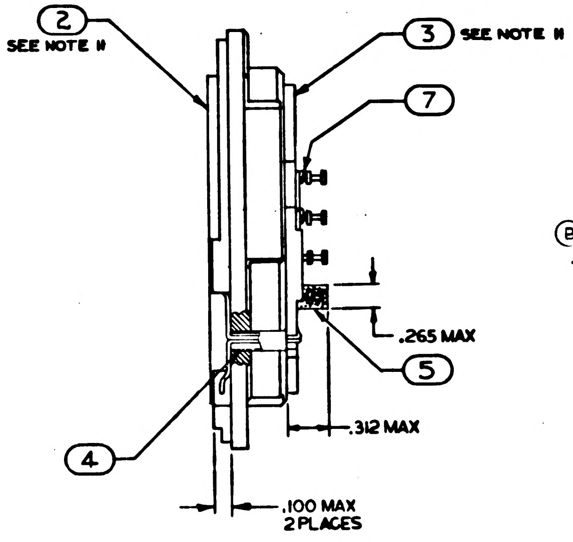
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO D-34414
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000126
SHEET 1 OF 1

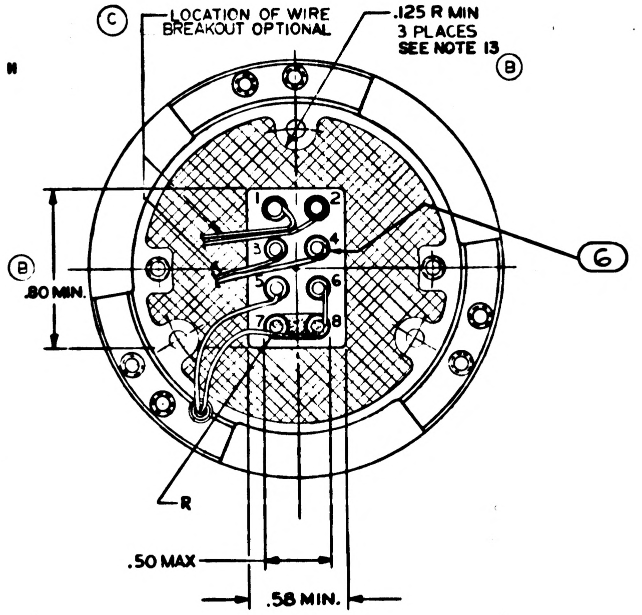
1000126 A

REVISIONS TDRR [illegible]			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS	-4-62	WK
B	TDRR 00300	1-30-63	WK
C	TDRR 00607	3-20-63	WK

WIRING LEGEND				
WIRE NO.	FROM	TO	COLOR	FIND NO.
1	SNS	TERM. 5	RED	8
2	SNS	TERM 7 OR 8	PINK	9
3	HTR	TERM. 1	BLU	10
4	HTR	TERM. 2	BLU	10
5	TERM 7 OR 8	TERM 6	BARE	11
6	HTR	TERM 3	YEL	12
7	HTR	TERM 4	YEL	12







NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
Ⓑ 2. HEATERS AND SENSOR SHALL CONFORM TO PS1000126
Ⓒ 3. HEATERS SHALL HAVE THE FOLLOWING CHARACTERISTICS
   VOLTAGE: 30 VDC
   RESISTANCE 2480 Ω ± 3% AT 133°F ± 1°F
   POWER CONSUMPTION .375 WATTS MAX
Ⓒ 4. HEATERS TO BE WOUND WITH WIRE WITH TEMP COEFF OF .000072 Ω/Ω/°F MAX
Ⓒ 5. CALIBRATION: TEMP SENSOR ITEM ② TO HAVE A RESISTANCE OF 126.6 Ω ±.1 Ω AT 133°F ±.1°F USING 1.0 MA ± 2% CURRENT WHEN MEASURED BETWEEN TERMINALS 5 & 6 PADDING RESISTANCE 7.4 Ω MAX
6. HEATER AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND
Ⓒ 7. SENSOR TEMPERATURE COEFFICIENT: .00220 Ω/Ω°F ± 4% AT 133°F
8. CARE SHOULD BE TAKEN NOT TO UNSOLDER CONNECTION AT TERMINAL 7 OR 8 DO NOT TAMPER WITH PINK WIRE (ITEM ⑨) OR POTTING (ITEM ⑤) ON TERMINAL 7 OR 8
9. MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD
10. ALL SOLDERED CONNECTIONS TO BE PER MIL-STD-440 USING ITEM ⑦
11. METHOD OF FABRICATING THE HEATER AND SENSOR, AND THE BONDING OF SAME TO THE TAPERED MOUNT IS A PROPRIETARY PROCESS OF COX AND CO, INC
Ⓑ 12. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL, AT THE INDICATED LOCATION BEFORE ASSEMBLING HEATER AND SENSOR (ITEMS ② AND ③) TO ITEM ① PER MIL-STD-130
13. HEATER, SENSOR AND BONDING OUTLINE IS OPTIONAL EXCEPT WHERE NOTED BUT THEY ARE NOT TO EXCEED OUTLINE OF METAL PART OR TO ENTER TAPPED OR CLEARANCE HOLES. WIRE ROUTING IS TO BE CLEAR OF TAPPED OR CLEARANCE HOLES
14. SUPPLIER OF HEATERS AND SENSORS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2
15. HEATERS TO BE INTERWOVEN. ALTERNATE: HEATERS MAY BE PLACED ONE ABOVE THE OTHER EXCEPT PRIMARY HEATER (BLUE LEADS) MUST BE IN CONTACT WITH ITEM ①
Ⓒ 16. SENSOR OPERATING CURRENT 14.5 MA ± 2% SELF HEATING EFFECT, RESISTANCE RISE 0.1 Ω MAX
Ⓒ 17. HEATERS MUST BE CAPABLE OF WITHSTANDING 35VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE

ORIGINAL SOURCE OF SUPPLY
COX AND CO, INC
Ⓑ 115 EAST 23 ST.
NEW YORK 1, N.Y.

MASTER

AS REQD	WIRE, ELECTRICAL E-30 19 STRAND, YELLOW		MIL-W-16878		12
AS REQD	WIRE, ELECTRICAL, NO. 26		QQ-W-343 TYPE S, S CTD		11
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, BLUE		MIL-W-16878		10
AS REQD	WIRE, ELECTRICAL, E32, 7 STRAND, PINK HIGH RESISTANCE				9
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, RED		MIL-W-16878		8
AS REQD	SOLDER, COMP SN 10, WARP2		QQ-S-571		7
8	TERMINAL, INSULATED	1000100-3			6
AS REQD	INSULATING COMPOUND	1000144			5
AS REQD	INSULATION, SLEEVING, ELECTRICAL	1006776-18			4
2	HEATER ASSEMBLY			SEE NOTE 11	3
1	SENSOR ASSEMBLY			SEE NOTE 11	2
1	MOUNT, TAPERED, 25 IRIG, MOD I	1000039			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
LIST OF PARTS AND MATERIALS					

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED [illegible] DATE 11/21/62
CHECKED
DRAWN L MILLS 9-4-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVED [illegible] 2/10/62

HEATER AND TAPERED MOUNT ASSEMBLY 25 IRIG

SCALE 2/1
UNIT WT —
CODE IDENT —

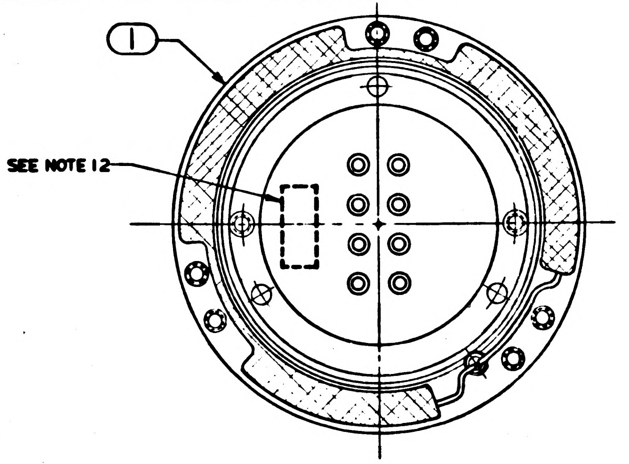
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO D-94414
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000126
SHEET 1 OF 1

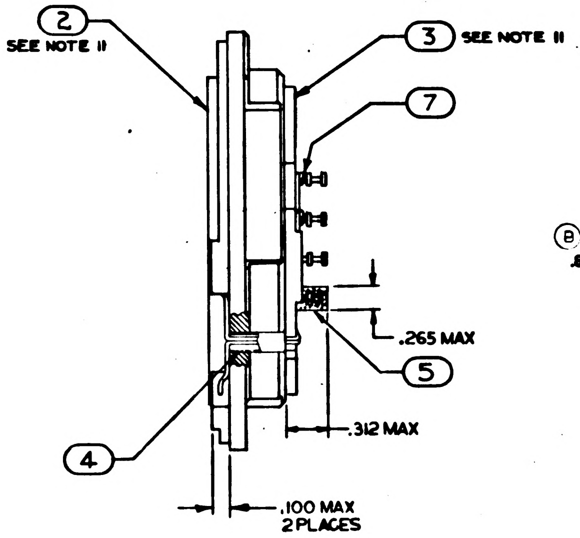
1000126 C

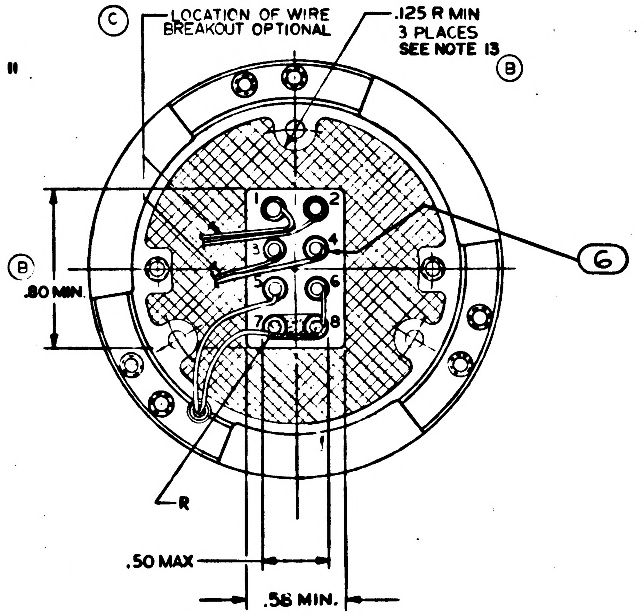
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS	-4-62	ajB
B	TDRR 00300	-30-63	ajB
C	TDRR 00607	3-20-63	ajB
D	TDRR 0 527	6-11-63	ajB

WIRING LEGEND				
WIRE NO.	FROM	TO	COLOR	FIND NO.
1	SNS	TERM. 5	RED	8
2	SNS	TERM 7 OR 8	PINK	9
3	HTR	TERM. 1	BLU	10
4	HTR	TERM. 2	BLU	10
5	TERM 7 OR 8	TERM 6	BARE	11
6	HTR	TERM 3	YEL	12
7	HTR	TERM 4	YEL	12







NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
Ⓓ Ⓑ 2. HEATERS AND SENSOR SHALL CONFORM TO ND 1002115
Ⓒ 3. HEATERS SHALL HAVE THE FOLLOWING CHARACTERISTICS
VOLTAGE: 30 VDC
RESISTANCE 2480 Ω ± 3% AT 133°F ± 1°F
POWER CONSUMPTION .375 WATTS MAX
Ⓒ 4. HEATERS TO BE WOUND WITH WIRE WITH TEMP COEFF OF .000072 Ω/Ω/°F MAX
Ⓒ 5. CALIBRATION: TEMP SENSOR ITEM ② TO HAVE A RESISTANCE OF 126.6 Ω ±.1 Ω AT 133°F ±.1°F USING 1.0 MA ± 2 % CURRENT WHEN MEASURED BETWEEN TERMINALS 5 & 6 PADDING RESISTANCE 7.4 Ω MAX
6. HEATER AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND
Ⓒ 7. SENSOR TEMPERATURE COEFFICIENT: .00220 Ω/Ω°F ± 4% AT 133°F
8. CARE SHOULD BE TAKEN NOT TO UNSOLDER CONNECTION AT TERMINAL 7 OR 8 DO NOT TAMPER WITH PINK WIRE (ITEM ⑨) OR POTTING (ITEM ⑤) ON TERMINAL 7 OR 8
9. MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD
10. ALL SOLDERED CONNECTIONS TO BE PER MIL-STD-440 USING ITEM ⑦
11. METHOD OF FABRICATING THE HEATER AND SENSOR, AND THE BONDING OF SAME TO THE TAPERED MOUNT IS A PROPRIETARY PROCESS OF COX AND CO, INC
Ⓑ 12. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL, AT THE INDICATED LOCATION BEFORE ASSEMBLING HEATER AND SENSOR (ITEMS ② AND ③) TO ITEM ① PER MIL-STD-130
13. HEATER, SENSOR AND BONDING OUTLINE IS OPTIONAL EXCEPT WHERE NOTED BUT THEY ARE NOT TO EXCEED OUTLINE OF METAL PART OR TO ENTER TAPPED OR CLEARANCE HOLES. WIRE ROUTING IS TO BE CLEAR OF TAPPED OR CLEARANCE HOLES
14. SUPPLIER OF HEATERS AND SENSORS SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 2
15. HEATERS TO BE INTERWOVEN.
ALTERNATE: HEATERS MAY BE PLACED ONE ABOVE THE OTHER EXCEPT PRIMARY HEATER (BLUE LEADS) MUST BE IN CONTACT WITH ITEM ①
Ⓒ 16. SENSOR OPERATING CURRENT 14.5 MA ± 2%, SELF HEATING EFFECT, RESISTANCE RISE 0.1 Ω MAX
Ⓒ 17. HEATERS MUST BE CAPABLE OF WITHSTANDING 35VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE

ORIGINAL SOURCE OF SUPPLY
COX AND CO, INC
Ⓑ 115 EAST 23 ST.
NEW YORK 1, N.Y.

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQD	WIRE, ELECTRICAL E-30 19 STRAND, YELLOW		MIL-W-16878		12
AS REQD	Ⓒ Ⓑ WIRE, ELECTRICAL, NO. 26		QQ-W-343 TYPE S, S CTD		11
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, BLUE		MIL-W-16878		10
AS REQD	Ⓒ Ⓑ WIRE, ELECTRICAL, E32, 7 STRAND, PINK HIGH RESISTANCE				9
AS REQD	WIRE, ELECTRICAL, E30, 19 STRAND, RED		MIL-W-16878		8
AS REQD	SOLDER, COMP SN 10, WARP2		QQ-S-571		7
8	TERMINAL, INSULATED	1000100-3			6
AS REQD	INSULATING COMPOUND	1000144			5
AS REQD	Ⓑ INSULATION, SLEEVING, ELECTRICAL	1006776-1			4
2	Ⓑ HEATER ASSEMBLY			SEE NOTE 11	3
1	SENSOR ASSEMBLY			SEE NOTE 11	2
1	MOUNT, TAPERED, 25 IRIG, MOD 1	1000039			1

LIST OF PARTS AND MATERIALS

MASTER

	Ⓑ DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED C J Bryan DATE 11/21/62
CHECKED
DRAWN L MILLS 9-4-62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVED W Kupfer 21 Nov 62

HEATER AND
TAPERED MOUNT
ASSEMBLY
25 IRIG

SCALE 2/1
UNIT WT —
CODE IDENT —

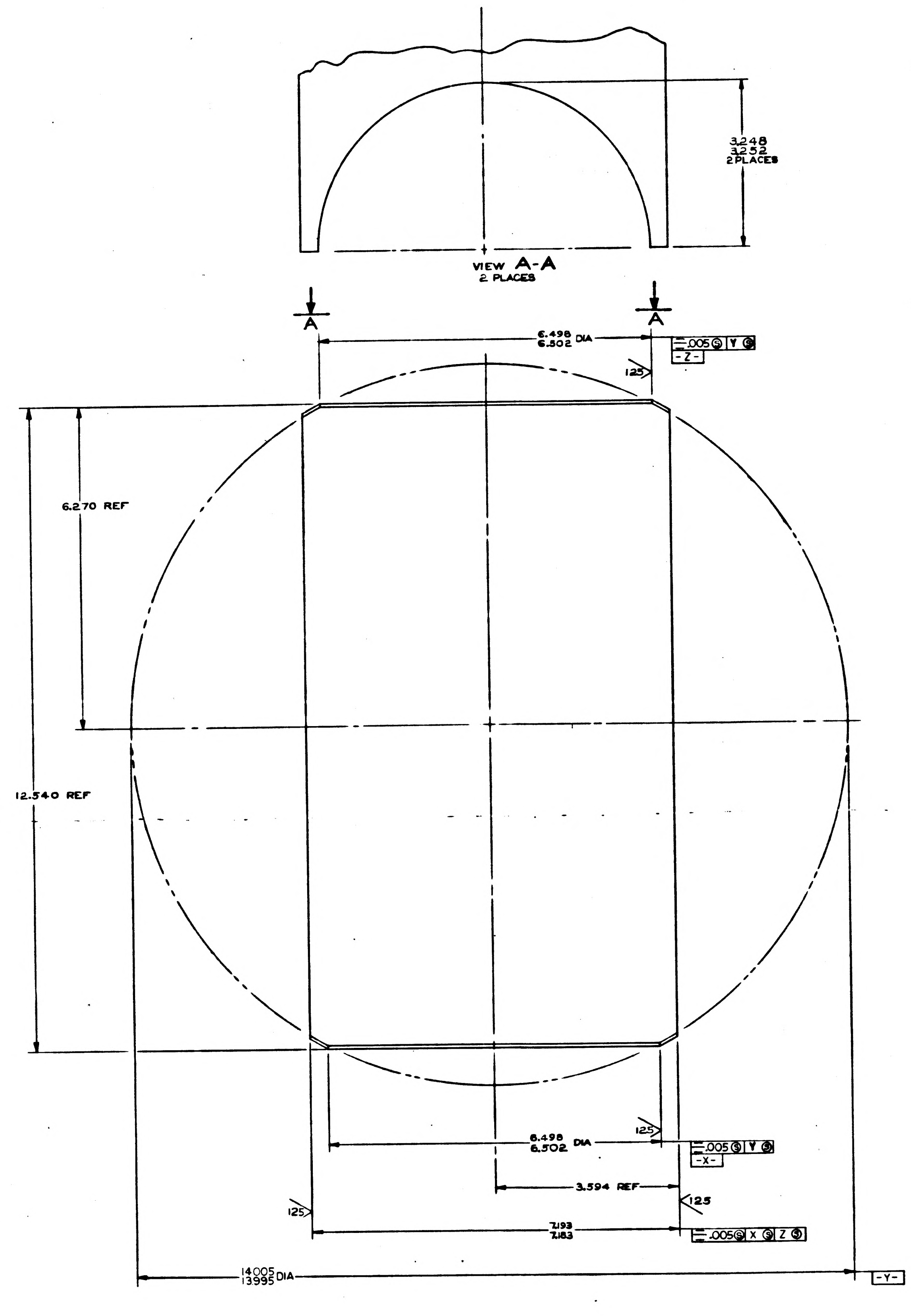
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO D-94414
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000126
SHEET 1 OF 1

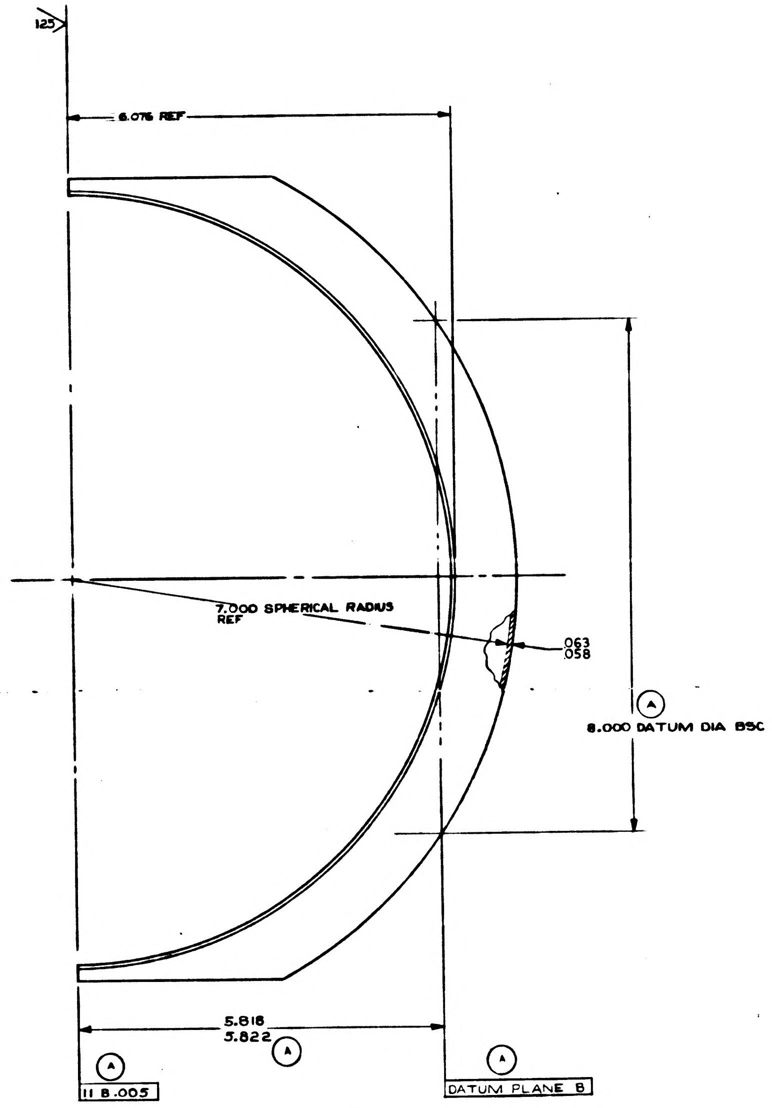
1000126 D

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS TDRR 00077		
A	TDRR 00431	2-6-68	4/26 WR


3.248
3.252
2 PLACES
VIEW A-A
2 PLACES
A
A
6.498
6.502 DIA
.005 Ⓢ Y Ⓢ
-Z-
125
6.270 REF
12.540 REF
6.498
6.502 DIA
125
.005 Ⓢ Y Ⓢ
-X-
3.594 REF
125
125
7.193
7.183
.005 Ⓢ X Ⓢ Z Ⓢ
14.005
13.995 DIA
-Y-


125
6.076 REF
7.000 SPHERICAL RADIUS
REF
.063
.058
Ⓐ
8.000 DATUM DIA BSC
5.818
5.822
Ⓐ
Ⓐ
Ⓐ
11 B .005
DATUM PLANE B

NOTES:

Ⓐ 1. AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DRAWING NO; REVISION LETTER AND MANUFACTURERS SYMBOL
Ⓐ PER MIL-STD-130

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

Ⓐ

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL1000201
1000083	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
APPROVED
CHECKED
DRAWN R W C
W J Rhine
MIT

HEMISPHERE
CASE

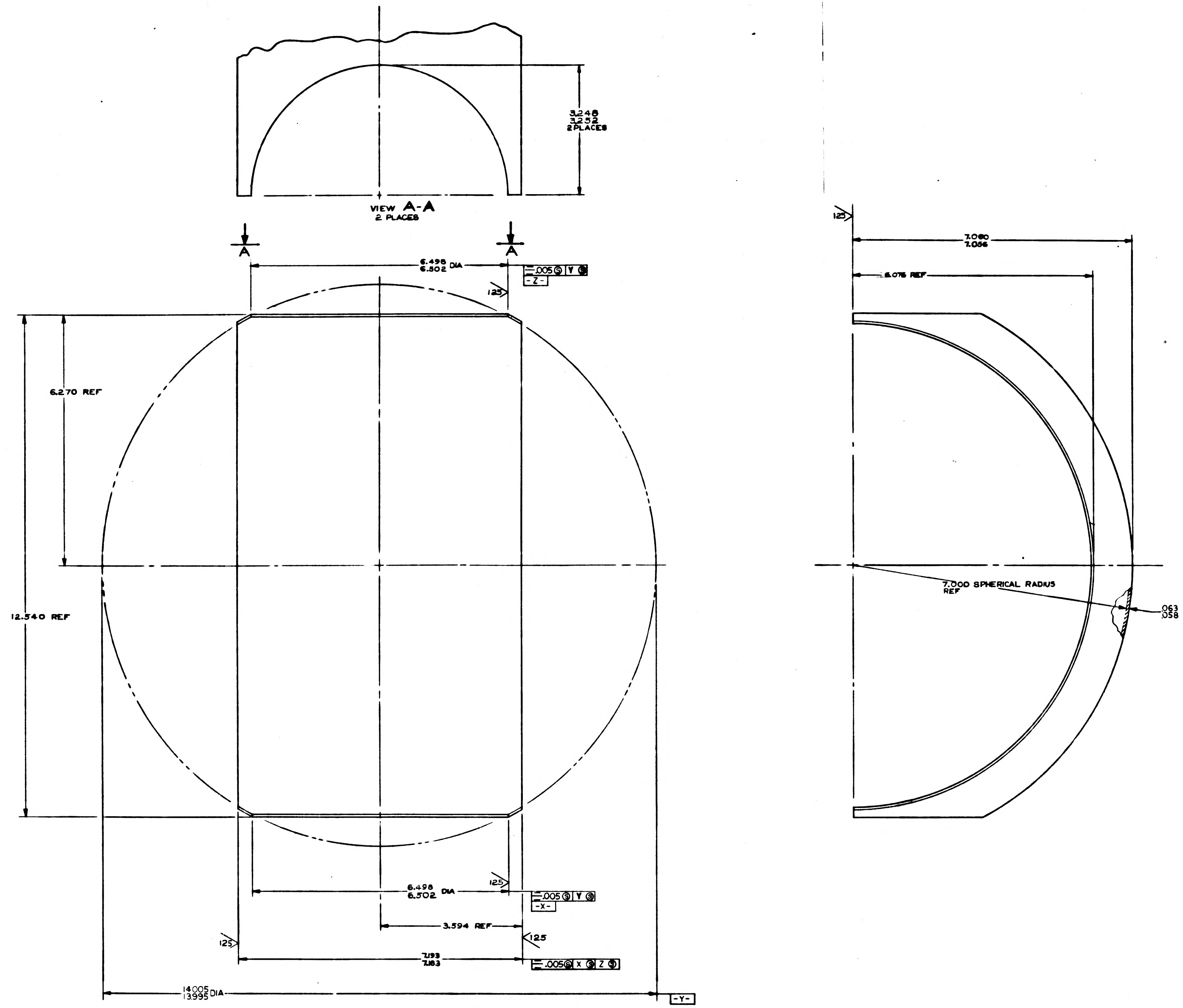
SCALE 1-1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO
1000127
SHEET 1 OF 1

1000127 A

REVISIONS TDRR 00077

SYM	DESCRIPTION	DATE	APPROVAL



3.248
3.252
2 PLACES
VIEW A-A
2 PLACES
A
A
6.498
6.502 DIA
.005 Ⓢ Y Ⓢ
-Z-
125
6.270 REF
12.540 REF
6.498
6.502 DIA
125
.005 Ⓢ Y Ⓢ
-X-
3.594 REF
125
125
7.193
7.183
.005 Ⓢ X Ⓢ Z Ⓢ
14.005
13.995 DIA
-Y-
125
7.060
7.056
6.076 REF
7.000 SPHERICAL RADIUS
REF
.063
.058

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.018}$

INCHES
PHOTOGRAPHIC SCALE ONLY

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000083	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL
AL ALY SH 6061
TEMP T6 ALT SPEC
QQ-A-327B TEMP T6

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN RWC
APPROVED FOR MSC
W J Rhine
BY DIRECTION
MIT
APPROVAL
10/31/64

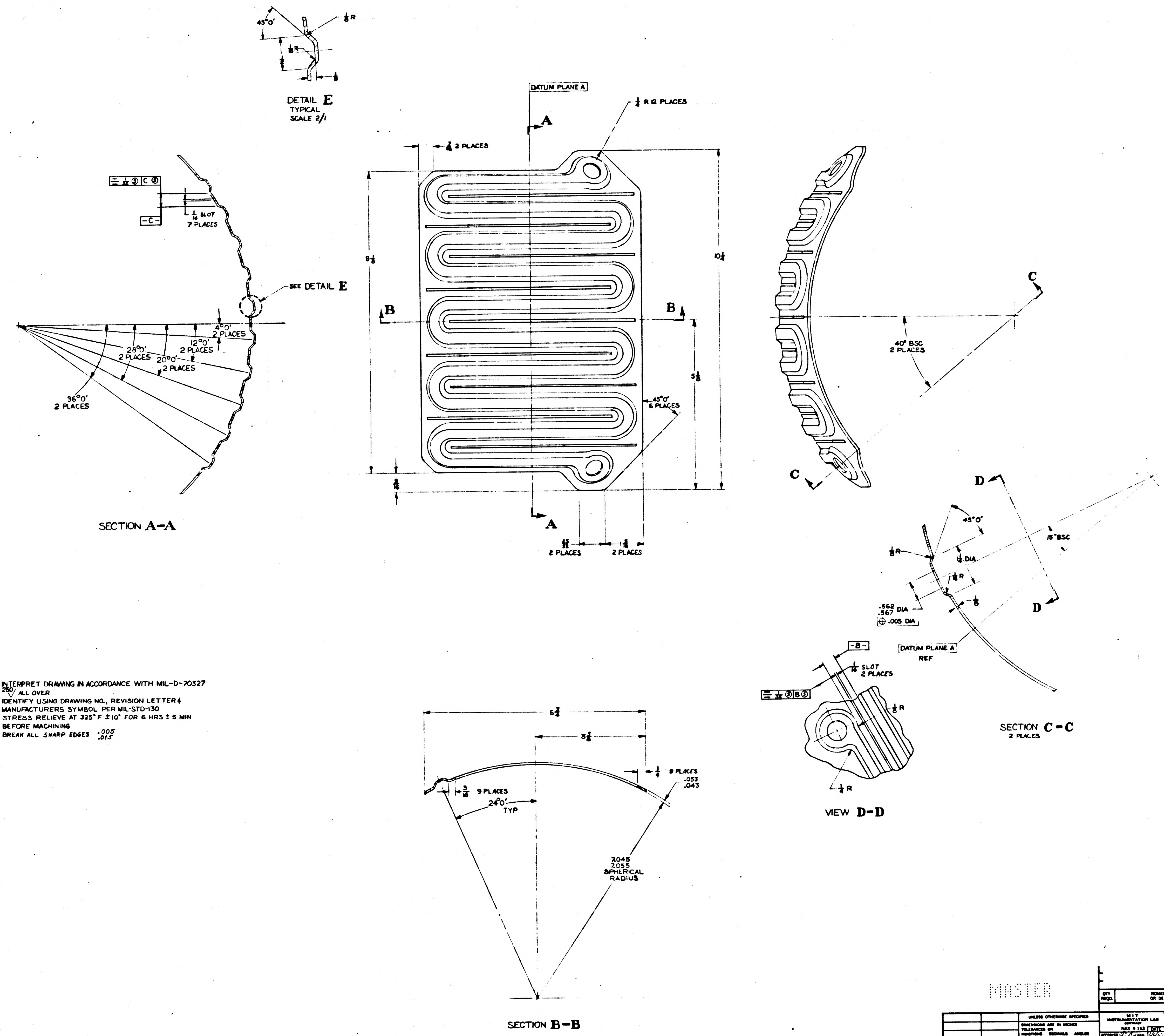
HEMISPHERE CASE

SCALE 1-1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000127
SHEET 1 OF 1

1000127

REVISIONS TDRR 00221				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


DETAIL E
TYPICAL
SCALE 2/1
45°0'
1/8 R
DATUM PLANE A
1/8 R 12 PLACES
7/16 2 PLACES
A
B
B
9 1/8
10 1/4
5 1/8
45°0' 6 PLACES
3/16
A
9/32 2 PLACES
1 1/8 2 PLACES
1/16 SLOT 7 PLACES
-C-
SEE DETAIL E
4°0' 2 PLACES
12°0' 2 PLACES
20°0' 2 PLACES
28°0' 2 PLACES
36°0' 2 PLACES
SECTION A-A
C
C
40° BSC 2 PLACES
D
D
45°0'
15° BSC
1/8 R
1/4 DIA
1/8 R
1/8
.562 .567 DIA
.005 DIA
DATUM PLANE A REF
SECTION C-C
2 PLACES
-B-
1/16 SLOT 2 PLACES
1/8 R
1/4 R
VIEW D-D
6 3/4
3 3/8
1/4 9 PLACES
.053 .043
3/16 9 PLACES
24°0' TYP
2.045 2.055 SPHERICAL RADIUS
SECTION B-B

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 250√ ALL OVER
3. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
4. STRESS RELIEVE AT 325°F ±10° FOR 6 HRS ± 5 MIN BEFORE MACHINING
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000083	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ——— ANGLES ± 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY SH 6061 TEMP O ALT SPEC QQ-A-327 TEMP O

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	[illegible]	2/6/63
CHECKED		
DRAWN	C.M. WHITE	[illegible] 62
APPROVED FOR MSC	[illegible]	
MIT/IL APPROVAL	W Kupfer	[illegible]

HEAT EXCHANGER
CASE

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000128
SHEET 1 OF 1

1000128

A 1000130

REVISIONS TDRR 00086

SYM	DESCRIPTION	DATE	APPROVAL
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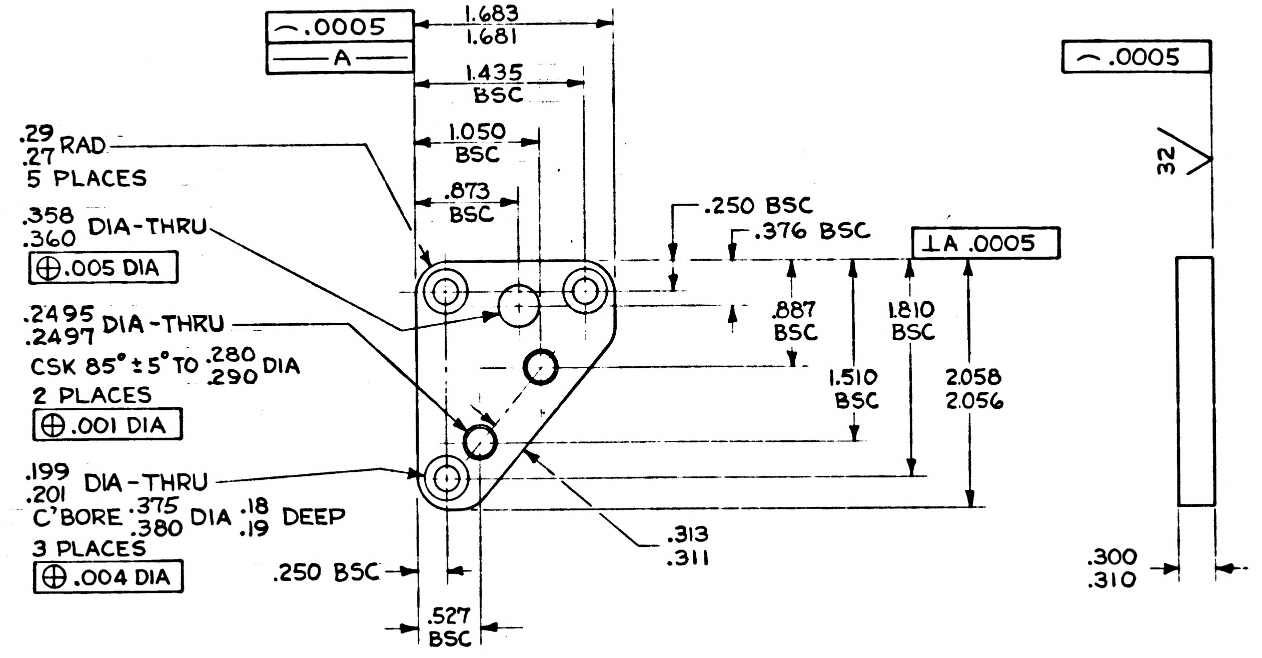


⌒ .0005
A
1.683
1.681
1.435 BSC
1.050 BSC
.873 BSC
.29 .27 RAD 5 PLACES
.358 .360 DIA-THRU
⊕ .005 DIA
.2495 .2497 DIA-THRU
CSK 85° ± 5° TO .280 .290 DIA
2 PLACES
⊕ .001 DIA
.199 .201 DIA-THRU
C'BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⊕ .004 DIA
.250 BSC
.527 BSC
.313
.311
.250 BSC
.376 BSC
⊥ A .0005
.887 BSC
1.810 BSC
1.510 BSC
2.058
2.056
⌒ .0005
32
.300
.310

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

(A)

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN COLD SPEC QQ-S-763

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	11/8/62
CHECKED		
DRAWN	RES	10-30-62

APPROVED FOR MSC
WJ Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W.I. Cuyler 8 Nov 1962

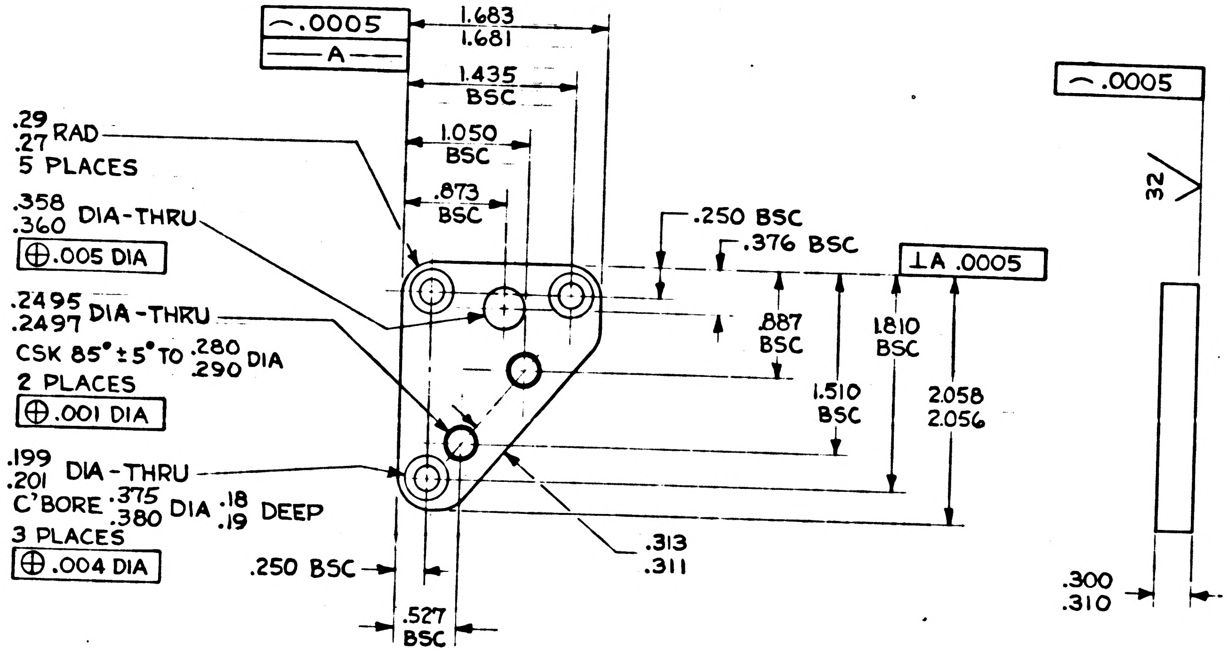
PAD
CASE MOUNTING
IX RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000130
SHEET 1 OF 1

1000130

SYM	REVISIONS DESCRIPTION	DATE	APPROVAL
	TDRR 00086		



⌒ .0005
A
1.683
1.681
1.435 BSC
1.050 BSC
.873 BSC
.29
.27 RAD
5 PLACES
.358
.360 DIA-THRU
⊕ .005 DIA
.2495
.2497 DIA-THRU
CSK 85° ± 5° TO .280
.290 DIA
2 PLACES
⊕ .001 DIA
.199
.201 DIA-THRU
C'BORE .375
.380 DIA .18
.19 DEEP
3 PLACES
⊕ .004 DIA
.250 BSC
.527 BSC
.313
.311
.250 BSC
.376 BSC
⊥A .0005
.887 BSC
1.810 BSC
1.510 BSC
2.058
2.056
⌒ .0005
32
.300
.310

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63⁄ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN HOT SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	RES	10-30-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W J Cuffe 8 Nov 1962

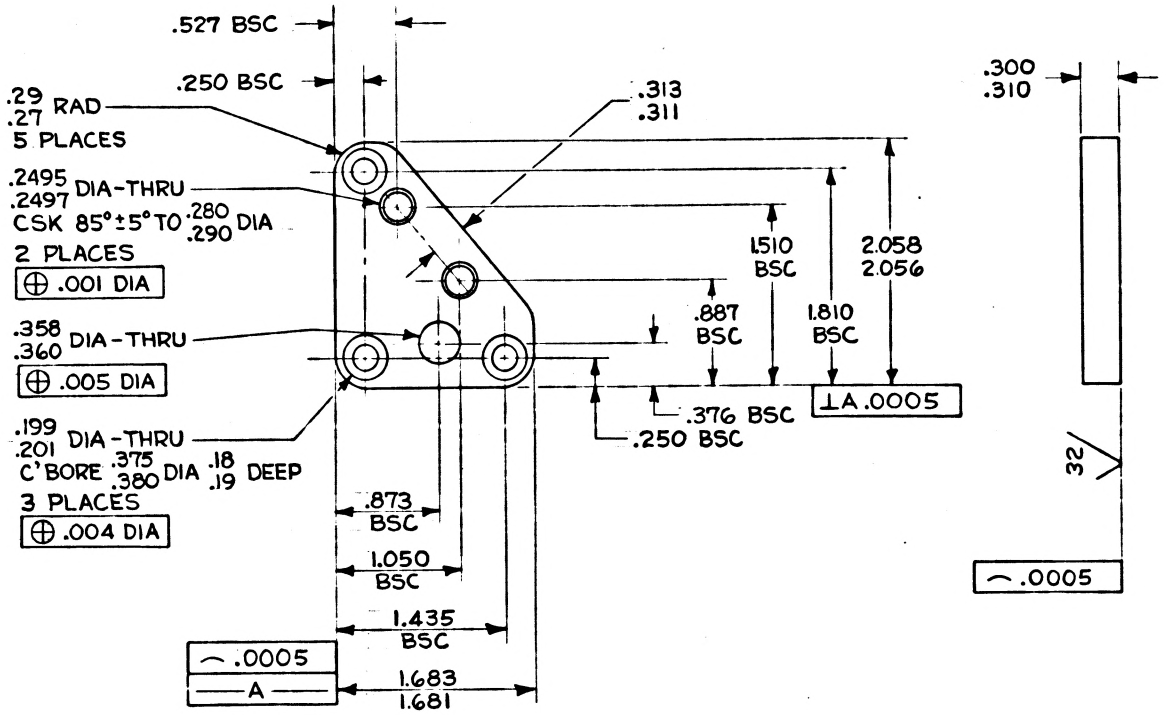
PAD
CASE MOUNTING
IX RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000130
SHEET 1 OF 1

1000131 A

REVISIONS TDRR 00086			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00342	2-12-63	WR



.527 BSC
.250 BSC
.29 .27 RAD
5 PLACES
.2495 .2497 DIA-THRU
CSK 85°±5° TO .280 .290 DIA
2 PLACES
⊕ .001 DIA
.358 .360 DIA-THRU
⊕ .005 DIA
.199 .201 DIA-THRU
C'BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⊕ .004 DIA
.313 .311
1.510 BSC
2.058 2.056
.887 BSC
1.810 BSC
⊥A .0005
.376 BSC
.250 BSC
.873 BSC
1.050 BSC
1.435 BSC
⌒ .0005
A
1.683 1.681
.300 .310
32
⌒ .0005

NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES $^{.005}_{.015}$
3 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

Ⓐ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN COLD SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A. J. Boyce	11/8/62
CHECKED		
DRAWN	RES	10-30-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
8 Nov 62

PAD
CASE MOUNTING
IX LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

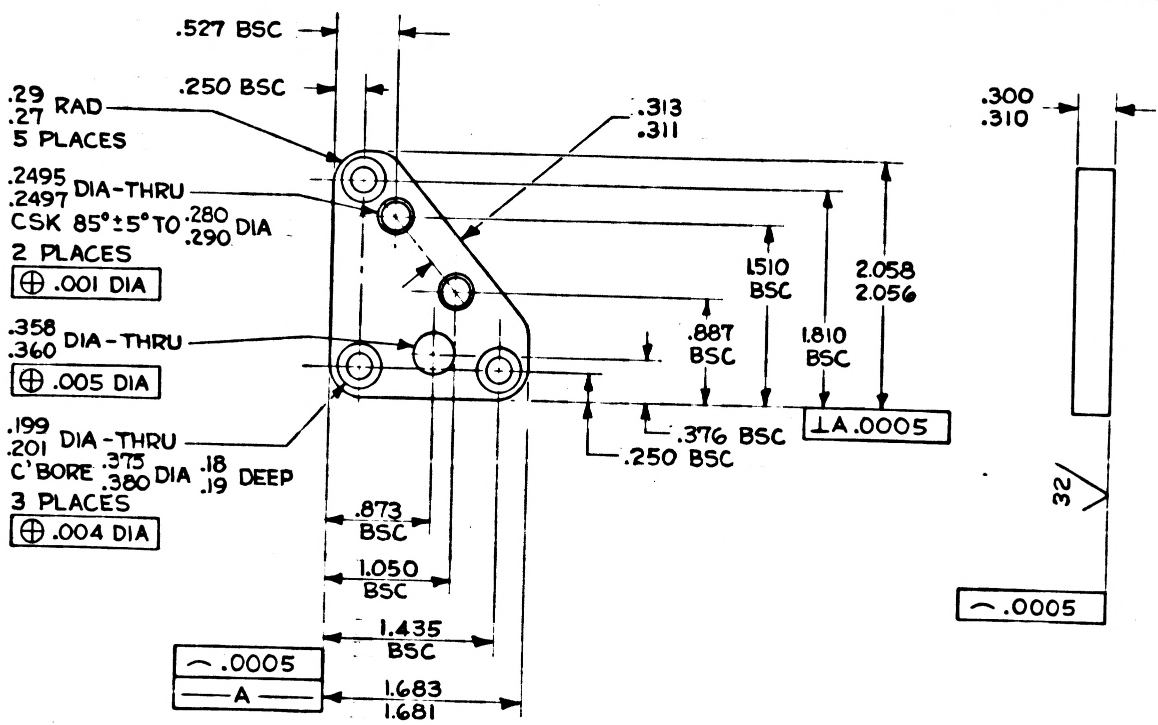
NASA DRAWING NO.
1000131.

SHEET 1 OF 1

1000131

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 00086



.527 BSC
.250 BSC
.29 .27 RAD 5 PLACES
.2495 .2497 DIA-THRU CSK 85°±5° TO .280 .290 DIA 2 PLACES
⊕ .001 DIA
.313 .311
.358 .360 DIA-THRU
⊕ .005 DIA
.199 .201 DIA-THRU C'BORE .375 .380 DIA .18 .19 DEEP 3 PLACES
⊕ .004 DIA
1.510 BSC
2.058 2.056
.887 BSC
1.810 BSC
⊥A .0005
.376 BSC
.250 BSC
.873 BSC
1.050 BSC
1.435 BSC
⌒ .0005
A
1.683 1.681
.300 .310
32
⌒ .0005

NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES $\frac{.005}{.015}$
3 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN HOT SPEC QQ-S-763

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	G. J. Boyce	11/8/62
CHECKED		
DRAWN	RES	10-30-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W Klaus 8 Nov 62

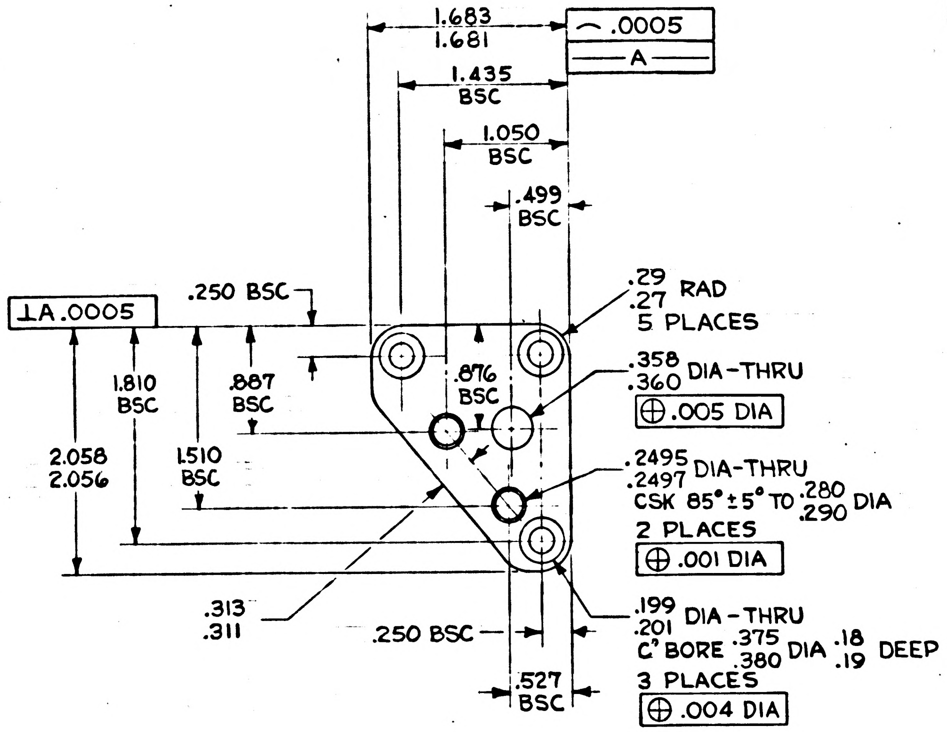
PAD
CASE MOUNTING
IX LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

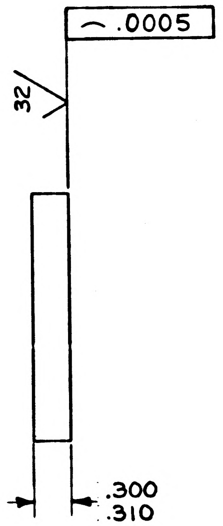
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000131
SHEET 1 OF 1

1000132 A

REVISIONS TDRR 00086			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00343	2-12-63	WK



1.683
1.681
⌒ .0005
A
1.435 BSC
1.050 BSC
.499 BSC
.250 BSC
⊥A .0005
.29
.27 RAD
5 PLACES
1.810 BSC
.887 BSC
.876 BSC
.358
.360 DIA-THRU
⊕ .005 DIA
2.058
2.056
1.510 BSC
.2495
.2497 DIA-THRU
CSK 85° ± 5° TO .280 .290 DIA
2 PLACES
⊕ .001 DIA
.313
.311
.250 BSC
.199
.201 DIA-THRU
C' BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
.527 BSC
⊕ .004 DIA



⌒ .0005
32
.300
.310

NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES $^{.005}_{.015}$
3 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

MASTER

Ⓐ

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIN NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN COLD SPEC QQ-S-763

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	RES	10-30-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W S Kupfer 8 Nov 62

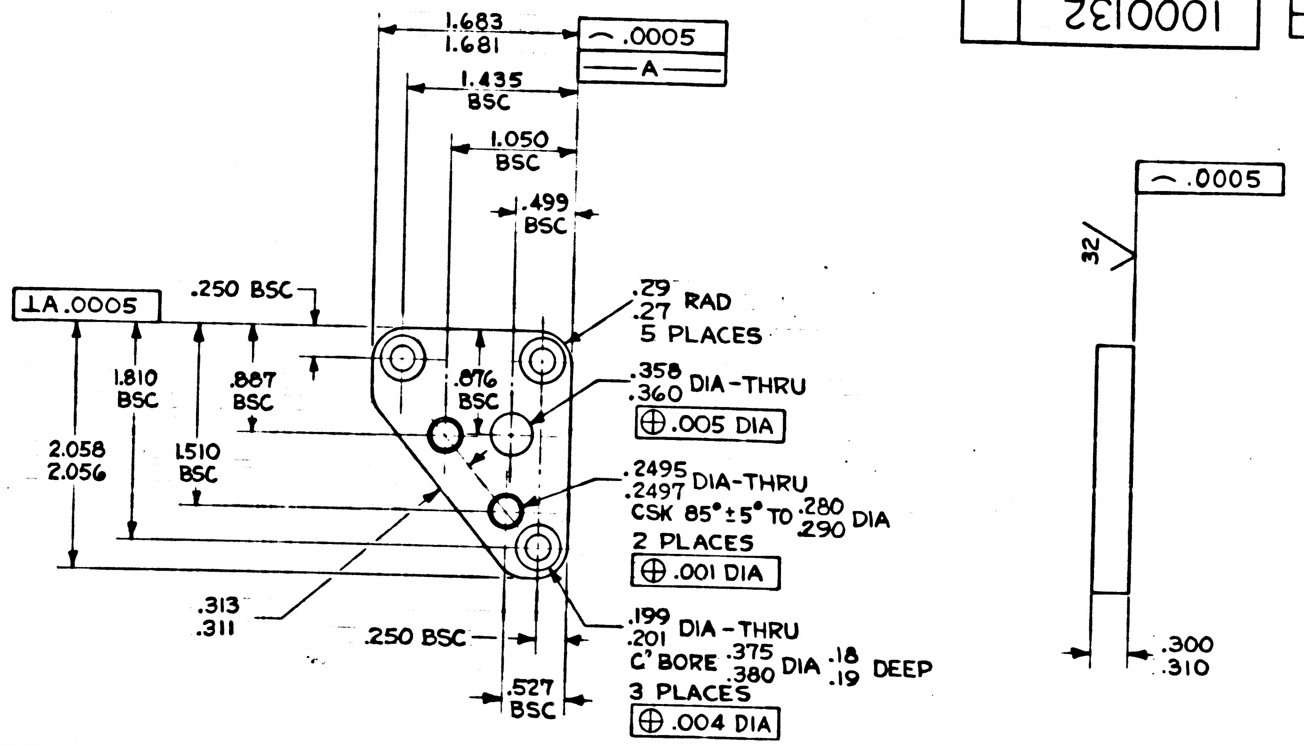
PAD
CASE MOUNTING
15X RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000132
SHEET 1 OF 1

1000132

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00086			


1.683
1.681
⌒ .0005
A
1.435 BSC
1.050 BSC
.499 BSC
⊥A .0005
.250 BSC
.29
.27 RAD
5 PLACES
1.810 BSC
.887 BSC
.876 BSC
2.058
2.056
1.510 BSC
.358
.360 DIA-THRU
⊕ .005 DIA
.2495
.2497 DIA-THRU
CSK 85° ± 5° TO .280 .290 DIA
2 PLACES
⊕ .001 DIA
.313
.311
.250 BSC
.199
.201 DIA-THRU
C' BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⊕ .004 DIA
.527 BSC
⌒ .0005
32
.300
.310

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN HOT SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/8/62
CHECKED		
DRAWN	RES	10-30-62

APPROVED FOR MSC
W J Blume 11-8-62
BY DIRECTION MIT APPROVAL
W A Kuffer 8 Nov 62

PAD
CASE MOUNTING
15X RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000132
SHEET 1 OF 1

1000133 A

REVISIONS TDRR 00086

SYM	DESCRIPTION	DATE	APPROVAL
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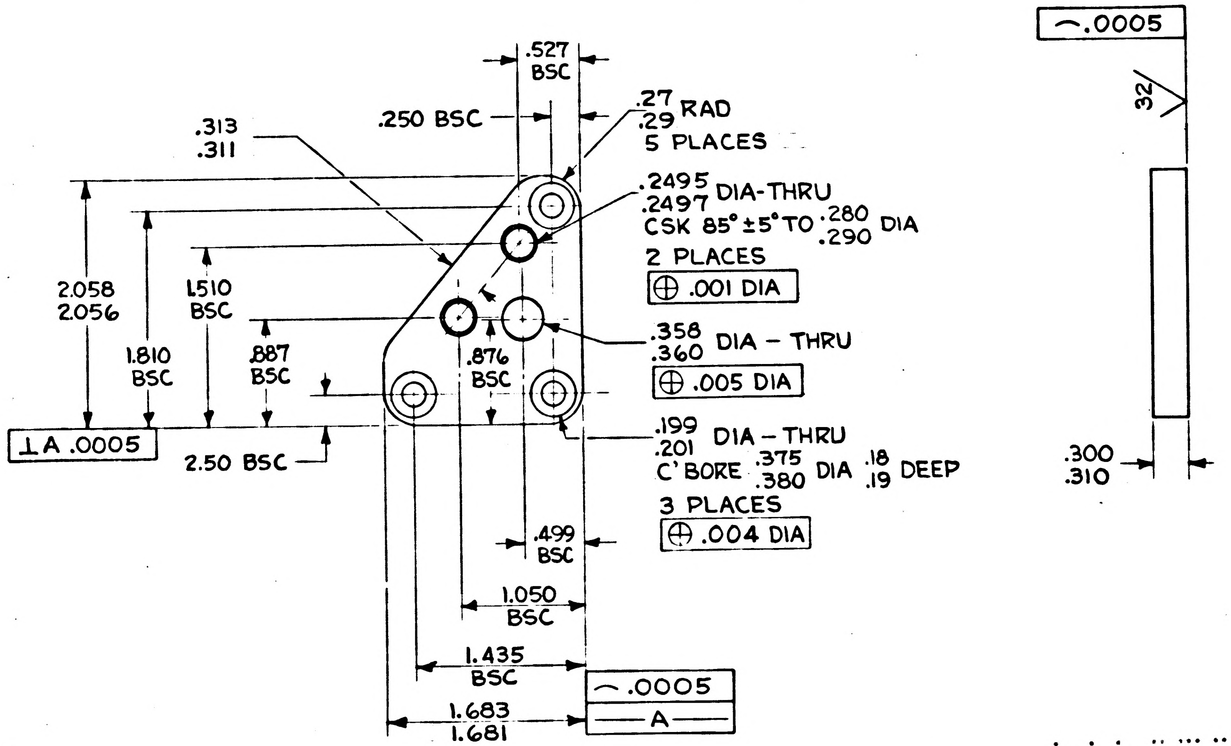

.527 BSC
.250 BSC
.313
.311
.27
.29 RAD
5 PLACES
.2495
.2497 DIA-THRU
CSK 85° ±5° TO .280
.290 DIA
2 PLACES
⊕ .001 DIA
2.058
2.056
1.810 BSC
1.510 BSC
.887 BSC
.876 BSC
.358
.360 DIA - THRU
⊕ .005 DIA
⊥A .0005
2.50 BSC
.199
.201 DIA - THRU
C'BORE .375
.380 DIA .18
.19 DEEP
3 PLACES
⊕ .004 DIA
.499 BSC
1.050 BSC
1.435 BSC
1.683
1.681
⌒ .0005
A
⌒ .0005
32
.300
.310

NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES .005 .015
3 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN COLD SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A. J. Boyce	11/8/62
CHECKED		
DRAWN	RES	10-30-62

APPROVED FOR MSC
W J Rhine 11-8-62
BY DIRECTION MIT APPROVAL
W. Kapp 8 Nov 62

PAD
CASE MOUNTING
15X LEFT HAND

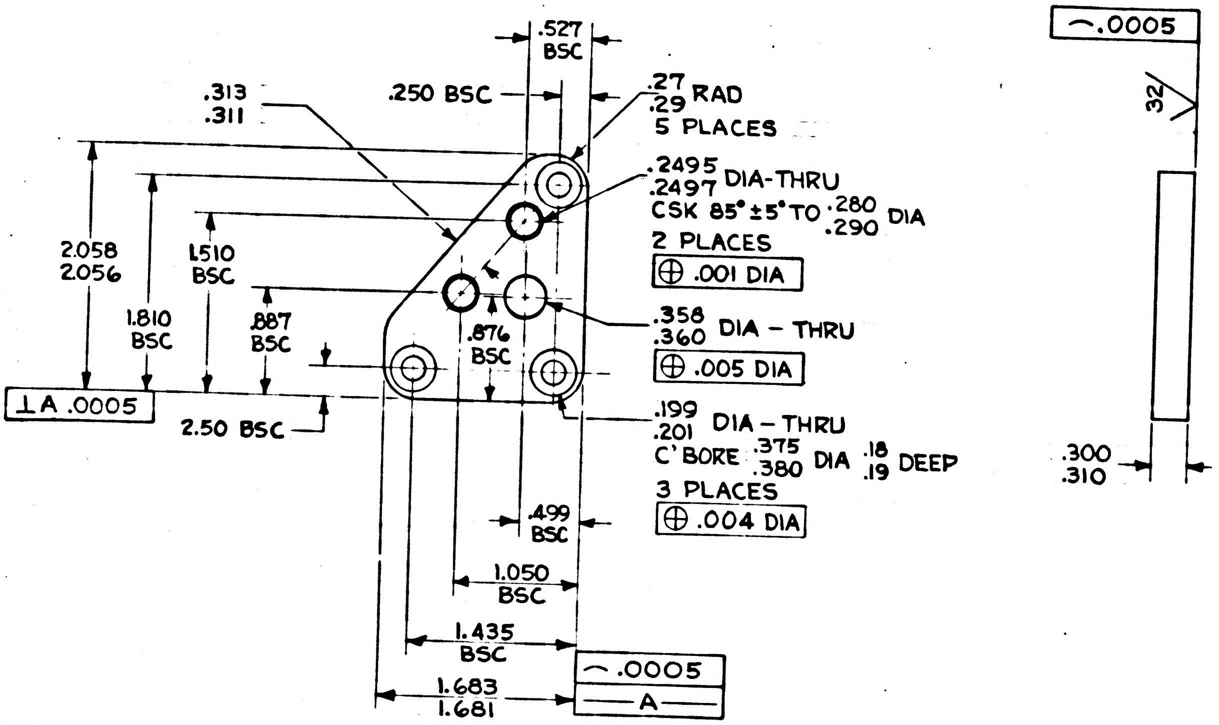
SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000133
SHEET 1 OF 1

1000133

REVISIONS TDRR 00086

SYM	DESCRIPTION	DATE	APPROVAL


.527
BSC
.313
.311
.250 BSC
.27
.29 RAD
5 PLACES
.2495
.2497 DIA-THRU
CSK 85° ±5° TO .280
.290 DIA
2 PLACES
⊕ .001 DIA
2.058
2.056
1.510
BSC
1.810
BSC
.887
BSC
.876
BSC
.358
.360 DIA - THRU
⊕ .005 DIA
⊥A .0005
2.50 BSC
.199
.201 DIA - THRU
C'BORE .375
.380 DIA .18
.19 DEEP
3 PLACES
⊕ .004 DIA
.499
BSC
1.050
BSC
1.435
BSC
1.683
1.681
⌒ .0005
A
⌒ .0005
32
.300
.310

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 BREAK ALL SHARP EDGES .005 / .015
3 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4 PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN HOT SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED a. J. Boyce 11/8/62
CHECKED
DRAWN RES 10-30-62
APPROVED FOR MSC
W. J. Rhine 11-8-62
BY DIRECTION MIT APPROVAL
8 Nov 62

PAD
CASE MOUNTING
15X LEFT HAND

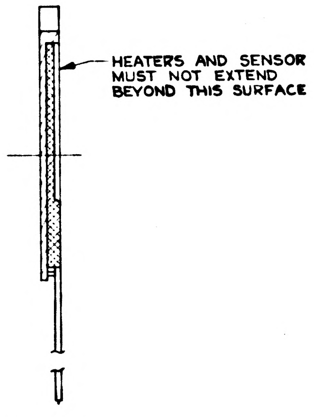
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000133
SHEET 1 OF 1

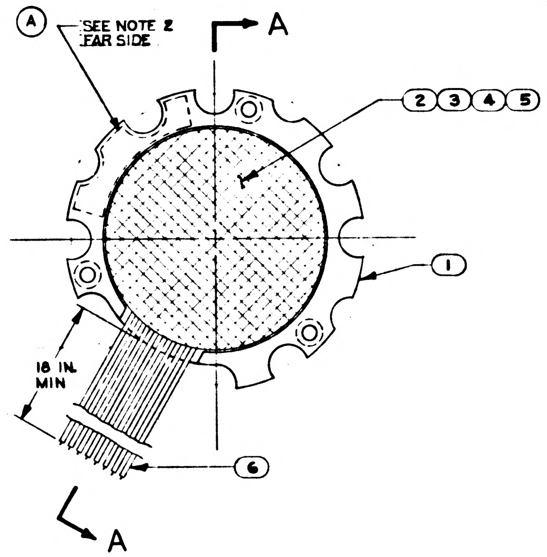
REVISIONS TDRR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00609	3-20-63	

WIRING LEGEND

WIRE NO.	FROM	COLOR
1	EMERGENCY HTR	YELLOW
2	EMERGENCY HTR	YELLOW
3	FIXED HEATER	BLACK
4	FIXED HEATER	BLACK
5	CONTROL HEATER	ORANGE
6	CONTROL HEATER	ORANGE
7	SENSOR	RED
8	SENSOR	RED



Ⓐ SECTION A-A



NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓐ 2 IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130

3 HEATERS AND SENSOR SHALL CONFORM TO PS 1000126

Ⓐ 4 THREE SEPARATE HEATERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

	CONTROL	FIXED	EMERGENCY
VOLTAGE:	30 VDC	21 VDC	30 VDC
RESISTANCE AT 130°F:	372Ω ± 3%	147Ω ± 3%	372Ω ± 3%
POWER RATING:	2.5 W	3.0 W	2.5 W

Ⓐ 5 HEATERS TO BE WOUND WITH WIRE WITH TEMPERATURE COEFFICIENT OF .000072 Ω/Ω/°F MAX

Ⓐ 6 CALIBRATION TEMPERATURE SENSOR; ITEM ⑤, TO HAVE A RESISTANCE OF 123 Ω ± 3% AT 130°F ± 0.1°F USING 10 MA ± 2% CURRENT. PADDED VALUE 126.6 Ω ± 0.1 Ω AT 130°F ± 0.1°F. MEASURED AT LEAD WIRE. PADDING MUST BE INTEGRATED WITH INTERWOVEN AREA

Ⓐ 7 HEATERS AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND.

Ⓐ 8 SENSOR TEMPERATURE COEFFICIENT: .00221 Ω/Ω/°F ± 4% AT 130°F.

9 MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD

10 METHOD OF FABRICATING THE HEATERS AND SENSOR, AND THE BONDING OF SAME TO THE HEATER PLATE IS A PROPRIETARY PROCESS OF COX AND CO, INC.

11 SUPPLIER OF HEATERS AND SENSOR SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND 1015404 CLASS 2

12 HEATERS & SENSORS TO BE INTERWOVEN & EVENLY DISTRIBUTED OVER AREA SHOWN

Ⓐ 13 SENSOR OPERATING CURRENT 14.5MA ± 2% SELF HEATING EFFECT RESISTANCE RISE 0.1Ω MAX

Ⓐ 14 CONTROL AND EMERGENCY HEATERS MUST BE CAPABLE OF WITHSTANDING 35 VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE

ORIGINAL SOURCE OF SUPPLY
COX AND CO, INC
115 EAST 23RD STREET
NEW YORK 1, NEW YORK

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
AS REQ	WIRE, ELECTRICAL, E30		MIL-W-16878	SEE WIRING LEGEND FOR COLOR	6
1	SENSOR			SEE NOTE 10	5
1	HEATER, CONTROL			SEE NOTE 10	4
1	HEATER, FIXED			SEE NOTE 10	3
1	HEATER, EMERGENCY			SEE NOTE 10	2
1	HEATER, PLATE	1000102			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000013	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		2/6/63
CHECKED		
DRAWN	RES	1-10-63

APPROVED FOR MSC

MIT/IL APPROVAL DATE

HEATER PLATE
ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000134

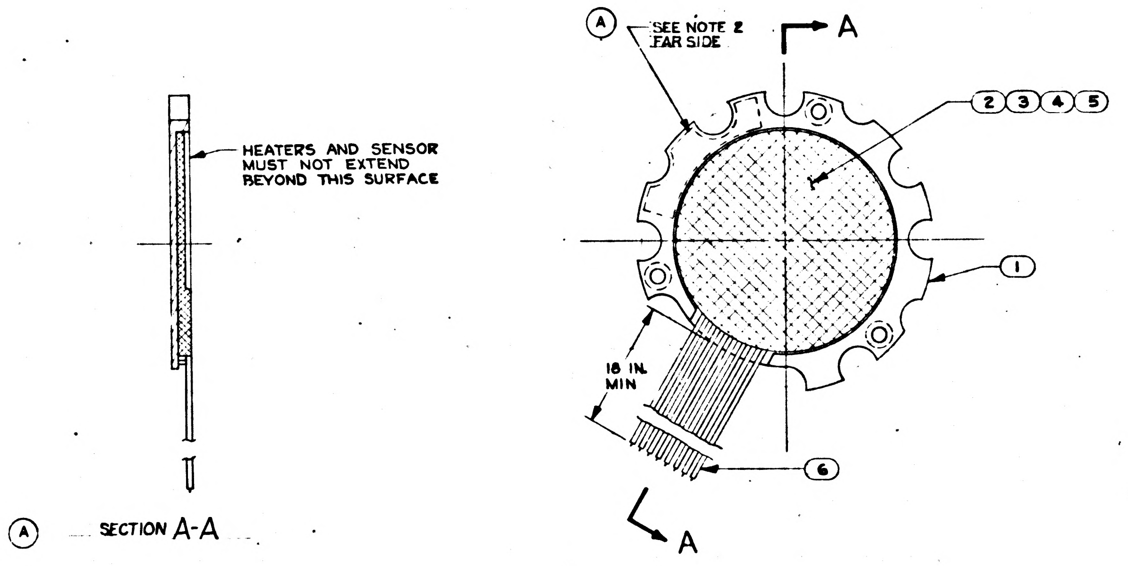
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00609	3-20-63	ajb WK.
	B	TDRR 01528	6- -63	gjb

WIRING LEGEND

WIRE NO.	FROM	COLOR
1	EMERGENCY HTR	YELLOW
2	EMERGENCY HTR	YELLOW
3	FIXED HEATER	BLACK
4	FIXED HEATER	BLACK
5	CONTROL HEATER	ORANGE
6	CONTROL HEATER	ORANGE
7	SENSOR	RED
8	SENSOR	RED



NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓐ 2 IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130

Ⓑ 3 HEATERS AND SENSOR SHALL CONFORM TO ND 1002115

Ⓐ 4 THREE SEPARATE HEATERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

	CONTROL	FIXED	EMERGENCY
VOLTAGE:	30 VDC	21 VDC	30 VDC
RESISTANCE AT 130°F:	372Ω ± 3%	147Ω ± 3%	372Ω ± 3%
POWER RATING:	2.5W	3.0W	2.5 W

Ⓐ 5 HEATERS TO BE WOUND WITH WIRE WITH TEMPERATURE COEFFICIENT OF .000072 Ω/Ω/°F MAX

Ⓐ 6 CALIBRATION TEMPERATURE SENSOR; ITEM ⑤, TO HAVE A RESISTANCE OF 123 Ω ± 3% AT 130°F ± 0.1°F USING 10 MA ± 2% CURRENT. PADDED VALUE 126.6 Ω ± 0.1 Ω AT 130°F ± 0.1°F. MEASURED AT LEAD WIRE. PADDING MUST BE INTEGRATED WITH INTERWOVEN AREA

7 HEATERS AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND.

Ⓐ 8 SENSOR TEMPERATURE COEFFICIENT: .00221 Ω/Ω °F ± 4% AT 130°F.

9 MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD

10 METHOD OF FABRICATING THE HEATERS AND SENSOR, AND THE BONDING OF SAME TO THE HEATER PLATE IS A PROPRIETARY PROCESS OF COX AND CO, INC.

11 SUPPLIER OF HEATERS AND SENSOR SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND 1015404 CLASS 2

12 HEATERS & SENSORS TO BE INTERWOVEN & EVENLY DISTRIBUTED OVER AREA SHOWN

Ⓐ 13 SENSOR OPERATING CURRENT 14.5MA ± 2% SELF HEATING EFFECT RESISTANCE RISE 0.1Ω MAX

Ⓐ 14 CONTROL AND EMERGENCY HEATERS MUST BE CAPABLE OF WITHSTANDING 35 VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE

ORIGINAL SOURCE OF SUPPLY
COX AND CO, INC
115 EAST 23RD STREET
NEW YORK 1, NEW YORK

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
AS REQ	WIRE, ELECTRICAL, E30		MIL-W-16878	SEE WIRING LEGEND FOR COLOR	6
1	SENSOR			SEE NOTE 10	5
1	HEATER, CONTROL			SEE NOTE 10	4
1	HEATER, FIXED			SEE NOTE 10	3
1	HEATER, EMERGENCY			SEE NOTE 10	2
1	HEATER, PLATE	1000102			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000013	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		2/1/63
CHECKED		
DRAWN	RES	1-10-63
APPROVED FOR MSC		6-3-63
MIT/IL APPROVAL		DATE
		6/63

HEATER PLATE ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000134
SHEET 1 OF 1

1000134 B

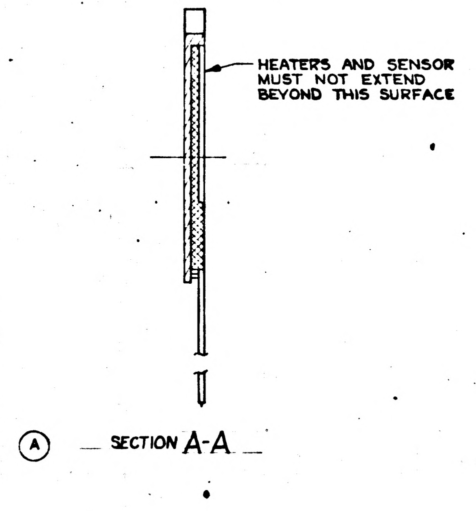
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND

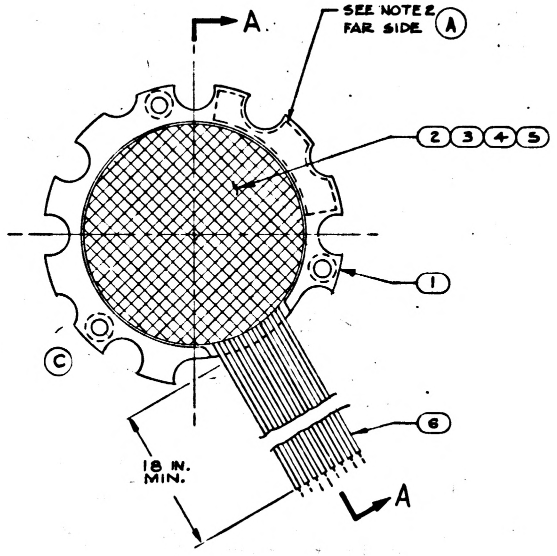
WIRE NO.	FROM	COLOR
1	EMERGENCY HTR	YELLOW
2	EMERGENCY HTR	YELLOW
3	FIXED HEATER	BLACK
4	FIXED HEATER	BLACK
5	CONTROL HEATER	ORANGE
6	CONTROL HEATER	ORANGE
7	SENSOR	RED
8	SENSOR	RED

REVISIONS TDRR 00331

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00609	3-20-63	ajb	WK.
Ⓜ	B	TDRR 01528	6-11-63	ajb	
	C	TDRR 01929	7-10-63	ajb	MBJ



Ⓐ SECTION A-A



NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓐ 2 IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130

Ⓑ 3 HEATERS AND SENSOR SHALL CONFORM TO ND 1002115

Ⓐ 4 THREE SEPARATE HEATERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

CHARACTERISTICS:	CONTROL	FIXED	EMERGENCY
VOLTAGE:	30 VDC	21 VDC	30 VDC
RESISTANCE AT 130°F:	372Ω ± 3%	147Ω ± 3%	372Ω ± 3%
POWER RATING:	2.5W	3.0W	2.5W

Ⓐ 5 HEATERS TO BE WOUND WITH WIRE WITH TEMPERATURE COEFFICIENT OF .000072 Ω/Ω/°F MAX

Ⓐ 6 CALIBRATION TEMPERATURE SENSOR; ITEM ⑤, TO HAVE A RESISTANCE OF 123 Ω ± 3% AT 130°F ± 0.1°F USING 10 MA ± 2% CURRENT. PADDED VALUE 126.6 Ω ± 0.1 Ω AT 130°F ± 0.1°F. MEASURED AT LEAD WIRE. PADDING MUST BE INTEGRATED WITH INTERWOVEN AREA

7 HEATERS AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND.

Ⓐ 8 SENSOR TEMPERATURE COEFFICIENT: .00221 Ω/Ω °F ± 4% AT 130°F.

9 MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD

Ⓒ 10 METHOD OF FABRICATING THE HEATERS AND SENSOR, AND THE BONDING OF SAME TO THE HEATER PLATE IS A PROPRIETARY PROCESS OF COX AND CO, INC. 115 E 23RD ST., N.Y. 1, N.Y.

11 SUPPLIER OF HEATERS AND SENSOR SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND 1015404 CLASS 2

12 HEATERS & SENSORS TO BE INTERWOVEN & EVENLY DISTRIBUTED OVER AREA SHOWN

Ⓐ 13 SENSOR OPERATING CURRENT 14.5MA ± 2% SELF HEATING EFFECT RESISTANCE RISE 0.1Ω MAX

Ⓐ 14 CONTROL AND EMERGENCY HEATERS MUST BE CAPABLE OF WITHSTANDING 35 VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
AS REQ	WIRE, ELECTRICAL, E30		MIL-W-16878	SEE WIRING LEGEND FOR COLOR	6
1	SENSOR			SEE NOTE 10	5
1	HEATER, CONTROL			SEE NOTE 10	4
1	HEATER, FIXED			SEE NOTE 10	3
1	HEATER, EMERGENCY			SEE NOTE 10	2
1	HEATER, PLATE	1000102			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000013	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A J Hayes DATE 2/6/63
CHECKED
DRAWN RES 1-10-63
APPROVED FOR MSC William J Surgh 6-3-63
MIT/IL APPROVAL W Kupfer DATE 6/6/63

HEATER PLATE ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000134
SHEET 1 OF 1

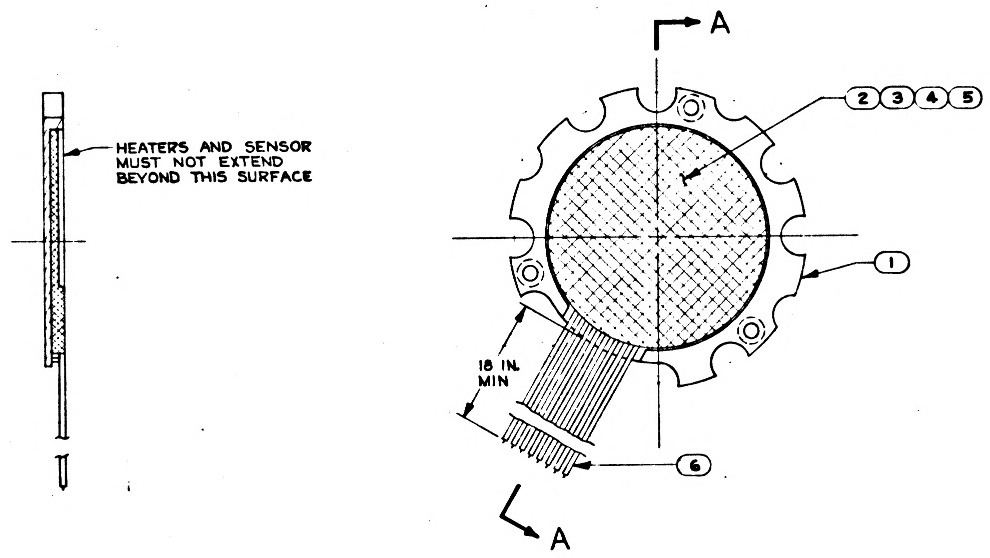
1000134 C

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 0033				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

WIRING LEGEND

WIRE NO.	FROM	COLOR
1	EMERGENCY HTR	YELLOW
2	EMERGENCY HTR	YELLOW
3	FIXED HEATER	BLACK
4	FIXED HEATER	BLACK
5	CONTROL HEATER	ORANGE
6	CONTROL HEATER	ORANGE
7	SENSOR	RED
8	SENSOR	RED



NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
3 HEATERS AND SENSOR SHALL CONFORM TO PS 1000126
4 THREE SEPARATE HEATERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

	CONTROL	FIXED	EMERGENCY
VOLTAGE:	35 VDC MAX	21 VDC MAX	35 VDC MAX
RESISTANCE AT 130°F:	372Ω ± 3%	106.5Ω ± 3%	372Ω ± 3%
POWER RATING:	2.5W	4.1W	2.5W

5 HEATERS TO BE WOUND WITH WIRE WITH TEMPERATURE COEFFICIENT OF .00002 Ω/Ω/°F MAX
6 TEMPERATURE SENSOR ITEM ⑤ TO HAVE A RESISTANCE OF 123 Ω ± 3% AT 130°F ± 0.1°F USING 10 MA ± 2% CURRENT. PADDED VALUE 126.7 Ω ± 0.1 Ω AT 130°F ± 0.1°F. MEASURED AT LEAD WIRE. PADDING MUST BE INTERGRATED WITH INTERWOVEN AREA
7 HEATERS AND SENSOR WIRES SHALL BE NON-INDUCTIVELY WOUND.
8 SENSORS TO BE WOUND WITH A WIRE TEMPERATURE COEFFICIENT OF .0025 Ω/Ω/°F ± 4% AT 133°F.
9 MAX CONDUCTOR BREAKAGE NOT TO EXCEED TWO STRANDS PER LEAD
10 METHOD OF FABRICATING THE HEATERS AND SENSOR, AND THE BONDING OF SAME TO THE HEATER PLATE IS A PROPRIETARY PROCESS OF COX AND CO, INC.
11 SUPPLIER OF HEATERS AND SENSOR SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND 1015404 CLASS 2
12 HEATERS & SENSORS TO BE INTERWOVEN & EVENLY DISTRIBUTED OVER AREA SHOWN

ORIGINAL SOURCE OF SUPPLY
COX AND CO, INC
115 EAST 23RD STREET
NEW YORK 1, NEW YORK

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
AS REQ	WIRE, ELECTRICAL, E30		MIL-W-16878	SEE WIRING LEGEND FOR COLOR	6
1	SENSOR			SEE NOTE 10	5
1	HEATER, CONTROL			SEE NOTE 10	4
1	HEATER, FIXED			SEE NOTE 10	3
1	HEATER, EMERGENCY			SEE NOTE 10	2
1	HEATER, PLATE	1000102			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000013	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		2/6/63
CHECKED		
DRAWN	RES	1-10-63
APPROVED FOR MSC	William L Swingle	63-6-1
MIT/IL APPROVAL	W Kupfer	DATE 6/63

HEATER PLATE ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
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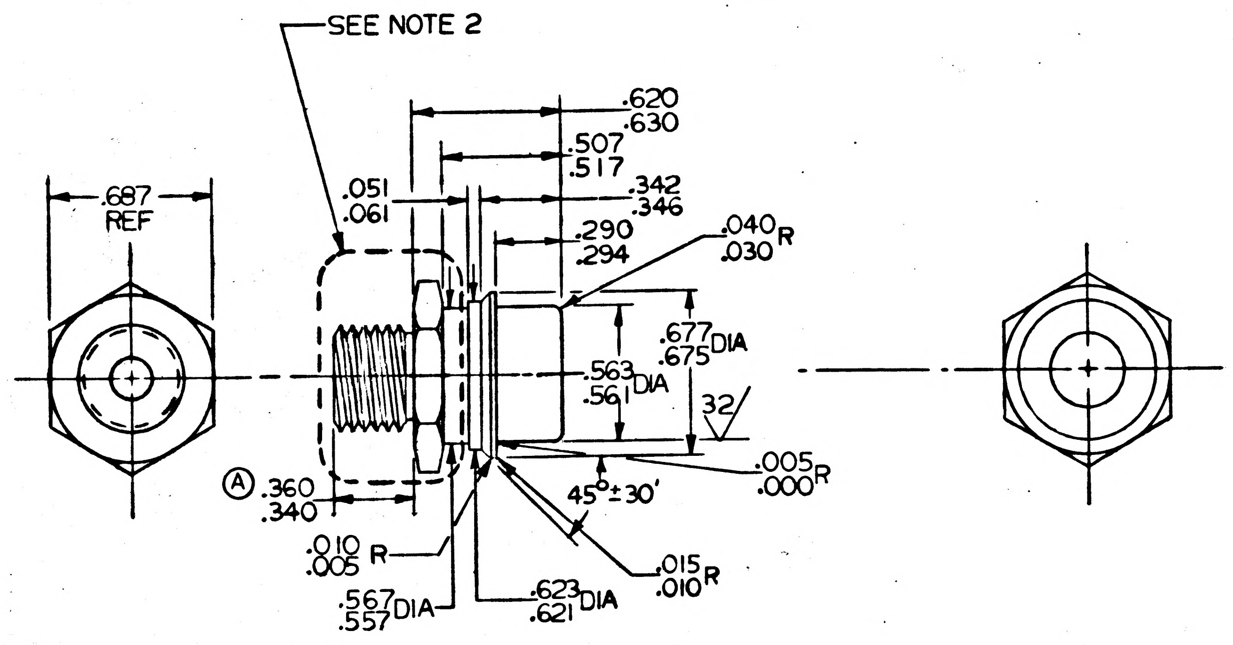
HOUSTON TEXAS
NASA DRAWING NO.
1000134
SHEET 1 OF 1

1000134

REVISIONS	TDRR 00113			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 02512	8-14-63	


SEE NOTE 2
.687 REF
.620 .630
.507 .517
.051 .061
.342 .346
.290 .294
.040 .030 R
.677 .675 DIA
.563 .561 DIA
32
.005 .000 R
45° ± 30'
Ⓐ .360 .340
.010 .005 R
.015 .010 R
.567 .557 DIA
.623 .621 DIA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. THIS PORTION OF CONNECTOR SHALL CONFORM TO MS 33656-4 STYLE E EXCEPT MODIFIED AS SHOWN
3. PART MUST MEET REQUIREMENTS OF PS 1000135
4. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130

ORIGINAL SOURCE(S) OF SUPPLY
SEATON WILSON MFG CO.
BURBANK CALIFORNIA
PART NO. Z-602-4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

	NEXT ASSY	USED ON
Ⓐ	1001500	DL1001500
	1000201	DL1000201
	10000.01	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153		DATE
APPROVED	a J Boyce	11/27/62
CHECKED		
DRAWN	R W C	10-31-62
APPROVED FOR MSC	W J Rhine 11-28-62	
BY DIRECTION		
MIT APPROVAL	J Wilson	11/25/62

COUPLING HALF
QUICK DISCONNECT
SPECIFICATION CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
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LABORATORY
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HOUSTON TEXAS

NASA DRAWING NO.
1000135

SHEET 1 OF 1

INCHES
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PHOTOGRAPHIC SCALE ONLY

Apollo G&N Specification
PS-1000135

Class A Release
TDRR 02135

PROCUREMENT SPECIFICATION

COUPLING HALF, QUICK DISCONNECT

Record of Revisions

Revision Letter	TDRR No.	Pages Revised	Approvals		Date
			MIT	NASA	
A	08083	8, 9, 10. Added 11			5/5/64

This specification consists of page i to iii and 1 to 11 inclusive.

COUPLING HALF, QUICK DISCONNECT

The purpose of this document is to establish the requirements for the procurement of a Coupling Half, Quick Disconnect.

24 July 63
MIT INSTRUMENTATION LABORATORY

7/24/63
NASA/MSC APPROVAL

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PROCUREMENT SPECIFICATION

COUPLING HALF, QUICK DISCONNECT

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the Quick Disconnect Coupling Half, hereinafter called the coupling half.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Methods of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of
MIL-C-25247	Coupling Assembly, Hydraulic, Self-Sealing, Quick Disconnect

Apollo G&N

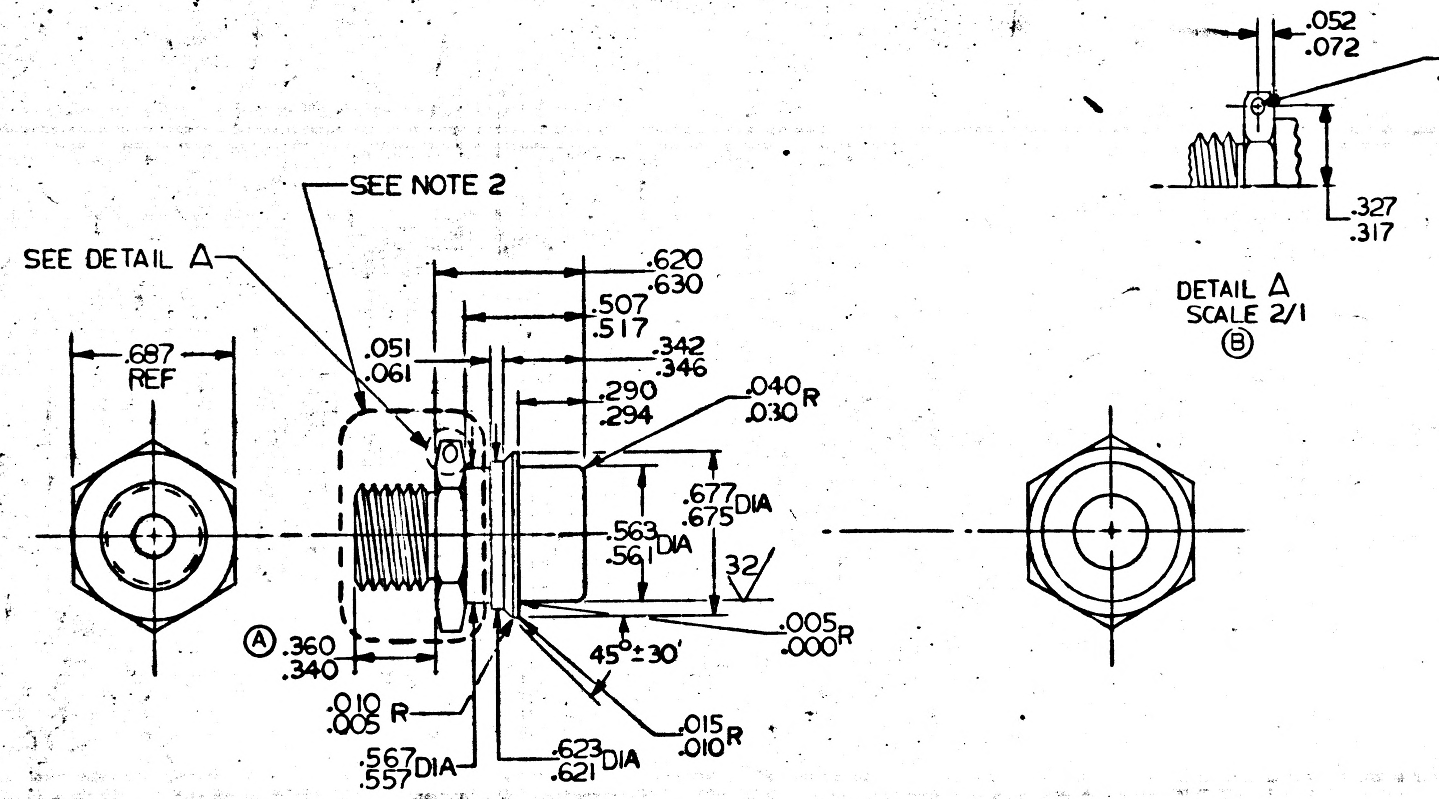
ND-1002023	Procedure for Serialization of Components, Assemblies, etc., for Apollo Guidance and Navigation Equipment
ND-1015404	General Specification, Configuration, Process and Quality Control Requirements for Suppliers of High Reliability Articles for Use in Spacecraft and Supporting Equipment

STANDARDS

Military

MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment
MS-28775	Packing, Preformed, Hydraulic, +275°F, ("O" Ring)

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00113				
	A	TDRR 02512	8-14-63	
	B	TDRR 04571	11-18-63	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.060 DIA THRU
.327
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DETAIL A
SCALE 2/1
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SEE NOTE 2
SEE DETAIL A
.620
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45°±30'
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.010 R
.567
.557 DIA
.623
.621 DIA

NOTES:

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2. THIS PORTION OF CONNECTOR SHALL CONFORM TO MS 33656-4 STYLE E EXCEPT MODIFIED AS SHOWN
3. PART MUST MEET REQUIREMENTS OF PS 1000135
4. Ⓑ IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND 1002019
5. Ⓑ PART TO BE SUPPLIED WITH PROTECTIVE COVER NASA PART NO. 1001494. PROTECTIVE COVER TO BE SECURED TO COUPLING WITH LOCKWIRE THRU HOLE.

Ⓑ PROCURE ONLY APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ MULTIPLE
Ⓑ USAGE

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/27/62
CHECKED		
DRAWN	R W C	10-31-62

APPROVED FOR MSC
W J Rhine
BY DIRECTION
MIT APPROVAL | 11/25/62

COUPLING HALF QUICK DISCONNECT
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
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SPACECRAFT CENTER
HOUSTON TEXAS

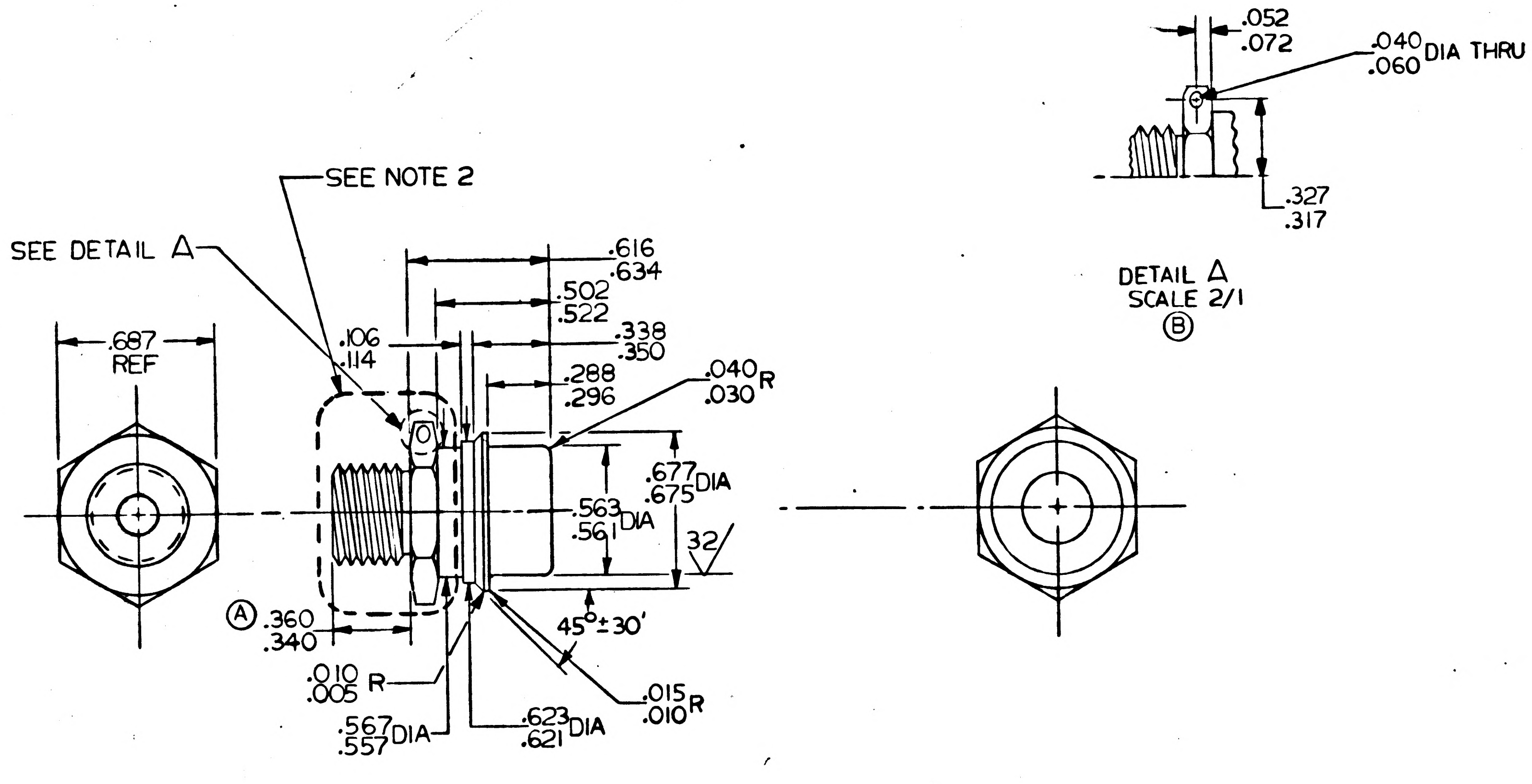
NASA DRAWING NO.
1000135

SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00113				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 02512	8-14-63	
	B	TDRR 04571	11-18-63	sah
	C	TDRR 05947	2-3-63	sah WR



SEE NOTE 2
SEE DETAIL A
.687 REF
.616
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.030 R
.677
.675 DIA
.563
.561 DIA
32
Ⓐ .360
.340
45° ± 30'
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.005 R
.015
.010 R
.567
.557 DIA
.623
.621 DIA
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.060 DIA THRU
.327
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DETAIL A
SCALE 2/1
Ⓑ

NOTES:

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Ⓑ PROCURE ONLY APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ MULTIPLE	
Ⓑ USAGE	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/27/62
CHECKED		
DRAWN	R W C	10-31-62

APPROVED FOR MSC
W J Rhine 11-2-62
BY DIRECTION
MIT APPROVAL [illegible] 11/28/62

COUPLING HALF
QUICK DISCONNECT
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
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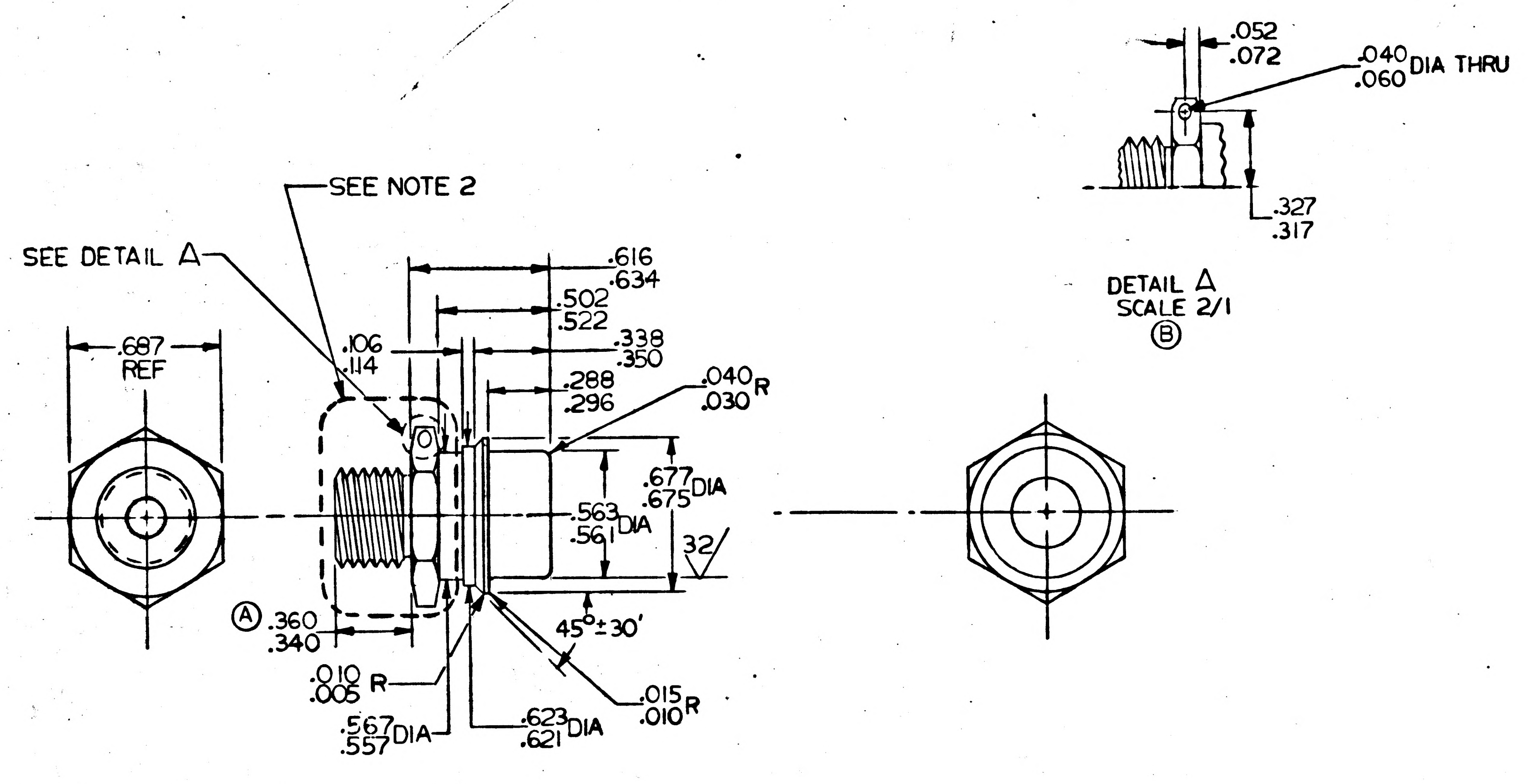
HOUSTON TEXAS
NASA DRAWING NO.
1000135
SHEET 1 OF 1

MASTER

REVISIONS TDRR 00113

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 02512	8-14-63	
	B	TDRR 04571	11-18-63	
	C	TDRR 05947	2-3-63	
	D	TDRR 12133	9-1-64	



SEE NOTE 2
SEE DETAIL A
.687 REF
.106 .114
.616 .634
.502 .522
.338 .350
.288 .296
.040 .030 R
.677 .675 DIA
.563 .561 DIA
32
Ⓐ .360 .340
45° ± 30'
.010 .005 R
.015 .010 R
.567 .557 DIA
.623 .621 DIA
.052 .072
.040 .060 DIA THRU
.327 .317
DETAIL A
SCALE 2/1
Ⓑ

NOTES:

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5. Ⓑ PART TO BE SUPPLIED WITH PROTECTIVE COVER NASA PART NO. 1001494. PROTECTIVE COVER TO BE SECURED TO COUPLING WITH LOCKWIRE THRU HOLE. (DETAIL A)

PROCURE FROM:

SEATON WILSON MFG. CO. INC.
911-919 N. VICTORY BLVD.
BURBANK, CALIF.
PART NO Z-602-4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ	MULTIPLE	
Ⓑ	USAGE	
	NEXT ASSY	USED ON
	APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		11/27/62
CHECKED		
DRAWN	RWC	10-31-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 11/25/62

COUPLING HALF
QUICK DISCONNECT
SOURCE CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

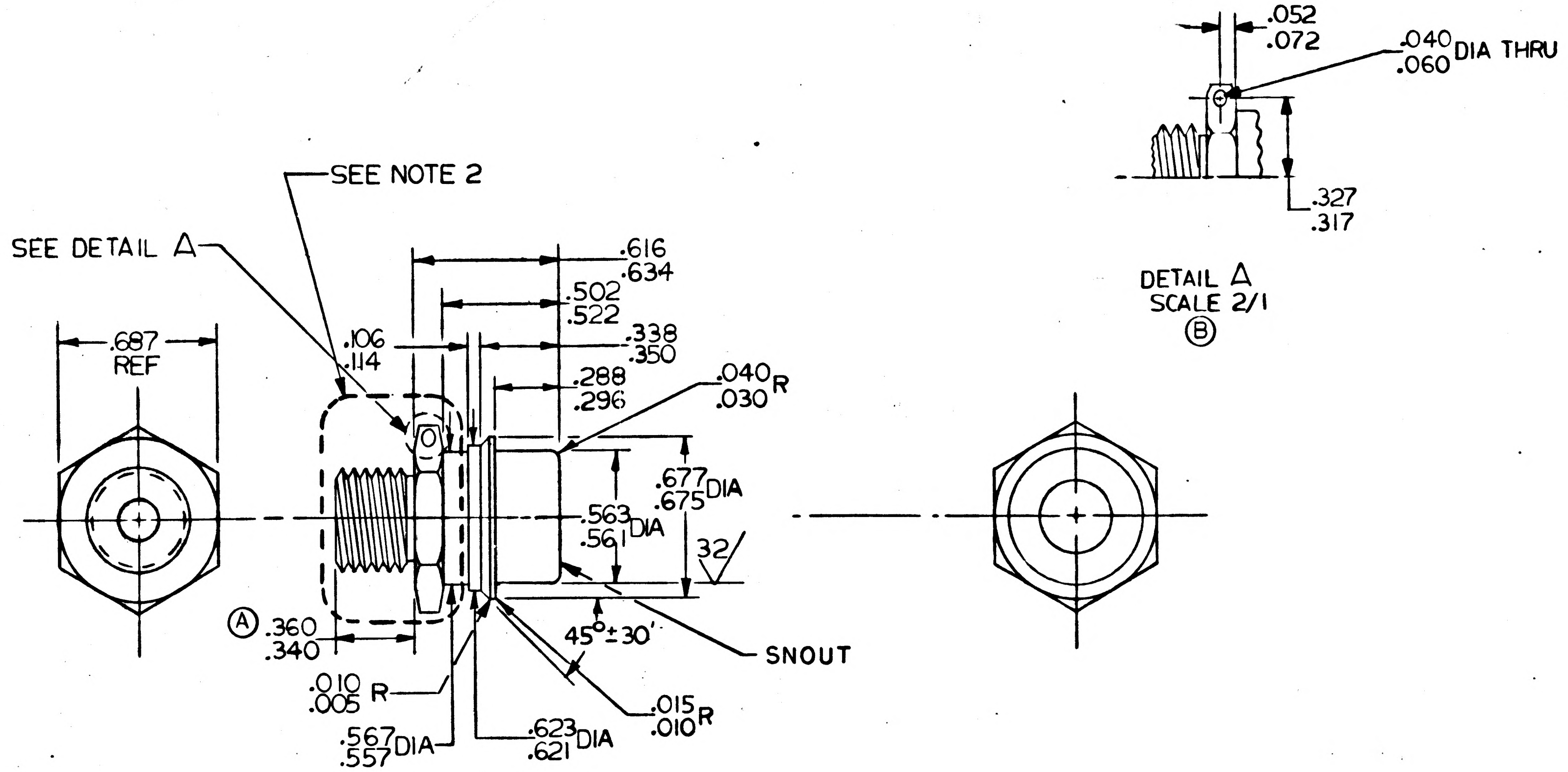
NASA DRAWING NO.
1000135

SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00113				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 02512	8-14-63	
	B	TDRR 04571	11-18-63	
	C	TDRR 05947	2-3-63	
	D	TDRR 12133	9-1-64	
	E	REVISED PER TDRR 20342	6/28/65	WC



SEE NOTE 2
SEE DETAIL A
.687 REF
.106 .114
.616 .634
.502 .522
.338 .350
.288 .296
.040 .030 R
.677 .675 DIA
.563 .561 DIA
32
Ⓐ .360 .340
45° ± 30'
SNOUT
.010 .005 R
.015 .010 R
.567 .557 DIA
.623 .621 DIA
.052 .072
.040 .060 DIA THRU
.327 .317
DETAIL A
SCALE 2/1
Ⓑ

NOTES:

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4. Ⓑ IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND 1002019
5. Ⓑ PART TO BE SUPPLIED WITH PROTECTIVE COVER NASA PART NO. 1001494. PROTECTIVE COVER TO BE SECURED TO COUPLING WITH LOCKWIRE THRU HOLE. (DETAIL A)
6. ALL LONGITUDINAL DIMENSIONS ARE GIVEN WITH THE SNOUT DEPRESSED

PROCURE FROM:
SEATON WILSON MFG. CO. INC.
911-919 N. VICTORY BLVD.
BURBANK, CALIF.
PART NO Z-602-4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓐ MULTIPLE	
USAGE	
Ⓑ	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/27/62
CHECKED		
DRAWN	R W C	10-31-62

APPROVED FOR MSC
W J Rhine 11-28-62
BY DIRECTION
MIT APPROVAL 11/25/62

COUPLING HALF
QUICK DISCONNECT
SOURCE CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

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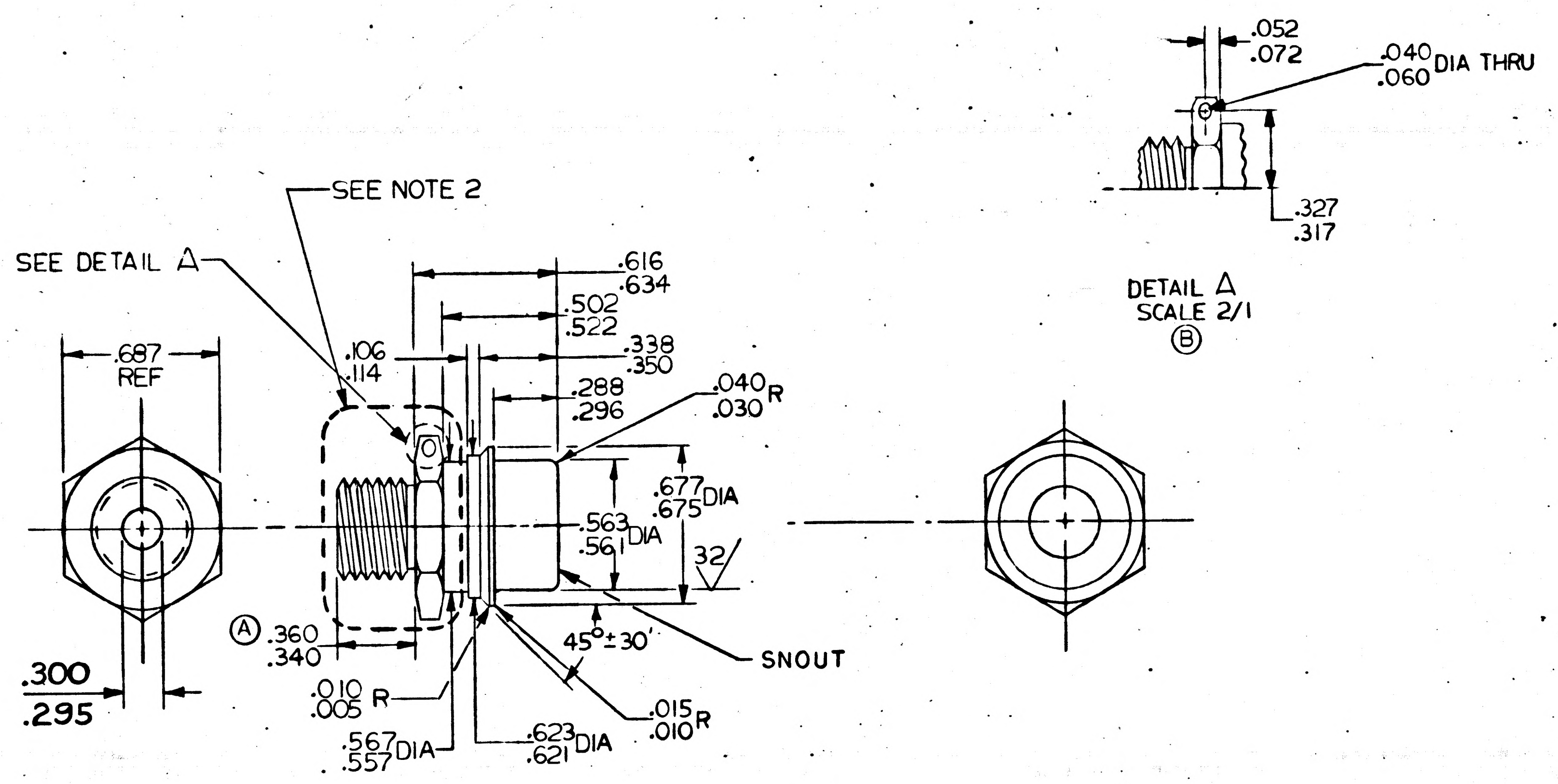
HOUSTON TEXAS

NASA DRAWING NO.
1000135
SHEET 1 OF 1

MASTER

REVISIONS TDRR 00113

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 02512	8-14-63		
	B	TDRR 04571	11-18-63		
	C	TDRR 05947	2-3-63		WK
	D	TDRR 12133	9-1-64		wk.
	E	REVISED PER TDRR 20342		wk	
	F	*REVISED PER TDRR 37785*	3-SEP -69	B.	



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DETAIL A
SCALE 2/1
Ⓑ
SEE NOTE 2
SEE DETAIL A
.616
.634
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REF
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.677
.675 DIA
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32
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45° ± 30'
SNOUT
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.010 R
.567
.557 DIA
.623
.621 DIA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. THIS PORTION OF CONNECTOR SHALL CONFORM TO MS 33656-4 STYLE E EXCEPT MODIFIED AS SHOWN
3. PART MUST MEET REQUIREMENTS OF PS 1000135
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PROCURE FROM:
SEATON WILSON MFG. CO. INC.
911-919 N. VICTORY BLVD.
BURBANK, CALIF.
PART NO Z-602-4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ MULTIPLE	
USAGE	
Ⓑ	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
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MATERIAL:

MIT
INSTRUMENTATION LAB
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NAS 9-153 DATE
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CHECKED
DRAWN R W C 10-31-62
APPROVED FOR MSC
W J Rhine 11-28-62
BY DIRECTION
MIT APPROVAL 11/25/62

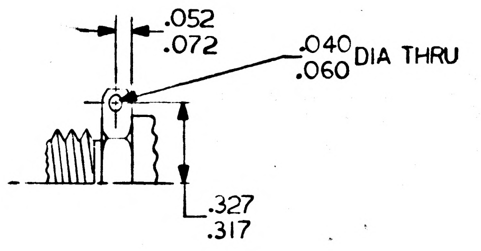
COUPLING HALF
QUICK DISCONNECT
SOURCE CONTROL
DRAWING

SCALE | UNIT WT. | CODE IDENT.

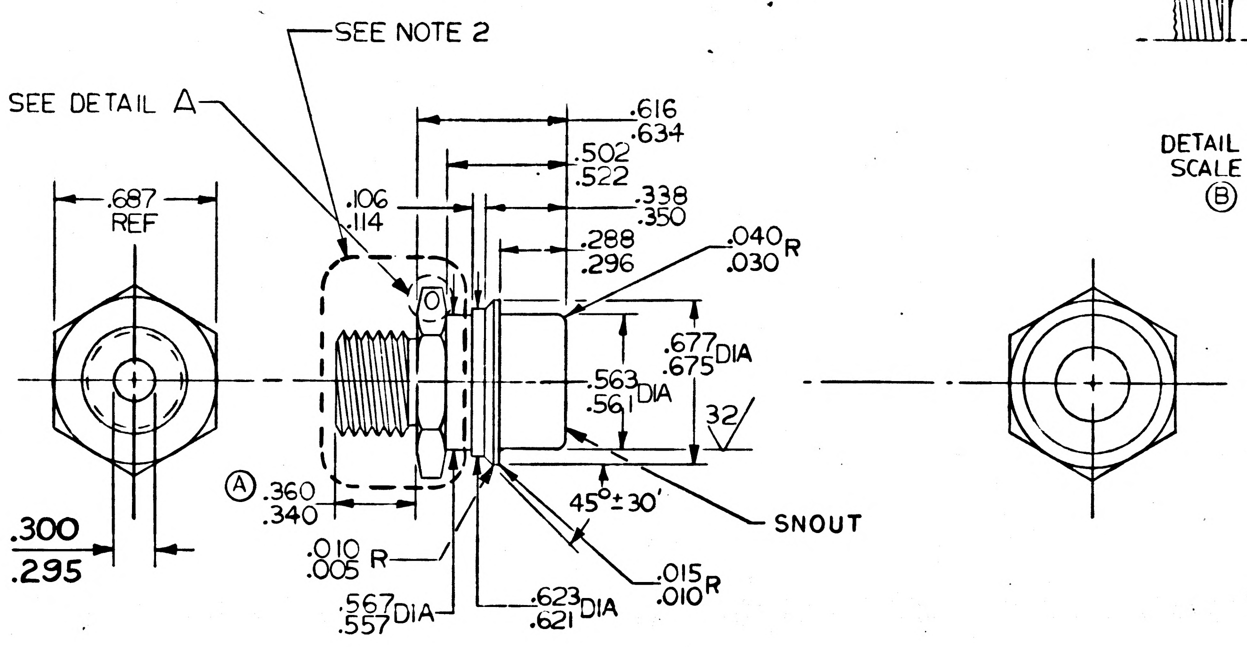
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000135
SHEET 1 OF 1

1000135 F

REVISIONS TDRR 00113					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 02512	8-14-63	AJB	
	B	TDRR 04571	11-18-63	SAH	
	C	TDRR 05947	2-3-63	SAH	WK
	D	TDRR 12133	9-1-64	SAH	WK.
	E	REVISED PER TDRR 20342	6/28/65	WYL	
	F	REVISED PER TDRR 37785	3-SEP-69	B.	V.M.
	G	REVISED PER TDRR 38160	22 JUN 70	M.G.	



DETAIL A
SCALE 2/1
Ⓑ



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. THIS PORTION OF CONNECTOR SHALL CONFORM TO MS 33656-4 STYLE E EXCEPT MODIFIED AS SHOWN
3. ~~PART MUST MEET REQUIREMENTS OF PS 1000135~~
4. Ⓑ IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND 1002019
5. Ⓑ PART TO BE SUPPLIED WITH PROTECTIVE COVER NASA PART NO. 1001494. PROTECTIVE COVER TO BE SECURED TO COUPLING WITH LOCKWIRE THRU HOLE. (DETAIL A)
6. ALL LONGITUDINAL DIMENSIONS ARE GIVEN WITH THE SNOUT DEPRESSED

PART NUMBER	INTERNAL SEAL MATERIAL	PURCHASING SPEC. REQUIREMENTS	MANUFACTURER'S IDENTIFICATION
1000135-000	BUNA N	PS 1000135	Z-602-4
1000135-001	ETHYLENE PROPYLENE (PARKER COMPOUND NO. E515-8)	PS 1000135	ZE-602-4

1000135 G

PROCURE FROM:
SEATON WILSON MFG. CO. INC.
911-919 N. VICTORY BLVD.
BURBANK, CALIF.
~~PART NO Z-602-4~~

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ Ⓑ MULTIPLE USAGE

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/27/62
CHECKED		
DRAWN	R W C	10-31-62

APPROVED FOR MSC
W J Robins 11-28-62
BY DIRECTION
MIT APPROVAL 11/28/62

COUPLING HALF
QUICK DISCONNECT
SOURCE CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

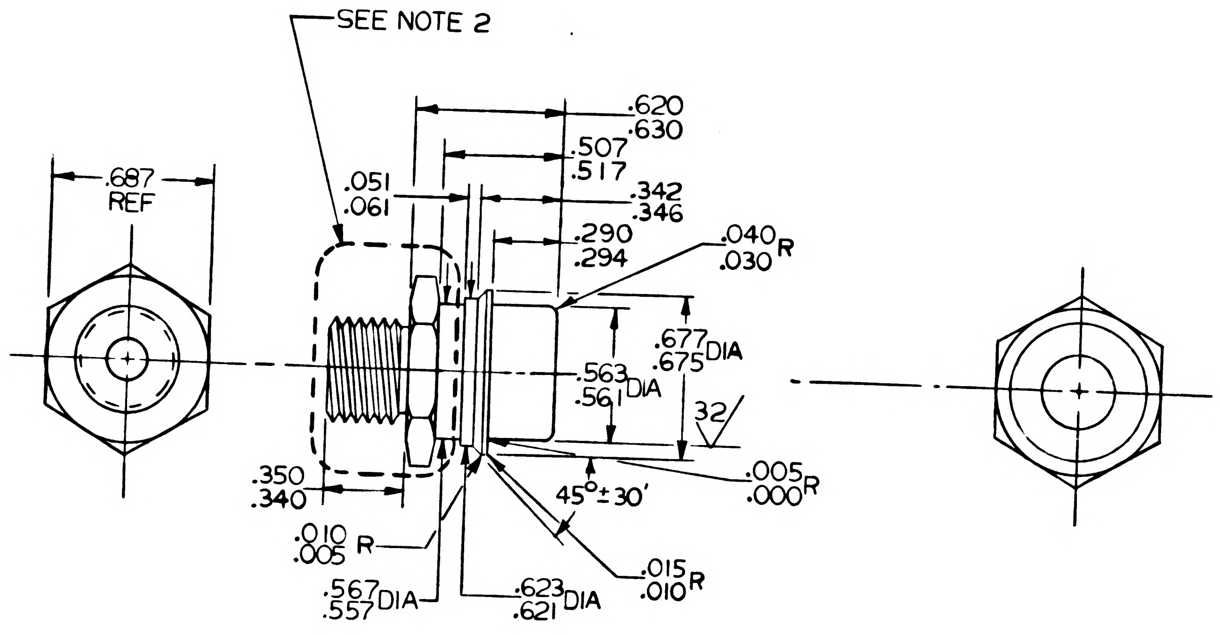
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000135

SHEET 1 OF 1

ZONE	SYM	REVISIONS TDRR 00113 DESCRIPTION	DATE	APPROVAL


SEE NOTE 2
.687 REF
.620 .630
.507 .517
.051 .061
.342 .346
.290 .294
.040 .030 R
.677 .675 DIA
.563 .561 DIA
32
.350 .340
.005 .000 R
45° ± 30'
.010 .005 R
.015 .010 R
.567 .557 DIA
.623 .621 DIA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. THIS PORTION OF CONNECTOR SHALL CONFORM TO MS 33656-4 STYLE E EXCEPT MODIFIED AS SHOWN
3. PART MUST MEET REQUIREMENTS OF PS 1000135
4. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130

ORIGINAL SOURCE(S) OF SUPPLY
SEATON WILSON MFG CO.
BURBANK CALIFORNIA
PART NO. Z-602-4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ——

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/27/62
CHECKED		
DRAWN	R W C	10-31-62

APPROVED FOR MSC
W J Rhine 11-28-62
BY DIRECTION

MIT APPROVAL 11/25/62

COUPLING HALF
QUICK DISCONNECT
SPECIFICATION CONTROL
DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000135

SHEET 1 OF 1

Apollo G&N Specification
PS-1000135

Class A Release
TDRR 02135

PROCUREMENT SPECIFICATION

COUPLING HALF, QUICK DISCONNECT

Record of Revisions

Revision Letter	TDRR No.	Pages Revised	Approvals		Date
			MIT	NASA	

This specification consists of page i to iii and 1 to 10 inclusive.

COUPLING HALF, QUICK DISCONNECT

The purpose of this document is to establish the requirements for the procurement of a Coupling Half, Quick Disconnect.

MIT INSTRUMENTATION LABORATORY

7/24/63
NASA/MSC APPROVAL

PROCUREMENT SPECIFICATION

COUPLING HALF, QUICK DISCONNECT

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the Quick Disconnect Coupling Half, hereinafter called the coupling half.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Methods of
MIL-E-17555	Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of
MIL-C-25247	Coupling Assembly, Hydraulic, Self-Sealing, Quick Disconnect

Apollo G&N

ND-1002023	Procedure for Serialization of Components, Assemblies, etc., for Apollo Guidance and Navigation Equipment
ND-1015404	General Specification, Configuration, Process and Quality Control Requirements for Suppliers of High Reliability Articles for Use in Spacecraft and Supporting Equipment

STANDARDS

Military

MIL-STD-810	Environmental Test Methods for Aerospace and Ground Equipment
MS-28775	Packing, Preformed, Hydraulic, +275°F, ("0" Ring)

Part Number	Description	Required
1000120	Connector, Electrical Plug 34 Pin	2
1000121	Connector Electrical Recepticle 26 pin.	3
1000122	Connector Electrical Receptacle 26 pin	3

1000137 Ⓜ

REVISIONS TDRR 00106

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDR 00144	12 DEC 62	ajB	WK

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN		

APPROVED FOR MSC
Jack Barnard

MIT/IL APPROVAL	DATE
W Kupfer	21 NOV 62

HARNESS ASSEMBLY
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000137
SHEET OF

1000137 (M)

REVISIONS TDRR 00106				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDR 00144	12DEC62	ajB WK
	B	TDR 00767	10APR63	ajB WK

Part Number	Description	Required
1000120	Connector, Electrical Plug 34 Pin	2
1000121	Connector Electrical Recepticle 26 pin.	3
1000122	Connector Electrical Receptacle 26 pin	3
1000149	Bracket Conn. Harness Assy	1
1000226	Bracket Conn Harness Assy	1

WIRE	TYPE	E-28	MIL-W-16878
Color	Blk	9ft	
	Brn	3ft	
	Red	20ft	
	Orn	15ft	
	Yel	15ft	
	Grn	18ft	
	Blu	5ft	
	Vio	17ft	
	Gv	19ft	
	Wht	7ft	

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	11/21/62
CHECKED		
DRAWN		

APPROVED FOR MSC
Jack Barnard 11/26/62

MIT/IL APPROVAL	DATE
W Kupfer	21NOV62

HARNESS ASSEMBLY
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000137

SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000137

REVISIONS TDRR 00106

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDR 00144	12 DEC 62	ajB	WK
	B	TDR 00767	10 APR 63	ajB	WK
	C	REPLACED BY REV D WITH CHANGES TDRR 01669	19 June 63	ajB	

Part Number	Description	Required
1000120	Connector, Electrical Plug 34 Pin	2
1000121	Connector Electrical Recepticle 26 pin.	3
1000122	Connector Electrical Receptacle 26 pin	3
1000149	Bracket Conn. Harness Assy	1
1000226	Bracket Conn Harness Assy	1

WIRE	TYPE	E-28	MIL-W-16878
Color	Blk	9ft	
	Brn	3ft	
	Red	20ft	
	Orn	15ft	
	Yel	15ft	
	Grn	18ft	
	Blu	5ft	
	Vio	17ft	
	Gy	19ft	
	Wht	7ft	

REPLACED BY REV D WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000005	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN		

APPROVED FOR MSC
Jack Barnard

MIT/IL APPROVAL	DATE
W Kupfer	2 NOV

HARNESS ASSEMBLY
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000137

SHEET OF

INCHES
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PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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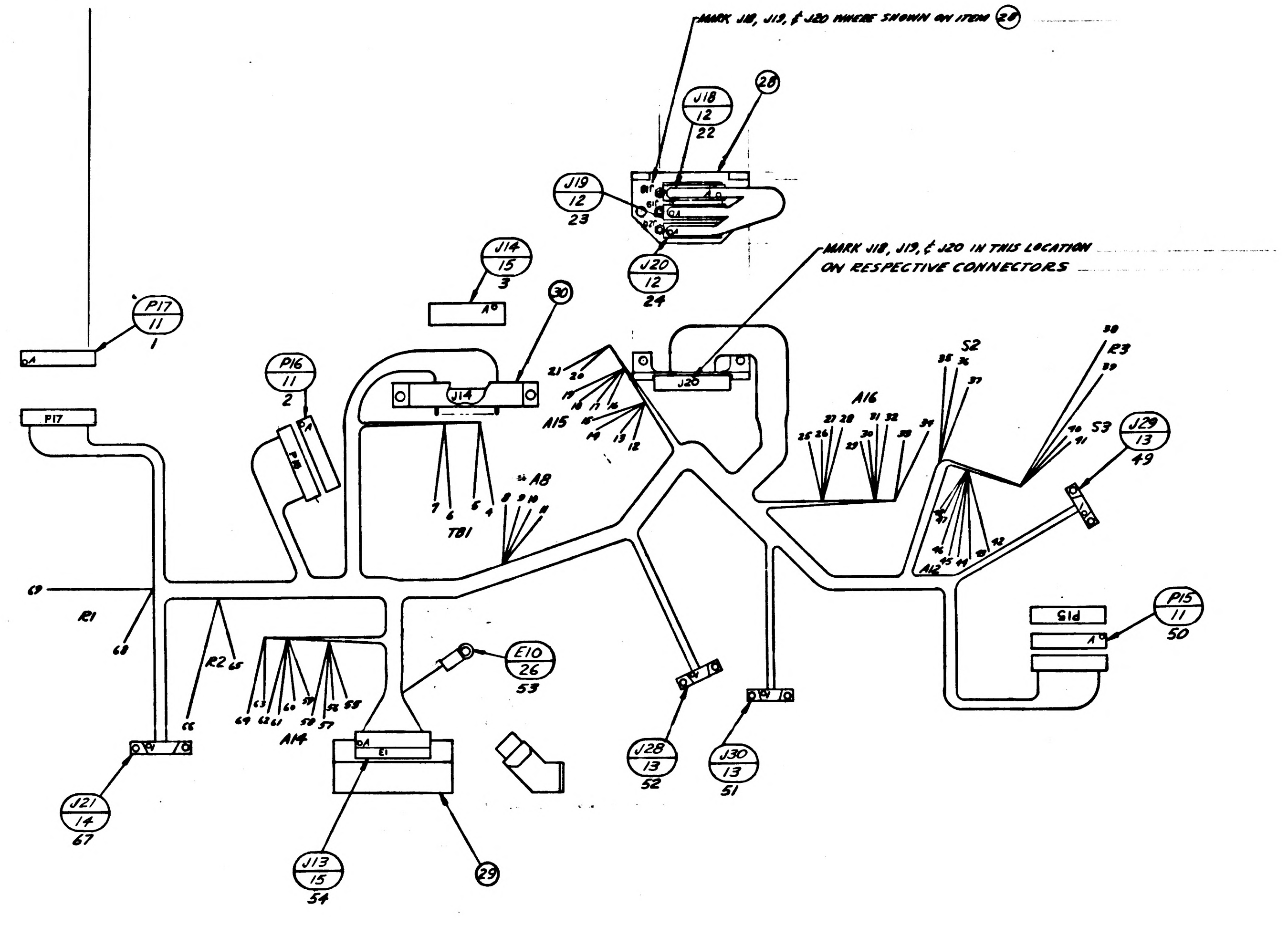
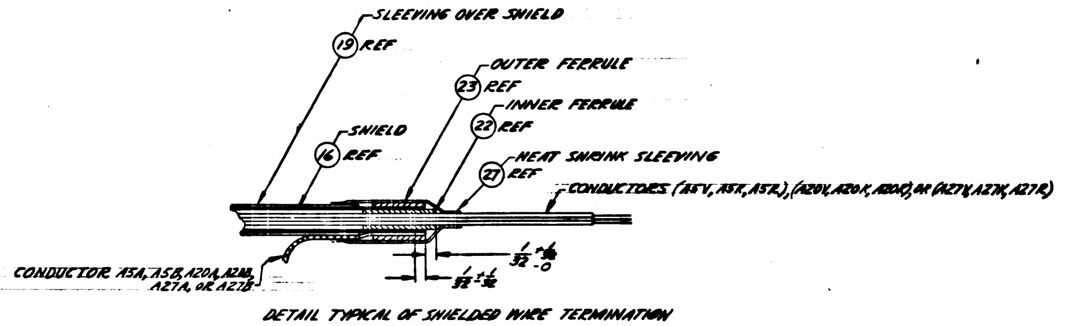
REVISIONS		TDRR 01663	
SYM	DESCRIPTION	DATE	APPROVAL
D	-		


MARK J18, J19, & J20 WHERE SHOWN ON ITEM ㉘

MARK J18, J19, & J20 IN THIS LOCATION ON RESPECTIVE CONNECTORS

J18 / 12 / 22
㉘
J19 / 12 / 23
J20 / 12 / 24
J14 / 15 / 3
㉚
P17 / 11 / 1
P17
P16 / 11 / 2
P16
J14
J20
A15
21 20 19 18 17 16 15 14 13 12
A8
8 9 10 11
7 6 5 4
TB1
A16
25 26 27 28 29 30 31 32 33 34
S2
35 36 37
R3
38 39
S3
40 41
J29 / 13 / 49
A12
42 43 44 45 46 47 48
P15
P15 / 11 / 50
69
R1
68
R2
65 66
A14
69 63 62 61 60 59 58 57 56 55
E10 / 26 / 53
E1
J13 / 15 / 54
㉙
J21 / 14 / 67
J28 / 13 / 52
J30 / 13 / 51



SLEEVING OVER SHIELD
⑲ REF
OUTER FERRULE
㉓ REF
INNER FERRULE
㉒ REF
SHIELD
⑯ REF
HEAT SHRINK SLEEVING
㉗ REF
CONDUCTORS (A5V, A5K, A5R), (A20V, A20K, A20R), OR (A27V, A27K, A27R)
CONDUCTOR A5A, A5B, A20A, A20B, A27A, OR A27B
1/32 +1/32 -0
1/32 ±1/32

DETAIL TYPICAL OF SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
NO SCALE

THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
1000005	DL1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN ZHENO DATE 5-29-63
CHECKED WINBERG
APPROVAL J. E. Winberg
APPROVAL J. E. Miller
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "A",
STABLE MEMBER

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 1000137
SCALE 1-1
WT
SHEET 14 OF 14

1000137

INCHES
PHOTOGRAPHIC SCALE ONLY

APPLICATION	
NEXT ASSY	USED ON
1000005	DL1000201

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
D	REPLACES REV C WITH CHANGES TDRR 01669	6-4-63	WK

REV															
SHEET															
REV STATUS OF SHEETS	REV	D	–	–	–	–	–	–	–	–	–	–	–	–	–
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

		DATE
APPROVED		6-17-63
CHECKED	WINBERG	6-6-63
DRAWN	THENO	6-4-63

APPROVED FOR MSC

BY DIRECTION

W K A June 63

WIRING HARNESS "A",
STABLE MEMBER

SCALE
REVISION

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000137

SHEET 1 OF 14

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

TDRR 01669

LIST OF MATERIAL

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION
28	1	1000264	Bracket
29	1	1000226	Bracket
30	1	1000149	Bracket
31	AR	QQ-S-571 (SN60WARP2)	Solder ( )
32	AR	MIL-T-713 TYPE P	Twine, Nylon, Waxed( )

MANNED SPACECRAFT CENTER HOUSTON TEXAS	REVISION	NASA DRAWING NO. 1000317
		SHEET 3 of 14

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

TDRR 01669

CONDUCTOR INDIVIDUAL FIND NUMBER	NO.	LENGTH	FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION FIND NO.		SPEC	NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT		Y/N		TO TERMINATION FIND NO.		SPEC	NO.
A1 E	3	5 00	J18	B	10	Y			24	22	J19	B	Y	10			25	23
A1 R	2	5 00	J18	E	10	Y			24	22	J19	E	Y	10			25	23
A2 O	6	5 00	J18	C	10	Y			24	22	J19	C	Y	10			25	23
A2 V	4	5 00	J18	F	10	Y			24	22	J19	F	Y	10			25	23
A3 Y	8	5 00	J18	D	10	Y			25	22	J20	D	Y	10			25	24
A3 G	7	5 00	J18	L	10	Y			25	22	J20	L	Y	10			25	24
A4 Y	8	15 25	J18	D	10	Y				22	J13	EE	Y	10			25	54
A4 G	7	15 25	J18	L	10	Y				22	J13	HH	Y	10			25	54
A5 V			J28	8		N	27	22	23	52	J18	J	Y	10	19	16	24	22
A5 K			J28	1		N				52	J18	M	Y	10	23	22	24	22
A5 R			J28	3		N				52	J18	N	Y	10		27	24	22
A5 A			J28	2	25	N				52	SHLD	5	N					52
A5 B	1	5 00	SHLD	5	25	N				22	J18	P	Y	10			24	22
A6 V	4	5 00	J18	U	10	Y			25	22	J19	U	Y	10			25	23
A6 E	3	5 00	J18	V	10	Y			25	22	J19	V	Y	10			25	23
A7	4	16 00	J18	U	10	Y				22	R1		Y	13				68
A8	3	15 25	J18	V	10	Y				22	J13	M	Y	10			24	54
A9	4	17 50	J18	Y	10	Y			24	22	J14	CC	Y	10			24	3

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SPACECRAFT CENTER
HOUSTON TEXAS

REVISION

NASA DRAWING NO.
1000137
SHEET 5 of 14

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

TDRR 01669

CONDUCTOR				FROM								TO							
FIND NUMBER	NO.	INDIVIDUAL LENGTH		CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TERMINATION FIND NO.		SPEC	NO.	CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TERMINATION FIND NO.		SPEC	NO.
A10	8	5	00	J18	Z	10	Y			24	22	J20	c̄	10	Y			24	24
A11	5	17	50	J18	b	10	Y			24	22	J14	BB	10	Y			24	3
A12	7	17	50	J18	d	10	Y			24	22	J14	AA	10	Y			24	3
A13	8	15	25	J18	c̄	10	Y			24	22	J13	H	10	Y			24	54
A14	8	5	00	J19	c̄	10	Y			24	23	J20	Z	10	Y			24	24
A15	2	17	50	J19	d	10	Y			24	23	J14	W	10	Y			24	3
A16	6	17	50	J19	b	10	Y			24	23	J14	X	10	Y			24	3
A17	7	15	25	J19	Z	10	Y			24	23	J13	K	10	Y			25	54
A18	8	17	50	J19	Y	10	Y			24	23	J14	Y	10	Y			24	3
A19 V	4	5	00	J19	U	10	Y				23	J20	U	10	Y			24	24
A19 E	3	5	00	J19	V	10	Y				23	J20	V	10	Y			24	24
A20 V				J29	8		N	27	22	23	49	J19	J	10	Y	20	17	24	23
A20 K				J29	1		N				49	J19	M	10	Y	22	23	24	23
A20 R				J29	3		N				49	J19	N	10	Y		27	24	23
A20 A				J29	2		N				49	SHLD	20	25	N				49
A20 B	1	5	00	SHLD		25	N				23	J19	P	10	Y			24	23
A21 R	2	5	00	J19	E	10	Y				23	J20	E	10	Y			25	24
A21 E	3	5	00	J19	B	10	Y				23	J20	B	10	Y			25	24

MANNED
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REVISION

NASA DRAWING NO.
1000137
SHEET 6 of 14

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

TDRR 01669

CONDUCTOR			FROM									TO								
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CUT WIRE OR SHIELD CIRCUIT POINT		STRIP WIRE OR JACKET	Y/N	TERMINATION FIND NO.		SPEC	NO.	CUT WIRE OR SHIELD CIRCUIT POINT		STRIP WIRE OR JACKET	Y/N	TERMINATION FIND NO.		SPEC	NO.		
A22 G	7	5 00	J19	L	10	Y			24	23	J20	L	10	Y				24		
A22 Y	8	5 00	J19	D	10	Y			24	23	J20	D	10	Y				24		
A23 [illegible]	4	5 00	J19	F	10	Y				23	J20	F	10	Y			25	24		
A23 O	6	5 00	J19	C	10	Y				23	J20	C	10	Y			25	24		
A24	9	17 50	J20	d	10	Y			24	24	J14	T	10	Y			24	3		
A25	1	17 50	J20	b	10	Y			24	24	J14	U	10	Y			24	3		
A26	10	17 50	J20	Y	10	Y			24	24	J14	V	10	Y			24	3		
A27 V			J30	8		N	27	22	23	51	J20	J	10	Y	18	21	24	24		
A27 K			J30	1		N				51	J20	M	10	Y	22	23	24	24		
A27 R			J30	3		N				51	J20	N	10	Y		27	24	24		
A27 A			J30	2		N				51	SHLD	27	25	N				51		
A27 B	1	5 00	SHLD	27	25	N				24	J20	P	10	Y			24	24		
A28	2	14 25	J20	E	10	Y				24	R3	c̄	13	Y				38		
A29	4	7 50	J20	F	10	Y				24	A16	2	13	Y				28		
A30	3	8 37	J20	B	10	Y				24	A16	4	13	Y				32		
A31	6	15 12	J20	C	10	Y				24	R2	c̄	13	Y				65		
A32	2	24 00	P17	e	10	Y			24	1	P15	W	10	Y			24	50		
A33	1	15 37	P17	d	10	Y			24	1	J14	H	10	Y			24	3		

MANNED SPACECRAFT CENTER
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REVISION

NASA DRAWING NO.
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SHEET 7 of 14

INCHES
0 1 2
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APPLICATION	
NEXT ASSY	USED ON
1000005	DL1000201

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES TDRR 01669	6-4-63	E.W.	WK
E	FIND NO. 28 WAS "1000264" REVERSED PINS J & M ON J18 REVERSED PINS d & Y J19, & J20 TDRR 02138	7-16-63	E.W.	7/24/63 WK
F	REVISED TDRR 04292	11-6-63	E.W.	WK
G	REVISED TDRR 04293	11-6-63	C.V.	WK

REV STATUS	REV	G	G	G	G	G	G	G	G	G	G	G	G	G	G
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

		DATE
APPROVED		6-17-63
CHECKED	WINBERG	6-6-63
DRAWN	THENO	6-?-63

APPROVED FOR MSC
BY DIRECTION

WIRING HARNESS "A", STABLE MEMBER

SCALE
REVISION G

DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000137
SHEET 1 OF 14

TDRR 01669

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION		TOTAL LENGTH
1	1	MIL-W-16878 E28	WIRE, 28 AWG	BLK	10 FT. 5.62 IN.
2	1			RED	19 FT. 9.25 IN.
3	1			GY	17 FT. 11.75 IN.
4	1			VIO	13 FT. 9.38 IN.
5	1			BLU	5 FT. 1.88 IN.
6	1			ORN	14 FT. 5.38 IN.
7	1			GRN	17 FT. 6.88 IN.
8	1			YEL	14 FT. 3.75 IN.
9	1			WHT	4 FT. 11.88 IN.
10	1			BRN	2 FT. 6.75 IN.
11	3	1000121	Connector - Receptacle (P15, 16, 17)		
12	3	1000122	Connector - Receptacle (J18, 19, 20)		
13	3	1010318 -1	Connector - Plug (J28, 29, 30)		
14	1	1010472 -1	Connector - Plug (J21)		
15	2	1000120	Connector - Plug (J13,14)		
16	1	QQ-B-575 (7/64 I.D. 36 AWG)	6 5/8 " Long Shield - Wire		
17	1	QQ-B-575 (7/64 I.D. 36 AWG)	9" Long Shield - Wire		
18	1	QQ-B-575 (7/64 I.D. 36 AWG)	4 5/8" Long Shield - Wire		
19	1	1010490-830	6" Long Sleeving - Heat Shrink WHT		
20	1	1010490-950	8 3/8" Long Sleeving, Heat Shrink WHT		
21	1	1010490-710	4" Long Sleeving, Heat Shrink WHT		
22	6	1000243 -5	Ferrule, Inner		
23	6	1000242 -5	Ferrule, Outer		
24	123	1006776 -18	Insulation, Sleeving 5/16 Long		
25	51	1006776 -16	Insulation, Sleeving 5/16 Long		
26	1	MS25036 -48	Terminal Lug		
27	6	1015865-138( )	5/8 Long Sleeving, Heat Shrink BLK		

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SHEET 2 of 14

TDRR 01669

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION
28	1	1000267	Bracket
29	1	1000226	Bracket
30	1	1000149	Bracket
31	AR	QQ-S-571 (SN60WARP2)	Solder ( )
32	AR	MIL-T-713 TYPE P CLASS 2, BLACK	TAPE, Nylon, Waxed)

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SHEET 3 of 14

TDRR 01669

NOTES

NOTES:

1. TWISTED CONDUCTORS ARE TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM
2. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:

A	INDICATES SHIELD GROUND ON "FROM" END
B	INDICATES SHIELD GROUND ON "TO" END
C	INDICATES WHT/ORN
D	INDICATES WHT/BLK/BRN
E	INDICATES GRAY
F	INDICATES WHT/BLK/RED
G	INDICATES GREEN
H	INDICATES WHT/BLU
J	INDICATES WHT/RED
K	INDICATES BLACK
L	INDICATES BLUE
M	INDICATES WHT/YEL
N	INDICATES BROWN
O	INDICATES ORANGE
R	INDICATES RED
S	INDICATES WHT/BLK
T	INDICATES WHT/BRN
U	INDICATES WHT/GY
V	INDICATES VIOLET
W	INDICATES WHITE
X	INDICATES WHT/VIO
Y	INDICATES YELLOW
P	INDICATES WHT/GRN

3. "Y" OR "N" IN TINNED COLUMN INDICATES YES OR NO
4. DIMENSIONS ARE IN INCHES AND TWO PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 31
6. LACE CABLE USING ITEM 32
7. SPARE LEADS ON CONNECTORS J21, J28, J29, AND J30 TO BE CUT TO 10 INCHES AND LACED INTO HARNESS
8. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER
9. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
10. MARK CHARACTERS $^{.10}_{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
11. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING.
12. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

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INCHES
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MANNED
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REVISION G

NASA DRAWING NO.
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SHEET 6 of 14

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	FROM TERMINATION FIND NO.		SPEC	NO.	TO CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	TO TERMINATION FIND NO.		SPEC	NO.
A10	8	5	81	J18	Z	10	Y			24	22	J20	c̄	10	Y			24	24
A11	5	17	31	J18	b	10	Y			24	22	J14	BB	10	Y			24	3
A12	7	17	31	J18	Y	10	Y			24	22	J14	AA	10	Y			24	3
A13	8	15	06	J18	c̄	10	Y			24	22	J13	H	10	Y			24	54
A14	8	5	00	J19	c̄	10	Y			24	23	J20	Z	10	Y			24	24
A15	2	17	31	J19	Y	10	Y			24	23	J14	W	10	Y			24	3
A16	6	17	26	J19	b	10	Y			24	23	J14	X	10	Y			24	3
A17	7	15	06	J19	Z	10	Y			24	23	J13	K	10	Y			25	54
A18	8	17	31	J19	d	10	Y			24	23	J14	Y	10	Y			24	3
A19 V	4	5	00	J19	U	10	Y				23	J20	U	10	Y			24	24
A19 E	3	5	00	J19	V	10	Y				23	J20	V	10	Y			24	24
A20 V				J29	8		N	27	22	23	49	J19	M	10	Y	20	17	24	23
A20 K				J29	1		N				49	J19	J	10	Y	22	23	24	23
A20 R				J29	3		N				49	J19	N	10	Y		27	24	23
A20 A				J29	2		N				49	SHLD	20	25	N				49
A20 B	1	4	81	SHLD	20	25	N				23	J19	P	10	Y			24	23
A21 R	2	5	00	J19	E	10	Y				23	J20	E	10	Y			25	24
A21 E	3	5	00	J19	B	10	Y				23	J20	B	10	Y			25	24

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NASA DRAWING NO.
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SHEET 7 of 14

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	FROM TERMINATION FIND NO.		SPEC	NO.	TO CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	TO TERMINATION FIND NO.		SPEC	NO.
A22 G	7	5	00	J19	L	10	Y			24	23	J20	L	10	Y				24
A22 Y	8	5	00	J19	D	10	Y			24	23	J20	D	10	Y				24
A23 Y	4	5	00	J19	F	10	Y				23	J20	F	10	Y			25	24
A23 O	6	5	00	J19	C	10	Y				23	J20	C	10	Y			25	24
A24	9	17	31	J20	Y	10	Y			24	24	J14	T	10	Y			24	3
A25	1	17	31	J20	b	10	Y			24	24	J14	U	10	Y			24	3
A26	10	17	31	J20	d	10	Y			24	24	J14	V	10	Y			24	3
A27 V				J30	8		N	27	22	23	51	J20	M	10	Y	18	21	24	24
A27 K				J30	1		N				51	J20	J	10	Y	22	23	24	24
A27 R				J30	3		N				51	J20	N	10	Y		27	24	24
A27 A				J30	2		N				51	SHLD	27	25	N				51
A27 B	1	4	81	SHLD	27	25	N				24	J20	P	10	Y			24	24
A28	2	11	81	J20	E	10	Y				24	R3		13	Y				38
A29	4	7	31	J20	F	10	Y				24	A16	2	13	Y				28
A30	3	7	93	J20	B	10	Y				24	A16	4	13	Y				32
A31	6	15	18	J20	C	10	Y				24	R2		13	Y				65
A32	2	24	00	P17	6	10	Y			24	1	P15	W	10	Y			24	50
A33	1	15	37	P17	d	10	Y			24	1	J14	H	10	Y			24	3

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NASA DRAWING NO.
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CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	FROM TERMINATION FIND NO.		SPEC	NO.	TO CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	TO TERMINATION FIND NO.		SPEC	NO.
A1 E	3	5	00	J18	B	10	Y			24	22	J19	B	10	Y			25	23
A1 R	2	5	00	J18	E	10	Y			24	22	J19	E	10	Y			25	23
A2 O	6	5	00	J18	C	10	Y			24	22	J19	C	10	Y			25	23
A2 V	4	5	00	J18	F	10	Y			24	22	J19	F	10	Y			25	23
A3 Y	8	5	00	J18	D	10	Y			25	22	J20	D	10	Y			25	24
A3 G	7	5	00	J18	L	10	Y			25	22	J20	L	10	Y			25	24
A4 Y	8	15	06	J18	D	10	Y				22	J13	EE	10	Y			25	54
A4 G	7	15	06	J18	L	10	Y				22	J13	HH	10	Y			25	54
A5 V				J28	8		N	27	22	23	52	J18	M	10	Y	19	16	24	22
A5 K				J28	1		N				52	J18	J	10	Y	23	22	24	22
A5 R				J28	3		N				52	J18	N	10	Y		27	24	22
A5 A				J28	2		N				52	SHLD	5	25	N				52
A5 B	1	4	81	SHLD	5	25	N				22	J18	P	10	Y			24	22
A6 V	4	5	00	J18	U	10	Y			25	22	J19	U	10	Y			25	23
A6 E	3	5	00	J18	V	10	Y			25	22	J19	V	10	Y			25	23
A7	4	15	81	J18	U	10	Y				22	R1		13	Y				68
A8	3	15	06	J18	V	10	Y				22	J13	M	10	Y			24	54
A9	4	17	31	J18	d	10	Y			24	22	J14	CC	10	Y			24	3

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CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	FROM TERMINATION FIND NO.		SPEC	NO.	TO CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	TO TERMINATION FIND NO.		SPEC	NO.
A34	10	13	37	P17	b	10	Y			24	1	J14	J	10	Y			24	3
A35	2	5	00	P17	Z	10	Y			24	1	P17	T	10	Y			24	1
A36	2	13	37	P17	Y	10	Y			24	1	J14	K	10	Y			24	3
A37	2	9	62	P17	W	10	Y			24	1	P16	c̄	10	Y			24	2
A38 W	9	24	00	P17	U	10	Y			25	1	P15	U	10	Y			24	50
A38 E	3	24	00	P17	V	10	Y			25	1	P15	V	10	Y			24	50
A38 K	1	24	00	P17	S	10	Y			25	1	P15	S	10	Y			25	50
A39 W	9	9	62	P17	U	10	Y				1	P16	U	10	Y			25	2
A39 E	3	9	62	P17	V	10	Y				1	P16	V	10	Y			25	2
A39 K	1	9	62	P17	N	10	Y			25	1	P16	N	10	Y			25	2
A40	1	5	00	P17	S	10	Y				1	P17	N	10	Y				1
A41 K				J21	1	10					67	P17	M	10	Y			24	1
A41 T				J21	2	10					67	P17	J	10	Y			24	1
A42 G	7	24	00	P17	L	10	Y			25	1	P15	L	10	Y			24	50
A42 Y	8	24	00	P17	D	10	Y			25	1	P15	D	10	Y			24	50
A43 G	7	9	62	P17	L	10	Y				1	P16	L	10	Y			25	2
A43 Y	8	9	62	P17	D	10	Y				1	P16	D	10	Y			25	2
A44	7	24	00	P17	H	10	Y			24	1	P15	K	10	Y			24	50

INCHES
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CONDUCTOR			FROM					TO				
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A56			J21 16	10			67	P16 J	10	Y	24	2
A57 G	7	8 87	P16 L	10	Y		2	J13 HH	10	Y		54
A57 Y	8	8 87	P16 D	10	Y		2	J13 EE	10	Y		54
A58	1	5 00	P16 N	10	Y		2	P16 S	10	Y		2
A59 R	2	7 75	P16 B	10	Y		2	A14 3	13	Y		59
A59 E	3	8 00	P16 E	10	Y		2	A14 4	13	Y		61
A60 W	4	7 62	P16 F	10	Y		2	A14 2	13	Y		57
A60 O	6	7 37	P16 C	10	Y		2	A14 1	13	Y		55
A61	7	8 25	P16 K	10	Y	24	2	A14 5	13	Y		63
A62	6	22 50	P15 d	10	Y	24	50	J14 L	10	Y	24	3
A63	8	22 50	P15 b	10	Y	24	50	J14 M	10	Y	24	3
A64	2	5 00	P15 Z	10	Y	24	50	P15 T	10	Y	24	50
A65	7	22 50	P15 Y	10	Y	24	50	J14 N	10	Y	24	3
A66	1	6 00	P15 S	10	Y		50	P15 N	10	Y	24	50
A67D			21 20	10	N		67	P15 M	10	Y	24	50
A67F			J21 21	10	N		67	P15 J	10	Y	24	50
A68	7	20 25	P15 H	10	Y	24	50	J13 D	[illegible]	[illegible]	24	54
A69E	[illegible]	9 50	P15 E	10	Y		50	A12 2	13	Y		45

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CONDUCTOR			FROM					TO				
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A69 R	2	9 37	P15 B	10	Y		50	A12 3	13	Y		46
A70	4	10 12	P15 F	10	Y		50	S3 -	13	Y		40
A71	6	20 25	P15 C	10	Y		50	J13 Y	10	Y	24	54
A72	2	20 25	P15 c	10	Y	24	50	J13 A	10	Y	24	54
A73	8	15 00	J13 C	10	Y	25	54	A16 6	13	Y		34
A74	7	5 00	J13 C	10	Y		54	J13 E	10	Y	25	54
A75	7	5 00	J13 E	10	Y		54	J13 K	10	Y		54
A76	5	16 50	J13 F	10	Y	25	54	A12 2	13	Y		44
A77	5	11 12	J13 F	10	Y		54	TB1 4	13	Y		4
A78	4	10 50	J13 I	10	Y	24	54	R1	13	Y		69
A79 W		9 37	J21 10	10	N		67	J13 AA	10	Y	25	54
A79 U		9 37	J21 19	10	N		67	J13 DD	10	Y	24	54
A80 G			J28 6		N		52	J13 AA	10	Y		54
A80 I			J28 7		N		52	J13 BB	10	Y	25	54
A81 I	5	7 75	J13 BB	10	Y		54	A8 4	13	Y		10
A81 O	6	7 75	J13 CC	10	Y	24	54	A8 3	13	Y		8
A82	[illegible]	3 50	J13 FF	10	Y	24	54	E10	13	N	26	53
A83 L			J29 7		N		49	J13 KK	10	Y	25	54

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CONDUCTOR			FROM					TO				
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A45	7	9 62	P17 K	10	Y	24	1	P16 H	10	Y	24	2
A46 E	3	24 00	P17 E	10	Y	25	1	P15 E	10	Y	25	50
A46 R	2	24 00	P17 B	10	Y	25	1	P15 B	10	Y	25	50
A47 E	3	9 62	P17 E	10	Y		1	P16 E	10	Y	25	2
A47 R	2	9 62	P17 B	10	Y		1	P16 B	10	Y	25	2
A48 V	4	24 00	P17 F	10	Y	25	1	P15 F	10	Y	25	50
A48 O	6	24 00	P17 C	10	Y	25	1	P15 C	10	Y	25	50
A49 V	4	9 62	P17 F	10	Y		1	P16 F	10	Y	25	2
A49 O	6	9 62	P17 C	10	Y		1	P16 C	10	Y	25	2
A50	5	9 12	P16 d	10	Y	24	2	J14 P	10	Y	24	3
A51	4	9 12	P16 b	10	Y	24	2	J14 R	10	Y	24	3
A52	2	5 00	P16 Z	10	Y	24	2	P16 T	10	Y	24	2
A53	3	9 12	P16 Y	10	Y	24	2	J14 S	10	Y	24	3
A54	6	8 87	P16 W	10	Y	24	2	J13 B	10	Y	24	54
A55 W	9	8 87	P16 U	10	Y		2	J13 JJ	10	Y	24	54
A55 E	3	8 87	P16 V	10	Y		2	J13 LL	10	Y	24	54
A55 K	1	8 87	P16 S	10	Y	25	2	J13 NN	10	Y	24	54
A56 H			J21 17	10	N		67	P16 M	10	Y	24	2

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CONDUCTOR			FROM					TO				
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A83 G			J29 6		N		49	J13 MM	10	Y	25	54
A84 I			J30 7		N		51	J13 KK	10	Y		54
A84 G			J30 6		N		51	J13 MM	10	Y		54
A85	[illegible]	16 48	J13 X	10	Y	24	54	A12 1	13	Y		43
A86	2	16 12	J13 Z	10	Y	24	54	S2 -	13	Y		37
A87	4	17 25	J13 W	10	Y	24	54	S3 +	13	Y		41
A88 [illegible]			J28 5		N		52	J14 MM	10	Y	24	3
A88 [illegible]			J28 9		N		52	J14 KK	10	Y	24	3
A89 Y			J29 5		Y		49	J14 LL	10	Y	24	3
A89 E			J29 9		N		49	J14 FF	10	Y	24	3
A90 Y	8	9 37	J14 HH	10	Y	24	3	A8 6	13	Y		11
A90 G	7	9 37	J14 EE	10	Y	24	3	A8 5	13	Y		9
A91 Y			J30 5		N		51	J14 DD	10	Y	24	3
A91 E			J30 9		N		51	J14 Z	10	Y	24	3
A92 J			J21 13	10	N		67	J14 F	10	Y	24	3
A92 N			J21 2	10	N		67	J14 B	10	Y	24	3
A93 X			J21 18	10	N		67	J14 D	10	Y	24	3
A93 S			J21 11	10	N		67	J14 A	10	Y	24	3

INCHES
0 1 2
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TDRR 01669

CONDUCTOR				FROM							TO						
INDIVIDUAL FIND NUMBER	NO.	LENGTH		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	TERMINATION FIND NO.	SPEC	NO.	CUT WIRE OR SHIELD / STRIP WIRE OR JACKET / CIRCUIT POINT			Y/N	TERMINATION FIND NO.	SPEC	NO.
A94M				J21	15	10	N			67	J14	E	10	Y		24	3
A94 C				J21	14	10	N			67	J14	C	13	Y		24	3
A95 O	6	10	56	A14	1	13	Y			56	A13	1	13	Y			13
A95 V	4	10	44	A14	2	13	Y			58	A13	2	13	Y			15
A96 R	2	11	12	A14	3	13	Y			60	A13	3	13	Y			16
A96 E	3	11	37	A14	4	13	Y			62	A15	4	13	Y			19
A97	7	12	56	A14	6	13	Y			64	A15	5	13	Y			20
A98 O	6	5	44	A15	1	13	Y			12	A15	1	13	Y			25
A98 V	4	6	19	A15	2	13	Y			14	A15	2	13	Y			27
A99 R	2	6	37	A15	3	13	Y			17	A15	3	13	Y			29
A99 E	3	7	00	A15	4	13	Y			18	A15	4	13	Y			31
A100	7	8	12	A15	6	13	Y			21	A15	5	13	Y			33
A101	6	19	50	A16	1	13	Y			26	R2		13	Y			66
A102	2	9	06	A16	3	13	Y			30	R3		13	Y			37
A103	2	3	25	A12	3	13	Y			47	S2	+	13	Y			36
A104	3	17	75	A12	1	13	Y			42	TB1	1	13	Y			7
A105	3	17	43	A12	4	13	Y			48	TB1	2	13	Y			5
A106	2	18	12	S2	+	13	Y			35	TB1	3	13	Y			6

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SHEET 13 of 24

INCHES
0 1 2
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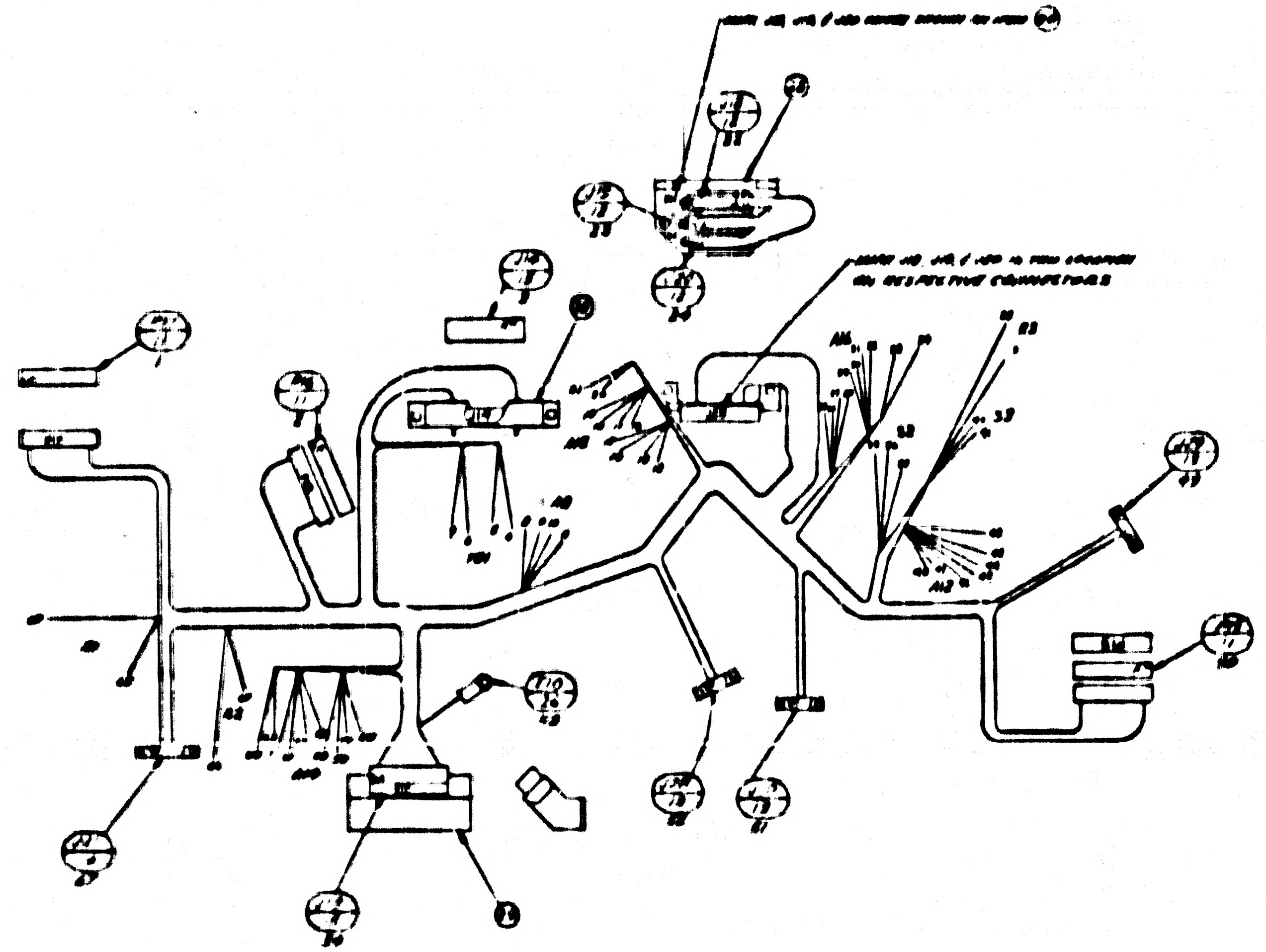

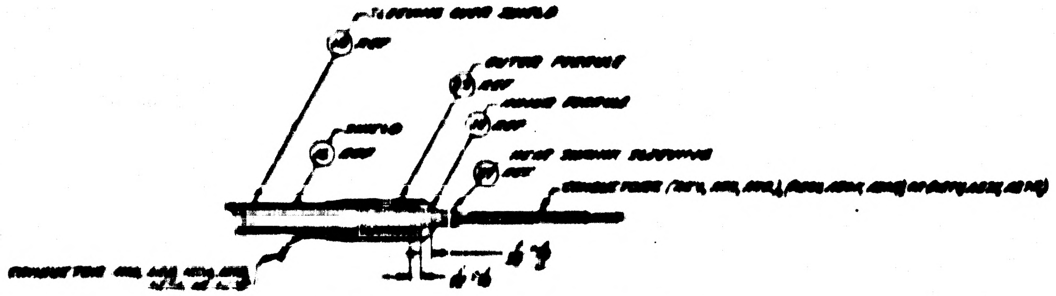

[illegible]

[illegible]

APPLICATION	
NEXT ASS'Y	USED ON
1000005	DL1000201

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES TDRR 01669	6-4-63	E.W.	WK
E	FIND NO. 28 WAS "1000264" REVERSED PINS J & M ON J18 REVERSED PINS d & Y ON J19, & J20 TDRR 02138	7-16-63	E.W.	7/24/63 WK
F	REVISED TDRR 04292	11-6-63	E.W.	WK
G	REVISED TDRR 04293	11-6-63	E.W.	WK
H	REVISED TDRR 06746	3-9-64	E.W.	WK

REV STATUS	REV	H	G	G	G	G	G	G	G	G	H	G	G	G	H
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

		DATE
APPROVED		6-17-63
CHECKED	WINBERG	6-6-63
DRAWN		

APPROVED FOR MSC

BY DIRECTION

WIRING HARNESS "A", STABLE MEMBER

DWG NO.

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SCALE

REVISION H

NASA DRAWING NO. 1000137

SHEET 1 OF 14

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION		TOTAL LENGTH
1	1	MIL-W-16878 E28	WIRE, 28 AWG	BLK	10 FT. 5.62 IN.
2	1			RED	19 FT. 9.25 IN.
3	1			GY	17 FT. 11.75 IN.
4	1			VIO	13 FT. 9.38 IN.
5	1			BLU	5 FT. 1.88 IN.
6	1			ORN	14 FT. 5.38 IN.
7	1			GRN	17 FT. 6.88 IN.
8	1			YEL	14 FT. 3.75 IN.
9	1			WHT	4 FT. 11.88 IN.
10	1			BRN	2 FT. 6.75 IN.
11	3	1000121	Connector - Receptacle (P15, 16, 17)		
12	3	1000122	Connector - Receptacle (J18, 19, 20)		
13	3	1010318 -1	Connector - Plug (J28, 29, 30)		
14	1	1010472 -1	Connector - Plug (J21)		
15	2	1000120	Connector - Plug (J13,14)		
16	1	QQ-B-575 (7/64 I.D. 36 AWG)	6 5/8 " Long Shield - Wire		
17	1	QQ-B-575 (7/64 I.D. 36 AWG)	9" Long Shield - Wire		
18	1	QQ-B-575 (7/64 I.D. 36 AWG)	4 5/8" Long Shield - Wire		
19	1	1010490-830	6" Long Sleeving - Heat Shrink WHT		
20	1	1010490-950	8 3/8" Long Sleeving, Heat Shrink WHT		
21	1	1010490-710	4" Long Sleeving, Heat Shrink WHT		
22	6	1000243 -5	Ferrule, Inner		
23	6	1000242 -5	Ferrule, Outer		
24	123	1006776 -18	Insulation, Sleeving 5/16 Long		
25	51	1006776 -16	Insulation, Sleeving 5/16 Long		
26	1	MS25036 -48	Terminal Lug		
27	6	1015865-138	5/8 Long Sleeving, Heat Shrink BLK		

LIST OF MATERIAL

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SHEET 2 of 14

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION
28	1	1000267	Bracket
29	1	1000226	Bracket
30	1	1000149	Bracket
31	AR	QQ-S-571 (SN60WARP2)	Solder ( )
32	AR	MIL-T-713 TYPE P CLASS 2, BLACK	TAPE, Nylon, Waxed

LIST OF MATERIAL

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NASA DRAWING NO. 1000137

SHEET 3 of 14

TDRR 01669

NOTES

NOTES:

1. TWISTED CONDUCTORS ARE TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM
2. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:
   - A INDICATES SHIELD GROUND ON "FROM" END
   - B INDICATES SHIELD GROUND ON "TO" END
   - C INDICATES WHT/ORN
   - D INDICATES WHT/BLK/BRN
   - E INDICATES GRAY
   - F INDICATES WHT/BLK/RED
   - G INDICATES GREEN
   - H INDICATES WHT/BLU
   - J INDICATES WHT/RED
   - K INDICATES BLACK
   - L INDICATES BLUE
   - M INDICATES WHT/YEL
   - N INDICATES BROWN
   - O INDICATES ORANGE
   - R INDICATES RED
   - S INDICATES WHT/BLK
   - T INDICATES WHT/BRN
   - U INDICATES WHT/GY
   - V INDICATES VIOLET
   - W INDICATES WHITE
   - X INDICATES WHT/VIO
   - Y INDICATES YELLOW
   - P INDICATES WHT/GRN
3. "Y" OR "N" IN TINNED COLUMN INDICATES YES OR NO
4. DIMENSIONS ARE IN INCHES AND TWO PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 31
6. LACE CABLE USING ITEM 32
7. SPARE LEADS ON CONNECTORS J21, J28, J29, AND J30 TO BE CUT TO 10 INCHES AND LACED INTO HARNESS
8. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER
9. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
10. MARK CHARACTERS .10 .14 HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
11. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING.
12. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

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SHEET 4 of 14

INCHES
0 1 2
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NASA DRAWING NO.
1000137
SHEET 6 of 14

CONDUCTOR FIND NUMBER	FIND NO.	INDIVIDUAL LENGTH	FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.			NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.			NO.
A10	8	5 81	J18	Z	10	Y			24	22	J20	c̄	10	Y			24	24
A11	5	17 31	J18	b	10	Y			24	22	J14	BB	10	Y			24	3
A12	7	17 31	J18	Y	10	Y			24	22	J14	AA	10	Y			24	3
A13	8	15 06	J18	c̄	10	Y			24	22	J13	H	10	Y			24	54
A14	8	5 00	J19	c̄	10	Y			24	23	J20	Z	10	Y			24	24
A15	2	17 31	J19	Y	10	Y			24	23	J14	W	10	Y			24	3
A16	6	17 26	J19	b	10	Y			24	23	J14	X	10	Y			24	3
A17	7	15 06	J19	Z	10	Y			24	23	J13	K	10	Y			25	54
A18	8	17 31	J19	d	10	Y			24	23	J14	Y	10	Y			24	3
A19 V	4	5 00	J19	U	10	Y				23	J20	U	10	Y			24	24
A19 E	3	5 00	J19	V	10	Y				23	J20	V	10	Y			24	24
A20 V			J29	8		N	27	22	23	49	J19	M	10	Y	20	17	24	23
A20 K			J29	1		N				49	J19	J	10	Y	22	23	24	23
A20 R			J29	3		N				49	J19	N	10	Y		27	24	23
A20 A			J29	2		N				49	SHLD	20	25	N				49
A20 B	1	4 81	SHLD	20	25	N				23	J19	P	10	Y			24	23
A21 R	2	5 00	J19	E	10	Y				23	J20	E	10	Y			25	24
A21 E	3	5 00	J19	B	10	Y				23	J20	B	10	Y			25	24

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NASA DRAWING NO.
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SHEET 7 of 14

CONDUCTOR FIND NUMBER	FIND NO.	INDIVIDUAL LENGTH	FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.			NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.			NO.
A22 G	7	5 00	J19	L	10	Y			24	23	J20	L	10	Y				24
A22 Y	8	5 00	J19	D	10	Y			24	23	J20	D	10	Y				24
A23 Y	4	5 00	J19	F	10	Y				23	J20	F	10	Y			25	24
A23 O	6	5 00	J19	C	10	Y				23	J20	C	10	Y			25	24
A24	9	17 31	J20	Y	10	Y			24	24	J14	T	10	Y			24	3
A25	1	17 31	J20	b	10	Y			24	24	J14	U	10	Y			24	3
A26	10	17 31	J20	d	10	Y			24	24	J14	V	10	Y			24	3
A27 V			J30	8		N	27	22	23	51	J20	M	10	Y	18	21	24	24
A27 K			J30	1		N				51	J20	J	10	Y	22	23	24	24
A27 R			J30	3		N				51	J20	N	10	Y		27	24	24
A27 A			J30	2		N				51	SHLD	27	25	N				51
A27 B	1	4 81	SHLD	27	25	N				24	J20	P	10	Y			24	24
A28	2	11 81	J20	E	10	Y				24	R3		13	Y				38
A29	4	7 31	J20	F	10	Y				24	A16	2	13	Y				28
A30	3	7 93	J20	B	10	Y				24	A16	4	13	Y				32
A31	6	15 18	J20	C	10	Y				24	R2		13	Y				65
A32	2	24 00	P17	E	10	Y			24	1	P15	W	10	Y			24	50
A33	1	15 37	P17	d	10	Y			24	1	J14	H	10	Y			24	3

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NASA DRAWING NO.
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SHEET 5 of 14

CONDUCTOR FIND NUMBER	FIND NO.	INDIVIDUAL LENGTH	FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.			NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.			NO.
A1 E	3	5 00	J18	B	10	Y			24	22	J[illegible]		10	Y			25	23
A1 R	2	5 00	J18	E	10	Y			24	22	J19	E	10	Y			25	23
A2 O	6	5 00	J18	C	10	Y			24	22	J19	C	10	Y			25	23
A2 V	4	5 00	J18	F	10	Y			24	22	J19	F	10	Y			25	23
A3 Y	8	5 00	J18	D	10	Y			25	22	J20	D	10	Y			25	24
A3 G	7	5 00	J18	L	10	Y			25	22	J20	L	10	Y			25	24
A4 Y	8	15 06	J18	D	10	Y				22	J13	EE	10	Y			25	54
A4 G	7	15 06	J18	L	10	Y				22	J13	HH	10	Y			25	54
A5 V			J28	8		N	27	22	23	52	J18	M	10	Y	19	16	24	22
A5 K			J28	1		N				52	J18	J	10	Y	23	22	24	22
A5 R			J28	3		N				52	J18	N	10	Y		27	24	22
A5 A			J28	2		N				52	SHLD	5	25	N				52
A5 B	1	4 81	SHLD	5	25	N				22	J18	P	10	Y			24	22
A6 V	4	5 00	J18	U	10	Y			25	22	J19	U	10	Y			25	23
A6 E	3	5 00	J18	V	10	Y			25	22	J19	V	10	Y			25	23
A7	4	16 81	J18	U	10	Y				22	R1		13	Y				68
A8	3	15 06	J18	V	10	Y				22	J13	M	10	Y			24	54
A9	4	17 31	J18	d	10	Y			24	22	J14	CC	10	Y			24	3

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SHEET 8 of 14

CONDUCTOR FIND NUMBER	FIND NO.	INDIVIDUAL LENGTH	FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.			NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.			NO.
A34	10	13 37	P17	b	10	Y			24	1	J14	J	10	Y			24	3
A35	2	5 00	P17	Z	10	Y			24	1	P17	T	10	Y			24	1
A36	2	13 37	P17	Y	10	Y			24	1	J14	K	10	Y			24	3
A37	2	9 62	P17	W	10	Y			24	1	P16	c̄	10	Y			24	2
A38 W	9	24 00	P17	U	10	Y			25	1	P15	U	10	Y			24	50
A38 E	3	24 00	P17	V	10	Y			25	1	P15	V	10	Y			24	50
A38 K	1	24 00	P17	S	10	Y			25	1	P15	S	10	Y			25	50
A39 W	9	9 62	P17	U	10	Y				1	P16	U	10	Y			25	2
A39 E	3	9 62	P17	V	10	Y				1	P16	V	10	Y			25	2
A39 K	1	9 62	P17	N	10	Y			25	1	P16	N	10	Y			25	2
A40	1	5 00	P17	S	10	Y				1	P17	N	10	Y				1
A41 K			J21	1	10					67	P17	M	10	Y			24	1
A41 T			J21	12	10					67	P17	J	10	Y			24	1
A42 G	7	24 00	P17	L	10	Y			25	1	P15	L	10	Y			24	50
A42 Y	8	24 00	P17	D	10	Y			25	1	P15	D	10	Y			24	50
A43 G	7	9 62	P17	L	10	Y				1	P16	L	10	Y			25	2
A43 Y	8	9 62	P17	D	10	Y				1	P16	D	10	Y			25	2
A44	7	24 00	P17	H	10	Y			24	1	P15	K	10	Y			24	50

INCHES
0 1 2
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NASA DRAWING NO.
1000137
SHEET 10 of 14

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.	NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.	NO.
A56 P				J21	16	10			67	P16	J	10	Y	24	2
A57 G	7	8	87	P16	L	10	Y		2	J13	HH	10	Y		54
A57 Y	8	8	87	P16	D	10	Y		2	J13	EE	10	Y		54
A58	1	5	00	P16	N	10	Y		2	P16	S	10	Y		2
A59 R	2	7	75	P16	B	10	Y		2	A14	3	13	Y		59
A59 E	3	8	00	P16	E	10	Y		2	A14	4	13	Y		61
A60 V	4	7	62	P16	F	10	Y		2	A14	2	13	Y		57
A60 O	6	7	37	P16	C	10	Y		2	A14	1	13	Y		55
A61	7	8	25	P16	K	10	Y	24	2	A14	5	13	Y		63
A62	6	22	50	P15	d	10	Y	24	50	J14	L	10	Y	24	3
A63	8	22	50	P15	b	10	Y	24	50	J14	M	10	Y	24	3
A64	2	5	00	P15	Z	10	Y	24	50	P15	T	10	Y	24	50
A65	7	22	50	P15	Y	10	Y	24	50	J14	N	10	Y	24	3
A66	1	6	00	P15	S	10	Y		50	P15	N	10	Y	24	50
A67D				J21	20	10	N		67	P15	M	10	Y	24	50
A67F				J21	21	10	N		67	P15	J	10	Y	24	50
A68	7	20	25	P15	H	10	Y	24	50	J13	D	10	Y	24	54
A69E	3	9	50	P15	E	10	Y		50	A12	2	13	Y		45

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NASA DRAWING NO.
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SHEET 11 of 14

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.	NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.	NO.
A69 R	2	9	37	P15	B	10	Y		50	A12	3	13	Y		46
A70	4	10	12	P15	F	10	Y		50	S3	-	13	Y		40
A71	6	20	25	P15	C	10	Y		50	J13	Y	10	Y	24	54
A72	2	20	25	P15	c	10	Y	24	50	J13	A	10	Y	24	54
A73	8	15	00	J13	C	10	Y	25	54	A16	6	13	Y		34
A74	7	5	00	J13	C	10	Y		54	J13	E	10	Y	25	54
A75	7	5	00	J13	E	10	Y		54	J13	K	10	Y		54
A76	5	16	50	J13	F	10	Y	25	54	A12	2	13	Y		44
A77	5	11	12	J13	F	10	Y		54	TB1	4	13	Y		4
A78	4	10	50	J13	I	10	Y	24	54	R1		13	Y		69
A79 W		9	37	J21	10	10	N		67	J13	AA	10	Y	25	54
A79 U		9	37	J21	19	10	N		67	J13	DD	10	Y	24	54
A80 C				J28	6		N		52	J13	AA	10	Y		54
A80 I				J28	7		N		52	J13	BB	10	Y	25	54
A81 I	5	7	75	J13	BB	10	Y		54	A8	4	13	Y		10
A81 O	6	7	75	J13	CC	10	Y	24	54	A8	3	13	Y		8
A82	1	3	50	J13	FF	10	Y	24	54	E10		13	N	26	53
A83 I				J29	7		N		49	J13	KK	10	Y	25	54

TDRR 01669

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

REVISION G

NASA DRAWING NO.
1000137
SHEET [illegible]

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.	NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.	NO.
A45	7	9	62	P17	K	10	Y	24	1	P16	H	10	Y	24	2
A46 E	3	24	00	P17	E	10	Y	25	1	P15	E	10	Y	25	50
A46 R	2	24	00	P17	B	10	Y	25	1	P15	B	10	Y	25	50
A47 E	3	9	62	P17	E	10	Y		1	P15	E	10	Y	25	2
A47 R	2	9	62	P17	B	10	Y		1	P16	B	10	Y	25	2
A48 V	4	24	00	P17	F	10	Y	25	1	P15	F	10	Y	25	50
A48 O	6	24	00	P17	C	10	Y	25	1	P15	C	10	Y	25	50
A49 V	4	9	62	P17	F	10	Y		1	P16	F	10	Y	25	2
A49 O	6	9	62	P17	C	10	Y		1	P16	C	10	Y	25	2
A50	5	9	12	P16	d	10	Y	24	2	J14	P	10	Y	24	3
A51	4	9	12	P16	b	10	Y	24	2	J14	R	10	Y	24	3
A52	2	5	00	P16	Z	10	Y	24	2	P16	T	10	Y	24	2
A53	3	9	12	P16	Y	10	Y	24	2	J14	S	10	Y	24	3
A54	6	8	87	P16	W	10	Y	24	2	J13	B	10	Y	24	54
A55 W	9	8	87	P16	U	10	Y		2	J13	JJ	10	Y	24	54
A55 E	3	8	87	P16	V	10	Y		2	J13	LL	10	Y	24	54
A55 K	1	8	87	P16	S	10	Y	25	2	J13	NN	10	Y	24	54
A56 H				J21	17	10	N		57	P16	M	10	Y	24	2

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NASA DRAWING NO.
1000137
SHEET 12 of 14

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.	NO.	TO CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.	NO.
A83 C				J29	6		N		49	J13	MM	10	Y	25	54
A84 I				J30	7		N		51	J13	KK	10	Y		54
A84 G				J30	6		N		51	J13	MM	10	Y		54
A85	3	16	48	J13	X	10	Y	24	54	A12	1	13	Y		43
A86	2	16	12	J13	Z	10	Y	24	54	S2	-	13	Y		37
A87	4	17	25	J13	W	10	Y	24	54	S3	+	13	Y		41
A88 [illegible]				J28	5		N		52	J14	MM	10	Y	24	3
A88 E				J28	9		N		52	J14	KK	10	Y	24	3
A89 Y				J29	5		N		49	J14	LL	10	Y	24	3
A89 E				J29	9		N		49	J14	FF	10	Y	24	3
A90 Y	8	9	62	J14	HH	10	Y	24	3	A8	6	13	Y		11
A90 G	7	9	62	J14	EE	10	Y	24	3	A8	5	13	Y		9
A91 Y				J30	5		N		51	J14	DD	10	Y	24	3
A91 E				J30	9		N		51	J14	Z	10	Y	24	3
A92 J				J21	13	10	N		67	J14	F	10	Y	24	3
A92 N				J21	2	10	N		67	J14	B	10	Y	24	3
A93 X				J21	18	10	N		67	J14	D	10	Y	24	3
A93 S				J21	11	10	N		67	J14	A	10	Y	24	3

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

TDRR 01669

CONDUCTOR				FROM							TO						
FIND NUMBER	NO.	INDIVIDUAL LENGTH		CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y N	TERMINATION FIND NO.	SPEC	NO.	CUT WIRE OR SHIELD STRIP WIRE OR JACKET CIRCUIT POINT			Y N	TERMINATION FIND NO.	SPEC	NO.
A94M				J21	15	10	N			67	J14	E	10	Y		24	3
A94 C				J21	14	10	N			67	J14	C	10	Y		24	3
A95 O	6	10	56	A14	1	13	Y			56	A15	1	13	Y			13
A95 V	4	10	44	A14	2	13	Y			58	A15	2	13	Y			15
A96 R	2	11	12	A14	3	13	Y			60	A15	3	13	Y			16
A96 E	3	11	37	A14	4	13	Y			62	A15	4	13	Y			19
A97	7	12	56	A14	6	13	Y			64	A15	5	13	Y			20
A98 O	6	5	44	A15	1	13	Y			12	A16	1	13	Y			25
A98 V	4	6	19	A15	2	13	Y			14	A16	2	13	Y			27
A99 R	2	6	37	A15	3	13	Y			17	A16	3	13	Y			29
A99 E	3	7	00	A15	4	13	Y			1[illegible]	A16	4	13	Y			31
A100	7	8	12	A15	6	13	Y			21	A16	5	13	Y			33
A101	6	19	50	A16	1	13	Y			26	R2		13	Y			66
A102	2	9	06	A16	3	13	Y			30	R3		13	Y			37
A103	2	3	25	A12	3	13	Y			47	S2	+	13	Y			36
A104	3	17	75	A12	1	13	Y			42	TB1	1	13	Y			7
A105	3	17	43	A12	4	13	Y			48	TB1	2	13	Y			5
A106	2	18	12	S2	+	13	Y			35	TB1	3	13	Y			6

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NASA DRAWING NO.
1000137
SHEET 13 of 14

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

APPLICATION	
NEXT ASSY	USED ON
1000005	DL1000201

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL	
D	REPLACES REV C WITH CHANGES TDRR 01669	6-4-63	E.W.	WK
E	FIND NO. 28 WAS "1000264" REVERSED PINS J & M ON J18 REVERSED PINS J & Y ON J19 & J20 TDRR 02138	7-16-63	E.W.	7/24/63 WK
F	REVISED TDRR 04292	11-6-63	E.W.	WK
G	REVISED TDRR 04293	11-6-63	E.W.	WK
H	REVISED TDRR 06746	3-9-64	E.W.	WK
J	REVISED PER TDRR 06980	1 APR 64	WP	PBR

REV STATUS														
REV	J	J	G	J	G	G	G	G	G	H	J	G	G	J
OF SHEETS SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

APPROVED
CHECKED
DRAWN
DATE

APPROVED FOR MSC
BY DIRECTION

WIRING HARNESS "A";
STABLE MEMBER

DWG NO

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HOUSTON TEXAS

NASA DRAWING NO. 1000137

SCALE
REVISION J

SHEET 1 OF 14

TDRR 01669

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION	TOTAL LENGTH
1	1	MIL-W-16878 E28	WIRE, 28 AWG BLK	10 FT. 5.62 IN.
2	1		RED	19 FT. 9.25 IN.
3	1		GY	17 FT. 11.75 IN.
4	1		VIO	13 FT. 9.38 IN.
5	1		BLU	5 FT. 1.88 IN.
6	1		ORN	14 FT. 5.38 IN.
7	1		GRN	17 FT. 6.88 IN.
8	1		YEL	14 FT. 3.75 IN.
9	1		WHT	4 FT. 11.88 IN.
10	1		BRN	2 FT. 6.75 IN.
11	3	1000121	Connector - Receptacle (P15, 16, 17)	
12	3	1000122	Connector - Receptacle (J18, 19, 20)	
13	3	1010318 -1	Connector - Plug (J28, 29, 30)	
14	1	1010472 -1	Connector - Plug (J21)	
15	2	1000120	Connector - Plug (J13,14)	
16	1	QQ-B-575 (7/64 I.D. 36 AWG)	6 5/8 " Long Shield - Wire	
17	1	QQ-B-575 (7/64 I.D. 36 AWG)	9" Long Shield - Wire	
18	1	QQ-B-575 (7/64 I.D. 36 AWG)	4 5/8" Long Shield - Wire	
19	1	1010490-830	6" Long Sleeving - Heat Shrink WHT	
20	1	1010490-950	8 3/8" Long Sleeving, Heat Shrink WHT	
21	1	1010490-710	4" Long Sleeving, Heat Shrink WHT	
22	6	1000243 -5	Ferrule, Inner	
23	6	1000242 -5	Ferrule, Outer	
24	123	1006776 -18	Insulation, Sleeving 5/16 Long	
25	51	1006776 -16	Insulation, Sleeving 5/16 Long	
26	1	1010717- 1	Terminal Lug	
27	6	1015865-138	5/8 Long Sleeving, Heat Shrink BLK	

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REVISION J

NASA DRAWING NO. 1000137
SHEET 2 of 14

TDRR 01669

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION
28	1	1000267	Bracket
29	1	1000226	Bracket
30	1	1000149	Bracket
31	AR	QQ-S-571 (SN60WARP2)	Solder ( )
32	AR	MIL-T-713 TYPE P CLASS 2, BLACK	TAPE, Nylon, Waxed)

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NASA DRAWING NO. 1000137
SHEET 3 of 14

TDRR 01669

NOTES

NOTES:

1. CONDUCTORS TO BE TWISTED PER THE WIRE TWISTING CHART.
2. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:

A INDICATES SHIELD GROUND ON "FROM" END
B INDICATES SHIELD GROUND ON "TO" END
C INDICATES WHT/ORN
D INDICATES WHT/BLK/BRN
E INDICATES GRAY
F INDICATES WHT/BLK/RED
G INDICATES GREEN
H INDICATES WHT/BLU
J INDICATES WHT/RED
K INDICATES BLACK
L INDICATES BLUE
M INDICATES WHT/YEL
N INDICATES BROWN
O INDICATES ORANGE
R INDICATES RED
S INDICATES WHT/BLK
T INDICATES WHT/BRN
U INDICATES WHT/GY
V INDICATES VIOLET
W INDICATES WHITE
X INDICATES WHT/VIO
Y INDICATES YELLOW
Z INDICATES WHT/GRN

3. "Y" OR "N" IN TWISTED COLUMN INDICATES YES OR NO
4. DIMENSIONS ARE IN INCHES AND TWO PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 31
6. LACE CABLE USING ITEM 32
7. SPARE LEADS ON CONNECTORS J21, J28, J29, AND J30 TO BE CUT TO 10 INCHES AND LACED INTO HARNESS
8. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER
9. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
10. MARK CHARACTERS .10 .14 HIGH COLOR BLACK PER MD1002019 AT LOCATIONS SHOWN
11. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING.
12. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

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REVISION J

NASA DRAWING NO. 1000137
SHEET 4 of 14

TDRR 01669

CONDUCTOR			FROM						TO					
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.
A22 G	7	5 00	J19 L	10	Y		24	23	J20 L	10	Y			24
A22 Y	8	5 00	J19 D	10	Y		24	23	J20 D	10	Y			24
A23 V	4	5 00	J19 F	10	Y			23	J20 F	10	Y		25	24
A23 O	6	5 00	J19 C	10	Y			23	J20 C	10	Y		25	24
A24	9	17 31	J20 Y	10	Y		24	24	J14 T	10	Y		24	3
A25	1	17 31	J20 b	10	Y		24	24	J14 U	10	Y		24	3
A26	10	17 31	J20 d	10	Y		24	24	J14 V	10	Y		24	3
A27 V			J30 8		N	27 22	23	51	J20 M	10	Y	18 21	24	24
A27 K			J30 1		N			51	J20 J	10	Y	22 23	24	24
A27 R			J30 3		N			51	J20 H	10	Y	27	24	24
A27 A			J30 2		N			51	SHLD 27	25	N			51
A27 B	1	4 81	SHLD 27	25	N			24	J20 P	10	Y		24	24
A28	2	11 81	J20 E	10	Y			24	R3	13	Y			38
A29	4	7 31	J20 F	10	Y			24	A16 2	13	Y			28
A30	3	7 93	J20 B	10	Y			24	A16 4	13	Y			32
A31	6	15 18	J20 C	10	Y			24	R2	13	Y			65
A32	2	24 00	P17 c̄	10	Y		24	1	P15 W	10	Y		24	50
A33	1	15 37	P17 d	10	Y		24	1	J14 H	10	Y		24	3

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NASA DRAWING NO.
1000137
SHEET 7 of 14

TDRR 01669

CONDUCTOR			FROM						TO					
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.
A1 E	3	5 00	J18 B	10	Y		24	22	J19 B	10	Y		25	23
A1 R	2	5 00	J18 E	10	Y		24	22	J19 E	10	Y		25	23
A2 O	6	5 00	J18 C	10	Y		24	22	J19 C	10	Y		25	23
A2 V	4	5 00	J18 F	10	Y		24	22	J19 F	10	Y		25	23
A3 Y	8	5 00	J18 D	10	Y		25	22	J20 D	10	Y		25	24
A3 G	7	5 00	J18 L	10	Y		25	22	J20 L	10	Y		25	24
A4 Y	8	15 06	J18 D	10	Y			22	J13 EE	10	Y		25	54
A4 G	7	15 06	J18 L	10	Y			22	J13 HH	10	Y		25	54
A5 V			J28 8		N	27 22	23	52	J18 M	10	Y	19 16	24	22
A5 K			J28 1		N			52	J18 J	10	Y	23 22	24	22
A5 R			J28 3		N			52	J18 H	10	Y	27	24	22
A5 A			J28 2		N			52	SHLD 5	25	N			52
A5 B	1	4 81	SHLD 5	25	N			22	J18 P	10	Y		24	22
A6 V	4	5 00	J18 U	10	Y		25	22	J19 U	10	Y		25	23
A6 E	3	5 00	J18 V	10	Y		25	22	J19 V	10	Y		25	23
A7	4	15 81	J18 U	10	Y			22	R1	13	Y			68
A8	3	15 66	J18 V	10	Y			22	J13 M	10	Y		24	54
A9	4	17 31	J18 d	10	Y		24	22	J14 CC	10	Y		24	3

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NASA DRAWING NO.
1000137
SHEET 5 of 14

TDRR 01669

CONDUCTOR			FROM						TO					
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.
A34	10	13 37	P17 b	10	Y		24	1	J14 J	10	Y		24	3
A35	2	5 00	P17 Z	10	Y		24	1	P17 T	10	Y		24	1
A36	2	13 37	P17 X	10	Y		24	1	J14 K	10	Y		24	3
A37	2	9 62	P17 W	10	Y		24	1	P16 c̄	10	Y		24	2
A38 W	9	24 00	P17 U	10	Y		25	1	P15 U	10	Y		24	50
A38 E	3	24 00	P17 V	10	Y		25	1	P15 V	10	Y		24	50
A38 K	1	24 00	P17 S	10	Y		25	1	P15 S	10	Y		25	50
A39 W	9	9 62	P17 U	10	Y			1	P16 U	10	Y		25	2
A39 E	3	9 62	P17 V	10	Y			1	P16 V	10	Y		25	2
A39 K	1	9 62	P17 N	10	Y		25	1	P16 N	10	Y		25	2
A40	1	5 00	P17 S	10	Y			1	P17 N	10	Y			1
A41 K			J21 1	10				67	P17 M	10	Y		24	1
A41 T			J21 12	10				67	P17 J	10	Y		24	1
A42 G	7	24 00	P17 L	10	Y		25	1	P15 L	10	Y		24	50
A42 Y	8	24 00	P17 D	10	Y		25	1	P15 D	10	Y		24	50
A43 G	7	9 62	P17 L	10	Y			1	P16 L	10	Y		25	2
A43 Y	8	9 62	P17 D	10	Y			1	P16 D	10	Y		25	2
A44	7	24 00	P17 H	10	Y		24	1	P15 K	10	Y		24	50

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NASA DRAWING NO.
1000137
SHEET 8 of 14

TDRR 01669

CONDUCTOR			FROM						TO					
FIND NUMBER	NO.	INDIVIDUAL LENGTH	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.	CIRCUIT POINT	CUT WIRE OR SHIELD	STRIP WIRE OR JACKET Y/N	TERMINATION FIND NO.	SPEC	NO.
A10	8	5 81	J18 Z	10	Y		24	22	J20 c̄	10	Y		24	24
A11	5	17 31	J18 b	10	Y		24	22	J14 BB	10	Y		24	3
A12	7	17 31	J18 Y	10	Y		24	22	J14 AA	10	Y		24	3
A13	8	15 06	J18 c̄	10	Y		24	22	J13 H	10	Y		24	54
A14	8	5 00	J19 c̄	10	Y		24	23	J20 Z	10	Y		24	24
A15	2	17 31	J19 Y	10	Y		24	23	J14 W	10	Y		24	3
A16	6	17 25	J19 b	10	Y		24	23	J14 X	10	Y		24	3
A17	7	15 66	J19 Z	10	Y		24	23	J13 K	10	Y		25	54
A18	8	17 31	J19 d	10	Y		24	23	J14 Y	10	Y		24	3
A19 V	4	5 00	J19 U	10	Y			23	J20 U	10	Y		24	24
A19 E	3	5 00	J19 V	10	Y			23	J20 V	10	Y		24	24
A20 V			J29 8		N	27 22	23	49	J19 M	10	Y	20 17	24	23
A20 K			J29 1		N			49	J19 J	10	Y	22 23	24	23
A20 R			J29 3		N			49	J19 H	10	Y	27	24	23
A20 A			J29 2		N			49	SHLD 20	25	N			49
A20 B	1	4 81	SHLD 20	25	N			23	J19 P	10	Y		24	23
A21 R	2	5 00	J19 E	10	Y			23	J20 E	10	Y		25	24
A21 E	3	5 00	J19 B	10	Y			23	J20 B	10	Y		25	24

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NASA DRAWING NO.
1000137
SHEET 6 of 14

TDRR 01669

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	TO CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A69 R	2	9 37	P15	B	10	M		50	A12	3	13	M		46
A70	4	10 12	P15	F	10	M		50	S3	-	13	Y		40
A71	6	20 25	P15	C	10	M		50	J13	Y	10	Y	24	54
A72	2	20 25	P15	E	10	Y		50	J13	A	10	Y	24	54
A73	9	15 00	J13	C	10	M		54	J15	6	13	M		34
A74	7	5 00	J13	C	10	M		54	J13	E	10	Y	25	54
A75	7	5 00	J13	E	10	M		54	J13	K	10	Y		54
[illegible]		16 50	J13	F	10	M		54	A12	2	13	M		44
A77		11 12	J13	F	10	M		54	TB1	4	13	Y		4
[illegible]	4	10 50	J13	I	10	M	24	54	R1		13	M		60
[illegible] N		9 37	J21	10	10	N		67	J13	AA	10	Y	25	54
[illegible] U		9 37	J21	18	10	N		67	J13	DD	10	Y	24	54
[illegible] G			J28	6		N		52	J13	AA	10	Y		54
[illegible] I			J28	7		N		52	J13	BB	10	Y	25	54
A81 I	8	7 75	J13	BB	10	Y		54	A8	4	13	M		10
[illegible]		7 75	J13	CC	10	Y	24	54	A8	+	13	M		9
[illegible]		3 50	J13	FF	10	Y	24	54	J10		9	Y	24	33
[illegible] I			J28	7		N		42	J13	KK	10	Y	25	54

MANNED SPACECRAFT CENTER HOUSTON TEXAS

REVISION J

NASA DRAWING NO. 1000137

SHEET 11 OF 14

TDRR 01669

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	TO CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A45	7	9 62	P17	K	10	Y	24	1	P16	H	10	Y	24	2
A46 E	3	24 00	P17	E	10	Y	25	1	P15	E	10	Y	25	50
A46 R	2	24 00	P17	B	10	Y	25	1	P15	B	10	Y	25	50
A47 E	3	9 62	P17	E	10	Y		1	P16	E	10	Y	25	2
A47 R	2	9 62	P17	B	10	Y		1	P16	B	10	Y	25	2
A48 V	4	24 00	P17	F	10	Y	25	1	P15	F	10	Y	25	50
A48 O		24 00	P17	C	10	Y	25	1	P15	C	10	Y	25	50
A49 V	4	9 62	P17	F	10	M		1	P16	F	10	M	25	2
A49 O	6	9 62	P17	C	10	M		1	P16	C	10	Y	25	2
A50	5	9 12	P16	a	10	M	24	2	J14	P	10	Y	24	3
A51	4	9 12	P16	b	10	M	24	2	J14	R	10	M	24	3
A52	2	5 00	P16	Z	10	M	24	2	P16	T	10	M	24	2
A53	3	9 12	P16	Y	10	M	24	2	J14	S	10	M	24	3
A54	6	8 87	P16	X	10	Y	24	2	J13	B	10	M	24	54
A55 V	7	8 87	P16	U	10	M		2	J13	JJ	10	M	24	54
A55 E		8 87	P16	V	10	Y		2	J13	LL	10	M	24	54
A55 X	1	8 87	P16	S	10	M	24	2	J13	NN	10	M	24	54
A56 N			J21	17	10	N		67	P16	M	10	M	24	2

MANNED SPACECRAFT CENTER HOUSTON TEXAS

REVISION G

NASA DRAWING NO. 1000137

SHEET [illegible]

TDRR 01669

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	TO CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A83 G			J29	6		N		42	J13	MM	10	Y	25	[illegible]
A84 I			J30	7		N		51	J13	KK	10	M		[illegible]
A84 G			J30	6		N		51	J13	XX	10	M		[illegible]
A85		16 48	J13	X	10	M	24	54	A12	1	13	Y		43
A86		16 12	J13	[illegible]	10	M	24	54	S2	-	13	Y		37
A87		17 25	J13	W	10	M	24	54	S3	+	13	Y		41
[illegible]			J29	5		N		52	J14	MM	10	M	24	3
[illegible]			J29	9		N		52	J14	KK	10	M	24	3
[illegible]			J29	5		N		42	J14	LL	10	Y	24	3
A89 F			J29	9		N		42	J14	FF	10	M	24	3
A90 Y	7	9 62	J14	HH	10	Y	24	2	A8	6	13	Y		11
A90 G	7	9 62	J14	EE	10	M	24	2	A8	5	13	Y		9
A91 Y			J30	5		N		51	J14	DD	10	M	24	3
[illegible]			J30	9		N		51	J14	Z	10	M	24	3
A92 J			J21	13	10	N		67	J14	F	10	Y	24	3
A92 N			J21	2	10	N		67	J14	B	10	M	24	3
A92 X			J21	12	10	N		67	J14	D	10	M	24	3
[illegible]			J21	11	10	N		67	J14	A	10	M	24	3

MANNED SPACECRAFT CENTER HOUSTON TEXAS

REVISION G

NASA DRAWING NO. 1000137

SHEET 12 OF 14

TDRR 01669

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.	TO CIRCUIT POINT		CUT WIRE OR SHIELD / STRIP WIRE OR JACKET	Y/N	TERMINATION SPEC FIND NO.	NO.
A56 P			J21	16	10			67	P16	J	10	M	24	2
A57 [illegible]	7	8 87	P16	I	10	M		2	J13	HH	10	M		54
A57 [illegible]	7	8 87	P16	D	10	M		2	J13	EE	10	M		54
A58	1	5 00	P16	N	10	M		2	P16	S	10	M		2
A59 R	2	7 75	P16	B	10	M		2	A14	3	13	Y		39
A59 E	3	8 00	P16	E	10	M		2	A14	4	13	Y		61
A60 [illegible]		7 62	P16	F	10	M		2	A14	2	13	Y		57
A60 [illegible]	6	7 37	P16	C	10	M		2	A14	1	13	Y		55
A61	7	8 25	P16	K	10	M	24	2	A14	5	13	Y		63
A62	6	22 50	P15	a	10	M	24	50	J14	L	10	M	24	3
A63	2	22 50	P15	b	10	M	24	50	J14	M	10	Y	24	3
A64	2	5 00	P15	Z	10	M	24	50	P15	T	10	Y	24	50
A65	7	22 50	P15	Y	10	M	24	50	J14	N	10	M	24	3
A66	1	6 00	P15	S	10	Y		50	P15	N	10	Y	24	50
A67 D			J21	20	10	N		67	P15	M	10	Y	24	50
A67 F			J21	21	10	N		67	P15	J	10	Y	24	50
A68	7	20 25	P15	H	10	Y	24	50	J13	D	10	Y	24	54
[illegible]		9 50	P15	D	10	M		50	A12	2	13	Y		45

MANNED SPACECRAFT CENTER HOUSTON TEXAS

REVISION H

NASA DRAWING NO. 1000137

SHEET 10 OF 14

TDRR 01669

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

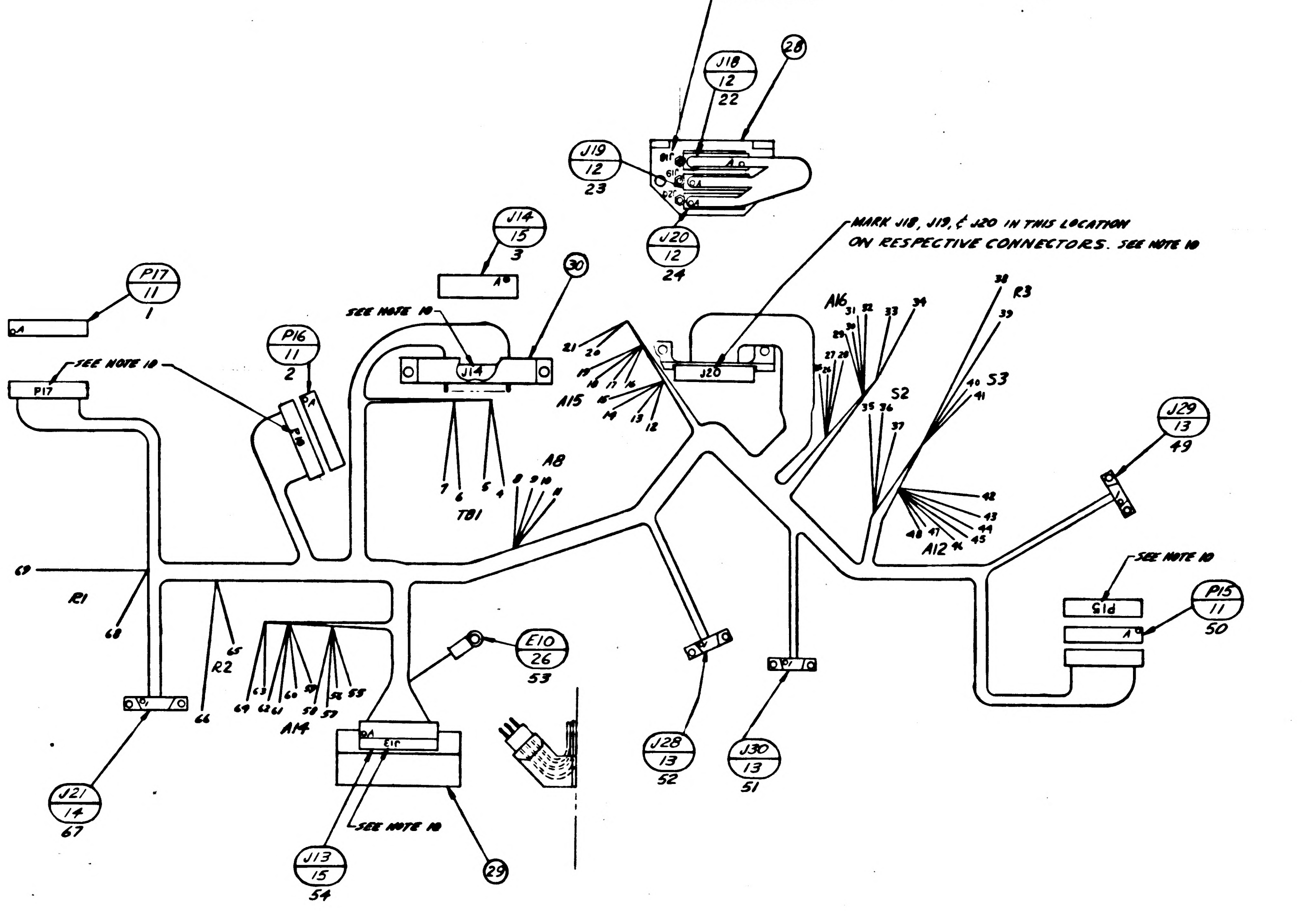
REVISION G

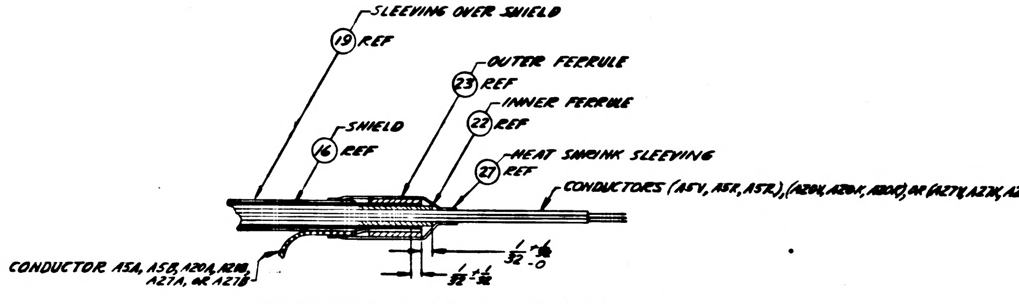
NASA DRAWING NO. 1000137
SHEET 13 of 14

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD / STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	FROM TERMINATION SPEC FIND NO.	NO.	TO CUT WIRE OR SHIELD / STRIP WIRE OR JACKET CIRCUIT POINT			Y/N	TO TERMINATION SPEC FIND NO.	NO.
A94M				J21	15	10	N		67	J14	E	10	N	24	3
A94 C				J21	14	10	N		67	J14	C	10	N	24	3
A95 O	6	10	56	A14	1	17	Y		56	A15	1	13	Y		13
A95 Y	4	10	44	A14	2	17	Y		58	A15	2	17	Y		15
A96 R	2	11	12	A14	3	[illegible]	Y		60	A15	3	13	Y		16
A96 E	3	11	37	A14	4	17	Y		62	A15	4	17	Y		19
A97	[illegible]	12	5[illegible]	A14	[illegible]	[illegible]	Y		64	A15	5	13	Y		20
A98 [illegible]	[illegible]	5	44	A15	1	17	Y		1[illegible]	A16	1	17	Y		25
A98 Y	[illegible]	6	19	A15	2	[illegible]	Y		14	A16	2	17	Y		27
A99 R	[illegible]	6	37	A15	3	[illegible]	Y		17	A16	3	[illegible]	Y		2[illegible]
A99 E	3	7	00	A15	4	[illegible]	Y		13	A16	4	[illegible]	Y		[illegible]
A100	7	8	12	A15	[illegible]	[illegible]	Y		2[illegible]	A16	5	[illegible]	Y		[illegible]
A101	6	14	50	A16	1	[illegible]	Y		2[illegible]	R2		[illegible]	Y		66
A102	2	9	06	A16	3	[illegible]	Y		30	R3		[illegible]	Y		[illegible]
A103	2	3	25	A12	3	[illegible]	Y		47	C2	+	[illegible]	Y		[illegible]
A104	3	17	75	A12	1	[illegible]	Y		4[illegible]	TB1	1	[illegible]	Y		7
A105	2	17	43	A12	4	[illegible]	Y		[illegible]	TB1	2	[illegible]	Y		5
A106	2	18	12	J2	+	[illegible]	Y		[illegible]	TB1	3	[illegible]	Y		6

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
D			
G	REVISED TDRR 04293	11-6-63	WK
H	REVISED TDRR 06796	3-8-64	E.V. WK
J	REVISED PER TDRR 06980	7 APR 64	

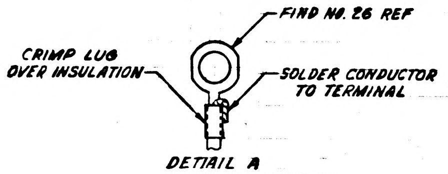

MARK J18, J19, & J20 WHERE SHOWN ON ITEM (28)
SEE NOTE 10
J18 / 12 / 22
(28)
J19 / 12 / 23
J20 / 12 / 24
J14 / 15 / 3
MARK J18, J19, & J20 IN THIS LOCATION
ON RESPECTIVE CONNECTORS. SEE NOTE 10
P17 / 11 / 1
SEE NOTE 10
(30)
P16 / 11 / 2
SEE NOTE 10
P17
J14
J20
A16
R3
S2
S3
A15
TB1
A8
J29 / 13 / 49
SEE NOTE 10
P15
P15 / 11 / 50
R1
R2
A14
A12
E10 / 26 / 53
J21 / 14 / 67
J28 / 13 / 52
J30 / 13 / 51
SEE NOTE 10
J13 / 15 / 54
(29)


SLEEVING OVER SHIELD
(19) REF
OUTER FERRULE
(23) REF
INNER FERRULE
(22) REF
SHIELD
(16) REF
HEAT SHRINK SLEEVING
(27) REF
CONDUCTORS (A5V, A5R, A5R), (A20V, A20V, A20R) OR (A27V, A27V, A27R)
CONDUCTOR A5A, A5B, A20A, A20B, A27A, OR A27B
1/32 +1/16 -0
1/32 ±1/32

DETAIL TYPICAL OF SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
NO SCALE

WIRE TWISTING CHART

NO. OF WIRES IN BUNDLE	NO. OF FULL TURNS PER INCH: MINIMUM	MAXIMUM
2 OR 3	2	4
4 OR MORE	1	3


FIND NO. 26 REF
CRIMP LUG OVER INSULATION
SOLDER CONDUCTOR TO TERMINAL

DETAIL A
SCALE 4:1

THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
1000005	DL1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
Contract NAS 9-497
DRAWN THENO DATE 5-29-63
CHECKED WINBERG
APPROVAL J. E. Winberg
APPROVAL J. E. Miller
NASA APPROVAL Jack Barnard
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "A", STABLE MEMBER

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 1000137
SCALE 1-1
WT
SHEET 14 OF 14

APPLICATION	
NEXT ASSY	USED ON
1000005	DL1000201

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
D	REPLACES REV C WITH CHANGES TDRR 01669	6-4-63	E.W. WK
E	FIND NO. 28 WAS 1000264 · REVERSED PINS J & M ON J18 REVERSED PINS d & Y ON J19 & J20 TDRR 02138	7-16-63	E.W. 7/24/63 WK
F	REVISED TDRR 04292	11-6-63	E.W. WK
G	REVISED TDRR 04293	11-6-63	E.W. WK
H	REVISED TDRR 06746	3-9-64	E.W. WK
J	REVISED PER TDRR 06980	7 APR 64	WP PBR
K	REVISED PER TDRR 07946	6 MAY 64	YB J.E.G.

Ⓜ

REV STATUS OF SHEETS	REV	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	SHEET				4				9	10			13	14	15

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

APPROVED
CHECKED
DRAWN
DATE

APPROVED FOR MSC
BY DIRECTION

WIRING HARNESS "A",
STABLE MEMBER

DWG NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

SCALE
REVISION K

NASA DRAWING NO. 1000137
SHEET 1 OF 15

TDRR 01669

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION	TOTAL LENGTH
1	1	MIL-W-16878 E28	WIRE, 28 AWG BLK	12 FT. 5.00 IN.
2	1		RED	19 FT. 9.00 IN.
3	1		GY	16 FT. 6.32 IN.
4	1		VIO	15 FT. 0.62 IN.
5	1		BLU	6 FT. 11.00 IN.
6	1		ORN	14 FT. 5.88 IN.
7	1		GRN	29 FT. 7.38 IN.
8	1		YEL	22 FT. 4.25 IN.
9	1		WHT	4 FT. 11.88 IN.
10	1		BRN	2 FT. 6.75 IN.
11	3	1000121	Connector - Receptacle (P15, 16, 17)	
12	3	1000122	Connector - Receptacle (J18, 19, 20)	
13	3	1010316 -1	Connector - Plug (J28, 29, 30)	
14	1	1010472 -1	Connector - Plug (J21)	
15	2	1000120	Connector - Plug (J13,14)	
16	1	QQ-B-575 (7/64 I.D. 36 AWG)	6 5/8 " Long Shield - Wire	
17	1	QQ-B-575 (7/64 I.D. 36 AWG)	9" Long Shield - Wire	
18	2	QQ-B-575 (7/64 I.D. 36 AWG)	4 5/8" Long Shield - Wire	
19	A/R	1010490-988	55" TOTAL LENGTH SLEEVING - HEAT SHRINK WHT	
20		DELETED		
21		DELETED		
22	12	[illegible]	Ferrule, Inner	
23	6	1000242 -5	Ferrule, Outer	
24	127	1006776 -16	Insulation, Sleeving 5/16 Long	
25	49	1006777 -16	Insulation, Sleeving 5/16 Long	
26	4	1010717- 1	Terminal Lug	
27		DELETED		

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION K

NASA DRAWING NO. 1000137
SHEET 2 of 15

TDRR 01669

LIST OF MATERIAL

FIND NO.	QTY	PART NO. OR IDENTIFYING NO.	DESCRIPTION
28	1	1000267	Bracket
29	1	1000226	Bracket
30	1	1000149	Bracket
31	AR	QQ-S-571 (SN60WARP2)	Solder
32	AR	MIL-T-713 TYPE I CLASS 2, BLACK	TAPE, Nylon, Waxed
33			
34	1	QQ-B-575 (7/64 I.D. 36 AWG)	18 1/2 " LONG SHIELD WIRE
35	1	QQ-B-575 (7/64 I.D. 36 AWG)	4 1/8 " LONG SHIELD WIRE

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

REVISION K

NASA DRAWING NO. 1000137
SHEET 3 of 15

TDRR 01669

NOTES:

1. CONDUCTORS TO BE TWISTED PER THE WIRE TWISTING CHART.
2. SUFFIX LETTERS ON CONDUCTOR NUMBERS INDICATE THE FOLLOWING:
   - A INDICATES SHIELD GROUND ON "FROM" END
   - B INDICATES SHIELD GROUND ON "TO" END
   - C INDICATES WHT/ORN
   - D INDICATES WHT/BLK/BRN
   - E INDICATES GRAY
   - F INDICATES WHT/BLK/RED
   - G INDICATES GREEN
   - H INDICATES WHT/BLU
   - J INDICATES WHT/RED
   - K INDICATES BLACK
   - L INDICATES BLUE
   - M INDICATES WHT/YEL
   - N INDICATES BROWN
   - O INDICATES ORANGE
   - R INDICATES RED
   - S INDICATES WHT/BLK
   - T INDICATES WHT/BRN
   - U INDICATES WHT/GY
   - V INDICATES VIOLET
   - W INDICATES WHITE
   - X INDICATES WHT/VIO
   - Y INDICATES YELLOW
   - P INDICATES WHT/GRN
3. "Y" OR "N" IN TINNED COLUMN INDICATES YES OR NO
4. DIMENSIONS ARE IN INCHES AND TWO PLACE DECIMALS
5. SOLDER PER MIL-STD-440 USING ITEM 31
6. LACE CABLE USING ITEM 32
7. SPARE LEADS ON CONNECTORS J21, J28, J29, AND J30 TO BE CUT TO 10 INCHES AND LACED INTO HARNESS
8. CONDUCTORS WITH THE SAME NUMBER ARE TWISTED TOGETHER
9. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
10. MARK CHARACTERS $^{.10}_{.14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN
11. LENGTHS SPECIFIED FOR TWISTED CONDUCTORS ARE FOR AFTER TWISTING.
12. LENGTHS IN CONDUCTOR CHART ARE FOR REFERENCE ONLY

MANNED
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REVISION K

NASA DRAWING NO. 1000137
SHEET 4 of 15

TDRR 01669

MANNED SPACECRAFT CENTER HOUSTON TEXAS
REVISION K
NASA DRAWING NO. 1000137
SHEET 7 of 8

Conductor Find Number	No.	Individual Length	From: Circuit Point	Strip Wire or Jacket	TIN	From Termination Find No.	Spec	No.	To: Circuit Point	Strip Wire or Jacket	TIN	To Termination Find No.	Spec	No.	
A22 G	7	5 00	J19 L	1	Y		24	23	J20 L	1	Y			24	
A22 Y		5 00	J19 D	1	Y		24	23	J20 D		Y			24	
A23 V		5 00	J19 F	1	Y			23	J20 F	1	Y		25	24	
A23 O	6	5 00	J19 C	1	Y			23	J20 C		Y		25	24	
A24 W		17 06	J20 Y	10	Y		24	24	J14 T	1	Y		24	2	
A24 K	1	17 06	J20 b	10	Y		24	24	J14 U		Y		24	2	
A24 N	10	17 06	J20 d	10	Y		24	24	J14 V		Y		24	2	
A27 V			J30 5		N	22		51	J20 M		Y	18 19	24	24	
A27 K			J30 1		N			51	J20 J	1	Y	22	24	24	
A27 R			J30 3		N			51	J20 N	1	Y		24	24	
A27 A			J30 2		N			51	SHLD 27		N			51	
A27 B	1	4 81	SHLD 27	25	N			24	J20 P		Y		24	24	
A28	2	12 44	J20 E	1	Y			24	R3		Y			35	SEE DETAIL 3
A29	4	7 56	J20 F	10	Y			24	A16 2	1	Y			25	SEE DETAIL 2
A30	3	8 19	J20 B		Y			24	A16 4	3	Y			32	SEE DETAIL 3
A31	6	14 93	J20 C		Y			24	R2	3	Y			5	SEE DETAIL 2
A32	2	24 00	P17 e	10	Y		24	1	P15 W		Y		24	20	
A33 K	1	15 37	P17 d	10	Y		24		J14 H		Y		24	3	

TDRR 01669

MANNED SPACECRAFT CENTER HOUSTON TEXAS
REVISION K
NASA DRAWING NO. 1000137
SHEET 5 of 5

Conductor Find Number	No.	Individual Length	From: Circuit Point	Strip Wire or Jacket	TIN	From Termination Find No.	Spec	No.	To: Circuit Point	Strip Wire or Jacket	TIN	To Termination Find No.	Spec	No.
A1 E		5 00	J18 B	1	Y		24	22	J19 3	10	Y		25	23
A1 R		5 00	J18 E	1	Y		24	22	J19 E	10	Y		25	23
A2 O		5 00	J18 C	1	Y		24	22	J19 C	10	Y		25	23
A2 V		5 00	J18 F	1	Y		24	22	J19 F	10	Y		25	23
A3 Y		5 00	J18 D	1	Y		25	22	J20 D	10	Y		25	24
A3 G		5 00	J18 L	1	Y		25	22	J20 L	10	Y		25	24
A4 Y		17 06	J18 D	10	Y			22	TB2 1	13				54A
A4 G		19 06	J18 L	10	Y			22	TB2 2	13				54D
A5 V			J28 6		N	22		52	J18 M	10	Y	19 16	24	22
A5 K			J28 1		N			52	J18 J	10	Y	22	24	22
A5 R			J28 3		N			52	J13 N	10	Y		24	22
A5 A			J28 2		N			52	SHLD 5	25	N			52
A5 B	1	4 81	SHLD 5	25	N			22	J18 P	10	Y		24	22
A6 V		5 00	J18 U	1	Y		25	22	J19 U	10	Y		25	23
A6 E		5 00	J18 V	1	Y		25	22	J19 V	10	Y		25	23
A7		15 56	J16 U	1	Y			22	R1	13	Y			68
A8	1	14 81	J16 V	1	Y			22	J13 M	10	Y		24	54
A9 V		17 06	J16 d	1	Y		24	22	J14 CC	10	Y		24	3

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REVISION K
NASA DRAWING NO. 1000137
SHEET of 5

Conductor Find Number	No.	Individual Length	From: Circuit Point	Strip Wire or Jacket	TIN	From Termination Find No.	Spec	No.	To: Circuit Point	Strip Wire or Jacket	TIN	To Termination Find No.	Spec	No.
A33 N	10	13 37	P17 b	1	Y		24	1	J14 J	1	Y		24	3
A35	2	5 00	P17 Z	1	Y		24	1	P17 T	10	Y		24	1
A33 R	2	13 37	P17 Y	10	Y		24	1	J14 K	1	Y		24	3
A37	2	9 62	P17 W	1	Y		24	1	P16 e	1	Y		24	2
A36 W	9	24 00	P17 U	10	Y		25	1	P15 U	1	Y		24	50
A36 E	3	24 00	P17 V	10	Y		25	1	P15 V	1	Y		24	50
A36 K	1	24 00	P17 S	10	Y		25	1	P15 S	1	Y		24	50
A39 W		9 62	P17 U	1	Y			1	P16 U		Y		25	2
A39 E	3	9 62	P17 V	10	Y			1	P16 V		Y		25	2
A39 K	1	9 62	P17 N	1	Y		25	1	P16 N		Y		25	2
A40	1	5 00	P17 S	10	Y			1	P17 N		Y			1
A41 K			J21 1	10			22	67	P17 M	10	Y	19 22 35		1
A41 T			J21 12	1				67	P17 J		Y		24	1
A42 G	7	24 00	P17 L	10	Y		25	1	P15 L		Y		24	50
A42 Y	5	24 00	P17 D	1	Y		25	1	P15 D	10	Y		24	50
A43 G	7	9 62	P17 L	1	Y			1	P16 L	10	Y		24	2
A43 Y	5	9 62	P17 D	1	Y			1	P16 D	1	Y		24	2
A44	7	24 00	P17 H	1	Y		24	1	P15 K	1	Y		24	50
A41 A	1	1 50	SHLD 41	25	Y				E31	19	Y		26	67C

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MANNED SPACECRAFT CENTER HOUSTON TEXAS
REVISION K
NASA DRAWING NO. 1000137
SHEET 6 of 5

Conductor Find Number	No.	Individual Length	From: Circuit Point	Strip Wire or Jacket	TIN	From Termination Find No.	Spec	No.	To: Circuit Point	Strip Wire or Jacket	TIN	To Termination Find No.	Spec	No.
A10		5 81	J18 Z	10	Y		24	22	J20 c	10	Y		24	24
A9 L	5	17 06	J18 b	10	Y		24	22	J14 BB	10	Y		24	3
A9 G	7	17 06	J18 Y	10	Y		24	22	J14 AA	10	Y		24	3
A13		14 81	J18 c	10	Y		24	22	J13 H	10	Y		24	54
A14		5 00	J19 c	10	Y		24	23	J20 Z	10	Y		24	24
A15 R	2	17 06	J19 Y	10	Y		24	23	J14 W	10	Y		24	3
A15 O		17 00	J19 b	10	Y		24	23	J14 X	10	Y		24	3
A17	7	14 81	J19 Z	1	Y		24	23	J13 K	10	Y		25	54
A15 Y		17 06	J19 d	10	Y		24	23	J14 Y	10	Y		24	3
A19 V		5 00	J19 U	1	Y			23	J20 U	10	Y		24	24
A19 E		5 00	J19 V	10	Y			23	J20 V	10	Y		24	24
A20 V			J29 8		N	22		49	J19 M	10	Y	19 17	24	23
A20 K			J29 1		N			49	J19 J		Y	22	24	23
A20 R			J29 3		N			49	J19 N		Y		24	23
A20 A			J29 2		N			49	SHLD 20	25	N			49
A20 B	1	4 81	SHLD 20	25	N			23	J19 P	10	Y		24	23
A21 R	2	5 00	J19 E	1	Y			23	J20 E	10	Y		25	24
A21 E	5	5 00	J19 B	10	Y			23	J20 B	10	Y		25	24

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REVISION K

NASA DRAWING NO. 1000137
SHEET [illegible] of 15

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		Y/N	FROM TERMINATION SPEC FIND NO.	FROM NO.	TO CIRCUIT POINT		Y/N	TO TERMINATION SPEC FIND NO.	TO NO.	
[illegible]	[illegible]	9 37	[illegible]	[illegible]			50	[illegible]	[illegible]	Y			
[illegible]		10 62	[illegible]	[illegible]			50	[illegible] -	[illegible]	Y		[illegible]	SEE DETAIL 4
[illegible]	[illegible]	20 25	[illegible]	[illegible]			50	[illegible]	[illegible]	[illegible]	[illegible]		SEE DETAIL 4
[illegible]	[illegible]	20 25	[illegible]	[illegible]			50	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	15 00	[illegible]	[illegible]			54	[illegible]	[illegible]	Y		[illegible]	
[illegible]	[illegible]	5 00	[illegible]	[illegible]			54	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	5 00	[illegible]	[illegible]			54	[illegible]	[illegible]	[illegible]			
76 L	5	16 50	[illegible]	[illegible]			54	[illegible]	[illegible]	Y			
[illegible]		10 50	[illegible]	[illegible]			[illegible]	[illegible]		Y			
[illegible]		9 37	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]		9 37	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]			[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]			[illegible]	[illegible]			52	[illegible]	[illegible]	[illegible]		[illegible]	
[illegible]		7 75	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	Y		[illegible]	
[illegible]		7 75	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	Y		[illegible]	
[illegible]		3 50	[illegible]	[illegible]			[illegible]	[illegible]	19	[illegible]		[illegible]	
[illegible]			[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]		4	

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REVISION K

NASA DRAWING NO. 1000137
SHEET 9 of 15

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		Y/N	FROM TERMINATION SPEC FIND NO.	FROM NO.	TO CIRCUIT POINT		Y/N	TO TERMINATION SPEC FIND NO.	TO NO.
[illegible]	[illegible]	9 62	P17 K	1	Y	[illegible]	1	P16 H	[illegible]	Y	24	[illegible]
A46 E	[illegible]	24 00	P17 E	10	Y	[illegible]	1	P15 E	[illegible]	Y	25	50
A46 R	2	24 00	P17 B	[illegible]	Y	[illegible]	1	P15 B	10	Y	25	50
A47 E	[illegible]	9 62	P17 E	1	Y		1	P16 E	[illegible]	Y	25	[illegible]
A47 R	2	9 62	P17 B	1	Y		1	P16 B	1	Y	[illegible]	[illegible]
A48 V	4	24 00	P17 F	1	Y	[illegible]	1	P15 F	10	Y	[illegible]	[illegible]
[illegible] O	[illegible]	24 00	P17 C	1	Y	[illegible]	1	P15 C	10	Y	[illegible]	[illegible]
[illegible] V	[illegible]	9 62	[illegible]	[illegible]	[illegible]		1	[illegible] F	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	9 62	[illegible]	[illegible]	[illegible]		1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A50 L		9 12	[illegible]		[illegible]	[illegible]	[illegible]	[illegible] F	[illegible]	[illegible]	[illegible]	[illegible]
A50 V		9 12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] R	[illegible]	[illegible]	[illegible]	[illegible]
52	[illegible]	5 00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] T	[illegible]	[illegible]	[illegible]	[illegible]
A50 E	[illegible]	9 12	[illegible] Y		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	6	8 87	[illegible]		[illegible]	[illegible]	[illegible]	[illegible] B	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	8 87	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		8 87	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	8 87	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			[illegible]	[illegible]	N	22	[illegible]	[illegible] Y	10	[illegible]	19 22 18 [illegible]	[illegible]

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REVISION K

NASA DRAWING NO. 1000137
SHEET 12 of 15

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		Y/N	FROM TERMINATION SPEC FIND NO.	FROM NO.	TO CIRCUIT POINT		Y/N	TO TERMINATION SPEC FIND NO.	TO NO.	
A83 G			J29 6		N		49	J13 MM	10	Y	25	54	
A84 L			J30 7		N		51	J13 KK	10	Y		54	
A84 G			J30 6		N		51	J13 MM	10	Y		54	
A76 E	3	16 48	J13 X	10	Y	24	54	A12 1	13	Y		43	
A76 R	2	16 12	J13 Z	10	Y	24	54	S2 -	13	Y		37	
A87	4	17 25	J13 W	10	Y	24	54	S3 +	13	Y		41	SEE DETAIL 4
A88 Y			J28 5		N		52	J14 MM	10	Y	24	3	
A88 E			J28 9		N		52	J14 KK	10	Y	24	3	
A89 Y			J29 5		N		49	J14 LL	10	Y	24	3	
A89 E			J29 9		N		49	J14 FF	10	Y	24	3	
A90 Y	8	9 62	J14 HH	10	Y	24	3	A8 6	13	Y		11	
A90 G	7	9 62	J14 EE	10	Y	24	3	A8 5	13	Y		9	
A91 Y			J30 5		N		51	J14 DD	10	Y	24	3	
A91 E			J30 9		N		51	J14 Z	10	Y	24	3	
A92 J			J21 13	10	N		67	J14 F	10	Y	24	3	
A92 M			J21 2	10	N		67	J14 B	10	Y	24	3	
A93 X			J21 18	10	N		67	J14 D	10	Y	24	3	
A93 S			J21 11	10	N		67	J14 A	10	Y	24	3	

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REVISION K

NASA DRAWING NO. 1000137
SHEET [illegible] of 15

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH	FROM CIRCUIT POINT		Y/N	FROM TERMINATION SPEC FIND NO.	FROM NO.	TO CIRCUIT POINT		Y/N	TO TERMINATION SPEC FIND NO.	TO NO.
[illegible] P			[illegible]	[illegible]			[illegible]	P16 J	[illegible]	Y	[illegible]	[illegible]
[illegible]	[illegible]	12 87	[illegible] I	[illegible]	[illegible]		[illegible]	TB 2 2	13	[illegible]		54E
[illegible]	[illegible]	10 87	[illegible]	[illegible]	[illegible]		[illegible]	TB 2 1	13	[illegible]		54B
[illegible]	[illegible]	5 00	[illegible]	[illegible]	[illegible]		[illegible]	[illegible] S	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	7 75	[illegible]	[illegible]	[illegible]		[illegible]	A14 [illegible]	[illegible]	Y		[illegible]
[illegible]	[illegible]	8 00	[illegible]	[illegible]	[illegible]		[illegible]	A14 4	[illegible]	Y		[illegible]
[illegible]	[illegible]	7 62	[illegible]	[illegible]	[illegible]		[illegible]	A14 [illegible]	[illegible]	Y		[illegible]
[illegible]	[illegible]	7 37	[illegible] C	[illegible]	[illegible]		[illegible]	A14 1	[illegible]	Y		[illegible]
[illegible]	[illegible]	8 25	[illegible] K	[illegible]	[illegible]	[illegible]	[illegible]	A14 5	[illegible]	Y		[illegible]
[illegible] O		22 50	[illegible]	[illegible]	[illegible]	[illegible]	50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A62 Y	[illegible]	22 50	[illegible]	[illegible]	[illegible]	[illegible]	50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	5 00	[illegible]	[illegible]	[illegible]	[illegible]	50	P15 T	[illegible]	[illegible]	[illegible]	50
A62 G	[illegible]	22 50	[illegible] Y	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] N	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	6 00	[illegible]	[illegible]	[illegible]		[illegible]	P15 N	[illegible]	[illegible]	[illegible]	50
[illegible]			J21 [illegible]	[illegible]	[illegible]	22	[illegible]	P15 [illegible]	[illegible]	[illegible]	19 22 34 [illegible]	50
[illegible]			[illegible]	[illegible]	[illegible]		[illegible]	P15 J	[illegible]	[illegible]	[illegible]	50
[illegible]	[illegible]	20 25	[illegible] H	[illegible]	[illegible]	[illegible]	50	[illegible]	[illegible]	[illegible]	[illegible]	54
[illegible]	[illegible]	9 5[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	Y		[illegible]
A56 A	1	1 50	SHLD 56	25	Y			E31	19	Y	26	67A
A67 A	1	1 50	SHLD 67	25	Y			E31	19	Y	26	67B

TDRR 01669

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	T/N	TERMINATION SPEC FIND NO.	NO.	TO CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	T/N	TERMINATION SPEC FIND NO.	NO.	
A24M				[illegible] 15	[illegible]			[illegible]	J14 [illegible]	[illegible]		24	[illegible]	
A24 [illegible]				[illegible] 14	[illegible]			67	J14 [illegible]	[illegible]		24	[illegible]	
A95 [illegible]	[illegible]	0	56	A14 1	[illegible]	Y		56	A15 1	[illegible]	Y		17	
A95 [illegible]	[illegible]	10	44	A14 2	[illegible]	Y		[illegible]	A15 [illegible]	[illegible]	Y		[illegible]	
A96 F	[illegible]	11	12	A14 3	[illegible]	Y		[illegible]	A15 3	[illegible]	Y		[illegible]	
A96 [illegible]	[illegible]	11	37	A14 4	[illegible]	Y		[illegible]	A15 4	[illegible]	Y		13	
A97	7	12	56	A14 [illegible]	[illegible]	Y		[illegible]	A15 5	[illegible]	Y		[illegible]	
[illegible]	[illegible]	5	44	A15 1	[illegible]	Y		[illegible]	A16 1	[illegible]	Y		[illegible]	
[illegible]		6	19	A15 2	[illegible]	Y		[illegible]	A16 2	[illegible]	Y		[illegible]	
[illegible]	[illegible]	6	37	A15 3	[illegible]	Y		[illegible]	A16 3	[illegible]	Y		[illegible]	
[illegible]	[illegible]	7	00	A15 4	[illegible]	Y		[illegible]	A16 4	[illegible]	Y		31	
[illegible]	[illegible]	8	12	A15 [illegible]	[illegible]	Y		[illegible]	A16 [illegible]	[illegible]	Y		33	
[illegible]	[illegible]	19	50	A16 1	[illegible]	Y		[illegible]	R2	[illegible]	Y		66	SEE DETAIL 2
[illegible]	[illegible]	9	06	A16 3	[illegible]	Y		[illegible]	R3	[illegible]	Y		39	SEE DETAIL 3
[illegible]	[illegible]	3	25	A12 [illegible]	[illegible]	Y		[illegible]	S2 [illegible]	[illegible]	Y		[illegible]	
[illegible]104E	[illegible]	17	00	A12 1	[illegible]	Y		[illegible]	TB1 1	[illegible]	Y		[illegible]	
A104 K	1	16	75	A12 [illegible]	[illegible]	Y		[illegible]	TB1 2	[illegible]	Y		[illegible]	
A106 R	[illegible]	16	75	A12 3	[illegible]	Y		46A	TB1 3	[illegible]	Y		6	

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REVISION K

NASA DRAWING NO.
100137
SHEET [illegible]

TDR² ACTION

CONDUCTOR FIND NUMBER	NO.	INDIVIDUAL LENGTH		FROM CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	T/N	TERMINATION SPEC FIND NO.	NO.	TO CUT WIRE OR SHIELD CIRCUIT POINT	STRIP WIRE OR JACKET	T/N	TERMINATION SPEC FIND NO.	NO.
A106L	5	17	50	A12 2	13	Y		43A	TB1 4	13	Y		4
A113L	5	15	00	J13 P	10	Y		54	J19 D	10	Y		23
A113V	4	15	00	J13 T	10	Y		54	J19 L	10	Y		23
A114Y	8	5	00	J13 EE	10	Y	24	54	TB2 1	13	Y		54C
A114G	7	7	00	J13 HH	10	Y	24	54	TB2 2	13	Y		54F

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HOUSTON TEXAS

REVISION K

NASA DRAWING NO.
100137
SHEET 14 of 15

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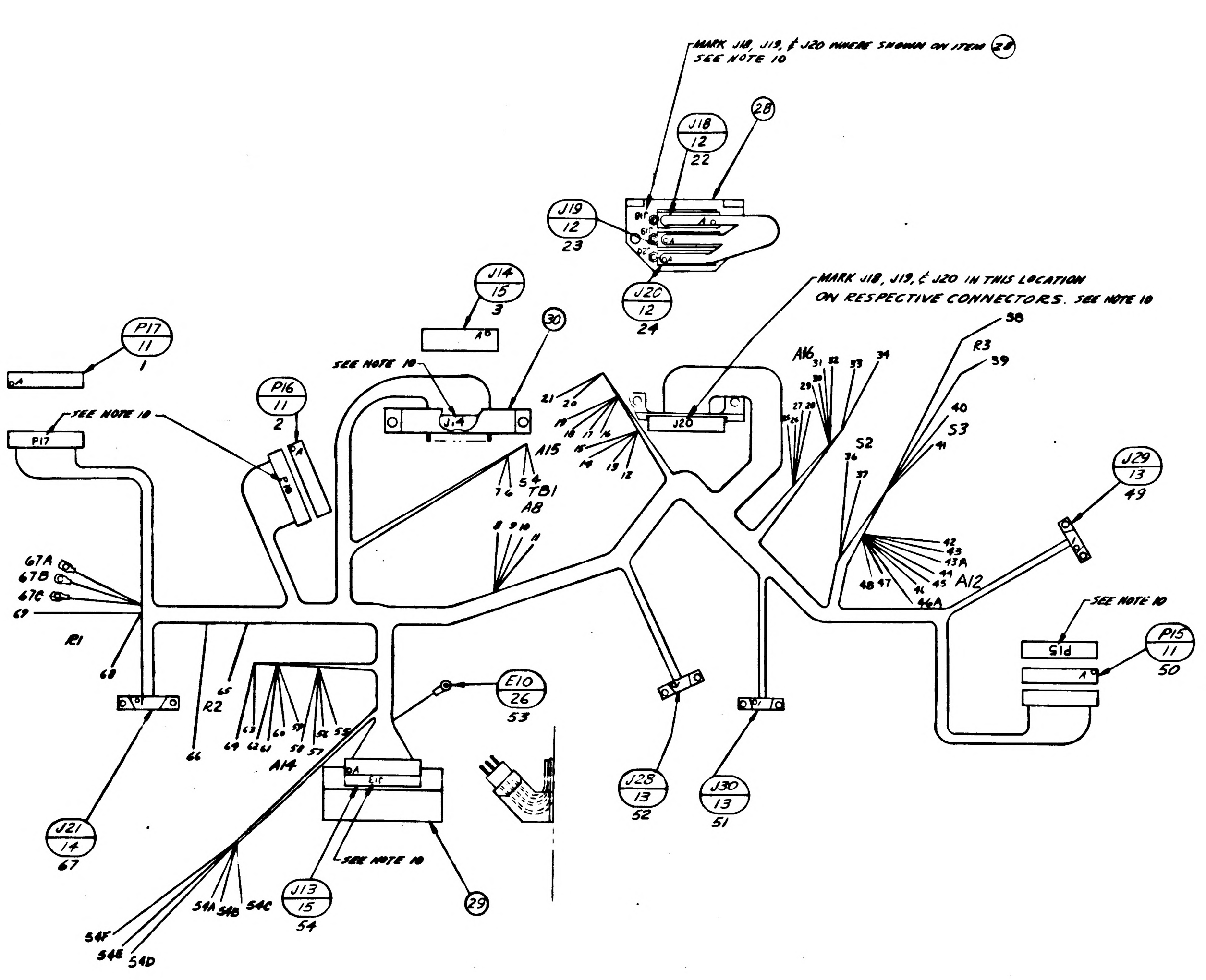
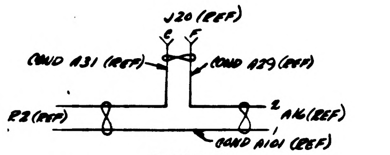
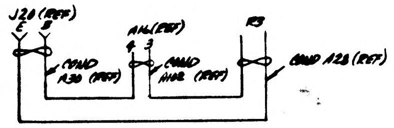
REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
D			
G	REVISED TDRR 04293	11-6-68	
H	REVISED TDRR 06746	3-8-69	WK
J	REVISED PER TDRR 06980	1 APR 69	
K	REVISED PER TDRR 07946	5 MAY	

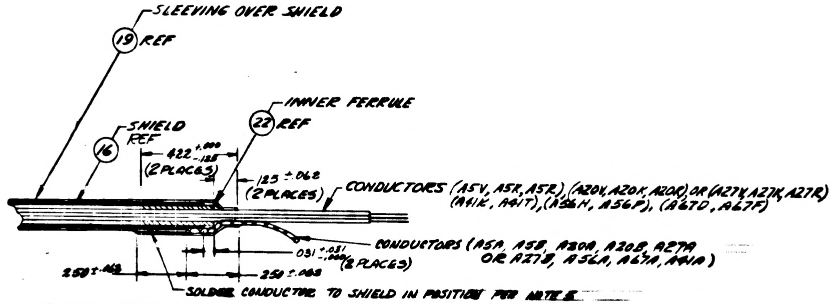

MARK J18, J19, & J20 WHERE SHOWN ON ITEM 28
SEE NOTE 10
J18 / 12 / 22
28
J19 / 12 / 23
J20 / 12 / 24
MARK J18, J19, & J20 IN THIS LOCATION ON RESPECTIVE CONNECTORS. SEE NOTE 10
J14 / 15 / 3
30
P17 / 11 / 1
P16 / 11 / 2
SEE NOTE 10
P17
SEE NOTE 10
J14
J20
A15
7 6 5 4
TB1
A8
8 9 10 11
21 20 19 18 17 16 15 14 13 12
A16
31 32 33 34
29 30 27 28 25 26
S2
36 37
R3
38 39 40
S3
41
42 43 43A 44 45 46 46A 47 48
A12
J29 / 13 / 49
SEE NOTE 10
P15
P15 / 11 / 50
67A 67B 67C 69
R1
68
R2
65 66
63 62 61 60 59 58 57 56 55 64
A14
E10 / 26 / 53
J28 / 13 / 52
J30 / 13 / 51
J21 / 14 / 67
J13
SEE NOTE 10
J13 / 15 / 54
29
54A 54B 54C 54D 54E 54F


J20 (REF)
C F
COND A31 (REF)
COND A29 (REF)
R2 (REF)
2
1
A16 (REF)
COND A101 (REF)

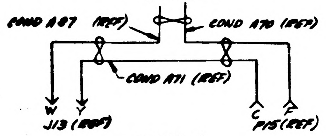
DETAIL 2


J20 (REF)
E B
COND A30 (REF)
A16 (REF)
4 3
COND A102 (REF)
R3
COND A28 (REF)

DETAIL 3


SLEEVING OVER SHIELD
19 REF
SHIELD REF
16
INNER FERRULE
22 REF
.422 +.000 -.125 (2 PLACES)
.125 ±.062 (2 PLACES)
CONDUCTORS (A5V, A5K, A5R), (A20V, A20K, A20R), OR (A27V, A27K, A27R) (A41K, A41T), (A56H, A56F), (A67D, A67F)
CONDUCTORS (A5A, A5B, A20A, A20B, A27A OR A27B, A56A, A67A, A41A)
.031 +.031 -.000 (2 PLACES)
.250 ±.062
.250 ±.062
SOLDER CONDUCTOR TO SHIELD IN POSITION PER NOTE 5

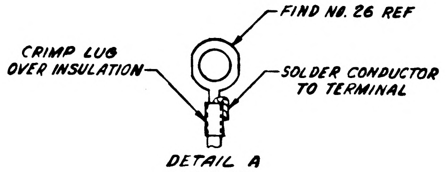
DETAIL TYPICAL OF SHIELDED WIRE TERMINATION
DETAIL 1
NO SCALE


+ S3 (REF) -
COND A87 (REF)
COND A70 (REF)
COND A71 (REF)
W Y
J13 (REF)
C F
P15 (REF)

DETAIL 4

WIRE TWISTING CHART

NO. OF WIRES IN BUNDLE	NO. OF FULL TURNS PER INCH.	
	MINIMUM	MAXIMUM
2 OR 3	2	4
4 OR MORE	1	3


FIND NO. 26 REF
CRIMP LUG OVER INSULATION
SOLDER CONDUCTOR TO TERMINAL

DETAIL A
SCALE 4:1

THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1000005	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
Contract NAS 9-497
DRAWN THENO DATE 5-29-65
CHECKED WINBERG
APPROVAL J. E. Winberg
APPROVAL J. E. Miller
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "A",
STABLE MEMBER

CODE IDENT NO
SIZE E
NASA DRAWING NO. 1000137
SCALE 1-1
WT
SHEET 15 OF 15

Part Number	Description	Required
1000120	Connector, Electrical Plug 34 Pin	2
1000121	Connector Electrical Recepticle 26 pin.	6

1000137

REVISIONS TDRR 00106				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY
USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN		

APPROVED FOR MSC
Jack Barnard 11/26/62

MIT/IL APPROVAL	DATE
W Kupfer	2 NOV 62

HARNESS ASSEMBLY
STABLE MEMBER

SCALE
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

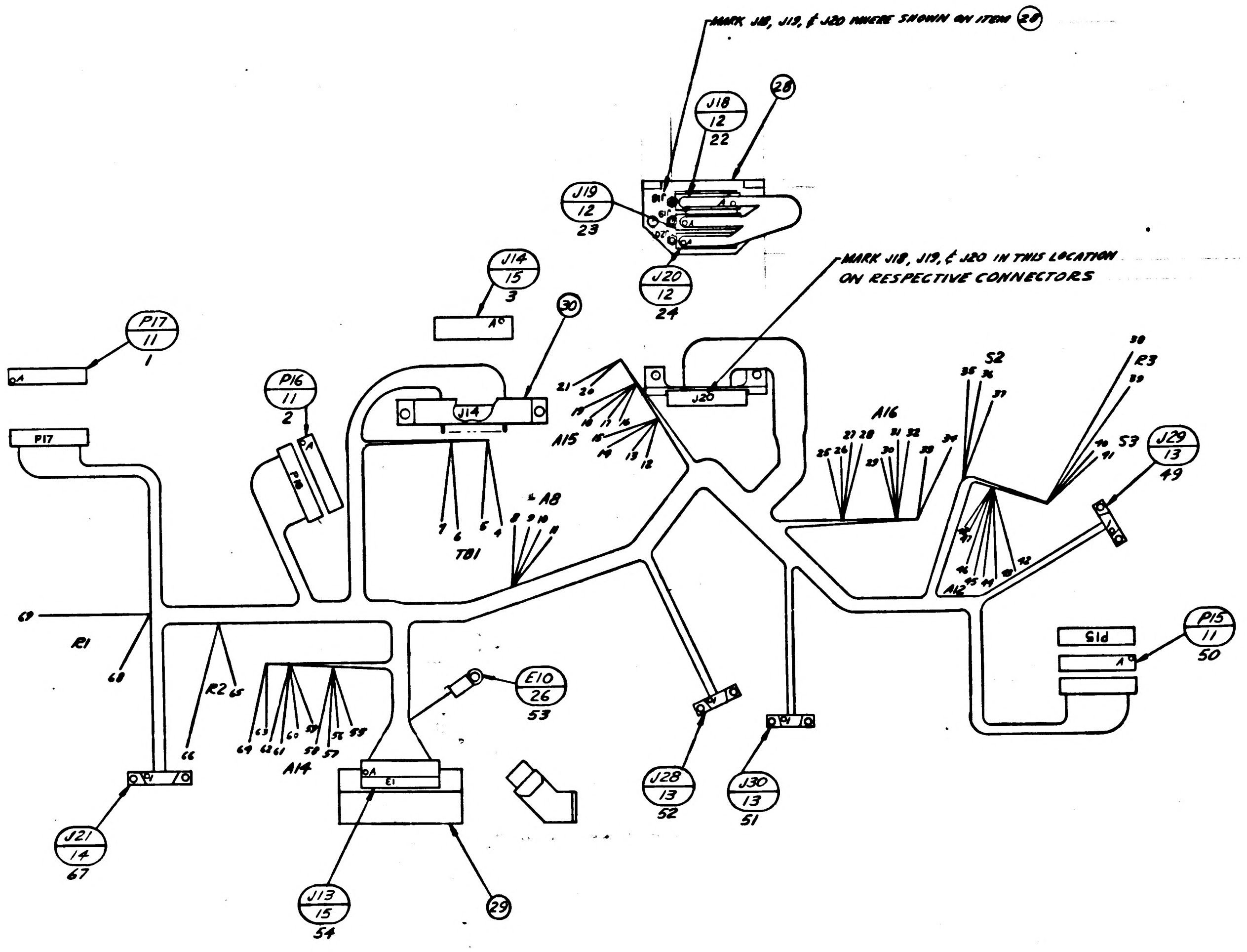
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

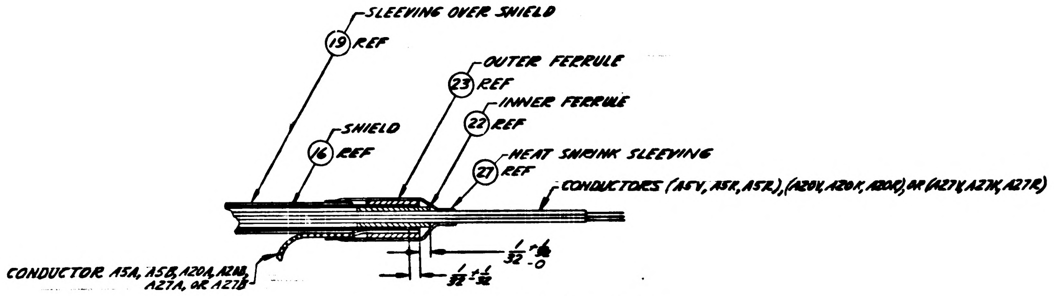
NASA DRAWING NO.
1000137

SHEET OF

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


MARK J18, J19, & J20 WHERE SHOWN ON ITEM 28
MARK J18, J19, & J20 IN THIS LOCATION ON RESPECTIVE CONNECTORS
J18 12 22
28
J19 12 23
J20 12 24
J14 15 3
30
P17 11 1
P17
P16 11 2
P18
J14
J20
A15
21 20 19 18 17 16 15 14 13 12
A8
7 6 5 4
8 9 10 11
TB1
A16
25 26 27 28 29 30 31 32 33 34
S2
35 36 37
R3
38 39
S3
40 41
J29 13 49
A12
42 43 44 45 46 47 48
69
R1
68
R2
65 66
63 64 62 61 60 59 58 57 56 55
A14
E10 26 53
E1
A
P15
P15 11 50
J28 13 52
J30 13 51
J21 14 67
J13 15 54
29


SLEEVING OVER SHIELD
19 REF
OUTER FERRULE
23 REF
INNER FERRULE
22 REF
SHIELD
16 REF
HEAT SHRINK SLEEVING
27 REF
CONDUCTORS (A5V, A5K, A5R), (A20V, A20K, A20R), OR (A27V, A27K, A27R)
CONDUCTOR A5A, A5B, A20A, A20B, A27A, OR A27B
$\frac{1}{32} {}^{+\frac{1}{32}}_{-0}$
$\frac{1}{32} \pm \frac{1}{32}$

DETAIL TYPICAL OF SHIELDED WIRE TERMINATION
CRIMP AS SHOWN
NO SCALE

THIS DRAWING MAY BE SCALED

1 INCH
2 INCHES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1000005	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN THENO DATE 5-29-63
CHECKED WINBERG
APPROVAL J. E. Winberg
APPROVAL J. E. Miller
NASA APPROVAL Jack Barnard
MIT APPROVAL

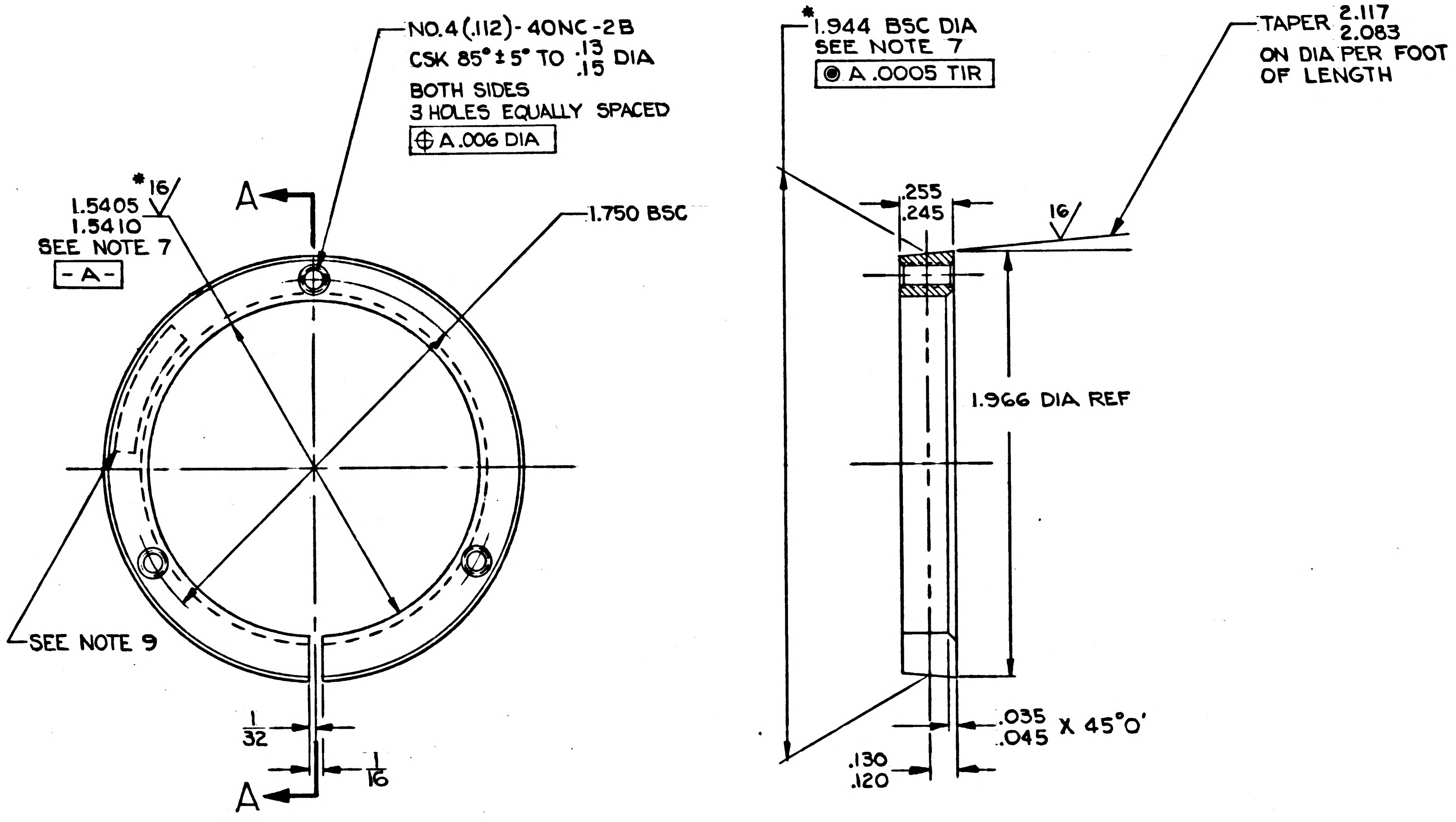
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "A", STABLE MEMBER

CODE IDENT NO.
SIZE E
NASA DRAWING NO 1000137
SCALE 1-1
WT
SHEET 14 OF 14

1000137

REVISIONS		TDRR 00105		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A4	TDRR 00302	2/6/63	ajB WK


NO.4 (.112)-40NC-2B
CSK 85° ± 5° TO .13/.15 DIA
BOTH SIDES
3 HOLES EQUALLY SPACED
⌖ A .006 DIA
*16
1.5405
1.5410
SEE NOTE 7
-A-
A
1.750 BSC
SEE NOTE 9
1/32
1/16
A
*1.944 BSC DIA
SEE NOTE 7
◉ A .0005 TIR
TAPER 2.117/2.083
ON DIA PER FOOT
OF LENGTH
.255
.245
16
1.966 DIA REF
.035
.045 X 45°0'
.130
.120

SECTION A-A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATL: CRES-AISI, CL 416, ANNEALED
   ALT: SPEC QQ-S-763, COND A, CL 416,
   Ⓐ FORM ROUND, FINISH COLD
3. 63/ ALL OVER, UNLESS OTHERWISE SPECIFIED
4. BREAK ALL SHARP EDGES .005/.015
5. ORDER OF OPERATIONS NON-MANDATORY PROCESS
   A. ROUGH MACHINE TO WITHIN .005 TO .010 OF FINISHED DIMENSIONS
   B. HEAT TREAT-1750°F FOR 30 MINUTES ± 5 MIN, OIL QUENCH, TEMPER AT 600°F FOR 2 HOURS ± 5 MINUTES
   C. FINISH MACHINE
   D. STABILIZE AT 200°F FOR 20 HOURS, AIR COOL
6. PASSIVATE IN ACCORDANCE WITH MIL-F-14072-FINISH E 300
7. * INDICATES DIMENSIONS BEFORE SLOTTING
8. Ⓐ HARDNESS: ROCKWELL Rc 36-40 (SEE NOTE 10.)
9. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
10. Ⓐ IF NOTE 5 IS NOT FOLLOWED, HARDEN TO ROCKWELL Rc 36-40 PER MIL-H-6875

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ	DL 1000201	
1000005	DL 1000001	
NEXT ASSY	USED ON	
APPLICATION		

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
±1/64	—	±0°30'

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN	R.G.S.	

APPROVED FOR MSC
Jack Barnard
BY DIRECTION M.I.T. APPROVAL
WA 21 Nov 62

CLAMP, SPLIT, GYRO

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

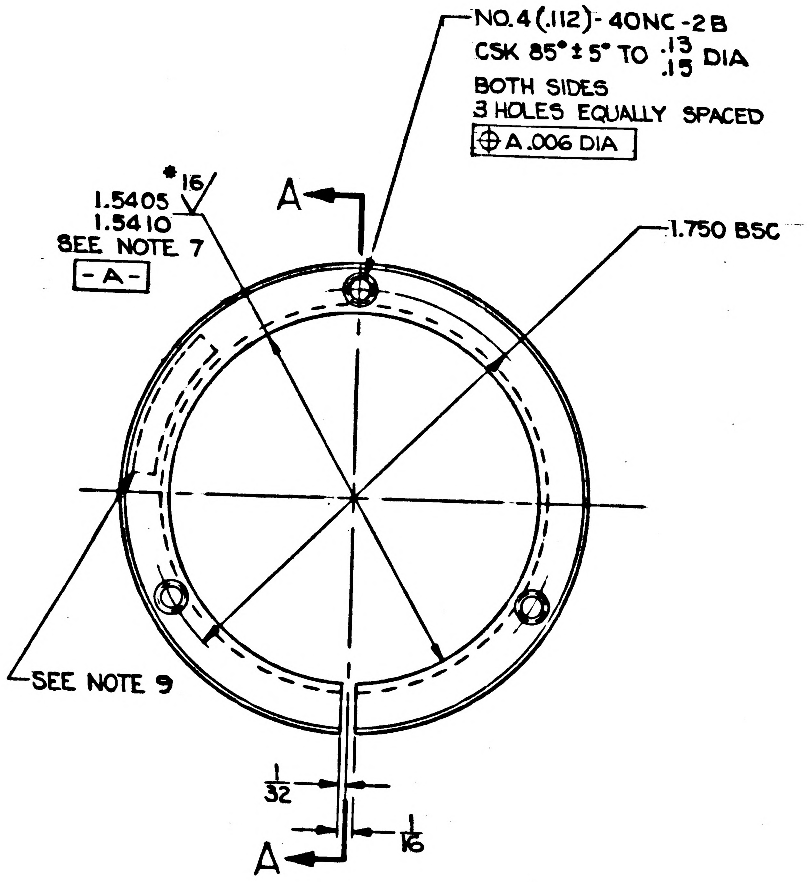
DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

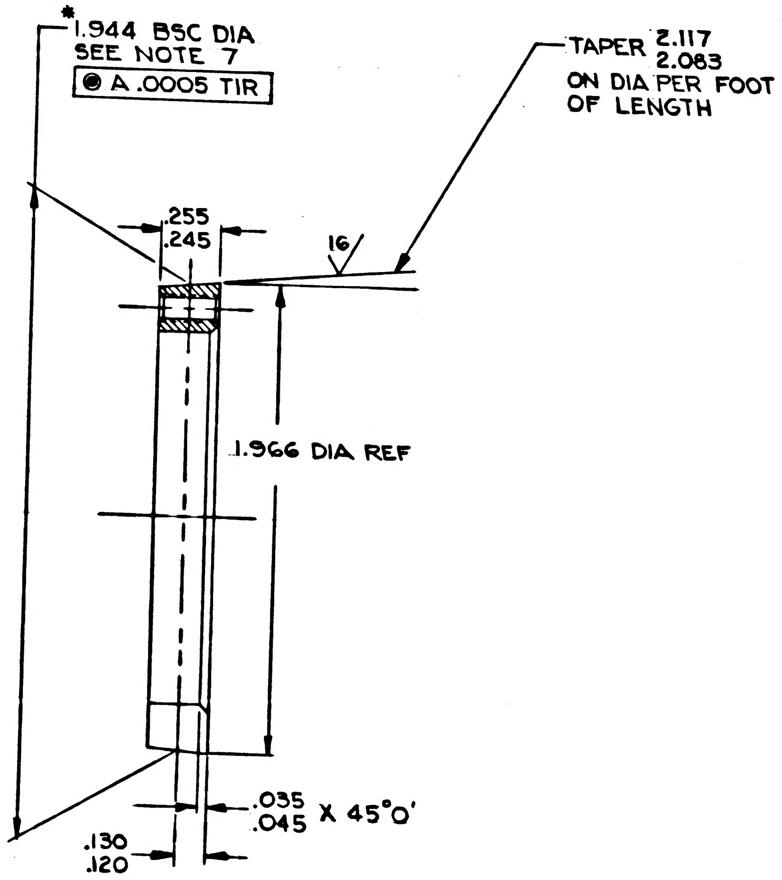
NASA DRAWING NO.
1000138

SHEET 1 OF 1

ZONE	SYM	REVISIONS TDRR 00105 DESCRIPTION	DATE	APPROVAL



NO.4 (.112)-40NC-2B
CSK 85° ± 5° TO .13/.15 DIA
BOTH SIDES
3 HOLES EQUALLY SPACED
⊕ A .006 DIA
*16
1.5405
1.5410
SEE NOTE 7
-A-
A
1.750 BSC
SEE NOTE 9
1/32
1/16
A



*1.944 BSC DIA
SEE NOTE 7
◉ A .0005 TIR
TAPER 2.117/2.083 ON DIA PER FOOT OF LENGTH
.255
.245
16
1.966 DIA REF
.035
.045 X 45°0'
.130
.120

SECTION A-A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATL: CRES-AISI, CL 416, ANNEALED
   ALT: SPEC QQ-S-763, COND A, CL416,
   FORM ROUND, FINISH HOT
3. 63√ ALL OVER, UNLESS OTHERWISE SPECIFIED
4. BREAK ALL SHARP EDGES .005/.015
5. ORDER OF OPERATIONS NON-MANDATORY PROCESS
   A. ROUGH MACHINE TO WITHIN .005 TO .010 OF FINISHED DIMENSIONS
   B. HEAT TREAT-1750°F FOR 30 MINUTES ± 5 MIN, OIL QUENCH, TEMPER AT 600°F FOR 2 HOURS ± 5 MINUTES
   C. FINISH MACHINE
   D. STABILIZE AT 200°F FOR 20 HOURS, AIR COOL
6. PASSIVATE IN ACCORDANCE WITH MIL-F-14072-FINISH E 300
7. * INDICATES DIMENSIONS BEFORE SLOTTING
8. HARDEN TO ROCKWELL C40-45 PER MIL-H-6875
9. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000005	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS — ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Boyce DATE 11/21/62
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC Jack Barnard
BY DIRECTION M.I.T. APPROVAL
WAK 21 Nov 62

CLAMP, SPLIT, GYRO

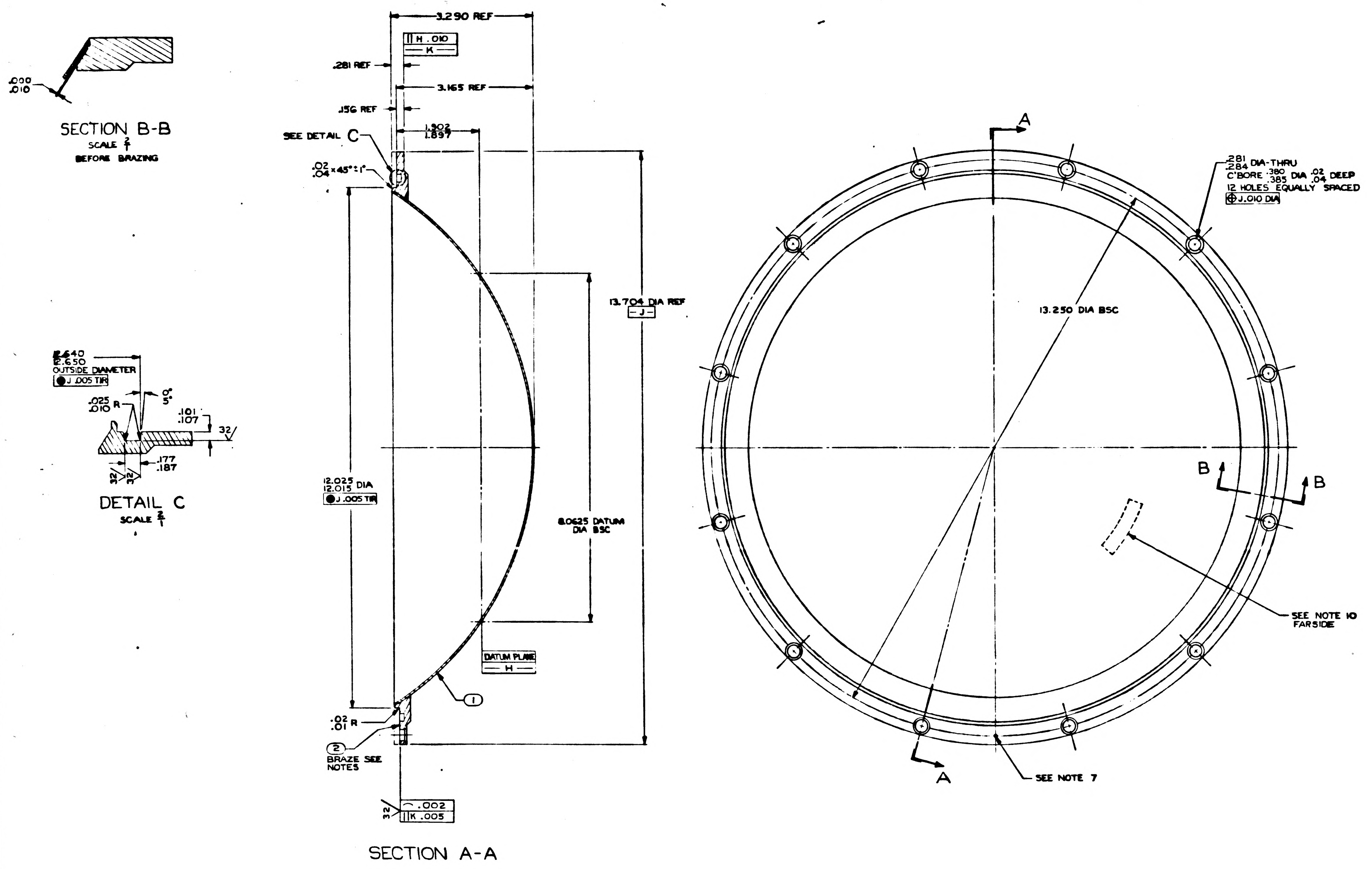
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000138
SHEET 1 OF

1000138

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00153	12-13-62	4/6

REVISIONS TDRR 00105



.000
.010
SECTION B-B
SCALE 2/1
BEFORE BRAZING
2.640
2.650
OUTSIDE DIAMETER
J .005 TIR
.025
.010 R
0°
5°
.101
.107
32
.177
.187
DETAIL C
SCALE 2/1
3.290 REF
H .010
K
.281 REF
3.165 REF
.156 REF
1.902
1.897
SEE DETAIL C
.02
.04 ×45°±1°
13.704 DIA REF
J
12.025
12.015 DIA
J .005 TIR
8.0625 DATUM DIA BSC
DATUM PLANE
H
1
.02
.01 R
2
BRAZE SEE NOTES
32
.002
K .005
SECTION A-A
A
A
B
B
.281
.284 DIA-THRU
C'BORE .380
.385 DIA .02
.04 DEEP
12 HOLES EQUALLY SPACED
J .010 DIA
13.250 DIA BSC
SEE NOTE 10 FARSIDE
SEE NOTE 7

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. BREAK SHARP EDGES $^{.005}_{.015}$
3. 63✓ MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
4. Ⓐ ORDER OF OPERATIONS: (PROCESS NON-MANDATORY)
   A ROUGH MACHINE.
   B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN.
   C FINISH MACHINE.
5. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894.
6. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
7. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MINIMUM HARDNESS. TO BE CHECKED AT INDICATED AREA ONLY.
   Ⓐ A SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MINUTES. AIR BLAST QUENCH.
   B AGE AT 350°F ±10°F FOR 6 HOURS ±10 MIN.
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR.
9. PRESSURE TEST USING HELIUM LEAK DETECTOR.
   ALLOWABLE LEAK RATE 1.0×10^{-8} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL.
10. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER MOVABLE	1000061			2
1	HEMISPHERE CASE COVER	1000060-1			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

Ⓐ

INCHES
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED DATE
CHECKED
DRAWN G QUINN 7/1/62
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL NOV 64

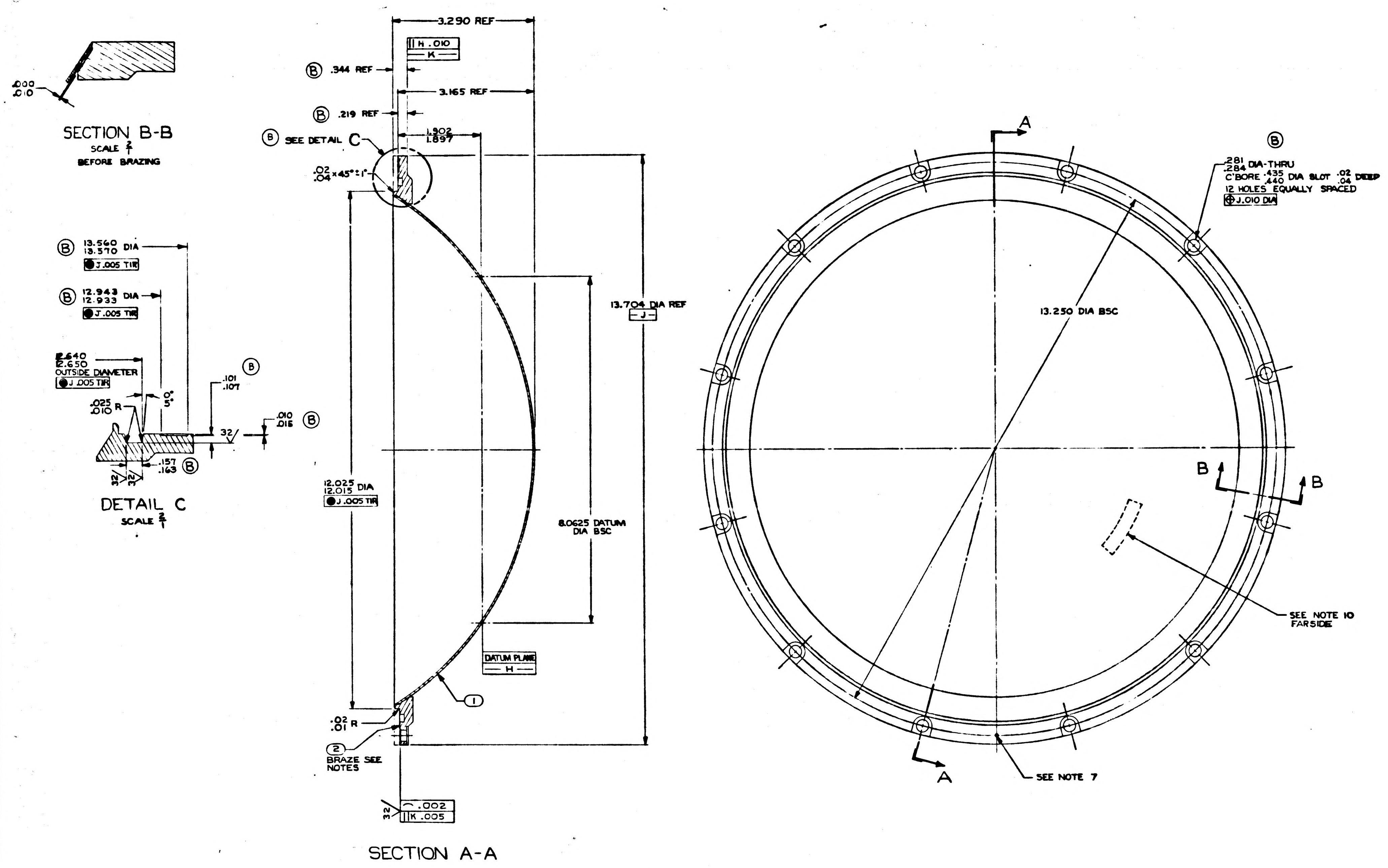
CASE COVER MOVABLE
BRAZING & MACHINING
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000139
SHEET 1 OF 1

A 1000139

Ⓜ	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
			REVISIONS TDRR 00105			
Ⓜ		A	TDRR 00153	2-13-62	4/J/B	
		B7	TDRR 00265	1-7-63	2/15	


.000
.010
SECTION B-B
SCALE 2/1
BEFORE BRAZING
Ⓑ 13.560 13.570 DIA
● J .005 TIR
Ⓑ 12.943 12.933 DIA
● J .005 TIR
2.640 2.650 OUTSIDE DIAMETER
● J .005 TIR
.025 .010 R
0° 5°
.101 .107
Ⓑ
32
.010 .015 Ⓑ
.157 .163 Ⓑ
32 32
DETAIL C
SCALE 2/1
3.290 REF
∥ H .010
— K —
Ⓑ .344 REF
3.165 REF
Ⓑ .219 REF
Ⓑ SEE DETAIL C
1.902 1.897
.02 .04 × 45° ± 1°
13.704 DIA REF
— J —
12.025 12.015 DIA
● J .005 TIR
8.0625 DATUM DIA BSC
DATUM PLANE
— H —
①
.02 .01 R
② BRAZE SEE NOTES
32
⌒ .002
∥ K .005
SECTION A-A
A
A
Ⓑ
.281 .284 DIA-THRU
C'BORE .435 .440 DIA SLOT .02 .04 DEEP
12 HOLES EQUALLY SPACED
⊕ J .010 DIA
13.250 DIA BSC
B
B
SEE NOTE 10 FARSIDE
SEE NOTE 7

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. BREAK SHARP EDGES $^{.005}_{.015}$.
3. 63 MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
4. Ⓐ ORDER OF OPERATIONS: (PROCESS NON-MANDATORY)
   A ROUGH MACHINE.
   B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN.
   C FINISH MACHINE.
5. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894.
6. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
7. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MINIMUM HARDNESS. TO BE CHECKED AT INDICATED AREA ONLY.
   Ⓐ A SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MINUTES. AIR BLAST QUENCH.
   B AGE AT 350°F ±10°F FOR 6 HOURS ±10 MIN.
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR.
9. PRESSURE TEST USING HELIUM LEAK DETECTOR.
   ALLOWABLE LEAK RATE 1.0 × 10^{-8} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL.
10. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER MOVABLE	1000061			2
1	HEMISPHERE CASE COVER	1000060-1			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

Ⓐ

INCHES
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT
NAS 9-153 DATE
APPROVED 4/2/62
CHECKED
DRAWN G QUINN 7/19/E
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

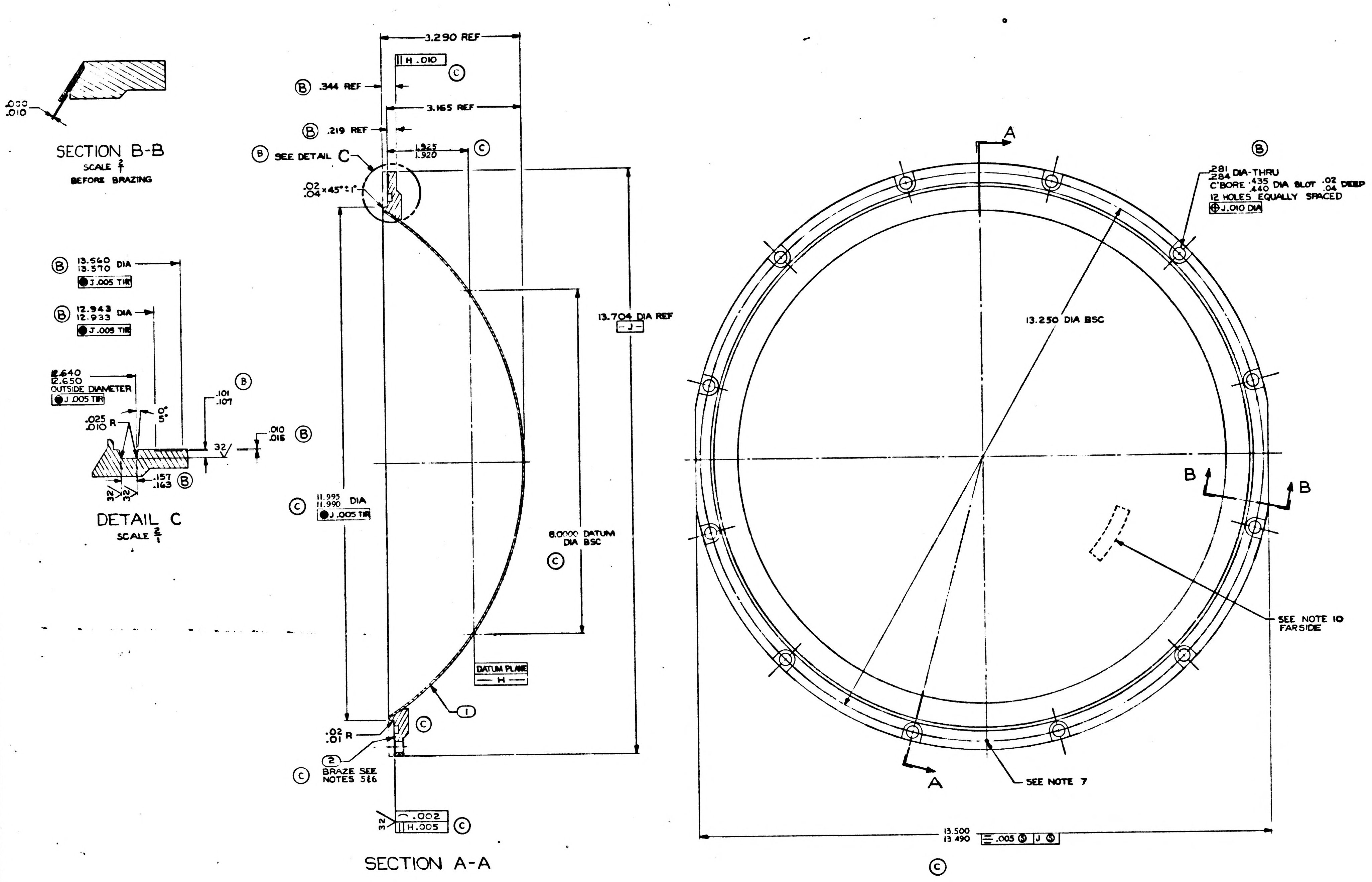
CASE COVER MOVABLE
BRAZING & MACHINING
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO.
1000139
SHEET 1 OF 1

REVISIONS TDRR 00105

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00153	2-13-62	WR
	B₇	TDRR 00265	1-7-63	
	C	TDRR 00432	2-15-63	WR


SECTION B-B
SCALE 2/1
BEFORE BRAZING
.000
.010
3.290 REF
H .010
.344 REF
3.165 REF
.219 REF
SEE DETAIL C
1.925
1.920
.02
.04 × 45° ± 1°
13.560
13.570 DIA
J .005 TIR
12.943
12.933 DIA
J .005 TIR
12.640
12.650
OUTSIDE DIAMETER
J .005 TIR
.101
.107
9°
5°
.025
.010 R
32
.010
.016
.157
.163
DETAIL C
SCALE 2/1
13.704 DIA REF
-J-
11.995
11.990 DIA
J .005 TIR
8.0000 DATUM DIA BSC
DATUM PLANE
— H —
1
.02
.01 R
2
BRAZE SEE NOTES 5 & 6
.002
H .005
SECTION A-A
A
A
13.250 DIA BSC
.281
.284 DIA-THRU
C'BORE .435
.440 DIA SLOT .02
.04 DEEP
12 HOLES EQUALLY SPACED
J .010 DIA
B
B
SEE NOTE 10
FARSIDE
SEE NOTE 7
13.500
13.490
.005 J

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. BREAK SHARP EDGES .005 .015.
3. 63 MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
4. ORDER OF OPERATIONS: (PROCESS NON-MANDATORY) Ⓐ
   - A ROUGH MACHINE.
   - B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN.
   - C FINISH MACHINE.
5. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7694.
6. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
7. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MINIMUM HARDNESS. TO BE CHECKED AT INDICATED AREA ONLY. Ⓐ
   - A SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MINUTES. AIR BLAST QUENCH.
   - B AGE AT 350°F ±10°F FOR 6 HOURS ±10 MIN.
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR.
9. PRESSURE TEST USING HELIUM LEAK DETECTOR. ALLOWABLE LEAK RATE 1.0×10^{-8} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL.
10. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER MOVABLE	1000061	—		2
1	HEMISPHERE CASE COVER	1000060-1			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED | DATE
CHECKED
DRAWN G QUINN 7/19
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

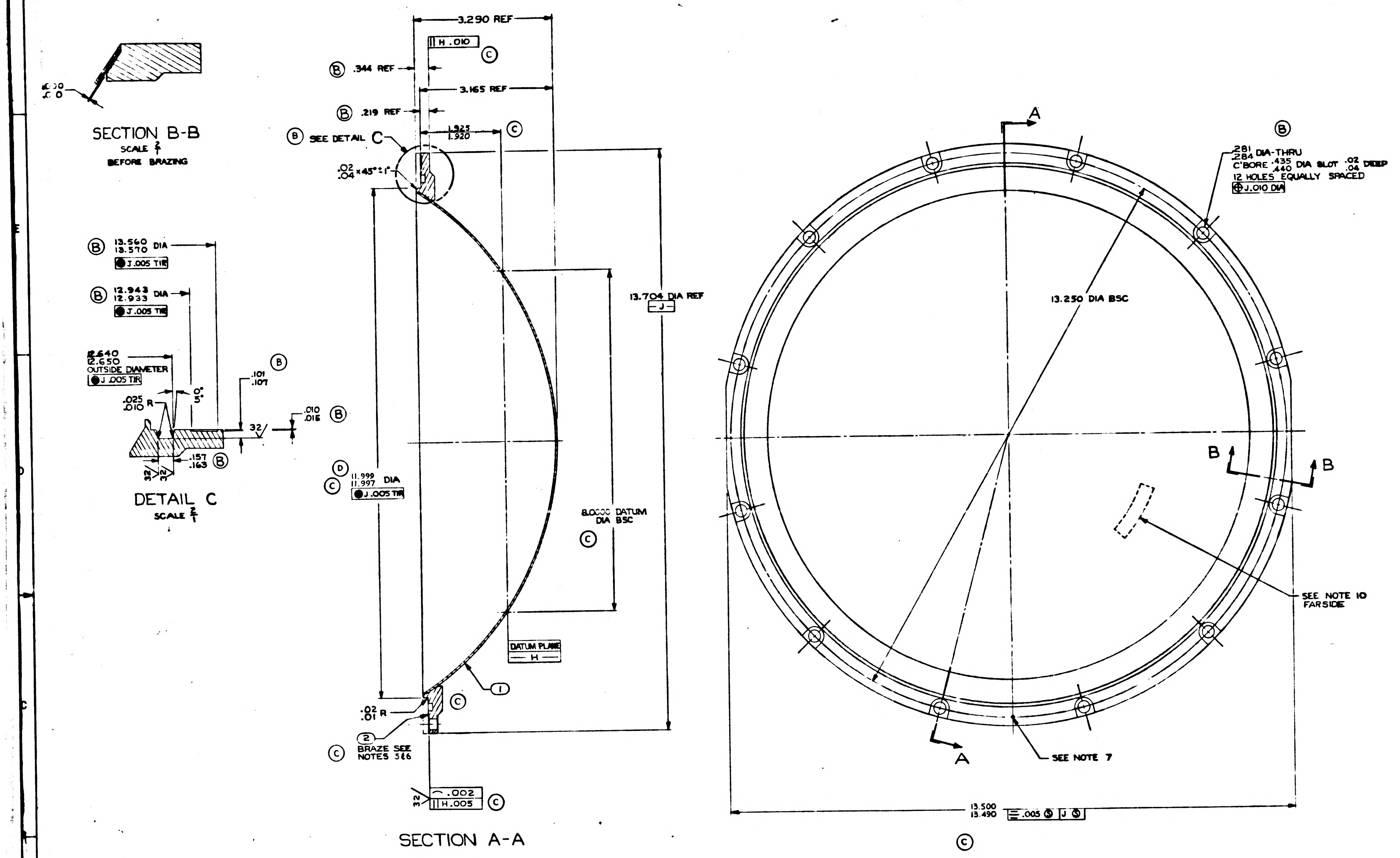
CASE COVER MOVABLE
BRAZING & MACHINING
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000139
SHEET 1 OF 1

1000139

ZONE	SYM	REVISIONS TDRR 00105 DESCRIPTION	DATE	APPROVAL	
	A	TDRR U0153	12-13-62		
	B₇	TDRR 00265	1-7-63		
	C	TDRR 00432	2-15-63		
	D	TDRR 00587	3-20-63		



SECTION B-B
SCALE 2/1
BEFORE BRAZING
13.560 / 13.570 DIA
J .005 TIR
12.943 / 12.933 DIA
J .005 TIR
12.640 / 12.650 OUTSIDE DIAMETER
J .005 TIR
.025 / .010 R
0° / 5°
.101 / .107
32
.010 / .015
.157 / .163
DETAIL C
SCALE 2/1
3.290 REF
H .010
.344 REF
3.165 REF
.219 REF
SEE DETAIL C
1.925 / 1.920
.02 / .04 × 45° ± 1°
13.704 DIA REF
J
11.999 / 11.997 DIA
J .005 TIR
8.0000 DATUM DIA BSC
DATUM PLANE
H
1
.02 / .01 R
2
BRAZE SEE NOTES 5&6
.002
H .005
SECTION A-A
A
A
.281 / .284 DIA-THRU
C'BORE .435 / .440 DIA SLOT .02 / .04 DEEP
12 HOLES EQUALLY SPACED
J .010 DIA
13.250 DIA BSC
B
B
SEE NOTE 10 FARSIDE
SEE NOTE 7
13.500 / 13.490
.005 J

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. BREAK SHARP EDGES .005/.015
3. 63/ MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
4. ORDER OF OPERATIONS: (PROCESS NON-MANDATORY)
   - A ROUGH MACHINE.
   - B STRESS RELIEVE AT 325 °F ± 10° FOR 6 HOURS ± 10 MIN.
   - C FINISH MACHINE.
5. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894.
6. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL.
7. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MINIMUM HARDNESS. TO BE CHECKED AT INDICATED AREA ONLY.
   - A SOLUTION HEAT TREAT AT 970°F ±10°F FOR 2 HOURS ±5 MINUTES. AIR BLAST QUENCH.
   - B AGE AT 350°F ±10°F FOR 6 HOURS ±10 MIN.
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR.
9. PRESSURE TEST USING HELIUM LEAK DETECTOR. ALLOWABLE LEAK RATE 1.0×10^{-8} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL.
10. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER MOVABLE	1000061			2
1	HEMISPHERE CASE COVER	1000060-1			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN G QUINN
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

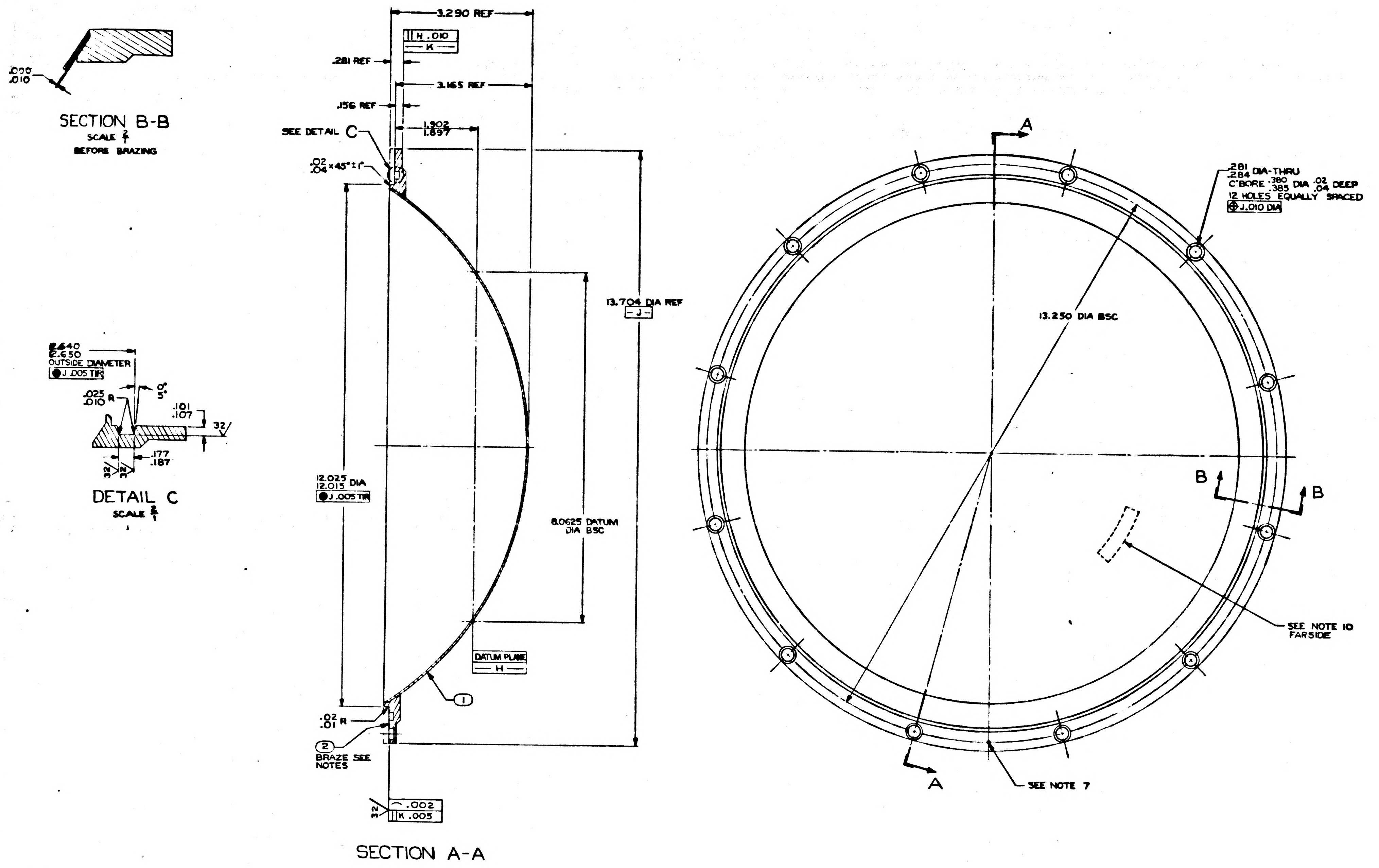
CASE COVER MOVABLE
BRAZING & MACHINING
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000139
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00105



.020
.010
SECTION B-B
SCALE 2/1
BEFORE BRAZING
2.640
2.650
OUTSIDE DIAMETER
● J .005 TIR
.025
.010 R
0°
5°
.101
.107
32/
.177
.187
32/
32/
DETAIL C
SCALE 2/1
3.290 REF
|| H .010
— K —
.281 REF
3.165 REF
.156 REF
SEE DETAIL C
1.902
1.897
.02
.04 × 45° ± 1°
13.704 DIA REF
— J —
12.025
12.015 DIA
● J .005 TIR
8.0625 DATUM DIA BSC
DATUM PLANE
— H —
1
.02
.01 R
2
BRAZE SEE NOTES
32/
⌒ .002
|| K .005
SECTION A-A
A
A
.281
.284 DIA-THRU
C'BORE .380
.385 DIA .02
.04 DEEP
12 HOLES EQUALLY SPACED
⊕ J .010 DIA
13.250 DIA BSC
B
B
SEE NOTE 10
FARSIDE
SEE NOTE 7

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES $^{.005}_{.015}$
3. 63/ MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
4. ORDER OF OPERATIONS (PROCESS NON-MANDATORY)
   - A ROUGH MACHINE
   - B STRESS RELIEVE AT 340°F ± 10° FOR 2 HOUS ± 10 MIN
   - C FINISH MACHINE
5. CLEAN COMPONENT PARTS IMMEDIATELY BEFORE BRAZING PER NAVORD OD 7894
6. DIP BRAZE PER NAVORD OD 17547 AND AIR COOL
7. PRECIPITATION HARDEN PER MIL-H-6088 AT 340° TO 360° FOR 8 HOURS ± 5 MIN TO BRINELL 80 MIN (R-E85) HARDNESS TO BE CHECKED AT INDICATED AREAS ONLY
8. ANODIC COAT PER MIL-A-8625 TYP I, CLEAR
9. PRESSURE TEST USING HELIUM LEAK DETECTOR
   ALLOWABLE LEAK RATE – 1.0×10^{-5} CC/ SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
10. IDENTIFY USING DRAWING NO. REVISION LETTER & MANUFACTURING SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	FLANGE CASE COVER MOVABLE	1000061			2
1	HEMISPHERE CASE COVER	1000060-1			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000001	DL1000001

APPLICATION

INCHES
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN G QUINN
APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL

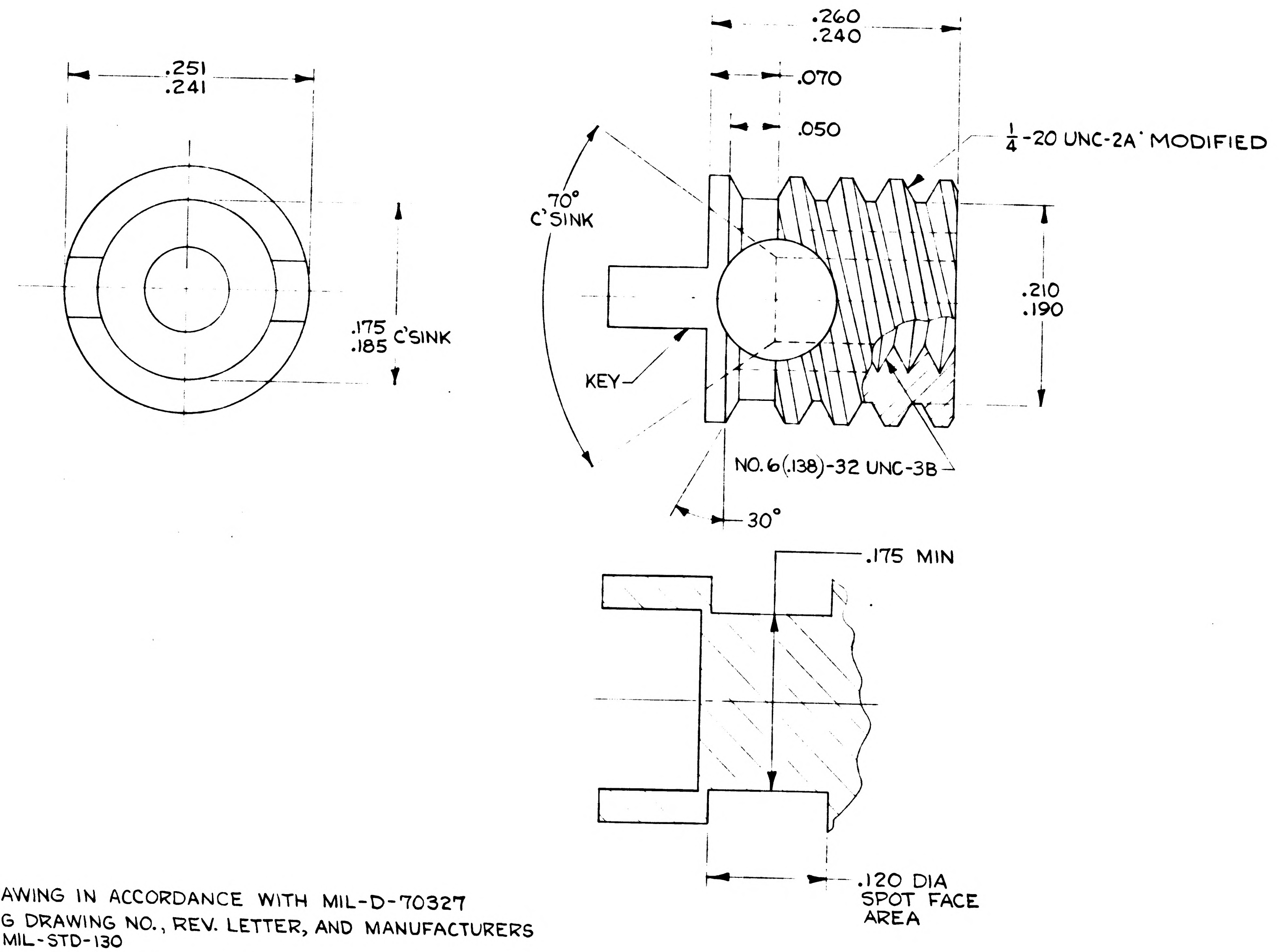
CASE COVER MOVABLE
BRAZING & MACHINING
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000139
SHEET 1 OF 1

1000139

REVISIONS TDRR 00113				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 IDENTIFY USING DRAWING NO., REV. LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
3 SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3
4 ALL INTERNAL THREADS SHALL CONFORM TO THE REQUIREMENTS OF MIL-S-7742 EXCEPT AS NOTED
5 INTERNAL THREAD LOCKING TORQUE SHALL CONFORM WITH MIL-N-25027
6 FINISH-PASSIVATE PER MIL-S-5002
7 DRY FILM LUBRICANT PER MIL-L-25504

ORIGINAL SOURCE OF SUPPLY
NEWTON INSERT CO.
6500 AVALON BLVD.
LOS ANGELES 3, CALIFORNIA
ITEM NO. NAS 1395-CA06L

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
A286 CRES STEEL
AMS 5737

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	CJ Boyce	11/27/62
CHECKED		
DRAWN	RES	11-9-62

APPROVED FOR MSC
W J Rhine 11-28-62
BY DIRECTION MIT APPROVAL
J Nelson 11/28/62

INSERT, THREADED SELF-LOCKING

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
10/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

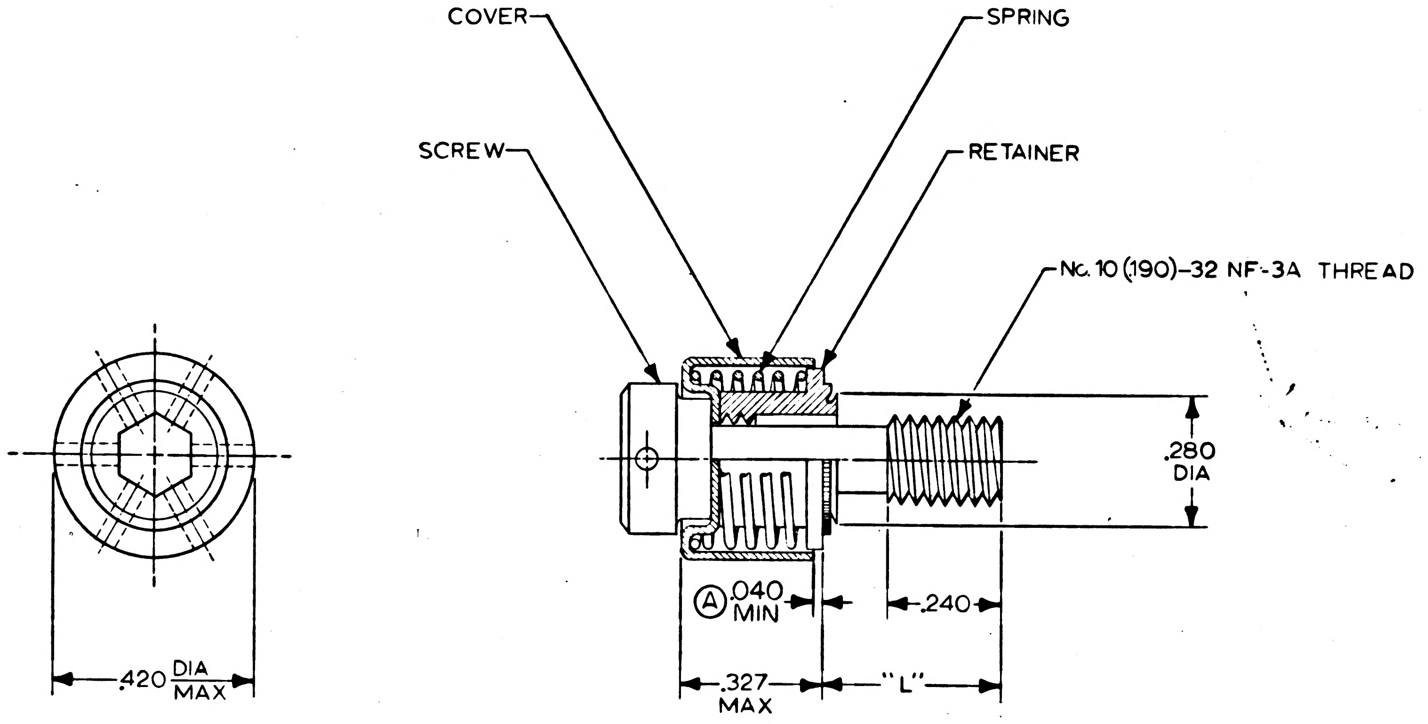
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000140
SHEET 1 OF 1

1000140

PART No.	"L" DIM
1000141-1	.540-.530
1000141-2	.440-.430

REVISIONS TDRR 00105				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A3	TDRR 00273	1/23/63	ajb WK

Ⓜ

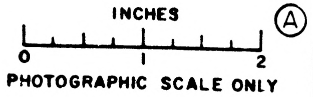


NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL:
    A. RETAINER - AISI 4130 OR 4140 STEEL ALT SPEC QQ-S-624 COND ANL
    B. COVER - CRES CLASS 301 OR 302 COND A FORM FLAT FINISH HOT SPEC QQ-S-763
    C. SPRING - STEEL WIRE PER QQ-W-470
    D. SCREW - MS-24673 MOD AS SHOWN
3. HEAT TREAT:
    RETAINER AND SPRING 160,000 TO 180,000 TENSILE STRENGTH
4. FINISH:
    A. RETAINER, SPRING, & SCREW ZINC PLATED PER QQ-Z-325 TYPE II CLASS 3
    B. COVER - PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN-E-300
5. MIN RADIAL FLOAT .023
6. IDENTIFY USING DRAWING NO, REVISION LETTER, APPLICABLE DASH NO. AND MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN Ⓐ NASA SPEC ND 1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY
HI-SHEAR CORP.
2600 WEST 247TH STREET
TORRANCE, CALIF.

MASTER



PHOTOGRAPHIC SCALE ONLY

Ⓐ MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE *2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN	MORSE	11-9-62

APPROVED FOR MSC
Jack Barnard 11/21/62
BY DIRECTION
M.I.T. APPROVAL W J [illegible] 21 NOV 62

SCREW, CAPTIVE,
ASSEMBLY

SPECIFICATON CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000141

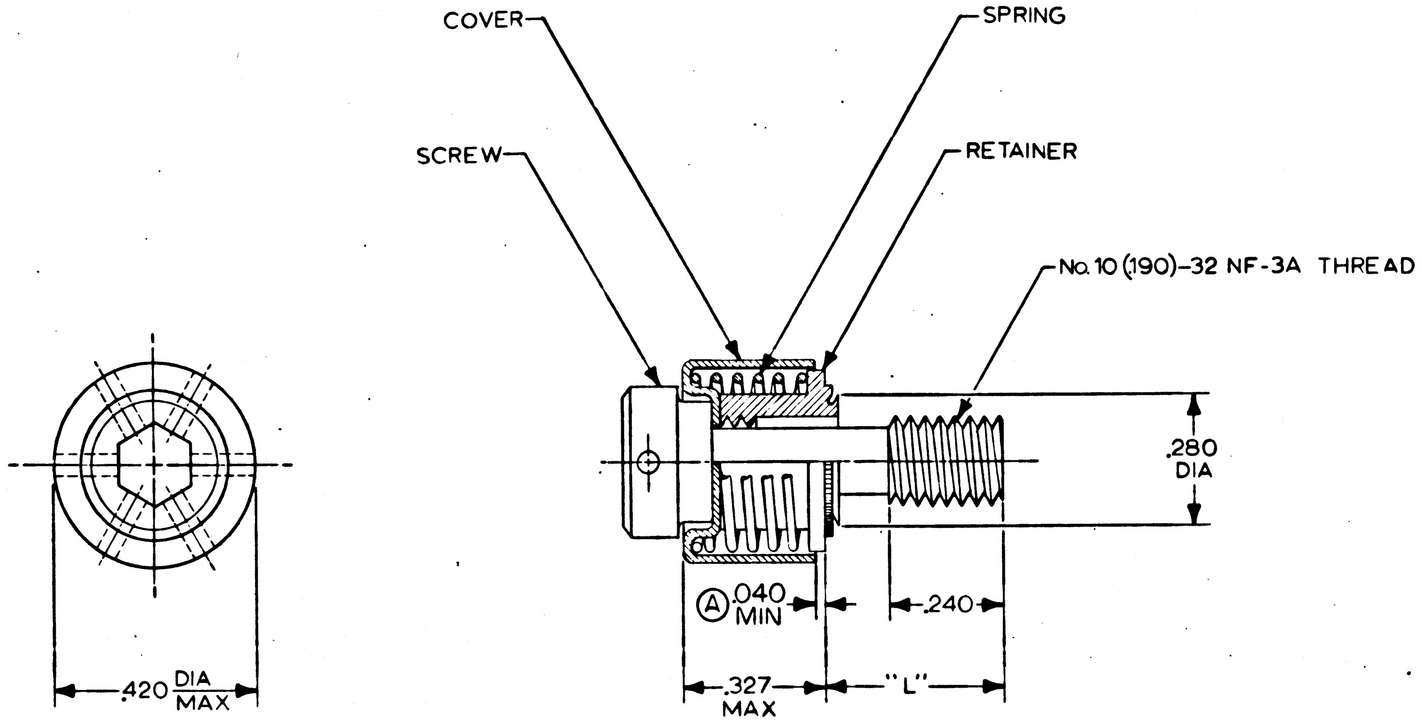
SHEET 1 OF 1 SHEET

PART No.	"L" DIM	HI SHEAR CORP. PART NO.
1000141-1	.540-.530	
1000141-2	.440-.430	P 143

Ⓑ

REVISIONS TDRR 00105

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ		A_3	TDRR 00273	1-23-63	ajB	wK
Ⓜ		B	TDRR 00706	4-3-63	ajB	wK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL:
   - A. RETAINER – AISI 4130 OR 4140 STEEL ALT SPEC QQ-S-624 COND ANL
   - B. COVER – CRES CLASS 301 OR 302 COND A FORM FLAT FINISH HOT SPEC QQ-S-763
   - C. SPRING – STEEL WIRE PER QQ-W-470
   - D. SCREW – MS-24673 MOD AS SHOWN
3. HEAT TREAT: RETAINER AND SPRING 160,000 TO 180,000 TENSILE STRENGTH
4. FINISH:
   - A. RETAINER & SPRING ZINC PLATED PER QQ-Z-325 TYPE II CLASS 3
   - Ⓑ B. COVER & SCREW PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN-E-300
5. MIN RADIAL FLOAT .023
6. IDENTIFY USING DRAWING NO, REVISION LETTER, APPLICABLE DASH NO. AND MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN Ⓐ NASA SPEC ND 1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY
HI-SHEAR CORP.
2600 WEST 247TH. STREET
TORRANCE, CALIF.

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ	MULTIPLE	DL1000201
	USAGE	DL1000001
	NEXT ASSY	USED ON
	APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE #2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	11/21/62
CHECKED		
DRAWN	MORSE	11-9-62

APPROVED FOR MSC
Jack Barnard
BY DIRECTION
M.I.T. APPROVAL W Ragan 21 NOV 62

SCREW, CAPTIVE, ASSEMBLY
SPECIFICATON CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

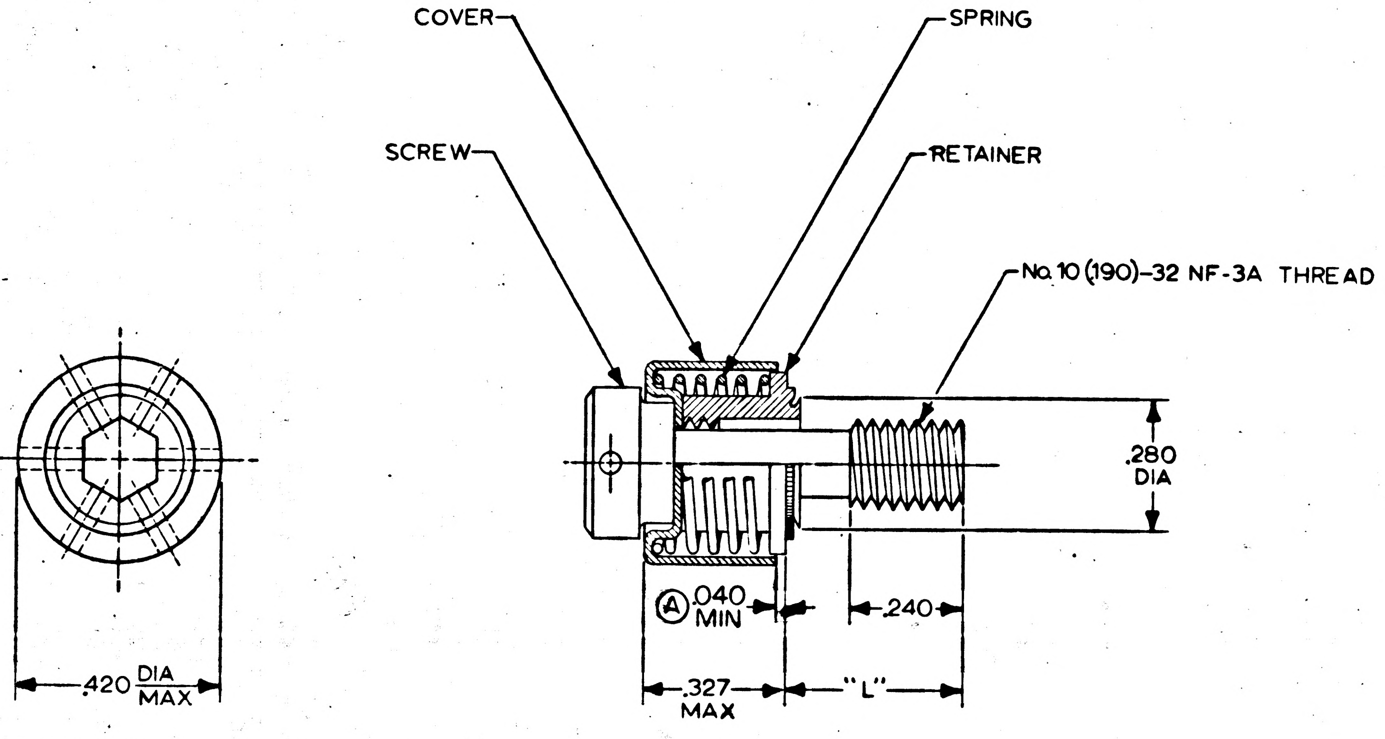
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000141
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART No.	"L" DIM	HI SHEAR CORP. PART NO.
1000141-1	.540-.530	
1000141-2	.440-.430	P208

Ⓑ Ⓓ

REVISIONS TDRR 00105					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A_3	TDRR 00273	1-23-63	ajB	wK
	B	TDRR 00706	4-3-63	ajB	wK
	C	TDRR 01682	6-19-63	ajB	wK
	D	TDRR 01978	7-10-63	ajB	wK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL:
   - A. RETAINER – AISI 4130 OR 4140 STEEL ALT SPEC QQ-S-624 COND ANL
   - Ⓒ B. COVER – CRES CLASS 301 OR 302 COND A FORM FLAT FINISH COLD SPEC QQ-S-763
   - Ⓒ C. SPRING – STEEL WIRE PER QQ-W-470 ALT. MAT'L – BERYLLIUM COPPER PER QQ-C-530
   - D. SCREW – MS-24673 MOD AS SHOWN
3. HEAT TREAT: RETAINER AND SPRING 160,000 TO 180,000 TENSILE STRENGTH
4. FINISH:
   - A. RETAINER & SPRING ZINC PLATED PER QQ-Z-325 TYPE II CLASS 3 Ⓑ
   - B. COVER & SCREW PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN-E-300
5. MIN RADIAL FLOAT .023
6. IDENTIFY USING DRAWING NO, REVISION LETTER, APPLICABLE DASH NO. AND MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN Ⓐ NASA SPEC ND 1015404 CLASS 3

Ⓓ PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE #2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN	MORSE	11-9-62

APPROVED FOR MSC
11/21/62
BY DIRECTION
M.I.T. APPROVAL 21 NOV 62

SCREW, CAPTIVE, ASSEMBLY

SPECIFICATON CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

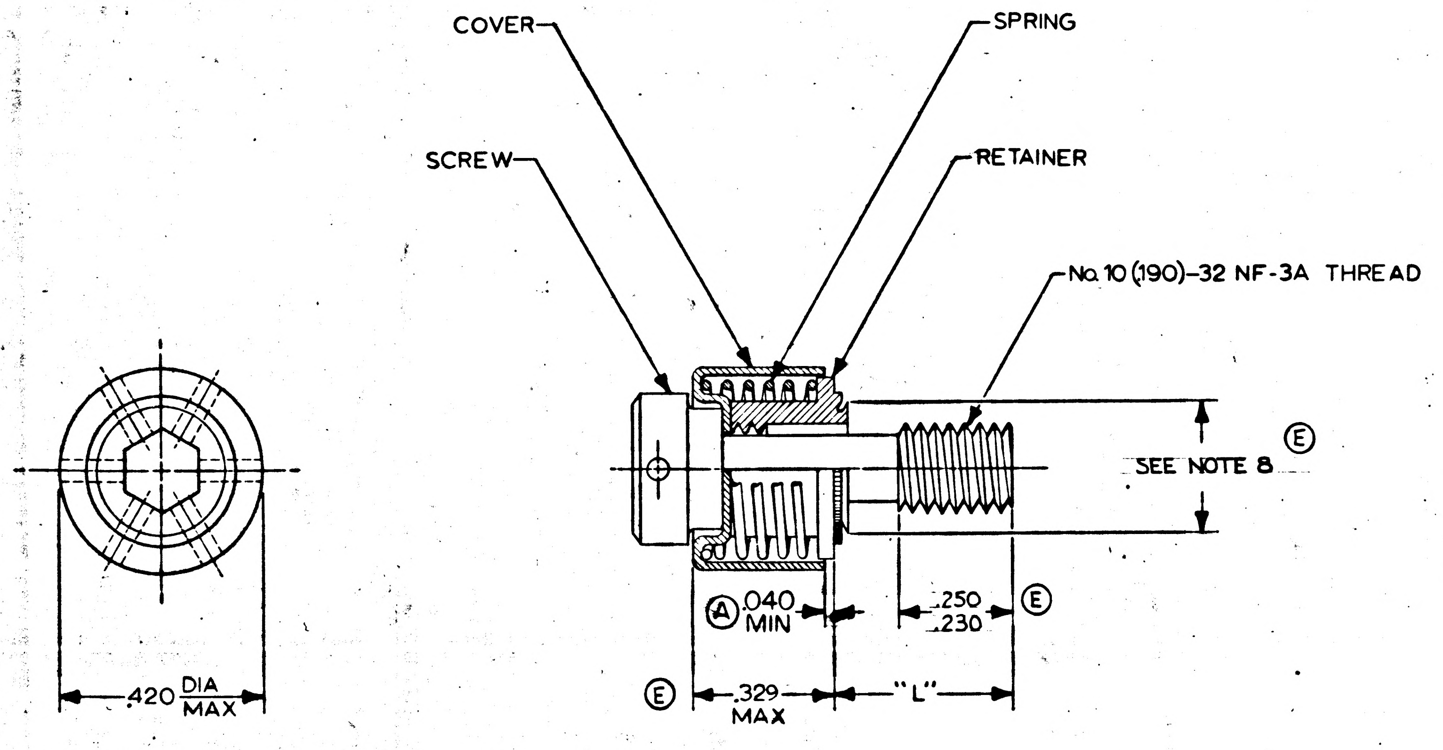
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000141
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART No.	"L" DIM	HI SHEAR CORP. PART NO.	
1000141-1	.540-.530		
1000141-2	.440-.430	P208	Ⓑ Ⓓ
1000141-3	.500-.490		Ⓔ

REVISIONS TDRR 00105					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A3	TDRR 00273	1-23-63	ajB	WK
	B	TDRR 00706	4-3-63	ajB	WK
	C	TDRR 01682	6-19-63	ajB	WB
	D	TDRR 01978	7-10-63	ajB	WK
	E	TDRR 03184	9-11-63	dah	WK

Ⓜ Ⓜ Ⓜ Ⓜ



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327. Ⓔ
2. MATERIAL:
   - A. RETAINER – AISI 4130 OR 4140 STEEL ALT SPEC QQ-S-624 COND ANL
   - Ⓔ Ⓒ B. COVER – CRES CLASS ~~301 OR~~ 302 COND A FORM FLAT FINISH COLD SPEC QQ-S-763
   - Ⓒ C. SPRING – STEEL WIRE PER QQ-W-470
     Ⓔ ALT. MAT'L – BERYLLIUM COPPER PER QQ-C-530 COND A
   - D. SCREW – Ⓔ MS-24673 MODIFIED AS SHOWN
3. HEAT TREAT:
   Ⓔ RETAINER: PER MIL-H-6875 TO 160,000-180,000 PSI TENSILE STRENGTH
   SPRING: SPRING TEMPER
4. FINISH:
   - Ⓑ A. RETAINER & SPRING ZINC PLATED PER QQ-Z-325 TYPE II CLASS 3
   - B. COVER & SCREW PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN-E-300
5. MIN RADIAL FLOAT .023
6. IDENTIFY USING DRAWING NO, REVISION LETTER, APPLICABLE DASH NO. AND MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN Ⓐ NASA SPEC ND 1015404 CLASS 3

Ⓔ 8. RETAINER TO BE DESIGNED TO BE INSTALLED IN .281/.283 DIA HOLE AND BE CAPABLE OF WITHSTANDING 300 LB PUSH-OUT FORCE AND 90 IN-LB TORQUE-OUT TORQUE.

Ⓓ PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 · · FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓔ		DL1001500
Ⓐ	MULTIPLE	DL1000201
	USAGE	DL1000001
	NEXT ASSY	USED ON
	APPLICATION	

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE #2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN	MORSE	11-9-62
APPROVED FOR MSC	Jack Barnard 11/21/62	
BY DIRECTION		
M.I.T. APPROVAL	W [illegible] 21 NOV 62	

SCREW, CAPTIVE, ASSEMBLY

SPECIFICATION CONTROL DRAWING

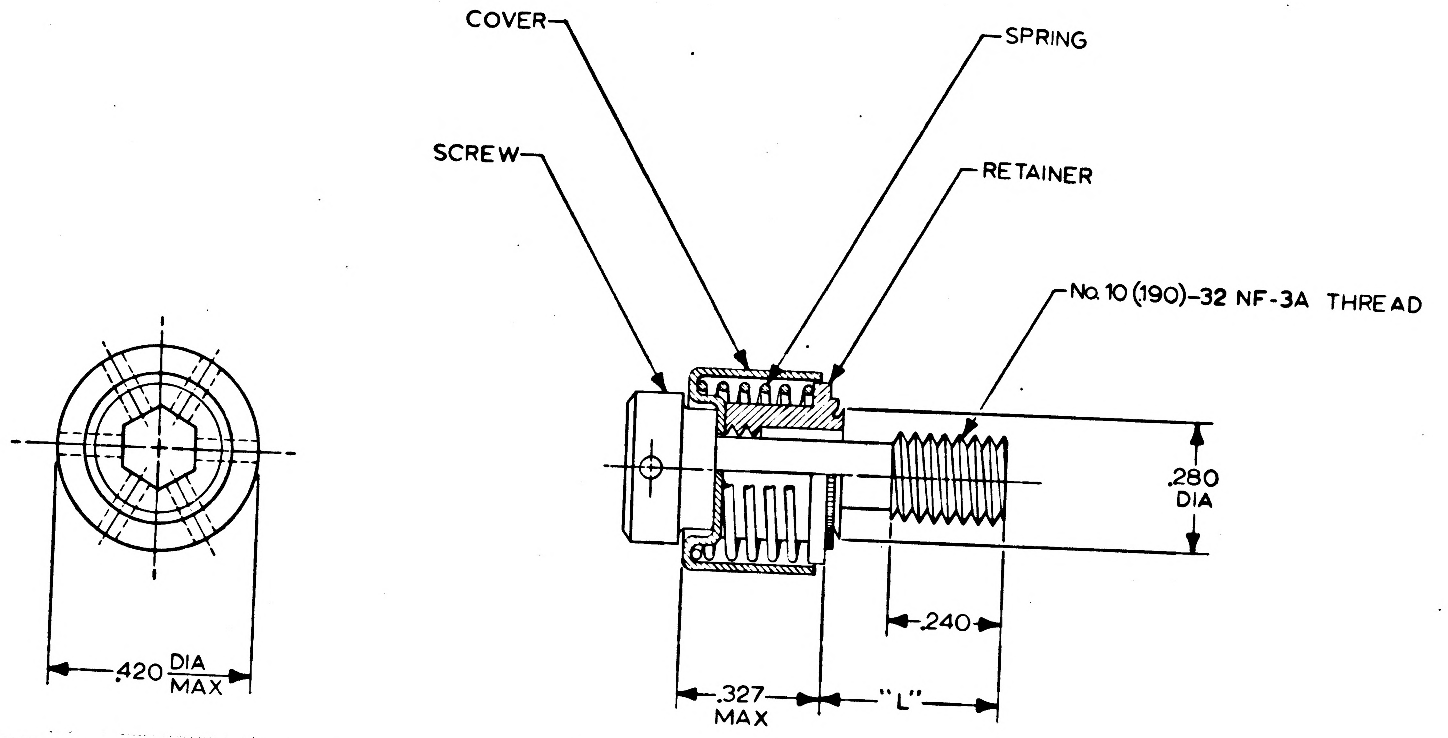
SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000141
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART No.	"L" DIM
1000141-1	.540-.530
1000141-2	.440-.430

ZONE	SYM	REVISIONS TDRR 00105 DESCRIPTION	DATE	APPROVAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL:
   - A. RETAINER – AISI 4130 OR 4140 STEEL ALT SPEC QQ-S-624 COND ANL
   - B. COVER – CRES CLASS 301 OR 302 COND A FORM FLAT FINISH HOT SPEC QQ-S-763
   - C. SPRING – STEEL WIRE PER QQ-W-470
   - D. SCREW – MS-24673 MOD AS SHOWN
3. HEAT TREAT:
   - RETAINER AND SPRING 160,000 TO 180,000 TENSILE STRENGTH
4. FINISH:
   - A. RETAINER, SPRING, & SCREW ZINC PLATED PER QQ-Z-325 TYPE II CLASS 3
   - B. COVER – PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN-E-300
5. MIN RADIAL FLOAT .023
6. IDENTIFY USING DRAWING NO, REVISION LETTER, APPLICABLE DASH NO. AND MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 SECTION 3

ORIGINAL SOURCE OF SUPPLY
HI-SHEAR CORP.
2600 WEST 247TH STREET
TORRANCE, CALIF.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE #2

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	11/21/62
CHECKED		
DRAWN	MORSE	11-9-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 21 NOV 62

SCREW, CAPTIVE, ASSEMBLY
SPECIFICATON CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
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MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000141
SHEET 1 OF 1 SHEET

1000141

1000142 (M)

REVISIONS TDR 00201

SYM	DESCRIPTION	DATE	APPROVAL	
A	REPLACED BY REVISION B WITH CHANGES TDRR 00333	2-5-63	ops	WK

Part No.	Description	Req'd
1000154	Connector Mount 16X	1
1000136-2	Insert, Threaded	2
1000141-2	Screw, Captive	11
1000146	Insert, Threaded	6

REPLACED BY REV. B WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/27/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12/28/62
BY DIRECTION
W Kupfer 28 Dec 62

CONNECTOR MOUNT
ASSEMBLY 16X

SCALE	UNIT WT.	CODE IDENT.

MIT
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LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000142

SHEET OF

1000142

REVISIONS TDR 00201

SYM	DESCRIPTION	DATE	APPROVAL

Part No.	Description	Req'd
1000154	Connector Mount 16X	1
1000136-2	Insert, Threaded	2
1000141-2	Screw, Captive	11
1000146	Insert, Threaded	6

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
1000001	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	G J Boyce	12/27/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12/28/62
BY DIRECTION
28 Dec 62

CONNECTOR MOUNT
ASSEMBLY 16X

SCALE	UNIT WT.	CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

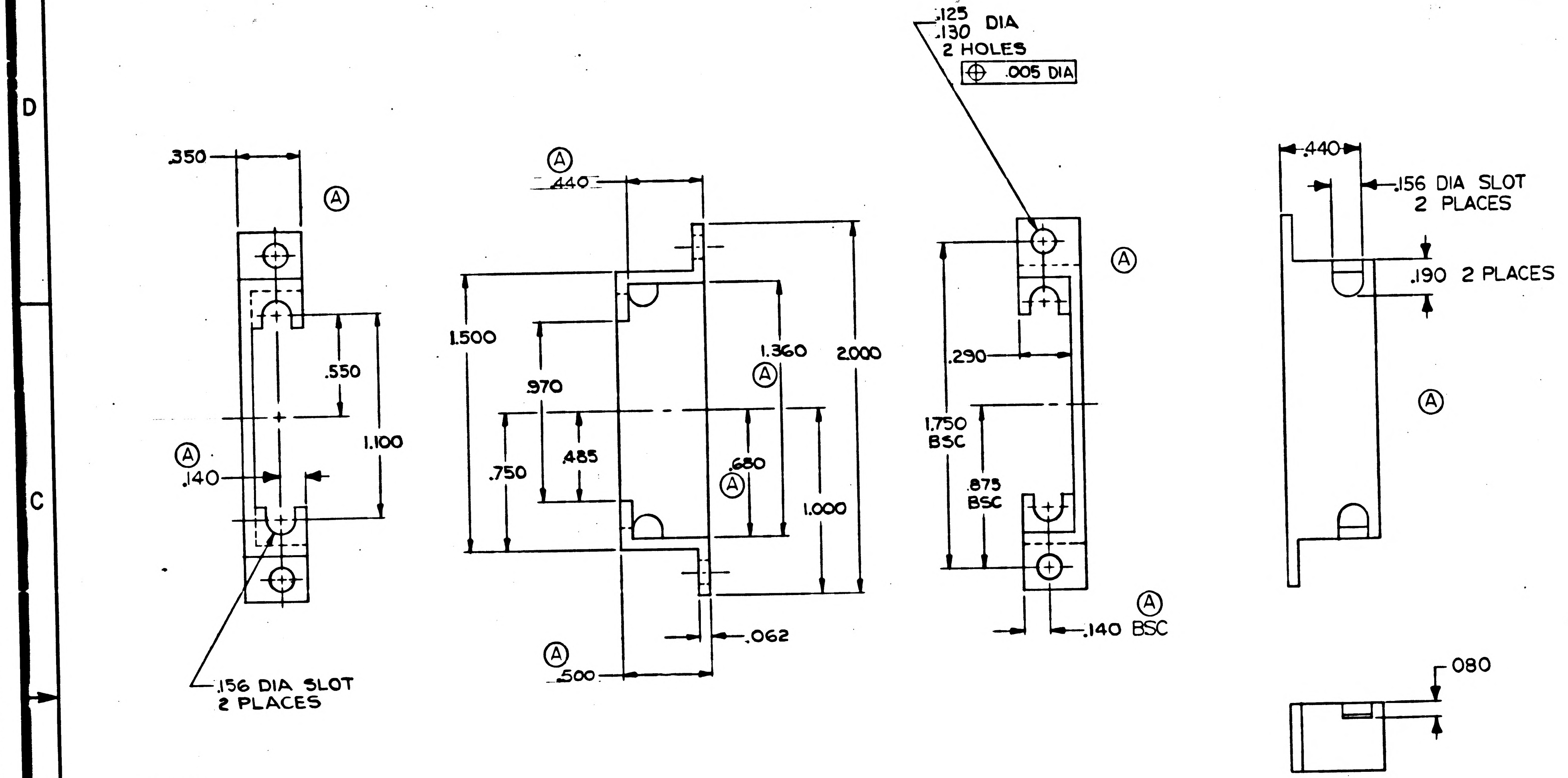
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000142

SHEET OF

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL REVISIONS	4-9-63	aga Wy



.350
Ⓐ
Ⓐ
.440
.550
1.100
Ⓐ
.140
.156 DIA SLOT
2 PLACES
1.500
.970
.750
.485
1.360
Ⓐ
2.000
Ⓐ
.680
1.000
.062
Ⓐ
.500
.125
.130 DIA
2 HOLES
⊕ .005 DIA
Ⓐ
.290
1.750
BSC
.875
BSC
Ⓐ
.140 BSC
.440
.156 DIA SLOT
2 PLACES
.190 2 PLACES
Ⓐ
.080

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ FINISH ALL OVER
Ⓐ 4. INSIDE CORNERS .010 RAD MAX
Ⓐ 5. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
Ⓐ 6. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS FIBER BASE, PER MIL-P-18177 TYPE GEE

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ 1000203	
1000202	
1000003	DL1000201
1000002	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
Ⓐ SEE NOTE 6

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	CJ Boyce	4-9-63
CHECKED		
DRAWN	R.G.S.	

APPROVED FOR MSC
W. J. Saragh 4/10/63
BY DIRECTION M.I.T. APPROVAL
W Kupfer 10 Apr 63

Ⓐ COVER
BRACKET, CONNECTOR
INTERGIMBAL SUBASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000143
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	1000144

REVISIONS		TDRR 00105	
SYM	DESCRIPTION	DATE	APPROVAL

SILASTIC
RTV 601 OR RTV 881

DOW CORNING CORP.
MIDLAND, MICHIGAN

PROPRIETARY ITEM

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000126	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		11/21/62
CHECKED		
DRAWN	PALERMO	11-16-62

APPROVED FOR MSC
Jack Barnard 11/21/62
BY DIRECTION
MIT APPROVAL W 21 NOV 62

INSULATING COMPOUND

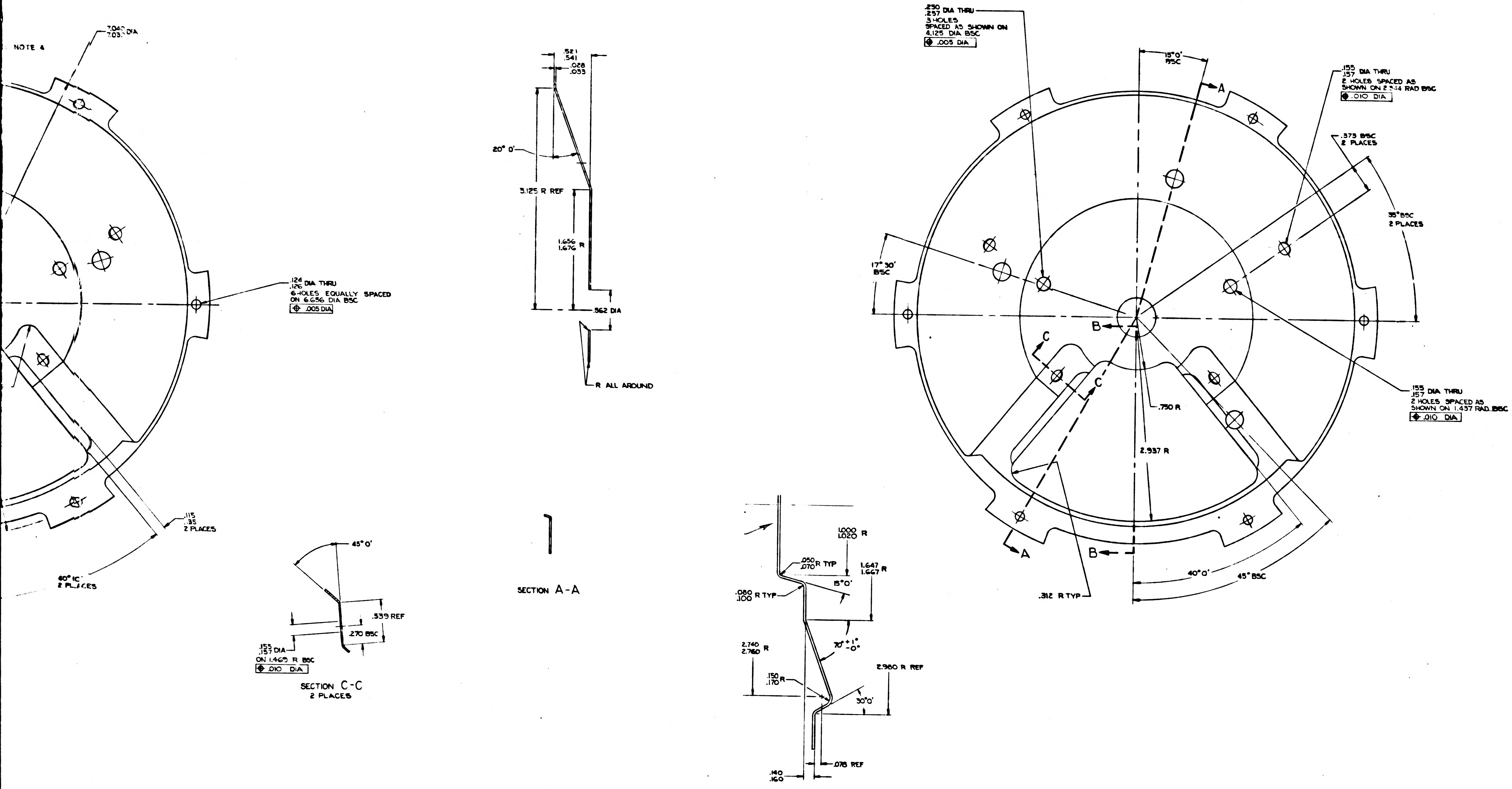
SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000144
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVAL
A	GENERAL REVISIONS	[illegible] 62	[illegible]

REVISIONS TDRR 02197


NOTE 4
7.040 / 7.03? DIA
.124 / .126 DIA THRU
6 HOLES EQUALLY SPACED ON 6.656 DIA BSC
.005 DIA
.115 / .135 2 PLACES
60° IC 2 PLACES
.521 / .541
.028 / .033
20° 0'
3.125 R REF
1.656 / 1.676 R
.562 DIA
R ALL AROUND
45° 0'
.539 REF
.270 BSC
.155 / .157 DIA ON 1.469 R BSC
.010 DIA
1.000 / 1.020 R
.050 / .070 R TYP
1.647 / 1.667 R
15° 0'
.080 / .100 R TYP
70° +1° -0°
2.740 / 2.760 R
2.980 R REF
.150 / .170 R
30° 0'
.078 REF
.140 / .160
.250 / .257 DIA THRU
3 HOLES
SPACED AS SHOWN ON 4.125 DIA BSC
.005 DIA
15° 0' BSC
A
.155 / .157 DIA THRU
2 HOLES SPACED AS SHOWN ON 2.344 RAD BSC
.010 DIA
.373 BSC 2 PLACES
35° BSC 2 PLACES
17° 30' BSC
B
C
C
.750 R
.155 / .157 DIA THRU
2 HOLES SPACED AS SHOWN ON 1.437 RAD BSC
.010 DIA
2.937 R
A
B
40° 0'
45° BSC
.312 R TYP

SECTION C-C
2 PLACES

SECTION A-A

SECTION B-B
2 PLACES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL1000201
1000006	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
AL ALY SH 3003-0
ALT SPEC QQ-A-359D

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED [illegible] DATE [illegible]
CHECKED
DRAWN R.G.S.
APPROVAL FOR MSC W.G. [illegible] 12-12-62
MIT APPROVAL [illegible] 12/12/62

GUIDE, WIRE
BEARING HOUSING
1X OUTER AX'S

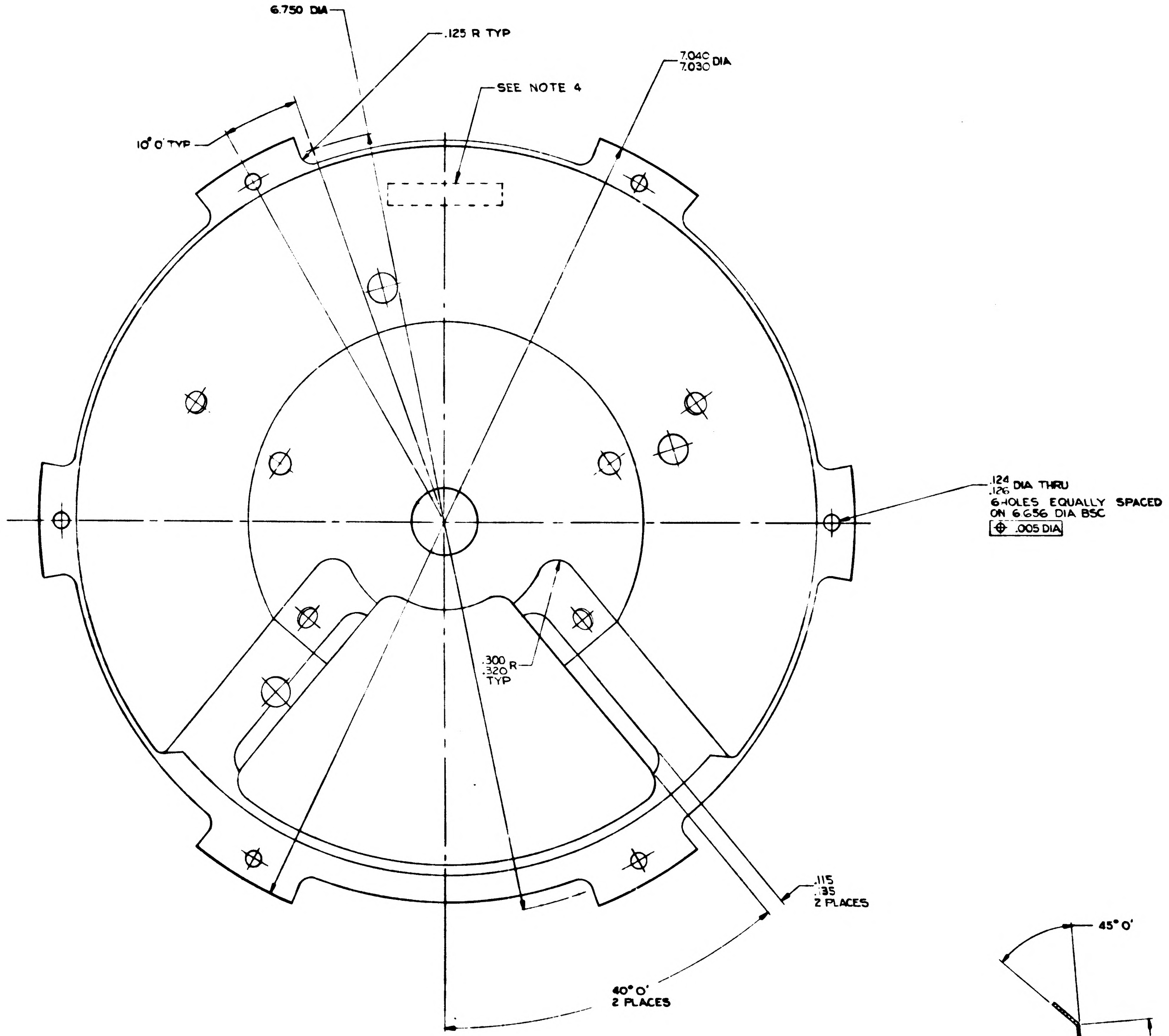
SCALE 2/1
UNIT WT
CODE IDENT

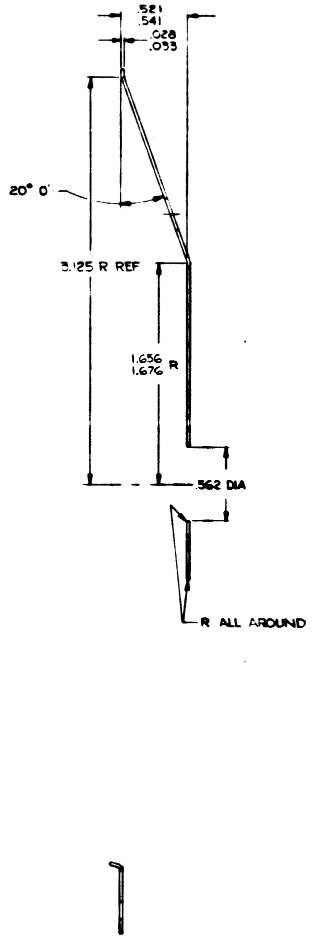
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO.
100015?
SHEET 1 OF 1

1000153 REV A SHEET 1

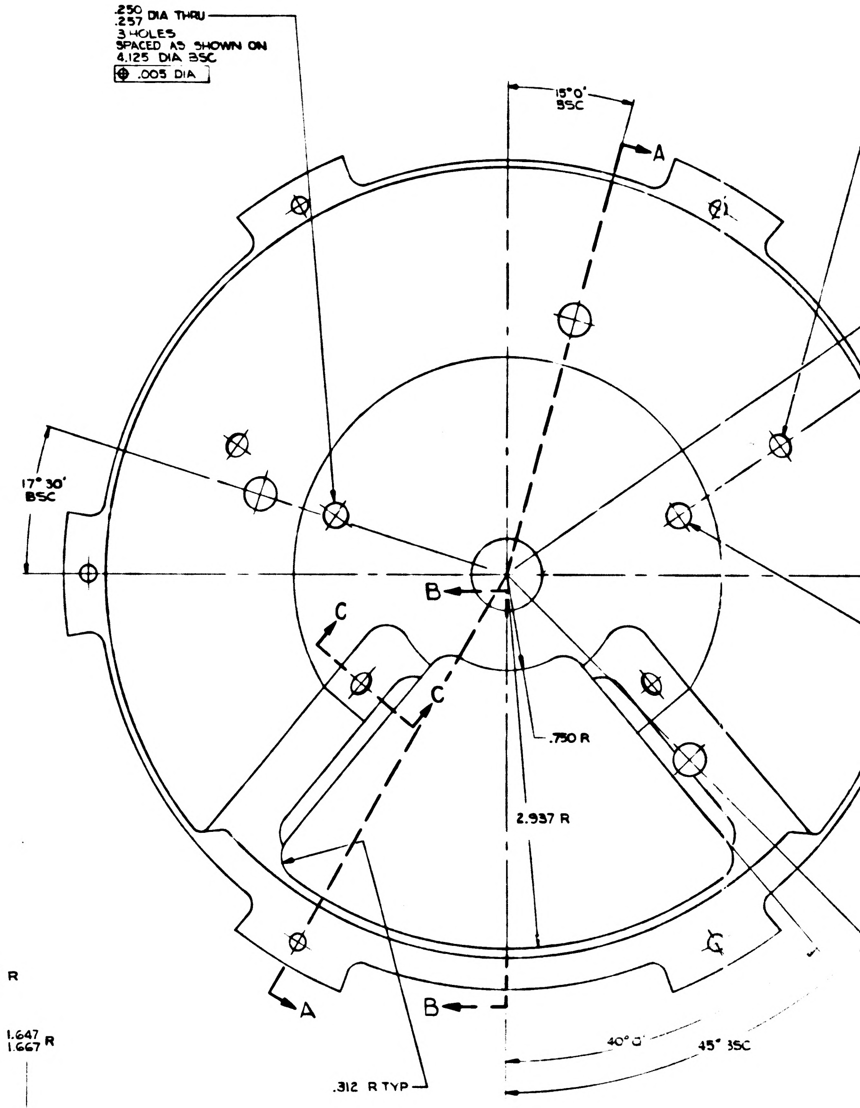
1000153

2/86


6.750 DIA
.125 R TYP
7.040
7.030 DIA
SEE NOTE 4
10° 0' TYP
.124
.126 DIA THRU
6 HOLES EQUALLY SPACED
ON 6.656 DIA BSC
⊕ .005 DIA
.300
.320 R
TYP
.115
.135
2 PLACES
40° 0'
2 PLACES

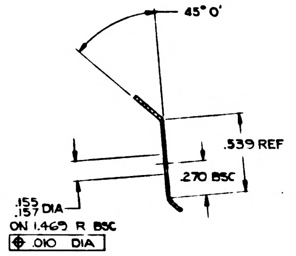

.521
.541
.028
.033
20° 0'
3.125 R REF
1.656
1.676 R
.562 DIA
R ALL AROUND

SECTION A-A

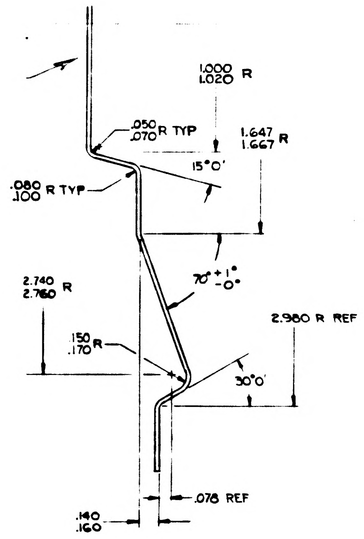

.250
.257 DIA THRU
3 HOLES
SPACED AS SHOWN ON
4.125 DIA BSC
⊕ .005 DIA
15° 0'
BSC
A
17° 30'
BSC
B
C
C
.750 R
2.937 R
A
B
.312 R TYP
40° 0'
45° BSC

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DEMENSIONS APPLY BEFORE TEFLON COAT


45° 0'
.539 REF
.270 BSC
.155
.157 DIA
ON 1.465 R BSC
⊕ .010 DIA

SECTION C-C
2 PLACES

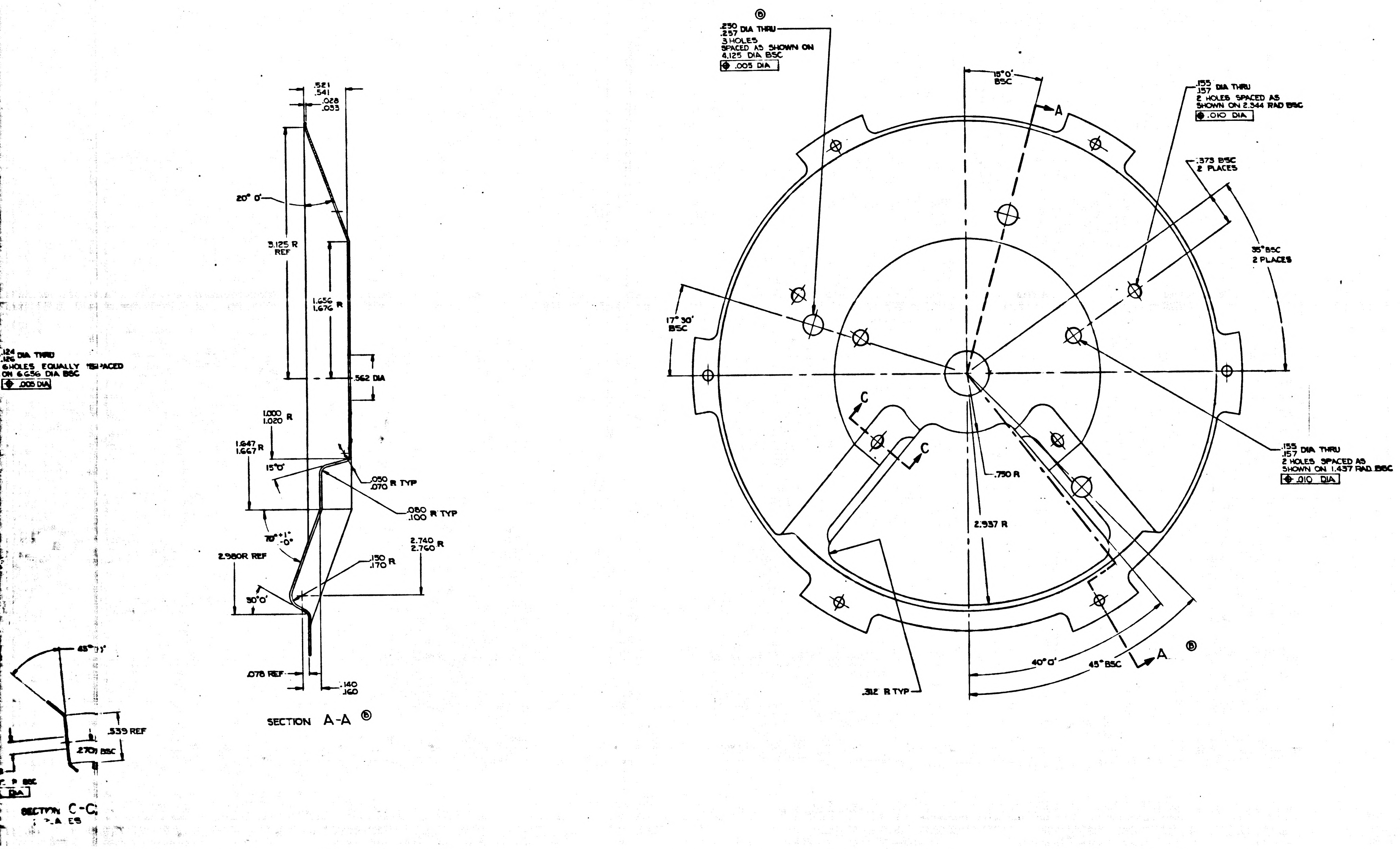

1.000
1.020 R
.050
.070 R TYP
1.647
1.667 R
15° 0'
.080
.100 R TYP
70° +1° −0°
2.740
2.760 R
2.980 R REF
.150
.170 R
30° 0'
.078 REF
.140
.160

SECTION B-B
2 PLACES

1000153	REV A	SHEET 1

1786

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS TDRR 00157		
A	GENERAL REVISIONS	12-10-62	
B	TDRR 00486	3-5-63	



Ⓑ
.250 .257 DIA THRU
3 HOLES
SPACED AS SHOWN ON
4.125 DIA BSC
⌖ .005 DIA
15° 0' BSC
A
.155 .157 DIA THRU
2 HOLES SPACED AS
SHOWN ON 2.344 RAD BSC
⌖ .010 DIA
.373 BSC
2 PLACES
35° BSC
2 PLACES
17° 30' BSC
C
C
.750 R
.155 .157 DIA THRU
2 HOLES SPACED AS
SHOWN ON 1.437 RAD BSC
⌖ .010 DIA
2.937 R
40° 0'
45° BSC
A
Ⓑ
.312 R TYP
.521 .541
.028 .033
20° 0'
3.125 R REF
1.656 1.676 R
.562 DIA
1.000 1.020 R
1.647 1.667 R
15° 0'
.050 .070 R TYP
.080 .100 R TYP
70° +1° -0°
2.740 2.760 R
2.980R REF
.150 .170 R
30° 0'
.078 REF
.140 .160
SECTION A-A Ⓑ
.124 .126 DIA THRU
6 HOLES EQUALLY SPACED
ON 6.656 DIA BSC
⌖ .005 DIA
45° 0'
.539 REF
.2701 BSC
DIA
SECTION C-C

MASTER

	QTY REQD	NOMENCLATURE OR DESCRIPTION | PART OR IDENTIFYING NO | SPECIFICATION | MATERIAL OR NOTES | FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000606	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0° 30'
DO NOT SCALE THIS DRAWING
MATERIAL
AL ALY SH 3003-0
ALT SPEC QQ-A-359D

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN R.G.S. 10-10-62
APPROVED FOR MSC 12-12-62
BY DIRECTION M.I.T. APPROVAL 12/12/62

GUIDE, WIRE
BEARING HOUSING
IX OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000153
SHEET 1 OF 1

1000153 B

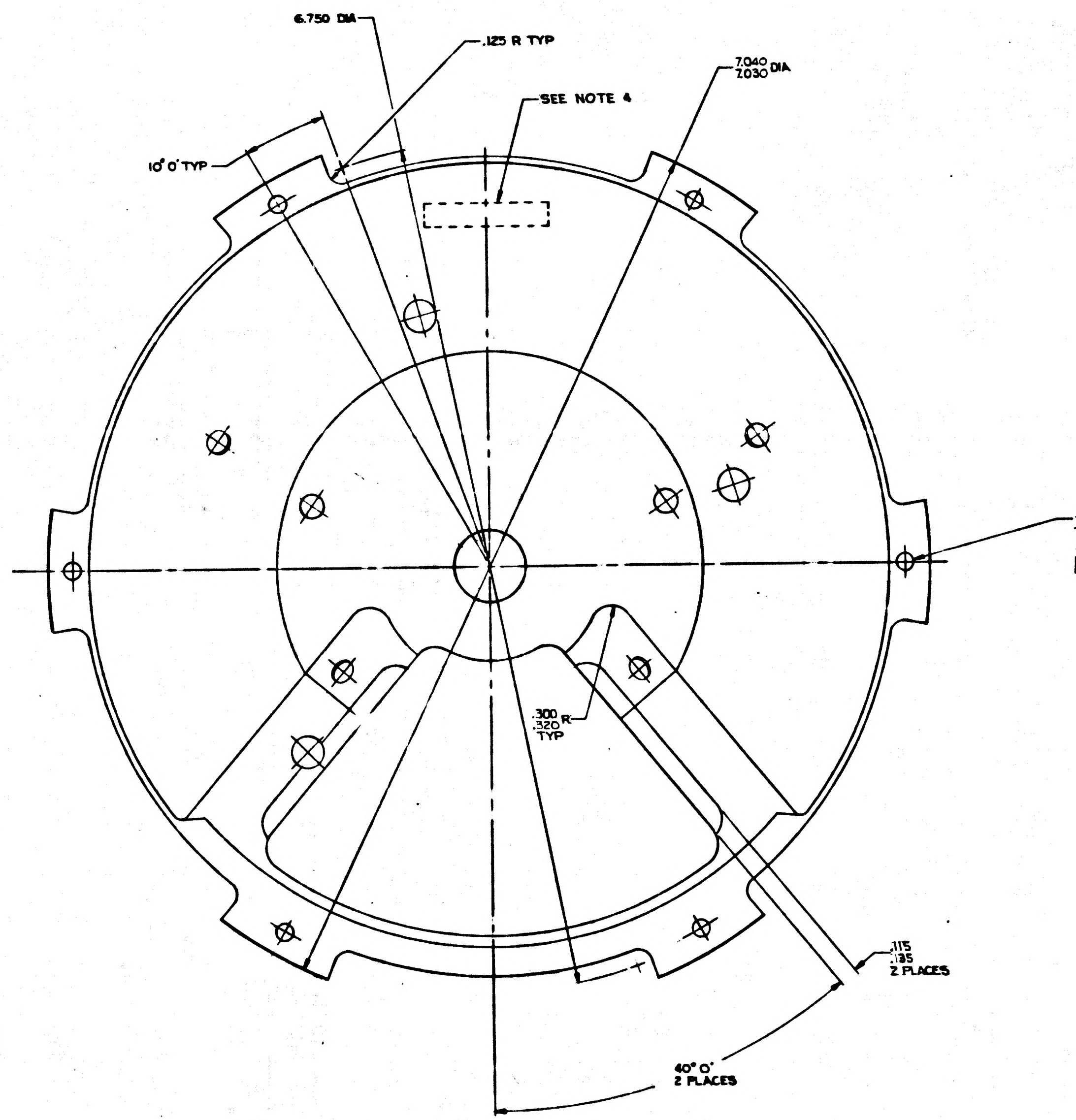
D

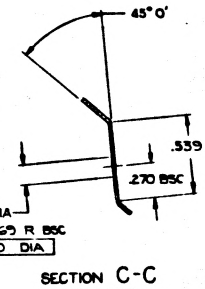
C

B

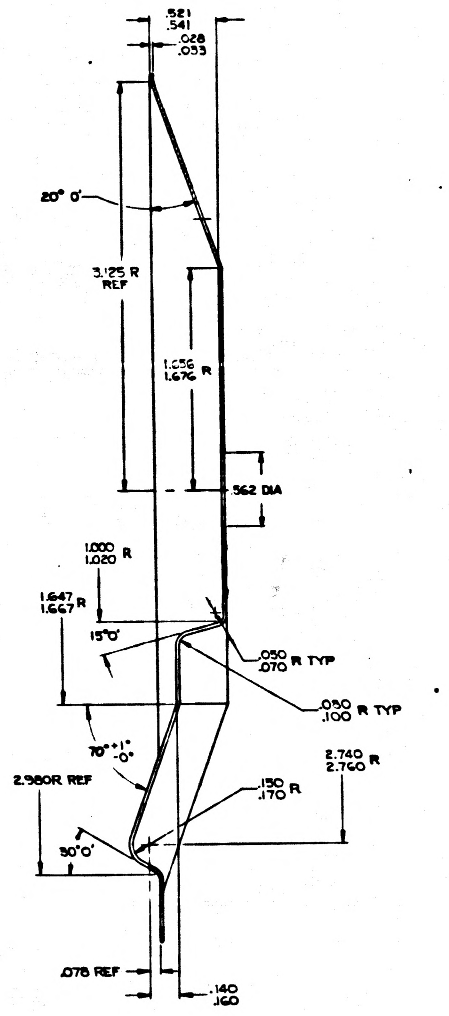
A

1000153

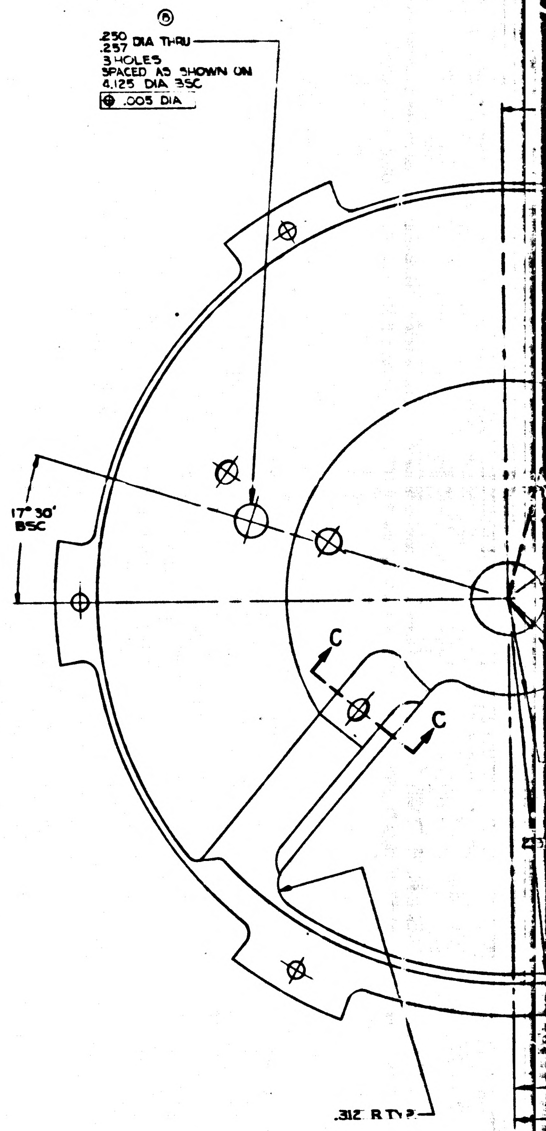

6.750 DIA
.125 R TYP
7.040
7.030 DIA
SEE NOTE 4
10° 0' TYP
.124
.126 DIA THRU
6 HOLES EQUALLY SPACED
ON 6.656 DIA BSC
⊕ .005 DIA
.300
.320 R
TYP
.115
.135
2 PLACES
40° 0'
2 PLACES


45° 0'
.539 REF
.270 BSC
.155
.157 DIA
ON 1.469 R BSC
⊕ .010 DIA

SECTION C-C
2 PLACES


.521
.541
.028
.033
20° 0'
3.125 R
REF
1.656
1.676 R
.562 DIA
1.000
1.020 R
1.647
1.667 R
15°0'
.050
.070 R TYP
.080
.100 R TYP
70° +1° -0°
2.980R REF
.150
.170 R
2.740
2.760 R
30°0'
.078 REF
.140
.160

SECTION A-A Ⓑ


Ⓑ
.250
.257 DIA THRU
3 HOLES
SPACED AS SHOWN ON
4.125 DIA BSC
⊕ .005 DIA
17° 30'
BSC
C
C
.312 R TYP

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES .005/.015
3. 250√ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DEMENSIONS APPLY BEFORE TEFLON COAT

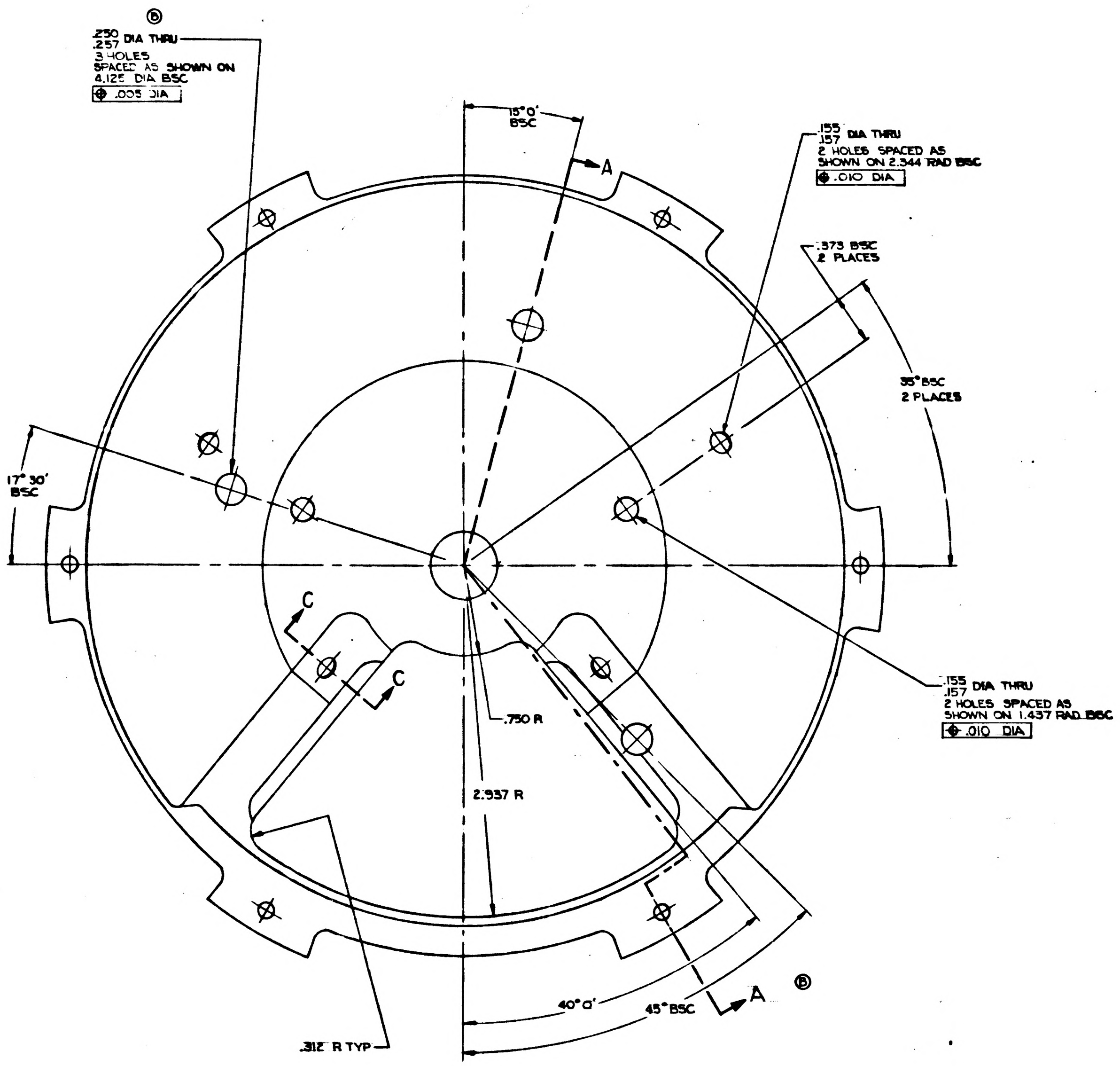
	REV	SHEET
1000153	B	1

3 2 1

REVISIONS TDRR 00157				
SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ A	GENERAL REVISIONS	12-10-62		WR
Ⓜ B	TDRR 00486	3-5-63		
C	TDRR 00774	4-9-63		

D

C



Ⓑ
.250 .257 DIA THRU
3 HOLES
SPACED AS SHOWN ON
4.125 DIA BSC
⌖ .005 DIA
15°0' BSC
A
.155 .157 DIA THRU
2 HOLES SPACED AS
SHOWN ON 2.344 RAD BSC
⌖ .010 DIA
.373 BSC
2 PLACES
35° BSC
2 PLACES
17°30' BSC
.155 .157 DIA THRU
2 HOLES SPACED AS
SHOWN ON 1.437 RAD BSC
⌖ .010 DIA
C
C
.750 R
2.937 R
.312 R TYP
40°0'
45° BSC
A
Ⓑ

B

C

1000153

A

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	2L1000201
1000006	2L1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
AL ALY SH 3003-0
ALT SPEC QQ-A-359D

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED DATE
CHECKED
DRAWN R.G.S.
APPROVED FOR MSC
BY DIVISION M.I.T. APPROVAL
12/12/62

GUIDE, WIRE
BEARING HOUSING
IX OUTER AXIS

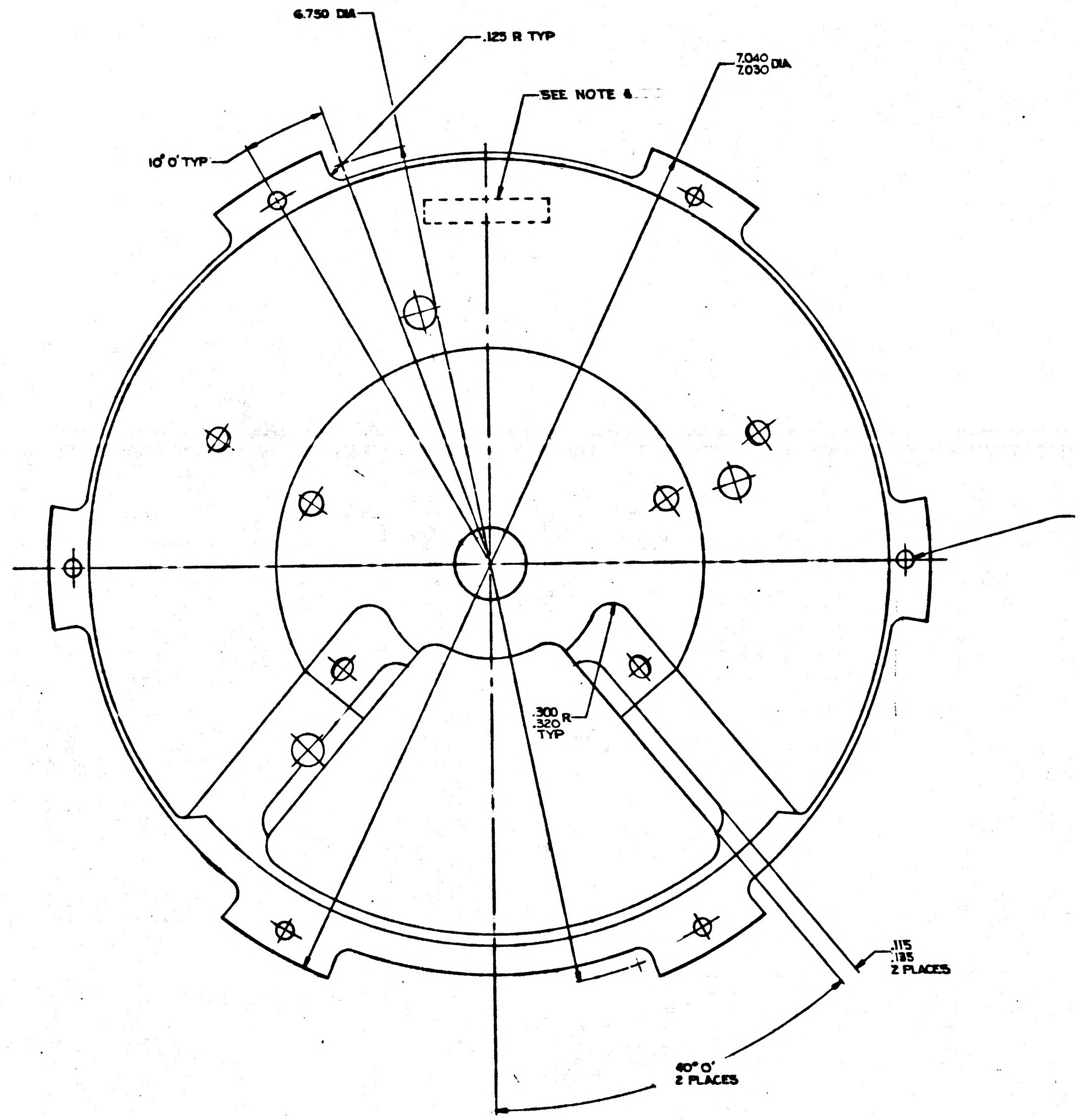
SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000153
SHEET 1 OF 1

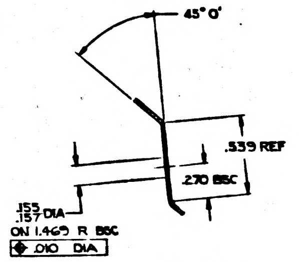
MASTER

3 2 1

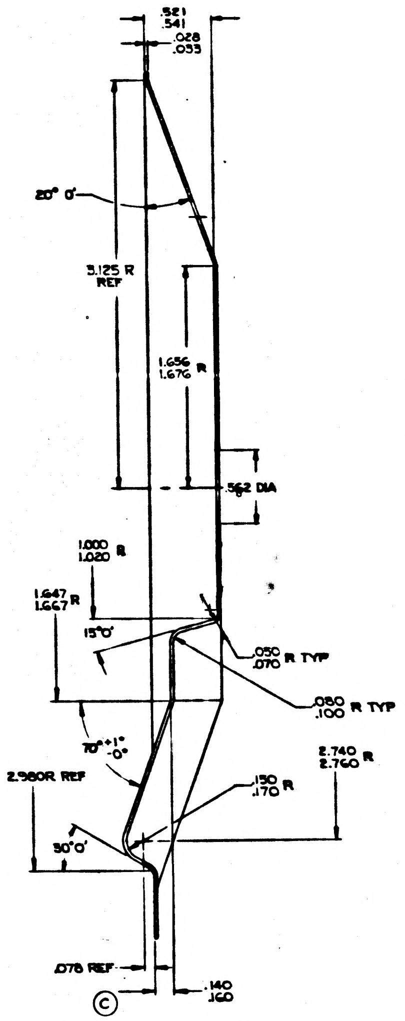
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY


6.750 DIA
.125 R TYP
7.040
7.030 DIA
SEE NOTE 4
10° 0' TYP
.300
.320 R
TYP
.115
.135
2 PLACES
40° 0'
2 PLACES

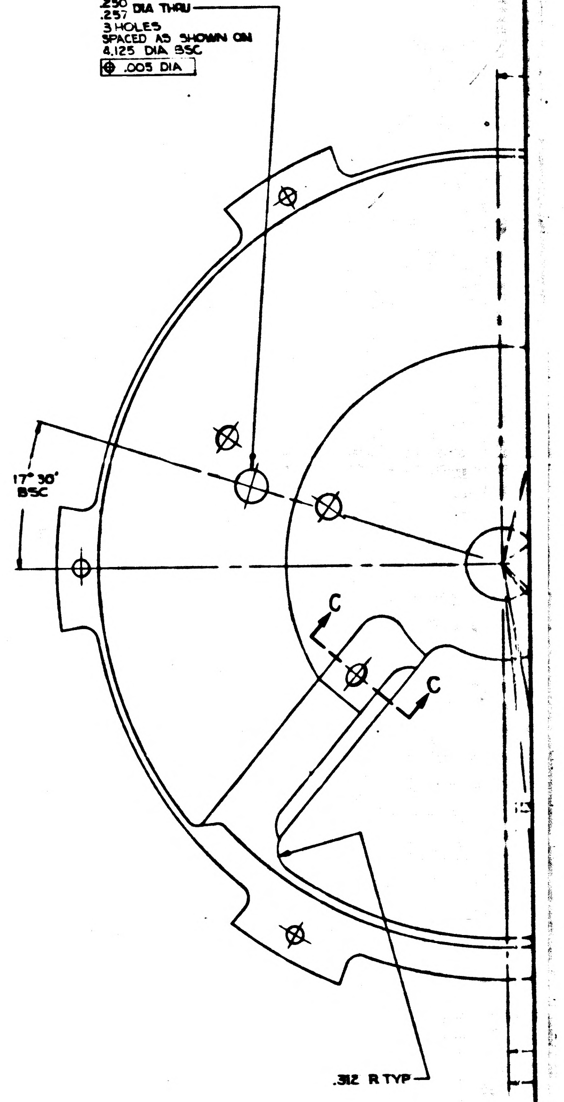
.124
.126 DIA THRU
6 HOLES EQUALLY SPACED
ON 6.656 DIA BSC
⌖ .005 DIA


45° 0'
.539 REF
.270 BSC
.155
.157 DIA
ON 1.469 R BSC
⌖ .010 DIA

SECTION C-C
2 PLACES


.521
.541
.028
.033
20° 0'
3.125 R
REF
1.656
1.676 R
.562 DIA
1.000
1.020 R
1.647
1.667 R
15°0'
.050
.070 R TYP
.080
.100 R TYP
70° +1° -0°
2.740
2.760 R
2.980R REF
.150
.170 R
30°0'
.078 REF
.140
.160
Ⓒ

SECTION A-A Ⓑ

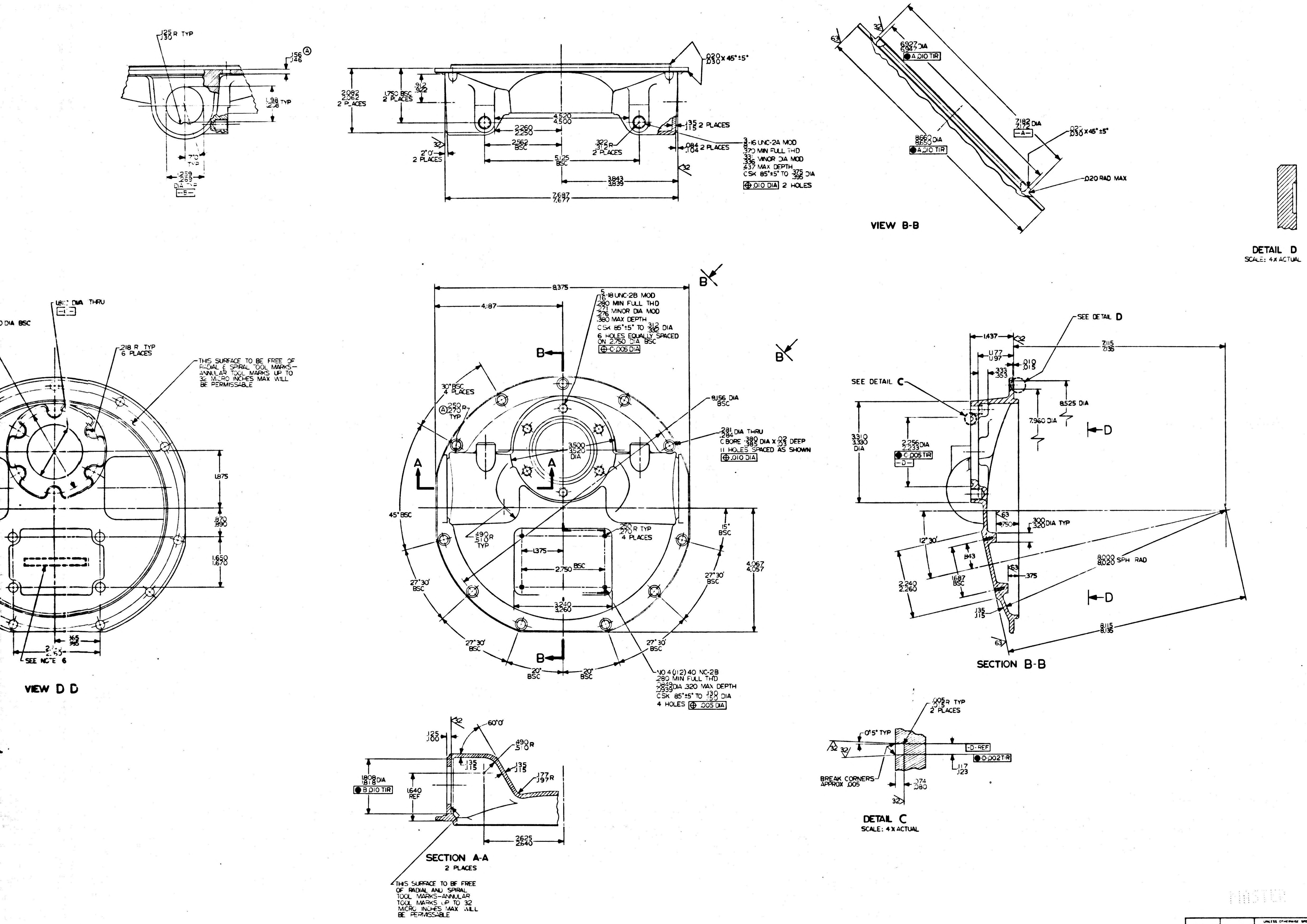

Ⓑ
.250
.257 DIA THRU
3 HOLES
SPACED AS SHOWN ON
4.125 DIA BSC
⌖ .005 DIA
17° 30'
BSC
C
C
.312 R TYP

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS AND BREAK SHARP EDGES $\frac{.005}{.015}$
3. 250/ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION AFTER TEFLON COAT PER MIL-STD-130
5. TEFLON (FEP) COAT .003/.004 UNIFORM THICKNESS ALL OVER
6. ALL DIMENSIONS APPLY BEFORE TEFLON COAT

1000153	REV C	SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	REVISIONS DESCRIPTION	DATE	APPROVAL	
	A3	TDR 00275	1/23/63		WK



5
4
3
2
1
F
E
D
C
B
A
.125 .130 R TYP
.156 .146
1.98 2.18 TYP
.259 .263 DIA
-E-
.020 .030 X 45° ±5°
2.082 2.062 2 PLACES
1.750 BSC 2 PLACES
.912 .922
4.520 4.500
2.260 2.250
2.562 BSC
5.125 BSC
.322 .312 R 2 PLACES
2°0' 2 PLACES
.135 .115 2 PLACES
.084 .104 2 PLACES
3/8-16 UNC-2A MOD
.370 MIN FULL THD
.331 .336 MINOR DIA MOD
.437 MAX DEPTH
CSK 85°±5° TO .375 .395 DIA
⊕ .010 DIA 2 HOLES
3.843 3.839
7.687 7.677
32
6.927 6.947 DIA
● A .010 TIR
7.182 7.172 DIA
-A-
.020 .030 X 45° ±5°
8.660 8.650 DIA
● A .010 TIR
.020 RAD MAX
63
VIEW B-B
DETAIL D
SCALE: 4X ACTUAL
.1810 DIA THRU
-C-
DIA BSC
.218 R TYP 6 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
1.875
.870 .890
1.650 1.670
.365 .395
2.655
SEE NOTE 6
VIEW D D
8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85°±5° TO .312 .332 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕ -C- .005 DIA
B
B
30° BSC 4 PLACES
(A) .250 .270 R TYP
8.156 DIA BSC
.281 .284 DIA THRU
C BORE .380 .385 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕ .010 DIA
3.500 3.520 DIA
A
A
45° BSC
.490 .510 R TYP
.250 .270 R TYP 4 PLACES
15° BSC
1.375
2.750 BSC
3.240 3.260
4.067 4.057
27°30' BSC
27°30' BSC
27°30' BSC
27°30' BSC
20° BSC
20° BSC
B
NO 4 (.112) 40 NC-2B
.280 MIN FULL THD
.0849 .0939 DIA .320 MAX DEPTH
CSK 85°±5° TO .130 .150 DIA
4 HOLES ⊕ .005 DIA
SEE DETAIL D
SEE DETAIL C
1.437
32
1.177 1.197
.010 .015
.333 .353
7.115 7.135
8.525 DIA
7.960 DIA
D
3.310 3.330 DIA
2.256 2.233 DIA
● C .005 TIR
-D-
63
.750
.300 .320 DIA TYP
12°30'
.843
1.687 BSC
2.240 2.260
63
.375
8.000 8.020 SPH RAD
D
.135 .115
8.115 8.135
63
SECTION B-B
.125 .100
32
60°0'
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
● B .010 TIR
1.640 REF
2.625 2.640
SECTION A-A
2 PLACES
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
.005 .015 R TYP 2 PLACES
0°5' TYP
32
-D- REF
● D .002 TIR
BREAK CORNERS APPROX .005
.117 .123
.074 .080
32
DETAIL C
SCALE: 4X ACTUAL

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL1000201	
1000142	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 1

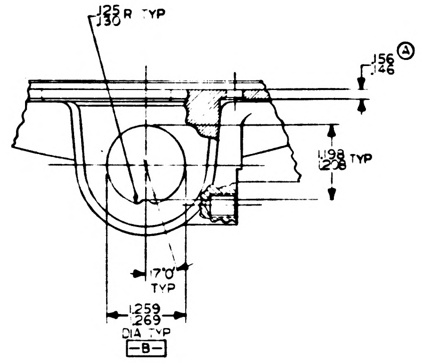
M I T INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED DATE 12/
CHECKED
DRAWN MORSE 12/
APPROVED FOR MSC 12/20/62
APPROVAL 31 DEC 62
W Hopfer

MOUNT, CONNECTOR
15X & 16X OUTER AXIS

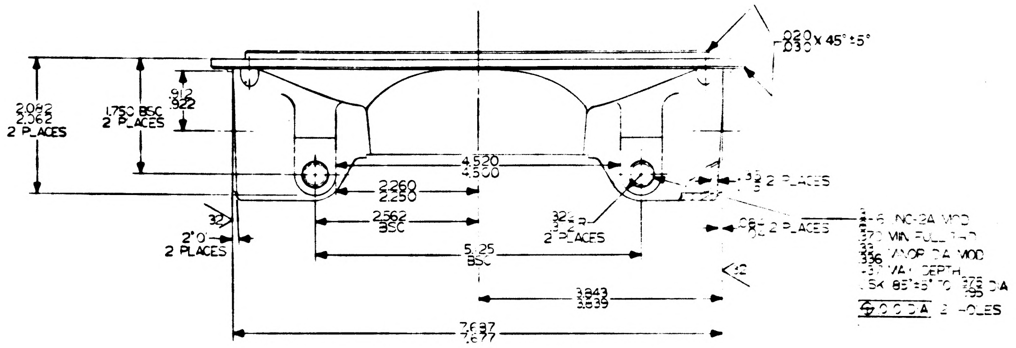
SCALE 1/1
UNIT WT
CODE IDENT

M I T INSTRUMENTATION LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000154
SHEET 1 OF 1 SHEET

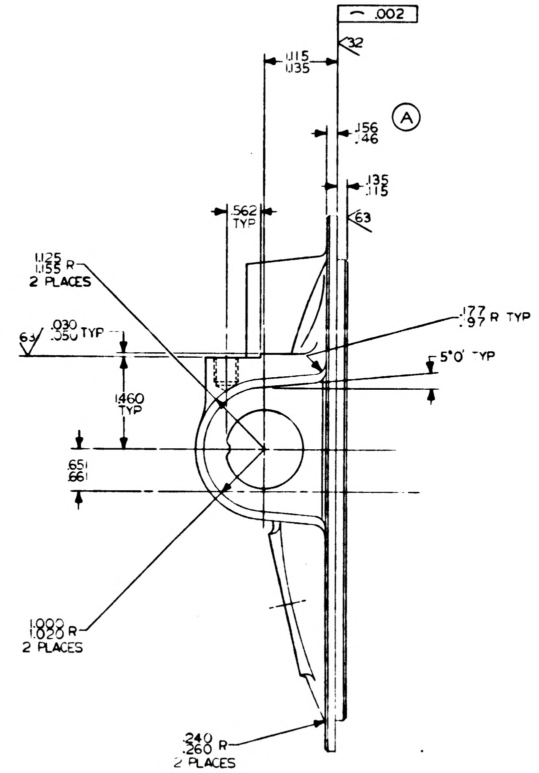
1000154 REV SH 1



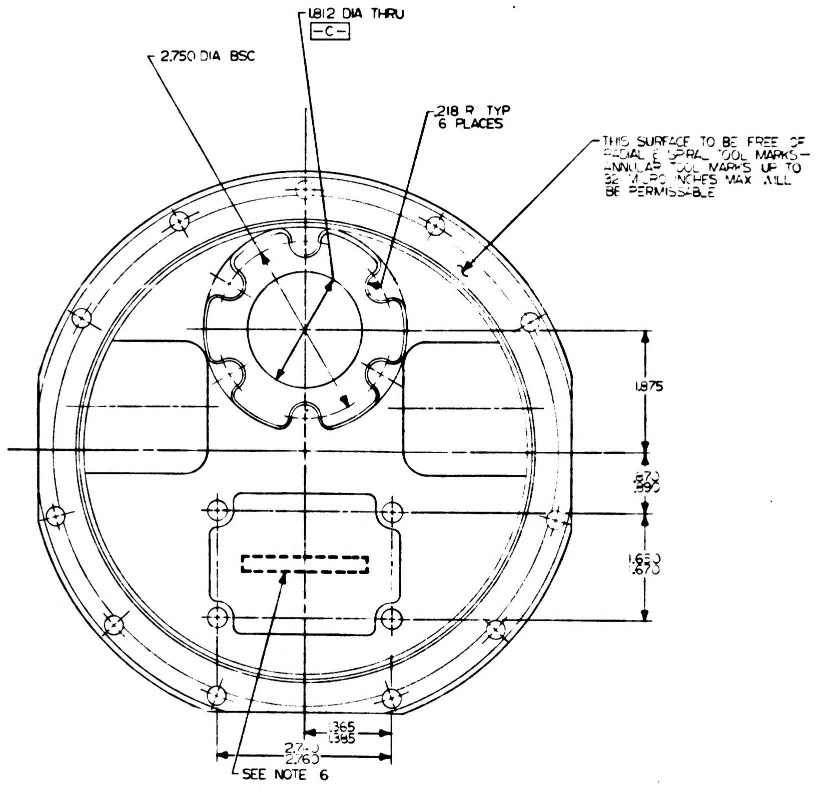
.125 R TYP
.130
.156 Ⓐ
.146
1.198 TYP
1.208
17°0'
TYP
1.259
1.269
DIA TYP
-B-



.222 X 45° ±5°
.232
2.072
2.062
2 PLACES
1.750 BSC
2 PLACES
.912
.922
4.520
4.500
2.260
2.250
2.262
BSC
2°0'
2 PLACES
5.25
BSC
2 PLACES
3.843
3.839
7.687
7.677
2 HOLES

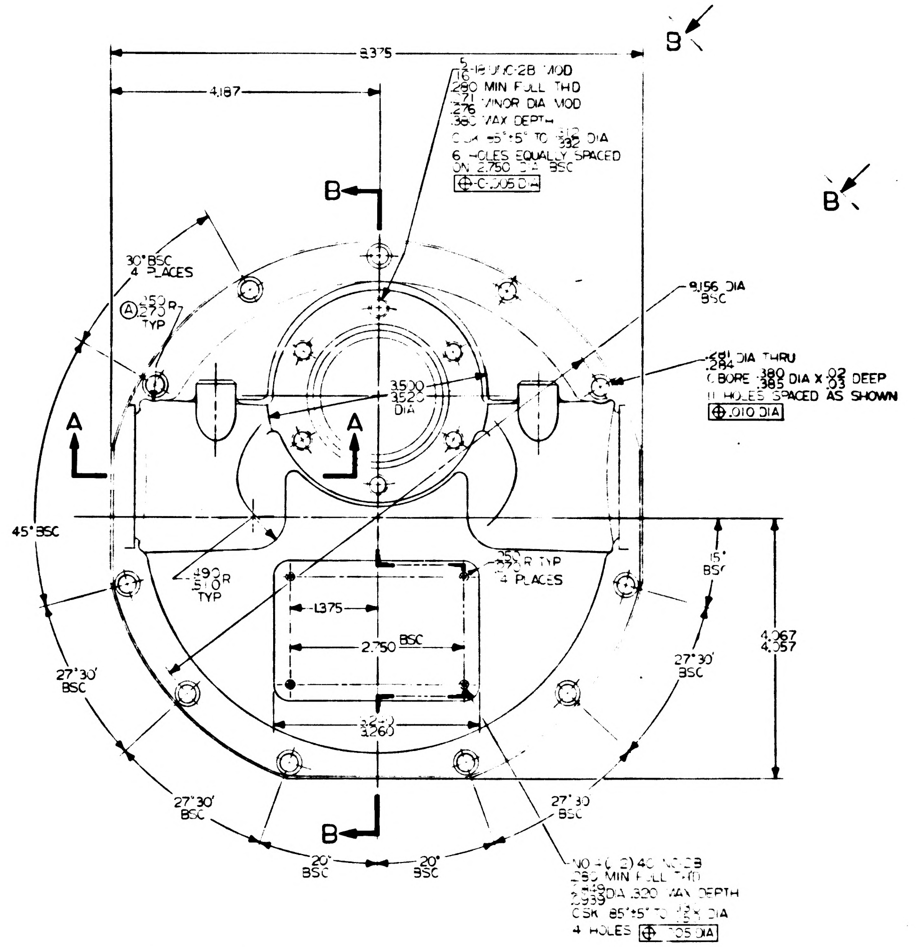


.002
32
1.115
1.135
.156
.146
Ⓐ
.135
.115
.562
TYP
63
1.125
1.155 R
2 PLACES
.177
.197 R TYP
5°0' TYP
.030
.050 TYP
1.460
TYP
.651
.661
1.000
1.020 R
2 PLACES
.240
.260 R
2 PLACES

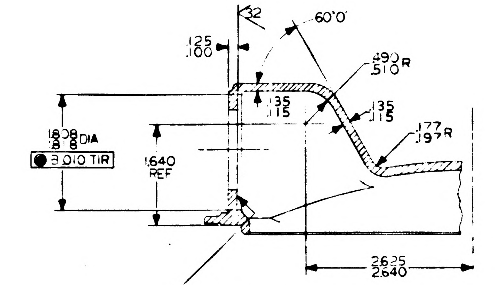


1.812 DIA THRU
-C-
2.750 DIA BSC
.218 R TYP
6 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
1.875
.875
.895
1.650
1.670
.365
.395
2.740
2.760
SEE NOTE 6

VIEW D-D



B
8.375
4.187
B
B
30° BSC
4 PLACES
Ⓐ
R
TYP
8.156 DIA
BSC
.281 DIA THRU
C'BORE .380 DIA X .02 DEEP
.385
6 HOLES SPACED AS SHOWN
.010 DIA
3.520
DIA
A
A
45° BSC
15°
BSC
.490
.510 R
TYP
R TYP
4 PLACES
1.375
2.750 BSC
27°30'
BSC
4.267
4.257
27°30'
BSC
27°30'
BSC
27°30'
BSC
20°
BSC
20°
BSC
4 HOLES
B



32
60°0'
.125
.100
.490
.510 R
.135
.115
.135
.115
.177
.197 R
1.808
1.818 DIA
.010 TIR
1.640
REF
2.625
2.640

SECTION A-A

2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

NOTES

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601 CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLET & ROUNDS TO BE .115/.135 UNLESS OTHERWISE SPECIFIED
4. 125/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES .005/.015
6. IDENTIFY USING DRAWING NO. REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. SEQUENCE OF OPERATION (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   - C. FINISH MACHINE
   - D. ANODIC COAT PER MIL-A-8625 TYPE I
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA
9. RADIOGRAPHIC REFERENCES PER NAVAER 00-15 PC-504
10. STABILIZE HEAT TREAT AT 200°F ±5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. CAST WALL THICKNESS .115/.135 UNLESS OTHERWISE SPECIFIED

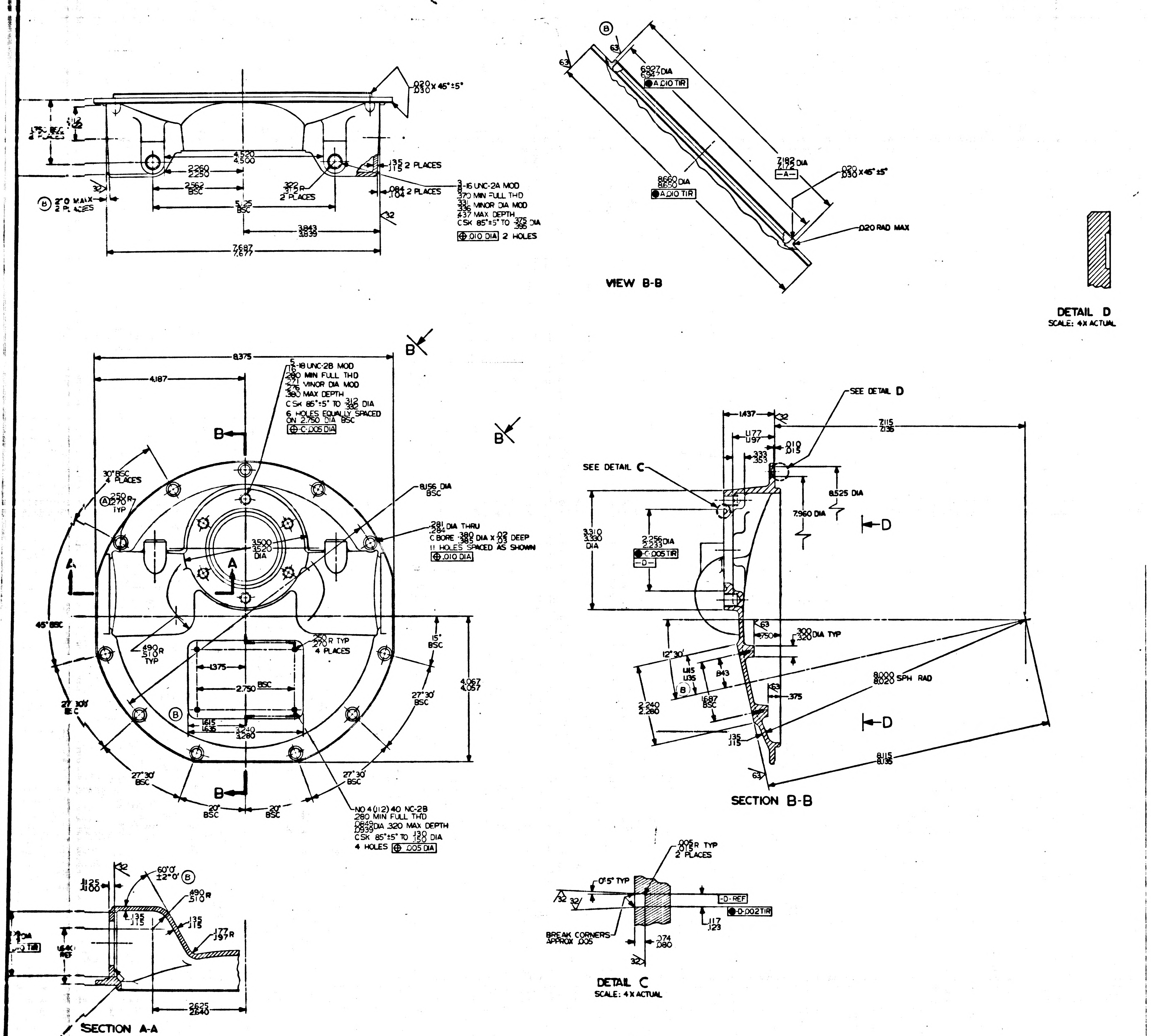
32/

BREAK CO
APPROX .01

1000154	REV	SHT 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDR 00195				
	A_3	TDR 00275	1/23/63		WK
	B	TDR 00773	4-9-63		

Ⓜ


.020 .030 X 45° ±5°
.112 .122
.750 REF 2 PLACES
4.520 4.500
2.260 2.250
2.562 BSC
.322 .312 R 2 PLACES
5.125 BSC
.135 .115 2 PLACES
.084 .104 2 PLACES
3/8-16 UNC-2A MOD
.370 MIN FULL THD
.331 .336 MINOR DIA MOD
.437 MAX DEPTH
CSK 85°±5° TO .375 .395 DIA
⊕ .010 DIA 2 HOLES
3.843 3.839
7.687 7.677
B 2°0 MAX 2 PLACES
32
63
B
6.927 6.947 DIA
● A .010 TIR
8.660 8.650 DIA
● A .010 TIR
7.182 7.172 DIA
-A-
.020 .030 X 45° ±5°
.020 RAD MAX
VIEW B-B
DETAIL D
SCALE: 4X ACTUAL
8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85°±5° TO .312 .332 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕-C-.005 DIA
B
B
30° BSC 4 PLACES
A .250 .270 R TYP
8.156 DIA BSC
.281 .284 DIA THRU
C BORE .380 .385 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕ .010 DIA
3.500 3.520 DIA
A
A
45° BSC
.490 .510 R TYP
.250 .270 R TYP 4 PLACES
15° BSC
1.375
2.750 BSC
4.067 4.057
27°30' BSC
27°30' BSC
B
1.615 1.635
3.240 3.280
27°30' BSC
27°30' BSC
20° BSC
20° BSC
B
NO 4 (.112) 40 NC-2B
.280 MIN FULL THD
.0849 .0939 DIA .320 MAX DEPTH
CSK 85°±5° TO .130 .150 DIA
4 HOLES ⊕ .005 DIA
SEE DETAIL D
SEE DETAIL C
1.437
1.177 1.197
.333 .353
.010 .015
7.115 7.135
8.525 DIA
7.960 DIA
D
3.310 3.330 DIA
2.256 2.233 DIA
● C .005 TIR
-D-
.750
.300 .320 DIA TYP
12°30'
1.115 1.135
.843
B
1.687 BSC
2.240 2.280
.375
8.000 8.020 SPH RAD
D
.135 .115
8.115 8.135
SECTION B-B
.125 .100
60°0' ±2°0' B
.490 .510 R
.135 .115
.177 .197 R
1.640 REF
2.625 2.640
SECTION A-A
2 PLACES
.005 .015 R TYP 2 PLACES
0°5' TYP
-D- REF
● -D- .002 TIR
BREAK CORNERS APPROX .005
.117 .123
.074 .080
DETAIL C
SCALE: 4X ACTUAL

THIS SURFACE TO BE FREE
OF RADIAL AND SPIRAL
TOOL MARKS—ANNULAR
TOOL MARKS UP TO 32
MICRO INCHES MAX WILL
BE PERMISSABLE

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL1000201
1000142	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 1

M I T INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN MORSE
APPROVED FOR MSC 12/20/62
MIT APPROVAL DATE

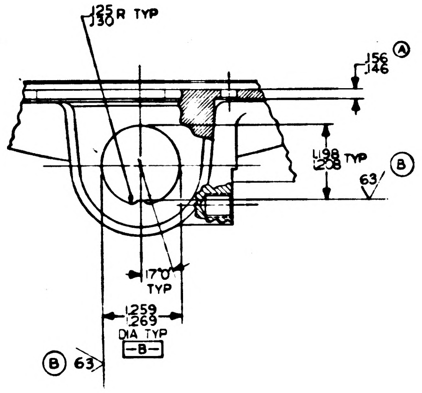
MOUNT, CONNECTOR
15X & 16X OUTER AXIS

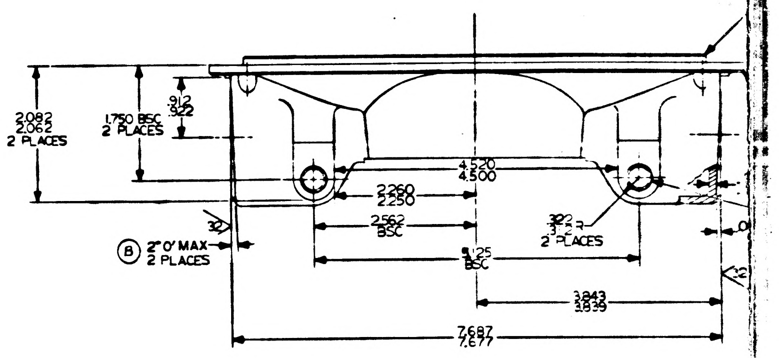
SCALE 1/1
UNIT WT.
CODE IDENT

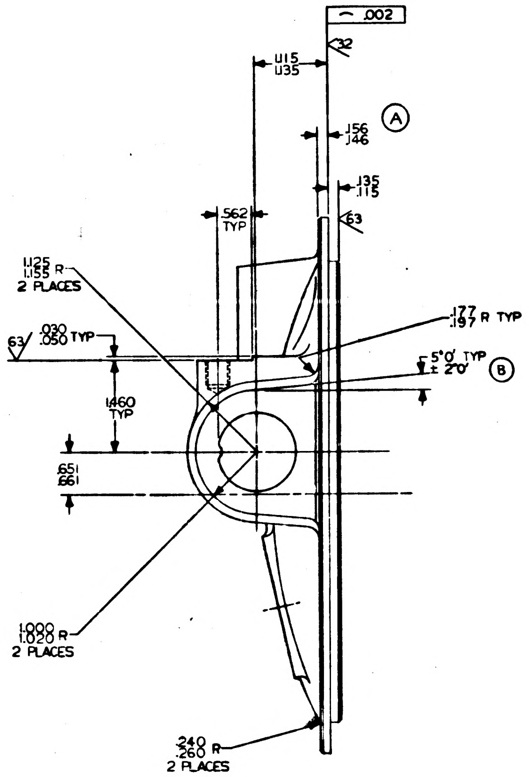
MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000154
SHEET 1 OF 1 SHEET

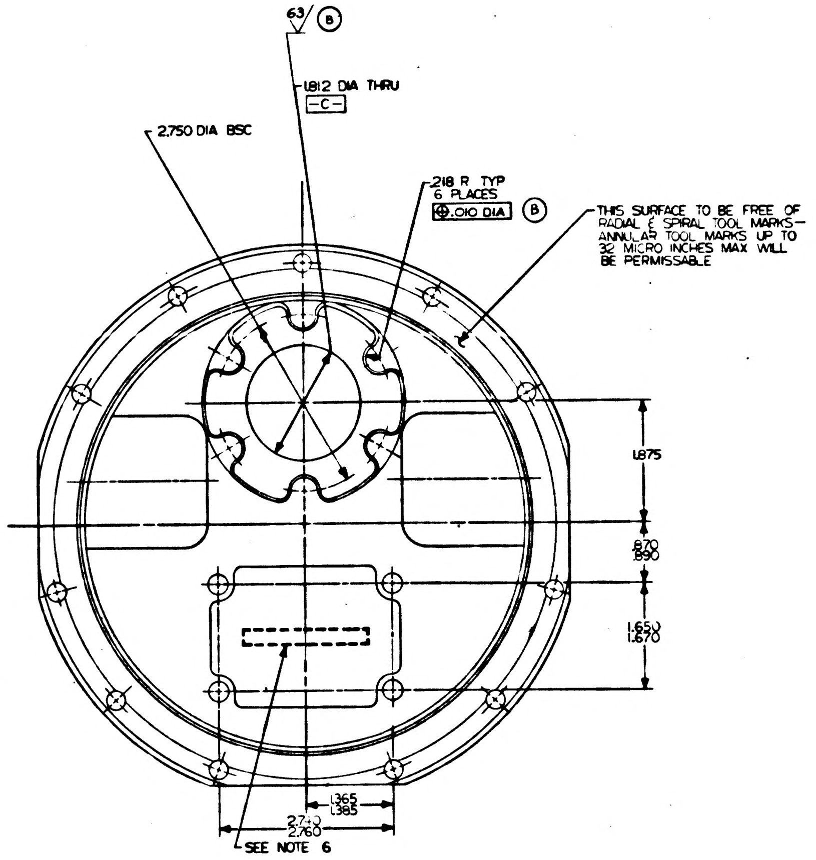
1000154 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

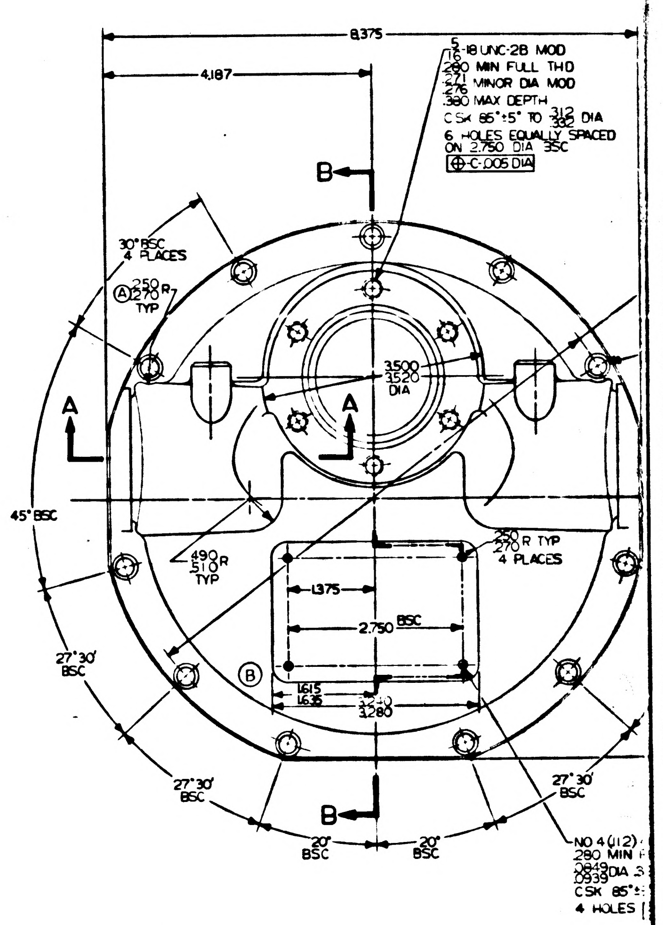

.125 .130 R TYP
.156 .146 Ⓐ
1.198 1.208 TYP Ⓑ
63
17°0' TYP
1.259 1.269 DIA TYP
-B-
Ⓑ 63


2.082 2.062 2 PLACES
1.750 BSC 2 PLACES
.912 .922
4.520 4.500
2.260 2.250
2.562 BSC
5.125 BSC
.322 .342 R 2 PLACES
32
Ⓑ 2°0' MAX 2 PLACES
3.843 3.839
7.687 7.677


.002
32
1.115 1.135
Ⓐ
.156 .146
.135 .115
63
.562 TYP
1.125 1.155 R 2 PLACES
.177 .197 R TYP
63 .030 .050 TYP
5°0' TYP ± 2°0' Ⓑ
1.460 TYP
.651 .661
1.000 1.020 R 2 PLACES
.240 .260 R 2 PLACES

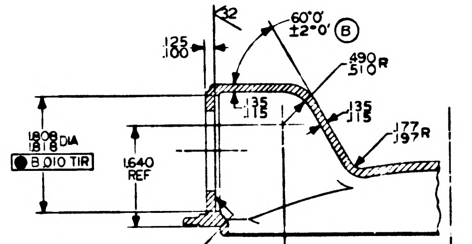

63 Ⓑ
1.812 DIA THRU
-C-
2.750 DIA BSC
.218 R TYP 6 PLACES
⊕ .010 DIA Ⓑ
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS— ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
1.875
.870 .890
1.650 1.670
1.365 1.385
2.740 2.760
SEE NOTE 6

VIEW D-D


8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85° ±5° TO .312 .332 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕ C .005 DIA
B
30° BSC 4 PLACES
Ⓐ .250 .270 R TYP
3.500 3.520 DIA
A
A
45° BSC
.490 .510 R TYP
.250 .270 R TYP 4 PLACES
1.375
2.750 BSC
Ⓑ
1.615 1.635
3.240 3.280
27°30' BSC
27°30' BSC
27°30' BSC
B
20° BSC
20° BSC
NO 4 (.112)
.280 MIN
.0849 .0939 DIA
CSK 85° ±
4 HOLES

NOTES

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
ALT: SPEC QQ-A-601 CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
4. $\overset{250}{\checkmark}$ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
6. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON MANDATORY)
    - A. ROUGH MACHINE
    - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
    - C. FINISH MACHINE
    - D. ANODIC COAT PER MIL-A-8625 TYPE I
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA
9. RADIOGRAPH REFERENCES PER NAVAER 00-15 PC-504
10. STABILIZE HEAT TREAT AT 200°F ±5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. CAST WALL THICKNESS $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED


32
60°0' ±2°0' Ⓑ
.125 .100
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
● B .010 TIR
1.640 REF
2.625 2.640

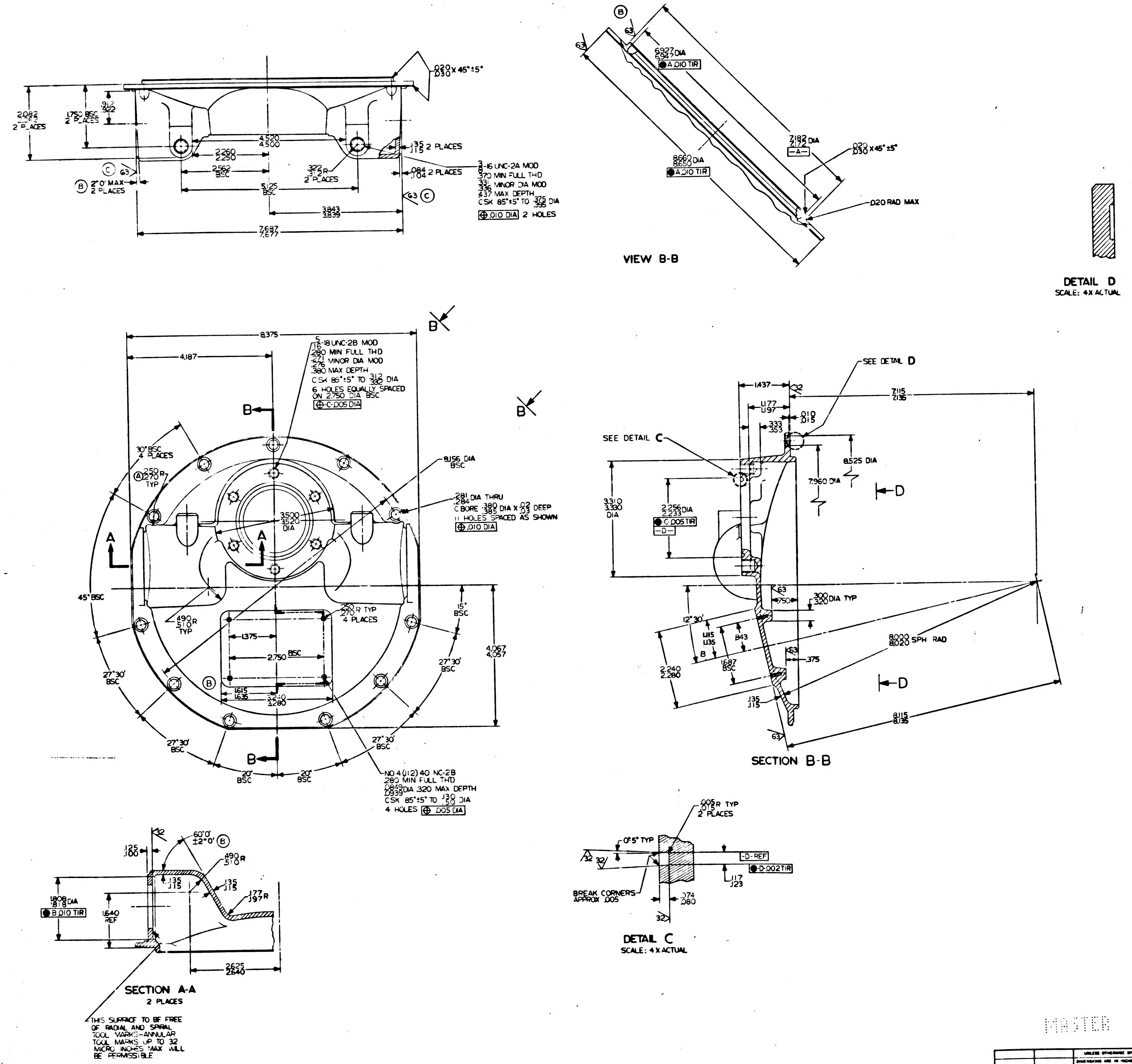
SECTION A-A

2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDR 00195			
	A_3	TDR 00275	1/23/63	ajb	WK
	B	TDR 00773	4-9-63	ajb	WK
	C	TDRR 01052	4-30-63	ajb	WK



.020 .030 X 45° ±5°
2.082 2.062 2 PLACES
1.750 BSC 2 PLACES
.912 .922
4.520 4.500
2.260 2.250
.135 .115 2 PLACES
2.562 BSC
.322 .312 R 2 PLACES
.084 .104 2 PLACES
Ⓒ 63
Ⓑ 2°0' MAX 2 PLACES
5.125 BSC
63 Ⓒ
3.843 3.839
7.687 7.677
3/8-16 UNC-2A MOD
.370 MIN FULL THD
.331 .336 MINOR DIA MOD
.437 MAX DEPTH
CSK 85°±5° TO .375 .395 DIA
⊕ .010 DIA 2 HOLES
Ⓑ
63
6.927 6.947 DIA
● A .010 TIR
8.660 8.650 DIA
● A .010 TIR
7.182 7.172 DIA
-A-
.020 .030 X 45° ±5°
.020 RAD MAX
VIEW B-B
DETAIL D
SCALE: 4X ACTUAL
B
8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85°±5° TO .312 .332 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕ C .005 DIA
B
B
30° BSC 4 PLACES
Ⓐ .250 .270 R TYP
8.156 DIA BSC
.281 .284 DIA THRU
C BORE .380 .385 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕ .010 DIA
3.500 3.520 DIA
A
A
45° BSC
.490 .510 R TYP
.250 .270 R TYP 4 PLACES
15° BSC
1.375
2.750 BSC
4.067 4.057
27°30' BSC
27°30' BSC
Ⓑ
1.615 1.635
3.240 3.280
27°30' BSC
27°30' BSC
B
20° BSC
20° BSC
NO 4 (.112) 40 NC-2B
.280 MIN FULL THD
.0849 .0939 DIA .320 MAX DEPTH
CSK 85°±5° TO .130 .150 DIA
4 HOLES ⊕ .005 DIA
SEE DETAIL D
1.437
32
7.115 7.135
1.177 1.197
.010 .015
.333 .353
SEE DETAIL C
8.525 DIA
7.960 DIA
D
3.310 3.330 DIA
2.256 2.233 DIA
● C .005 TIR
-D-
63
.300 .320 DIA TYP
.750
12°30'
1.115 1.135
.843
B
1.687 BSC
2.240 2.280
63
.375
8.000 8.020 SPH RAD
D
.135 .115
8.115 8.135
63
SECTION B-B
32
.125 .100
60°0' ±2°0' Ⓑ
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
● B .010 TIR
1.640 REF
2.625 2.640
SECTION A-A
2 PLACES
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
.005 .015 R TYP 2 PLACES
0°-5° TYP
32
32
-D- REF
● -D- .002 TIR
.117 .123
BREAK CORNERS APPROX .005
.074 .080
32
DETAIL C
SCALE: 4 X ACTUAL

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL1000201
1000142	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 1

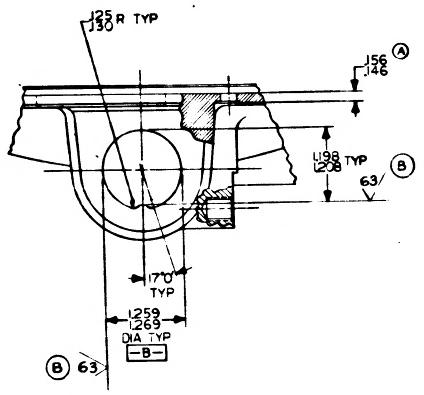
M I T INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED AJ Bryan DATE 12/26/62
CHECKED
DRAWN MORSE 12-21-62
APPROVED FOR MSC 12/28/62
APPROVAL W. Kupfer DATE 3 Dec 62

MOUNT, CONNECTOR
15X1 & 16X OUTER AXIS

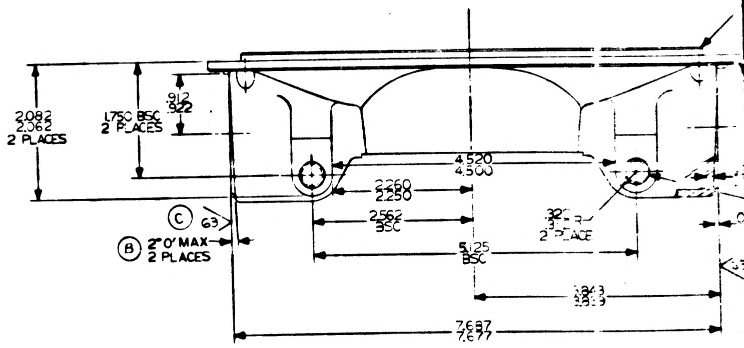
SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000154
SHEET 1 OF 1 SHEET

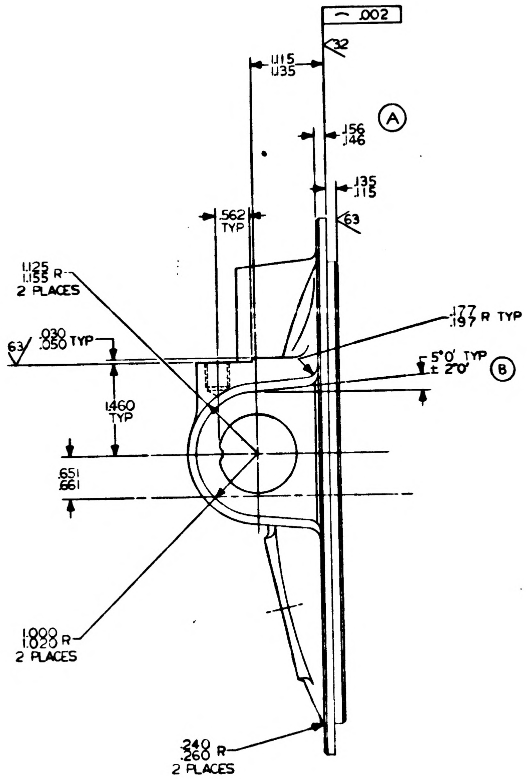
A4210001



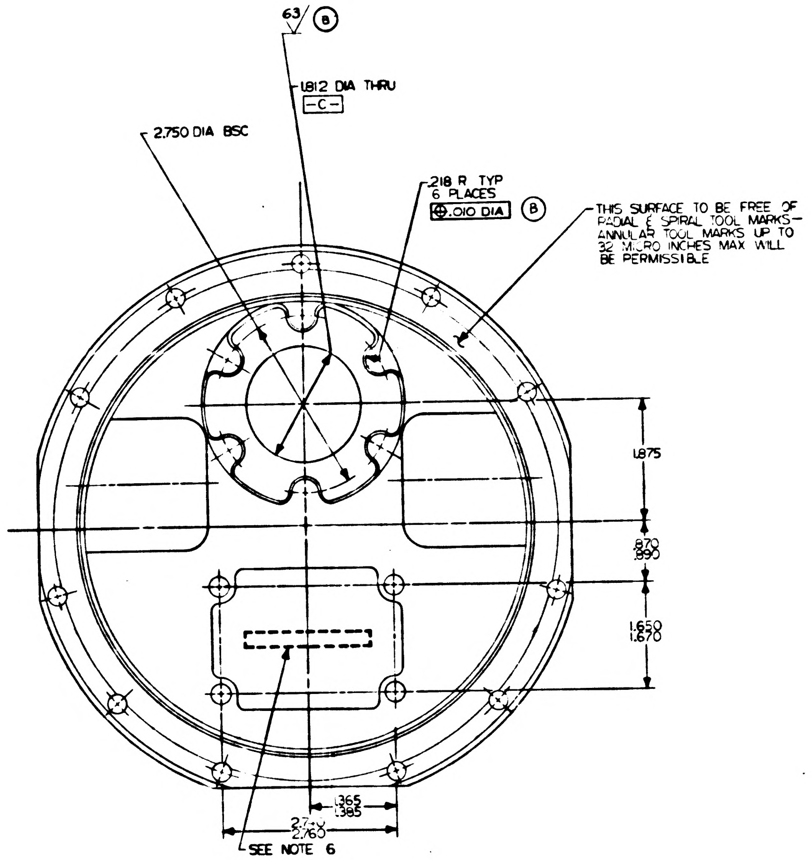
.125 .130 R TYP
.156 .146 Ⓐ
1.198 1.208 TYP Ⓑ
63
17°0' TYP
1.259 1.269 DIA TYP
-B-
Ⓑ 63



2.082 2.062 2 PLACES
1.750 BSC 2 PLACES
.912 .892
4.520 4.500
2.260 2.250
2.562 BSC
Ⓒ 63
Ⓑ 2°0' MAX 2 PLACES
5.125 BSC
7.697 7.677

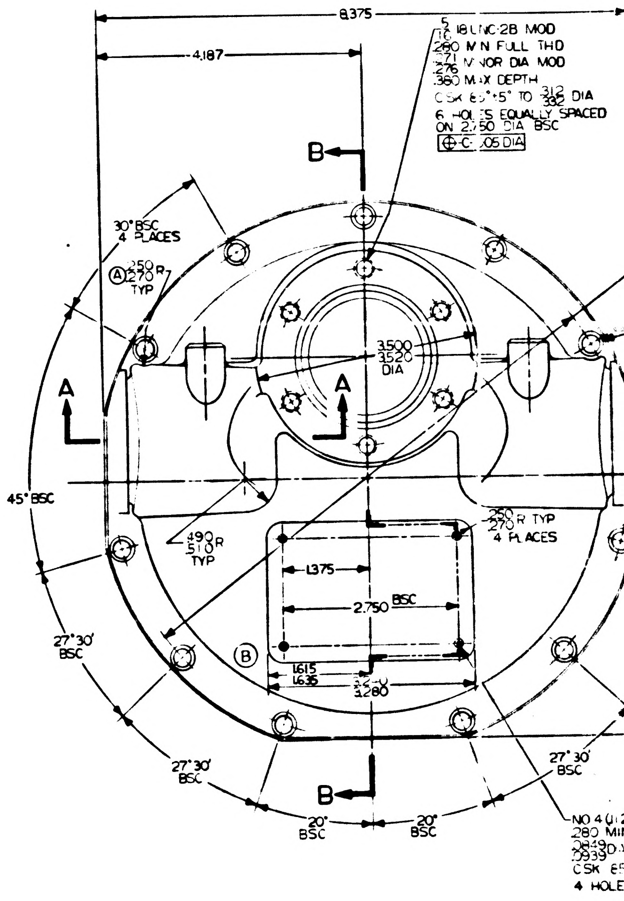


⌒ .002
.115 .135
32
.156 .146 Ⓐ
.135 .115
.562 TYP
63
1.125 1.155 R 2 PLACES
.177 .197 R TYP
63 .030 .050 TYP
5°0' ±2°0' TYP Ⓑ
1.460 TYP
.651 .661
1.000 1.020 R 2 PLACES
.240 .260 R 2 PLACES

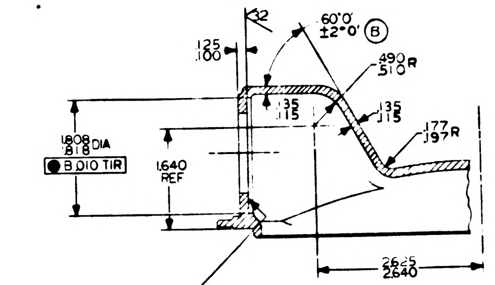


63 Ⓑ
1.812 DIA THRU
-C-
2.750 DIA BSC
.218 R TYP 6 PLACES
⊕ .010 DIA Ⓑ
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS— ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
1.875
.870 .890
1.650 1.670
.365 .385
2.740 2.760
SEE NOTE 6

VIEW D-D



8.375
4.187
5/16 18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85°±5° TO .312 .332 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕ -C- .005 DIA
B
30° BSC 4 PLACES
Ⓐ .250 .270 R TYP
3.500 3.520 DIA
A
A
45° BSC
.490 .510 R TYP
1.375
2.750 BSC
.250 .270 R TYP 4 PLACES
27°30' BSC
Ⓑ
1.615 1.635
2.260
27°30' BSC
B
20° BSC
20° BSC
27°30' BSC



32
60°0' ±2°0' Ⓑ
.125 .100
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
Ⓑ .010 TIR
1.640 REF
2.625 2.240

SECTION A-A

2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

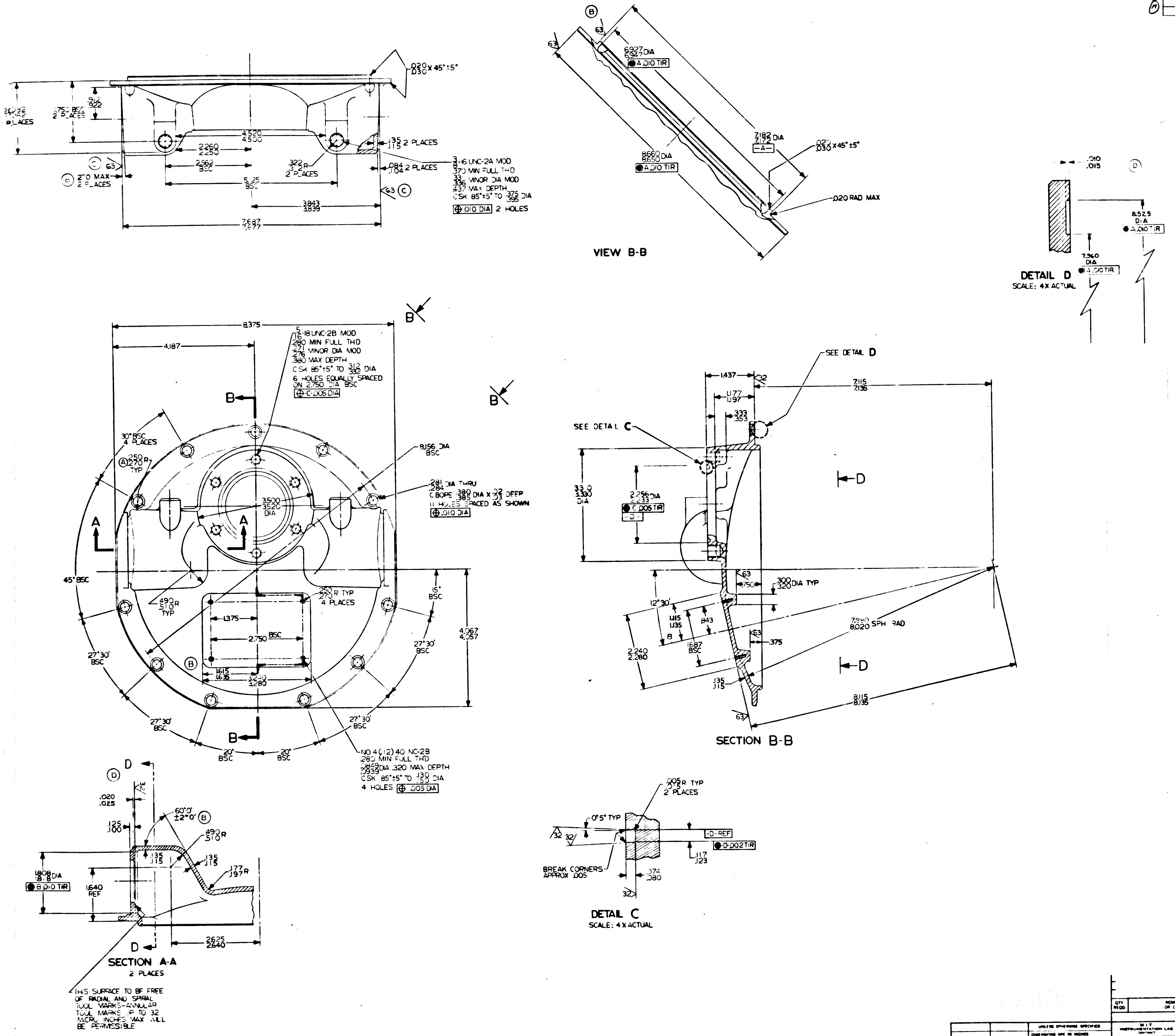
NOTES

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601 CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
4. $\frac{250}{\vee}$ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
6. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   - C. FINISH MACHINE
   - D. ANODIC COAT PER MIL-A-8625 TYPE I
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA
9. RADIOGRAPH REFERENCES PER NAVAER 00-15 PC-504
10. STABILIZE HEAT TREAT AT 200°F ±5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. CAST WALL THICKNESS $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED

	REV	SHT
1000154	C	1

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDR 00195			
	A3	TDR 00275	1/23/63		WK
	B	TDR 00773	4-9-63		WK
	C	TDRR 01052	4-30-63		WK
	D	TDRR 01332	5-21-63		WK



VIEW B-B
SECTION B-B
SECTION A-A
2 PLACES
DETAIL C
SCALE: 4X ACTUAL
DETAIL D
SCALE: 4X ACTUAL
SEE DETAIL C
SEE DETAIL D
.020 X 45° ±5°
.030
6.927 DIA
6.947
8.660 DIA
8.650
7.182 DIA
7.172
.020 RAD MAX
8.375
4.187
8.156 DIA BSC
3.500 DIA
3.520
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
11 HOLES SPACED AS SHOWN
4 HOLES
.010 DIA 2 HOLES
7.115
7.135
8.115
8.135
7.990
8.020 SPH RAD
BREAK CORNERS APPROX .005

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000142	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN MORSE 12-62
APPROVED FOR MSC 12/28/62
APPROVAL
DATE

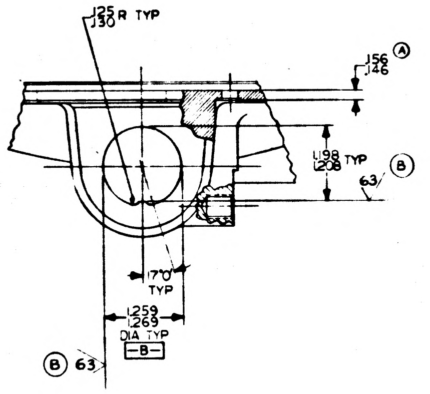
MOUNT, CONNECTOR
15X & 16X OUTER AXIS

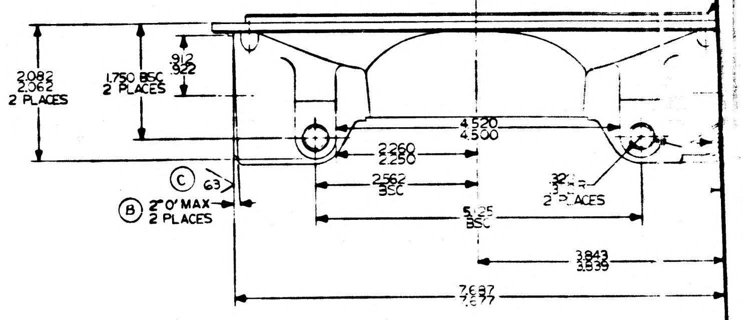
SCALE 1/1
UNIT WT
CODE IDENT

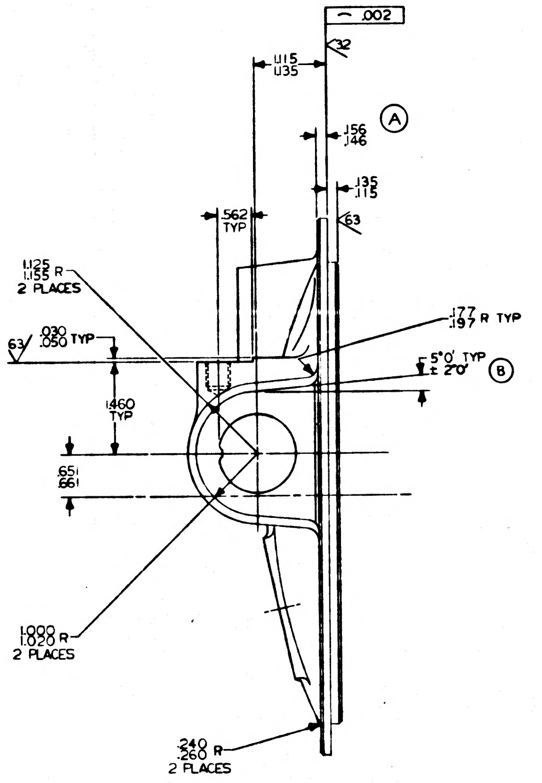
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000154
SHEET 1 OF 1 SHEET

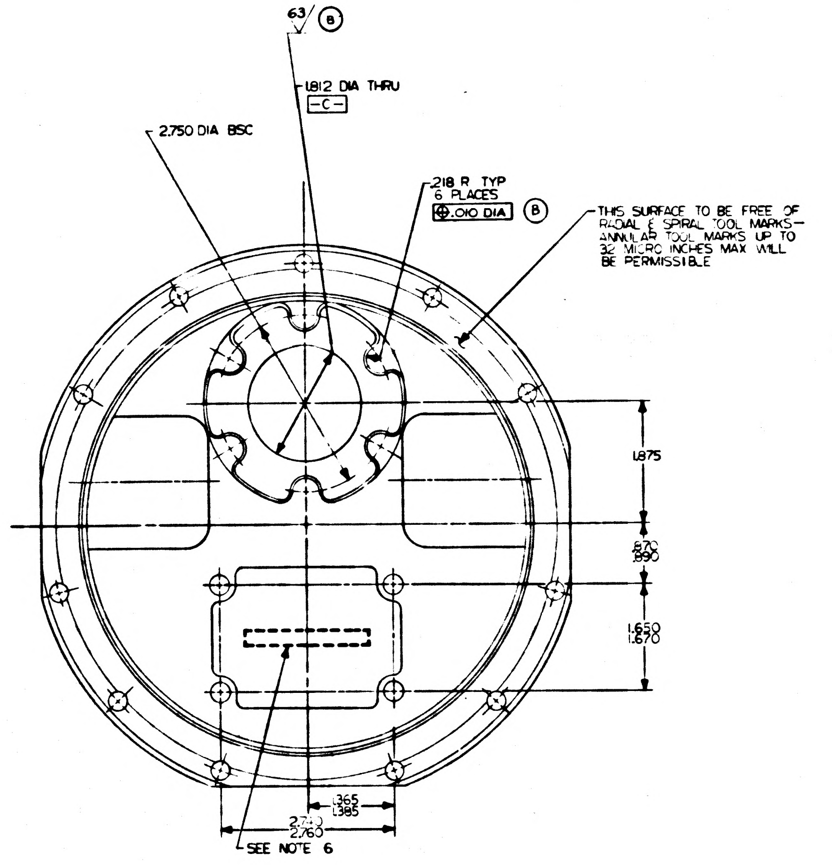
1000154 D

INCHES
PHOTOGRAPHIC SCALE ONLY

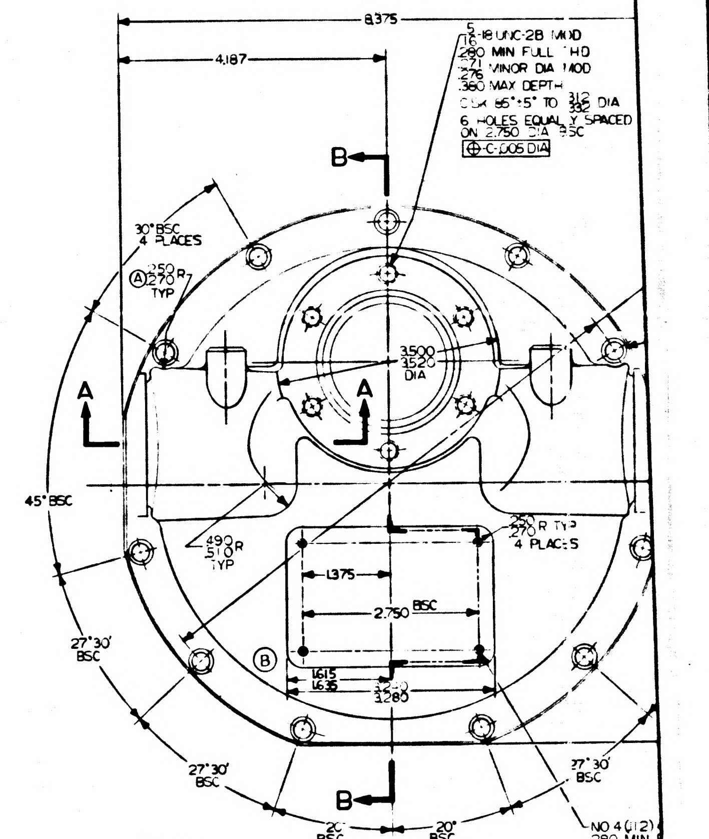

.125
.130 R TYP
.156
.146
Ⓐ
1.198
1.208 TYP
Ⓑ
63
17°0'
TYP
1.259
1.269
DIA TYP
-B-
Ⓑ 63

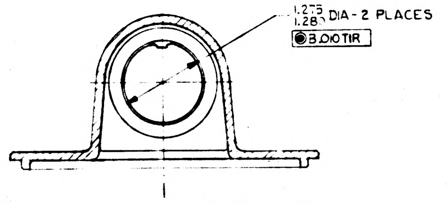

2.082
2.062
2 PLACES
1.750 BSC
2 PLACES
.912
.922
4.520
4.500
2.260
2.250
2.562
BSC
Ⓒ 63
Ⓑ 2°0' MAX
2 PLACES
5.125
BSC
2 PLACES
3.843
3.839
7.687
7.677


⌒ .002
32
1.115
1.135
Ⓐ
.156
.146
.135
.115
.562
TYP
63
1.125
1.155 R
2 PLACES
.177
.197 R TYP
63
.030
.050 TYP
5°0' TYP
± 2°0'
Ⓑ
1.460
TYP
.651
.661
1.000
1.020 R
2 PLACES
.240
.260 R
2 PLACES

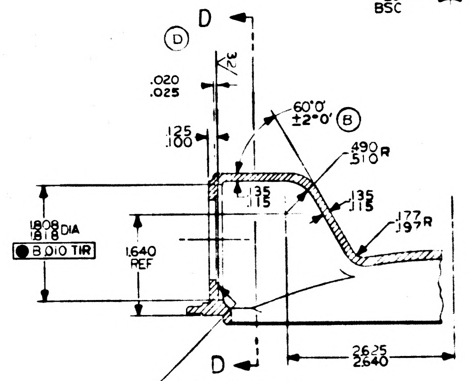

63 Ⓑ
1.812 DIA THRU
-C-
2.750 DIA BSC
.218 R TYP
6 PLACES
⊕ .010 DIA Ⓑ
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
1.875
.870
.890
1.650
1.670
1.365
1.385
2.740
2.760
SEE NOTE 6

VIEW D-D


8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271
.276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85°±5° TO .312
.332 DIA
6 HOLES EQUALLY SPACED
ON 2.750 DIA BSC
⊕ -C- .005 DIA
B
30° BSC
4 PLACES
Ⓐ .250
.270 R
TYP
A
A
3.500
3.520
DIA
45° BSC
.490
.510 R
TYP
.250
.270 R TYP
4 PLACES
1.375
2.750 BSC
Ⓑ
27°30'
BSC
1.615
1.635
3.260
3.280
27°30'
BSC
27°30'
BSC
B
20°
BSC
20°
BSC
NO 4 (.112)
.280 MIN
.0849
.0939 DIA
CSK 85°
4 HOLES


1.275
1.280 DIA - 2 PLACES
◎ B .010 TIR

SECTION D-D Ⓓ


Ⓓ
D
32
.020
.025
60°0'
±2°0' Ⓑ
.125
.100
.490
.510 R
.135
.115
.135
.115
.177
.197 R
1.808
1.818 DIA
◎ B .010 TIR
1.640
REF
2.625
2.640
D

SECTION A-A

2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

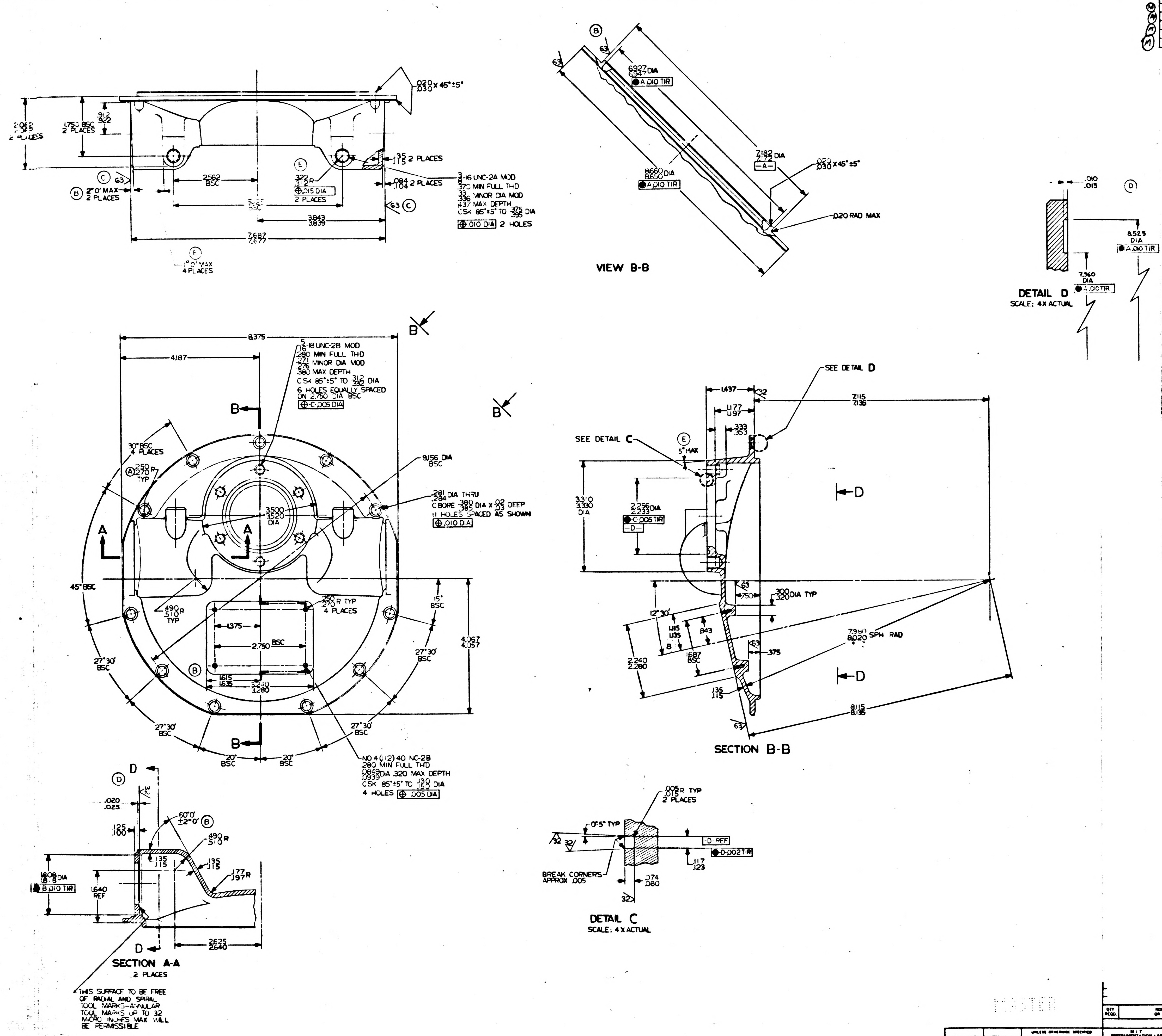
NOTES

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601 CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
4. 250√ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON MANDATORY)
   A. ROUGH MACHINE
   B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   C. FINISH MACHINE
   D. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR Ⓓ
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA, GRADE A
9. RADIOGRAPH REFERENCES PER NAVAER 00-15 PC-504
10. STABILIZE HEAT TREAT AT 200°F ±5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. CAST WALL THICKNESS $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
12. INSIDE MACHINED CORNERS $\frac{.000}{.010}$ R UNLESS OTHERWISE SPECIFIED Ⓓ

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDR 00195

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A3	TDR 00275	1/23/63	ajb	WK
	B	TDR 00773	4-9-63	ajb	WK
	C	TDRR 01052	4-30-63	ajb	WK
	D	TDRR 01332	5-21-63	ajb	WK
	E	TDRR 01683	6-19-63	ajb	WS



.020 .030 X 45°±5°
2.062 2.025 2 PLACES
1.750 BSC 2 PLACES
.912 .922
2.562 BSC
5.125 BSC
3.843 3.839
7.687 7.677
B 2°0' MAX 2 PLACES
C 63
E 1°0' MAX 4 PLACES
.322 .312 R
⊕ .015 DIA 2 PLACES
.135 .115 2 PLACES
.084 .104 2 PLACES
3/8-16 UNC-2A MOD
.370 MIN FULL THD
.33 .336 MINOR DIA MOD
.437 MAX DEPTH
CSK 85°±5° TO .375 .395 DIA
⊕ .010 DIA 2 HOLES
VIEW B-B
6.927 6.947 DIA
A .010 TIR
7.182 7.172 DIA
8.660 8.650 DIA
.020 RAD MAX
.010 .015
8.525 DIA
7.360 DIA
DETAIL D
SCALE: 4X ACTUAL
8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85°±5° TO .312 .332 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕ -C- .005 DIA
9.156 DIA BSC
.281 .284 DIA THRU
C BORE .380 .385 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕ .010 DIA
3.500 3.520 DIA
30° BSC 4 PLACES
.250 .270 R TYP
45° BSC
.490 .510 R TYP
1.375
2.750 BSC
1.615 1.635
3.240 3.280
4.067 4.057
15° BSC
27°30' BSC
20° BSC
NO 4 (.112) 40 NC-2B
.280 MIN FULL THD
.0849 .0939 DIA .320 MAX DEPTH
CSK 85°±5° TO .130 .150 DIA
4 HOLES ⊕ .005 DIA
SEE DETAIL D
SEE DETAIL C
1.437
1.177 1.197
.333 .353
7.115 7.135
5° MAX
3.310 3.330 DIA
2.256 2.233 DIA
C .005 TIR
12°30'
.300 .320 DIA TYP
7.980 8.020 SPH RAD
2.240 2.280
1.687 BSC
8.115 8.135
SECTION B-B
.005 .015 R TYP 2 PLACES
0°5' TYP
-D- REF
D .002 TIR
BREAK CORNERS APPROX .005
.074 .080
.117 .123
DETAIL C
SCALE: 4X ACTUAL
.020 .025
.125 .100
60°0' ±2°0'
.490 .510 R
.135 .115
.177 .197 R
1.608 1.618 DIA
B .010 TIR
1.640 REF
2.625 2.640
SECTION A-A
2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000142	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 1

M I T INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN MORSE
APPROVED FOR MSC 12/28/62

MOUNT, CONNECTOR
15X & 16X OUTER AXIS

SCALE 1/1
UNIT WT
CODE IDENT

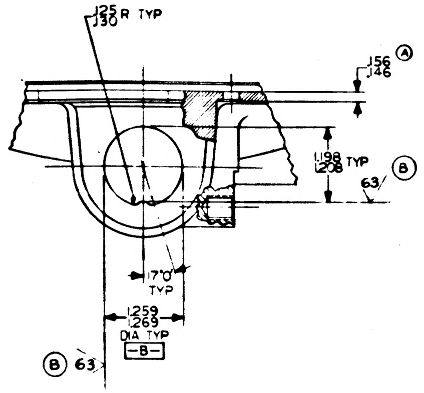
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000154
SHEET 1 OF 1 SHEET

1000154 E

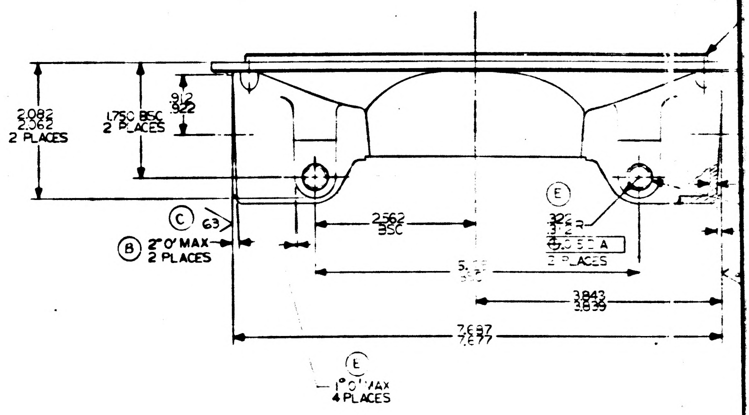
INCHES
PHOTOGRAPHIC SCALE ONLY

F-2

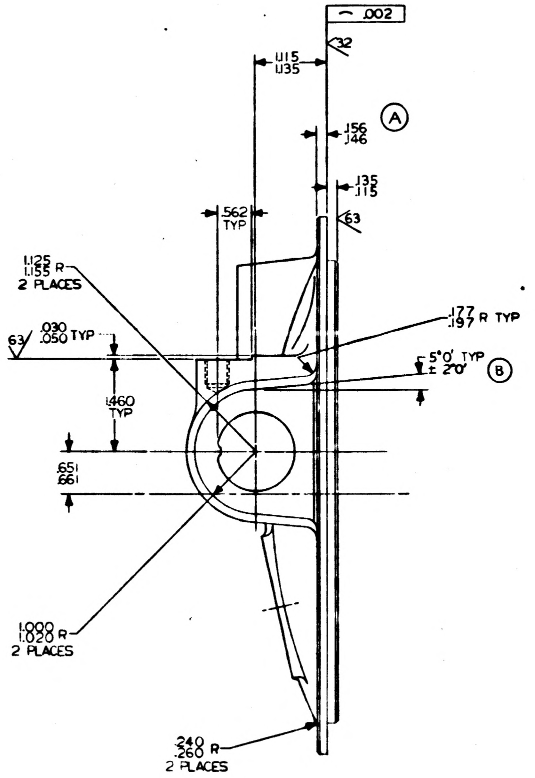
AA310001



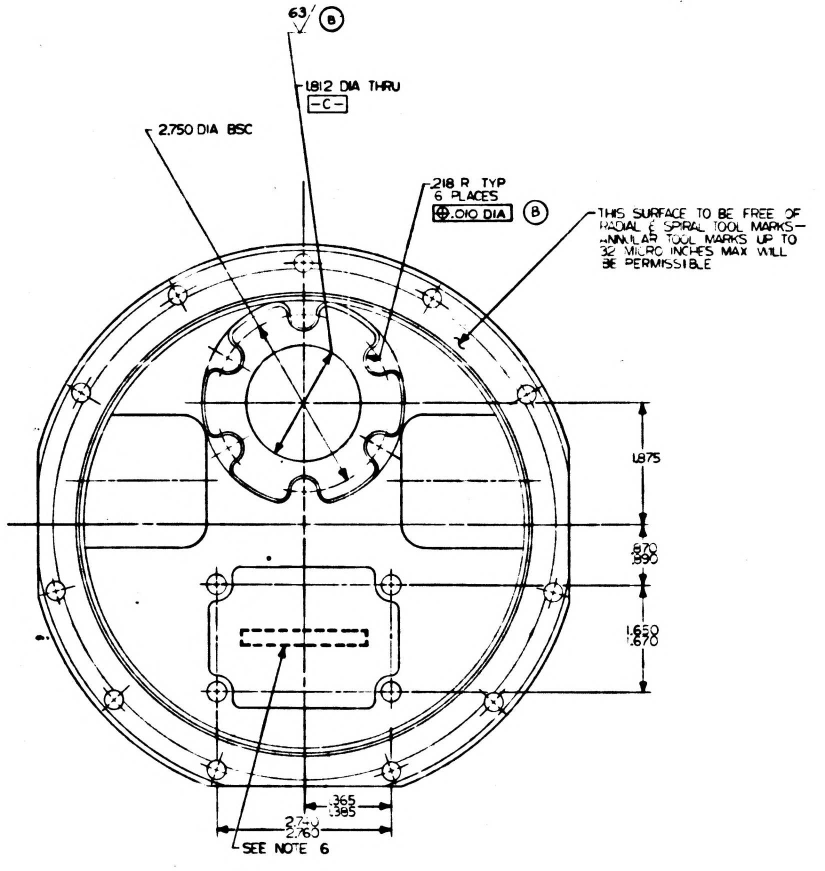
.125 .130 R TYP
.156 .146 Ⓐ
1.198 1.208 TYP Ⓑ
63
17°0' TYP
1.259 1.269 DIA TYP
-B-
Ⓑ 63



2.082 2.062 2 PLACES
1.750 BSC 2 PLACES
.912 .922
Ⓒ 63
Ⓑ 2°0' MAX 2 PLACES
2.562 BSC
Ⓔ
3.843 3.839
7.667 7.677
Ⓔ 1°0' MAX 4 PLACES
2 PLACES

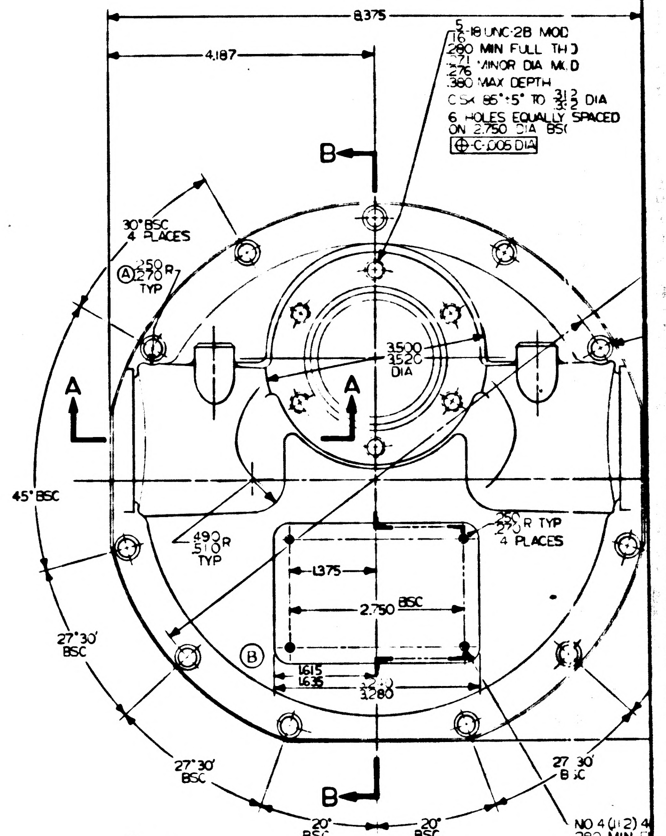


⌒ .002
32
1.115 1.135
.156 .146 Ⓐ
.135 .115
63
.562 TYP
1.125 1.155 R 2 PLACES
.177 .197 R TYP
63 .030 .050 TYP
5°0' TYP ± 2°0' Ⓑ
1.460 TYP
.651 .661
1.000 1.020 R 2 PLACES
.240 .260 R 2 PLACES

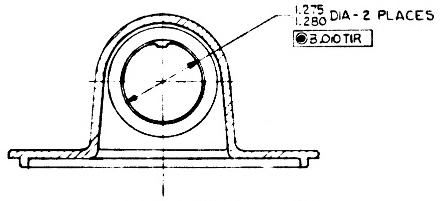


63 Ⓑ
1.812 DIA THRU
-C-
2.750 DIA BSC
.218 R TYP 6 PLACES
⊕ .010 DIA Ⓑ
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
1.875
.870 .890
1.650 1.670
.365 .385
2.740 2.760
SEE NOTE 6

VIEW D-D

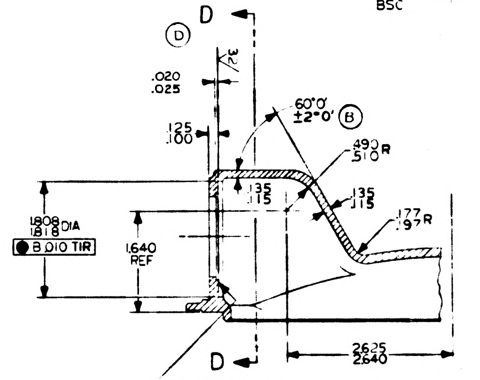


8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85°±5° TO .312 .322 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕ C .005 DIA
B
30° BSC 4 PLACES
Ⓐ .250 .270 R TYP
3.500 3.520 DIA
A
A
45° BSC
.490 .510 R TYP
.250 .270 R TYP 4 PLACES
1.375
2.750 BSC
Ⓑ
1.615 1.635
3.260 3.280
27°30' BSC
27°30' BSC
27°30' BSC
B
20° BSC
20° BSC
NO 4 (.112) 4
.280 MIN F
.0849 .0939 DIA .32
CSK 85°±5
4 HOLES



1.275 1.280 DIA - 2 PLACES
◎ B .010 TIR

SECTION D-D Ⓓ



D
Ⓓ
32
.020 .025
60°0' ±2°0' Ⓑ
.125 .100
.490 .510 R
.135 .115
.135 .115
.177 .197 R
1.808 1.818 DIA
◎ B .010 TIR
1.640 REF
2.625 2.640
D

SECTION A-A
2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

NOTES

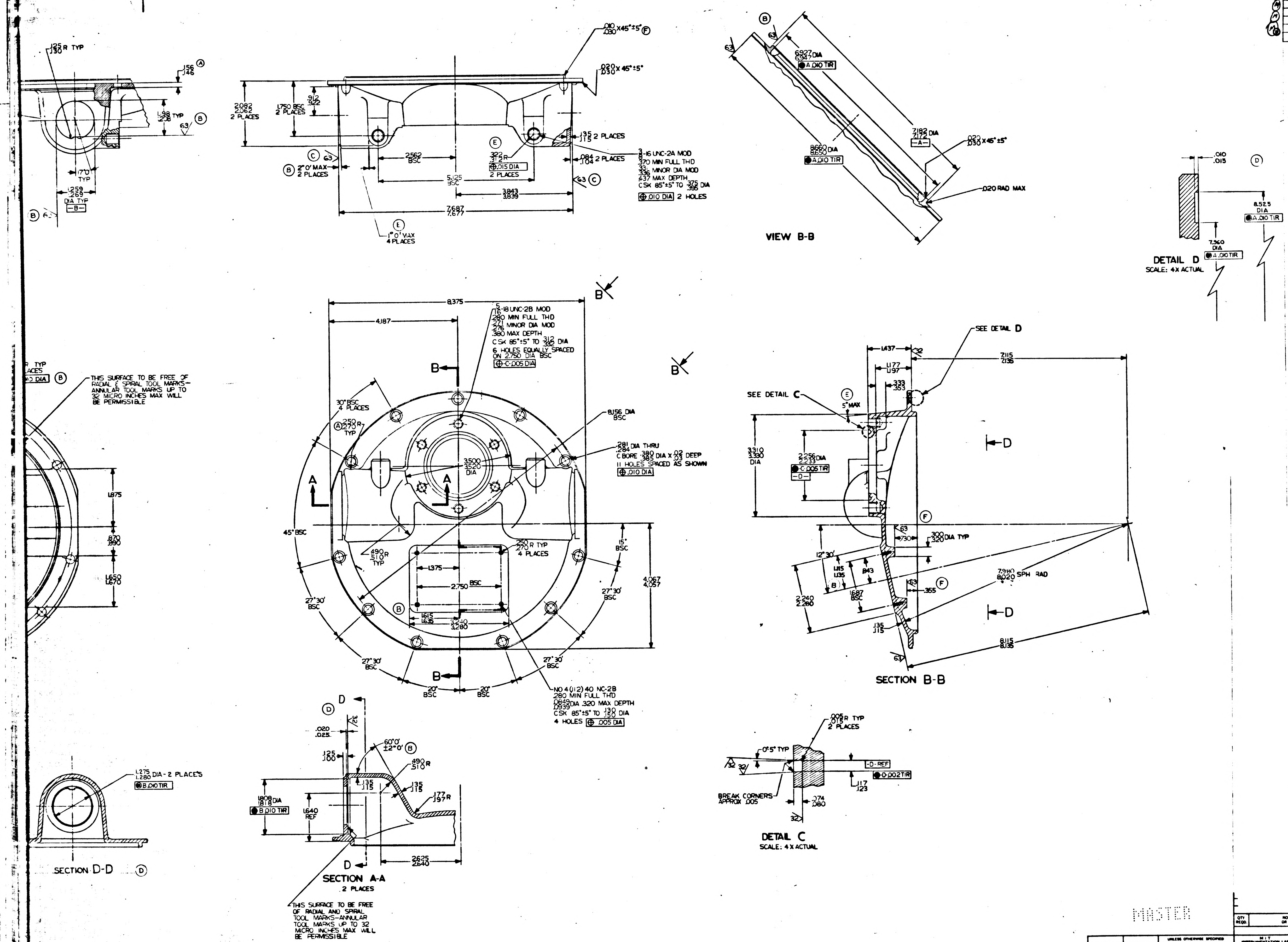
1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601 CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE .115/.135 UNLESS OTHERWISE SPECIFIED
4. 250∨ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES .005/.015
6. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   - C. FINISH MACHINE
   - D. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR Ⓓ
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA, GRADE A
9. RADIOGRAPH REFERENCES PER NAVAER 00-15 PC-504
10. STABILIZE HEAT TREAT AT 200°F ±5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. CAST WALL THICKNESS .115/.135 UNLESS OTHERWISE SPECIFIED
12. INSIDE MACHINED CORNERS .000/.010 R UNLESS OTHERWISE SPECIFIED Ⓓ

1000154	REV	SHT
	E	1

INCHES
PHOTOGRAPHIC SCALE ONLY

F1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDR 00195			
	A3	TDR 00275	1/23/63	AJB	WK
	B	TDR 00773	4-9-63	AJB	WK
	C	TDRR 01052	4-30-63	AJB	WK
	D	TDRR 01332	5-21-63	AJB	WK
	E	TDRR 01683	6-19-63	AJB	WS
	F	TDRR 02896	9-4-63	AJB	WK



VIEW B-B
DETAIL D
SCALE: 4X ACTUAL
SECTION B-B
DETAIL C
SCALE: 4 X ACTUAL
SECTION A-A
2 PLACES
SECTION D-D
SEE DETAIL C
SEE DETAIL D
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
BREAK CORNERS APPROX .005
5/16-18 UNC-2B MOD
.280 MIN FULL THD
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
8.156 DIA BSC
.281 DIA THRU
11 HOLES SPACED AS SHOWN
NO 4 (.112) 40 NC-2B
4 HOLES
3/8-16 UNC-2A MOD
2 HOLES
8.375
4.187
3.500 3.520 DIA
7.687 7.677
5.125 BSC
2.562 BSC
3.843 3.839
2.082 2.062 2 PLACES
1.750 BSC 2 PLACES
4.067 4.057
2.750 BSC
1.375
45° BSC
27°30' BSC
20° BSC
15° BSC
30° BSC 4 PLACES
7.980 8.020 SPH RAD
8.115 8.135
7.115 7.135
3.310 3.330 DIA
8.660 8.650 DIA
7.182 7.172 DIA
6.927 6.947 DIA
8.525 DIA
7.360 DIA
1.275 1.280 DIA - 2 PLACES
1.808 1.818 DIA
1.640 REF
2.625 2.640
.020 RAD MAX
1000154 REV SHT F 1

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL1000201
1000142	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 1

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN MORSE 12-7-62
APPROVED FOR MSC 12/20/62
APPROVAL DATE

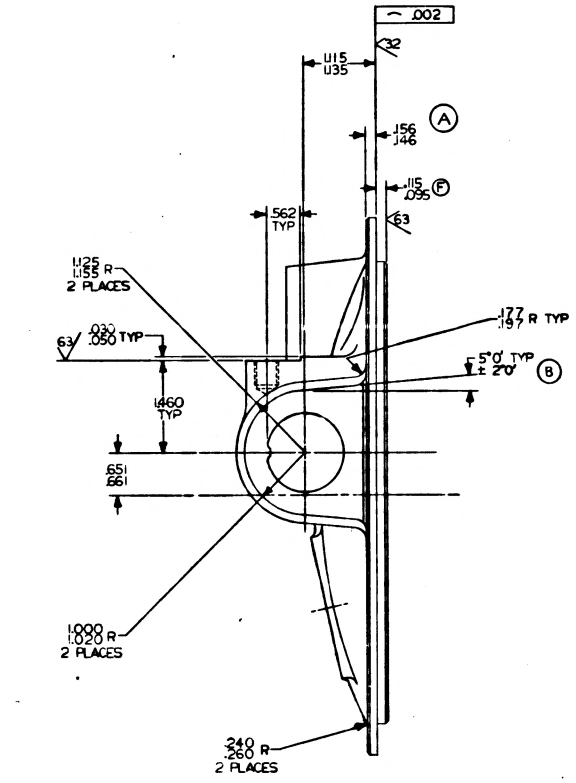
MOUNT, CONNECTOR
15X & 16X OUTER AXIS

SCALE 1/1
UNIT WT
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000154
SHEET 1 OF 1 SHEET

INCHES
PHOTOGRAPHIC SCALE ONLY

F-2



⌒ .002
32
1.115
1.135
.156
.146
Ⓐ
.115
.095 Ⓕ
63
.562
TYP
1.125
1.155 R
2 PLACES
63
.030
.050 TYP
.177
.197 R TYP
5°0' TYP
± 2°0' Ⓑ
1.460
TYP
.651
.661
1.000
1.020 R
2 PLACES
.240
.260 R
2 PLACES

NOTES

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601 CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
4. 250 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
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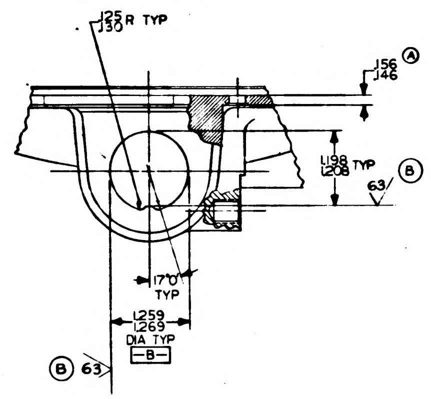
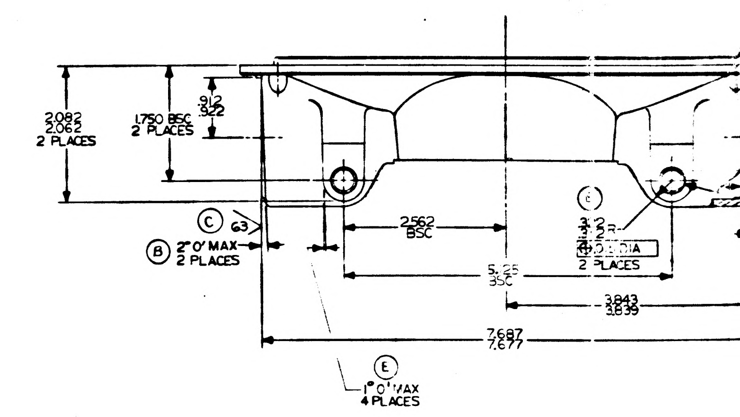
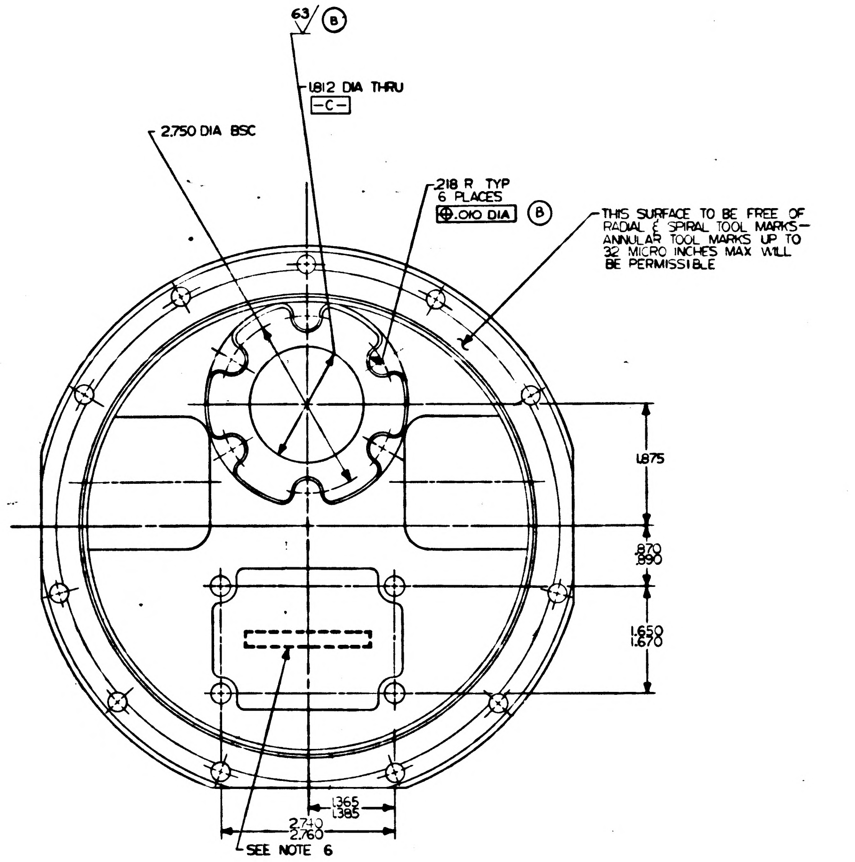
   B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   C. FINISH MACHINE
   D. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR Ⓓ
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA, GRADE A
9. RADIOGRAPH REFERENCES PER NAVAER 00-15 PC-504
10. STABILIZE HEAT TREAT AT 200°F ±5° F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. CAST WALL THICKNESS $\frac{.115}{.135}$ UNLESS OTHERWISE SPECIFIED
12. INSIDE MACHINED CORNERS $\frac{.000}{.010}$ R UNLESS OTHERWISE SPECIFIED Ⓓ



.125
.130 R TYP
.156
.146 Ⓐ
1.198
1.208 TYP Ⓑ
63
17°0'
TYP
1.259
1.269
DIA TYP
-B-
Ⓑ 63

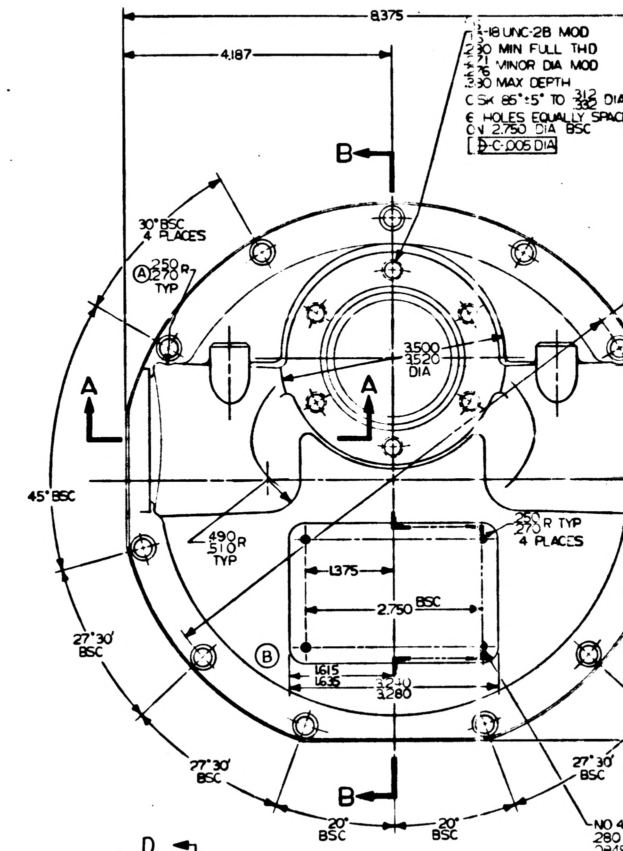


2.082
2.062
2 PLACES
1.750 BSC
2 PLACES
.912
.922
Ⓒ 63
Ⓑ 2°0' MAX
2 PLACES
2.562
BSC
Ⓒ
2 PLACES
5.125
BSC
3.843
3.839
7.687
7.677
Ⓔ
1°0' MAX
4 PLACES

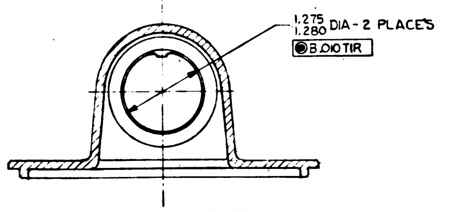


63 Ⓑ
1.812 DIA THRU
-C-
2.750 DIA BSC
.218 R TYP
6 PLACES
⊕ .010 DIA Ⓑ
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE
1.875
.870
.890
1.650
1.670
1.365
1.385
2.740
2.760
SEE NOTE 6

VIEW D-D

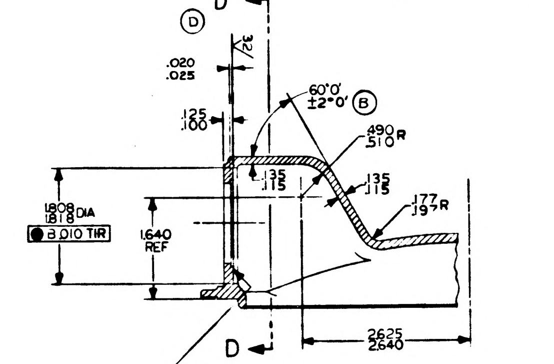


8.375
4.187
-18 UNC-2B MOD
.30 MIN FULL THD
MINOR DIA MOD
.30 MAX DEPTH
CSK 85°±5° TO .312 .320 DIA
6 HOLES EQUALLY SPACED
ON 2.750 DIA BSC
⊕ C .005 DIA
B
30° BSC
4 PLACES
.250
.270 R
TYP
Ⓐ
3.500
3.520
DIA
A
A
45° BSC
.490
.510 R
TYP
.250
.270 R TYP
4 PLACES
1.375
2.750 BSC
Ⓑ
1.615
1.635
3.240
3.280
27°30'
BSC
27°30'
BSC
27°30'
BSC
B
20°
BSC
20°
BSC
NO 4
.280
CSK
4 H



1.275
1.280 DIA - 2 PLACES
◎ B .010 TIR

SECTION D-D Ⓓ

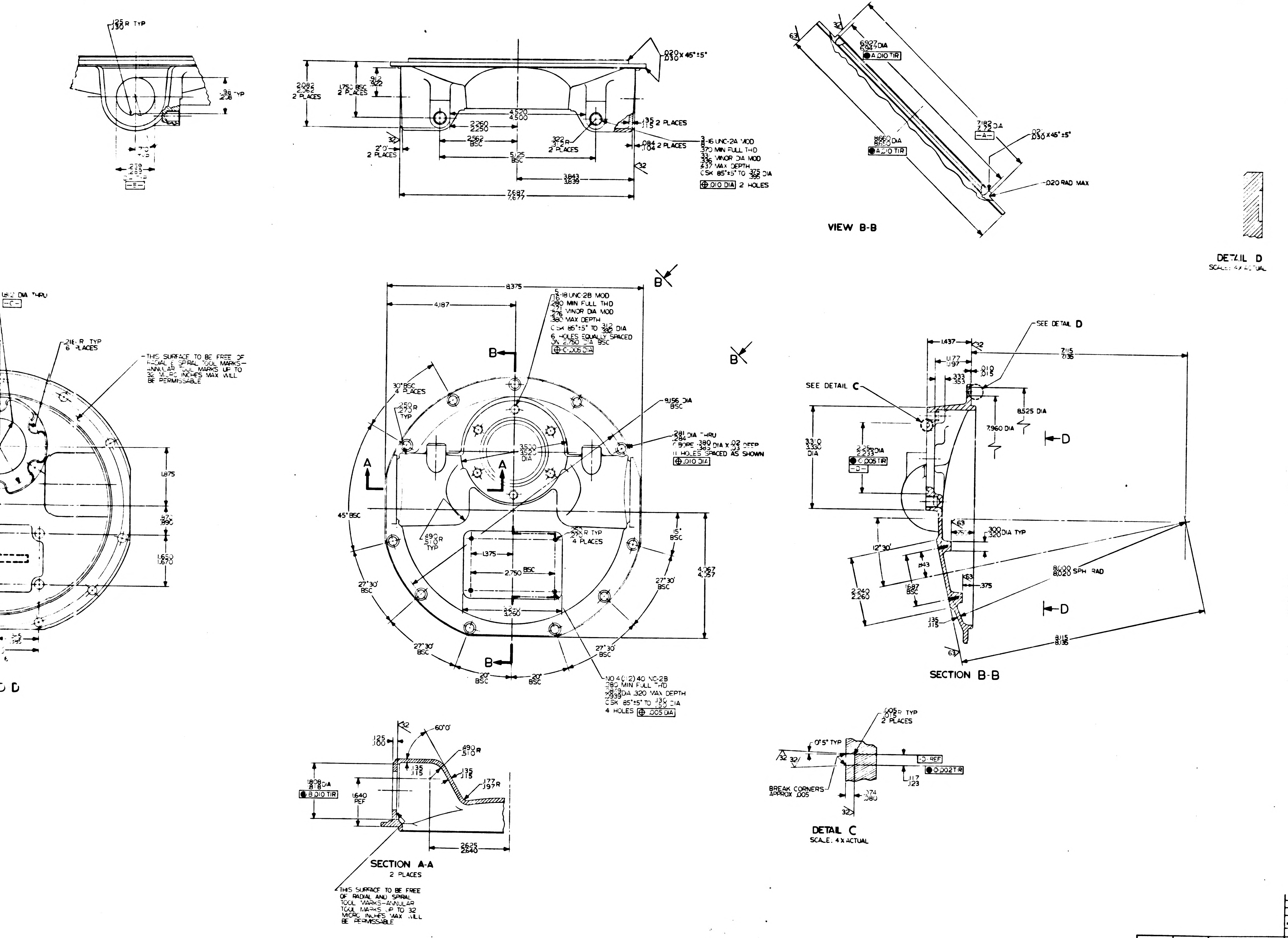


Ⓓ
D
32
.020
.025
.125
.100
60°0'
±2°0' Ⓑ
.490
.510 R
.135
.115
.135
.115
.177
.197 R
1.808
1.818 DIA
◎ B .010 TIR
1.640
REF
D
2.625
2.640

SECTION A-A
2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSIBLE

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY



.125 R TYP
.130
2.082
2.062
2 PLACES
1.750 BSC
2 PLACES
4.520
4.500
2.260
2.250
2.562 BSC
5.125 BSC
3.843
3.839
7.687
7.677
.020 X 45° ±5°
.030
.135
.115 2 PLACES
.084
.104 2 PLACES
3/8-16 UNC-2A MOD
.370 MIN FULL THD
.336 MINOR DIA MOD
.437 MAX DEPTH
CSK 85° ±5° TO .375 DIA
.010 DIA 2 HOLES
.6927 DIA
.6947
A .010 TIR
.8660 DIA
.8650
A .010 TIR
.7182 DIA
-A-
.020 X 45° ±5°
.030
.020 RAD MAX
VIEW B-B
DETAIL D
SCALE: 4X ACTUAL
.812 DIA THRU
-C-
.216 R TYP
6 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 MINOR DIA MOD
.380 MAX DEPTH
CSK 85° ±5° TO .312 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
C .005 DIA
30° BSC
4 PLACES
.250 R
.270
TYP
9.156 DIA
BSC
.281 DIA THRU
.284
C'BORE .380 DIA X .02 DEEP
11 HOLES SPACED AS SHOWN
.010 DIA
3.500
3.520
DIA
45° BSC
.490
.510 R
TYP
.250 R TYP
4 PLACES
1.375
2.750 BSC
3.250
15° BSC
4.067
4.057
27°30' BSC
20° BSC
NO 4 (.112) 40 NC-2B
.280 MIN FULL THD
.320 MAX DEPTH
CSK 85° ±5° TO .130 DIA
4 HOLES .005 DIA
B
A
1.875
1.650
1.670
SEE DETAIL D
SEE DETAIL C
1.437
.177
.197
.333
.353
.010
.015
7.115
7.135
8.525 DIA
7.960 DIA
3.310
3.330
DIA
2.253
2.233 DIA
C .005 TIR
-D-
D
.300
.320 DIA TYP
12°30'
.843
1.687 BSC
2.240
2.260
.375
8.000
8.020 SPH RAD
.135
.115
8.115
8.135
SECTION B-B
60°0'
.125
.100
.490
.510 R
.135
.115
.177
.197 R
1.808
1.818 DIA
B .010 TIR
1.640 REF
2.625
2.640
SECTION A-A
2 PLACES
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS—ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
.005 R TYP
.015
2 PLACES
0°5' TYP
-D- REF
D .002 TIR
.117
.123
.074
.080
BREAK CORNERS APPROX .005
DETAIL C
SCALE: 4X ACTUAL

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000142	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 1

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED DATE 12/20/64
CHECKED
DRAWN MORSE 12/2/64
APPROVED FOR MSC 12/28/64
APPROVAL DATE
W Kupfer 29 DEC 64

MOUNT, CONNECTOR
15X & 16X OUTER AXIS

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
Cambridge, Mass

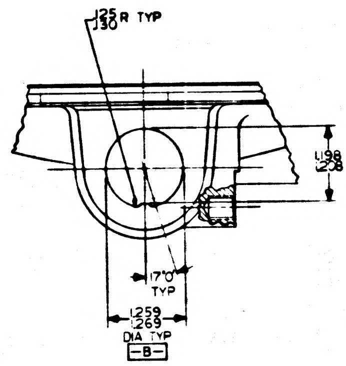
DWG NO

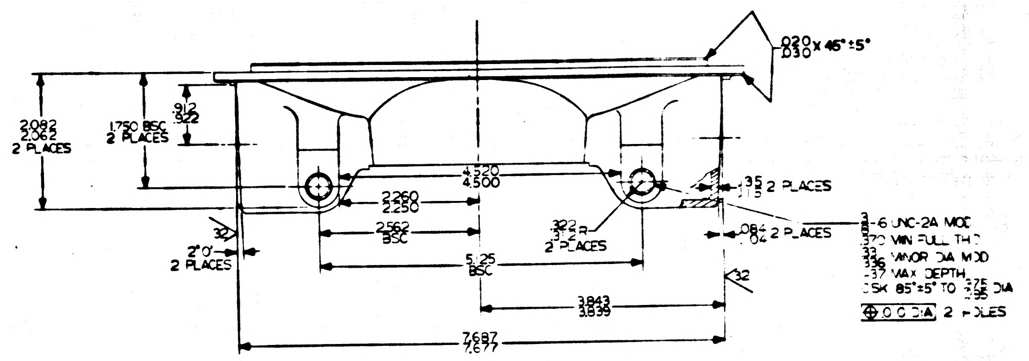
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

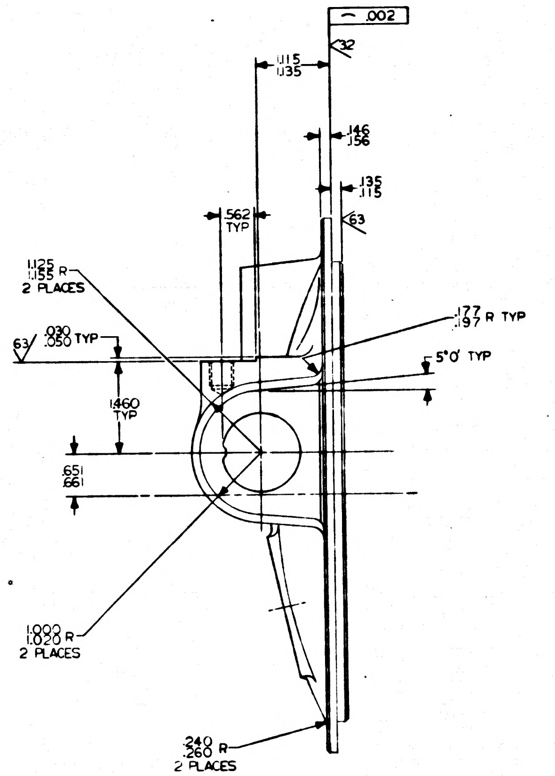
NASA DRAWING NO
1000154

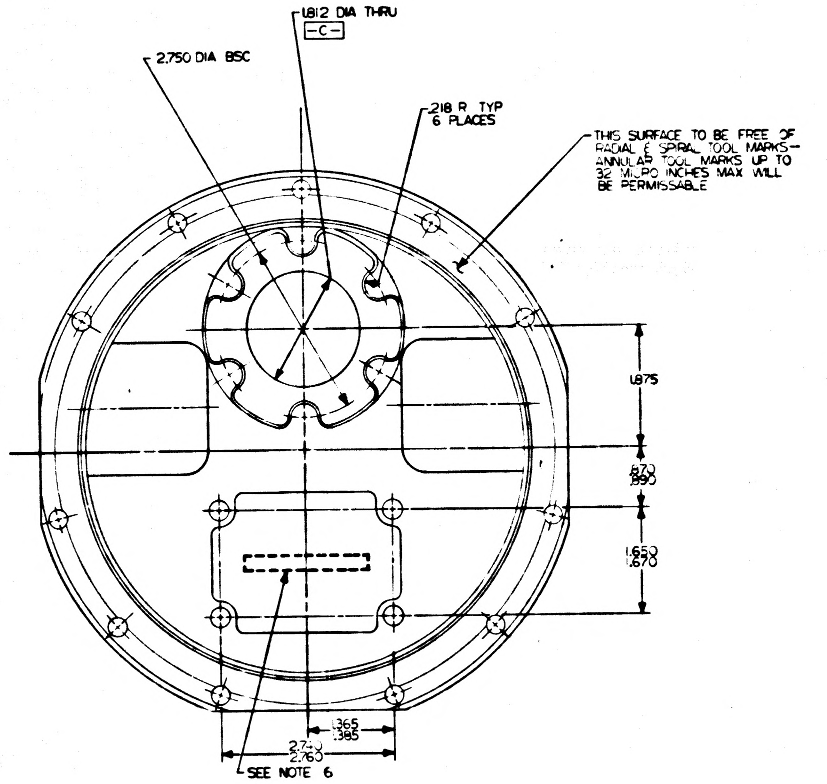
SHEET 1 OF SHEET

1000154	REV	SHT
		1

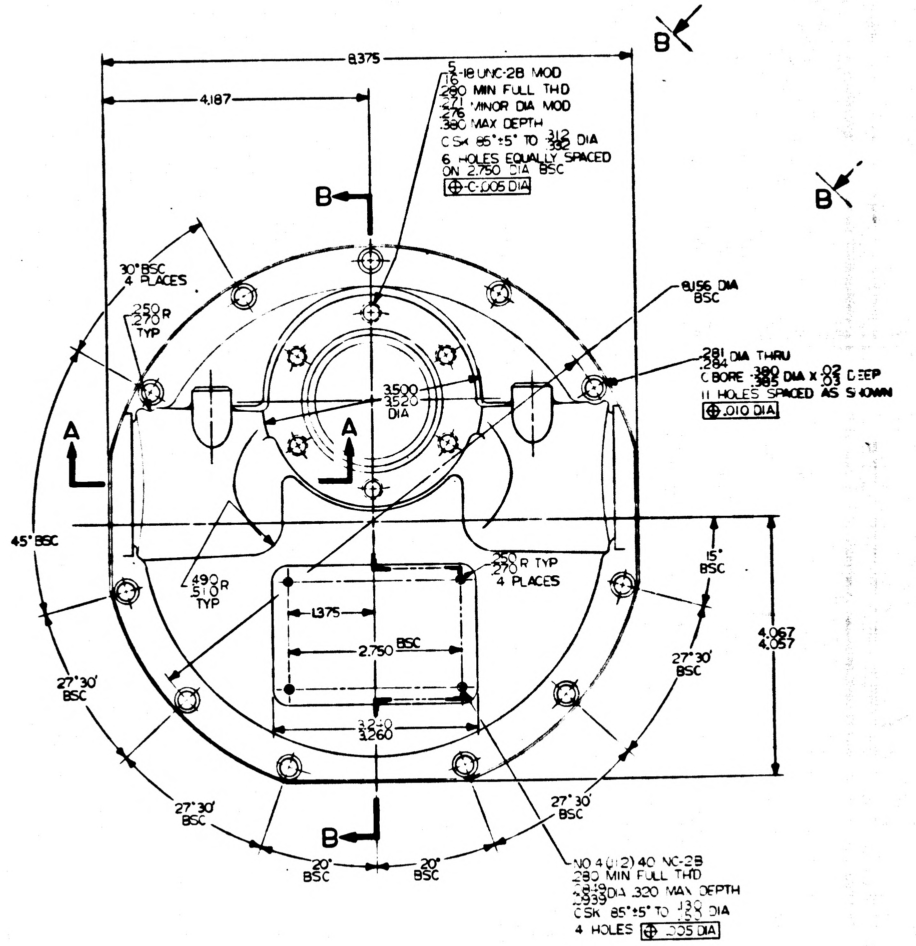

.125 R TYP
.130
1.198 TYP
1.208
17°0'
TYP
1.259
1.269
DIA TYP
-B-


.020 X 45° ±5°
.030
2.082
2.062
2 PLACES
1.750 BSC
2 PLACES
.912
.922
4.520
4.500
2.260
2.250
2.562
BSC
.322
.312 R
2 PLACES
5.25
BSC
3.843
3.839
7.687
7.677
.135 2 PLACES
.115
.084 2 PLACES
.04
2°0'
2 PLACES
32
3/8-6 UNC-2A MOD
.370 MIN FULL THD
.336 MINOR DIA MOD
.37 MAX DEPTH
CSK 85° ±5° TO .375 .395 DIA
⊕ .010 DIA 2 HOLES


⌒ .002
32
.115
.135
.146
.156
.135
.115
63
.562
TYP
1.125
1.155 R
2 PLACES
.030
.050 TYP
63
.177
.197 R TYP
5°0' TYP
1.460
TYP
.651
.661
1.000
1.020 R
2 PLACES
.240
.260 R
2 PLACES

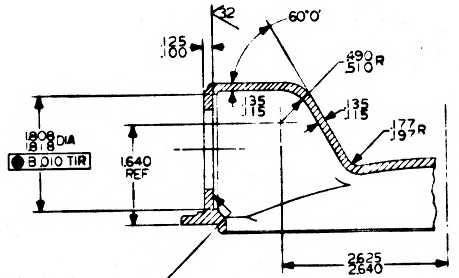

1.812 DIA THRU
-C-
2.750 DIA BSC
.218 R TYP
6 PLACES
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS— ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE
1.875
.870
.890
1.650
1.670
1.365
1.385
2.740
2.760
SEE NOTE 6

VIEW D-D


B
B
8.375
4.187
5/16-18 UNC-2B MOD
.280 MIN FULL THD
.271 .276 MINOR DIA MOD
.380 MAX DEPTH
CSK 85° ±5° TO .312 .332 DIA
6 HOLES EQUALLY SPACED ON 2.750 DIA BSC
⊕ -C- .005 DIA
B
30° BSC
4 PLACES
.250
.270 R
TYP
8.156 DIA
BSC
.281 .284 DIA THRU
C BORE .380 .385 DIA X .02 .03 DEEP
11 HOLES SPACED AS SHOWN
⊕ .010 DIA
3.500
3.520
DIA
A
A
45° BSC
.490
.510 R
TYP
.250
.270 R TYP
4 PLACES
15°
BSC
1.375
2.750 BSC
4.067
4.057
27°30'
BSC
27°30'
BSC
3.240
3.260
27°30'
BSC
27°30'
BSC
B
20°
BSC
20°
BSC
NO 4 (.112) 40 NC-2B
.280 MIN FULL THD
.0849 .0939 DIA .320 MAX DEPTH
CSK 85° ±5° TO .130 .150 DIA
4 HOLES ⊕ .005 DIA

NOTES:

1. MATERIAL: AL ALLOY PRECISION CASTING 356 T6 COMP 3
   ALT: SPEC QQ-A-601 CLASS 3 COND T6
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. FILLETS & ROUNDS TO BE $^{.115}_{.135}$ UNLESS OTHERWISE SPECIFIED
4. 125 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
5. BREAK ALL SHARP EDGES $^{.005}_{.015}$
6. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
7. ORDER OF OPERATION (PROCESS NON MANDATORY)
   - A. ROUGH MACHINE
   - B. STRESS RELIEVE AT 300°F FOR ONE HOUR, AIR COOL
   - C. FINISH MACHINE
   - D. ANODIC COAT PER MIL-A-8625 TYPE I
8. CASTING TO BE INSPECTED PER MIL-C-6021D CLASS IA
9. RADIOGRAPH REFERENCES PER NAVAER 00-15 PC-504
10. STABILIZE HEAT TREAT AT 200°F ±5°F FOR 20 HOURS AT TEMPERATURE, AIR COOL
11. LEAST WALL THICKNESS .135 UNLESS OTHERWISE SPECIFIED


32
60°0'
.125
.100
.490
.510 R
.135
.115
.135
.115
.177
.197 R
1.808
1.818 DIA
● B .010 TIR
1.640
REF
2.625
2.640

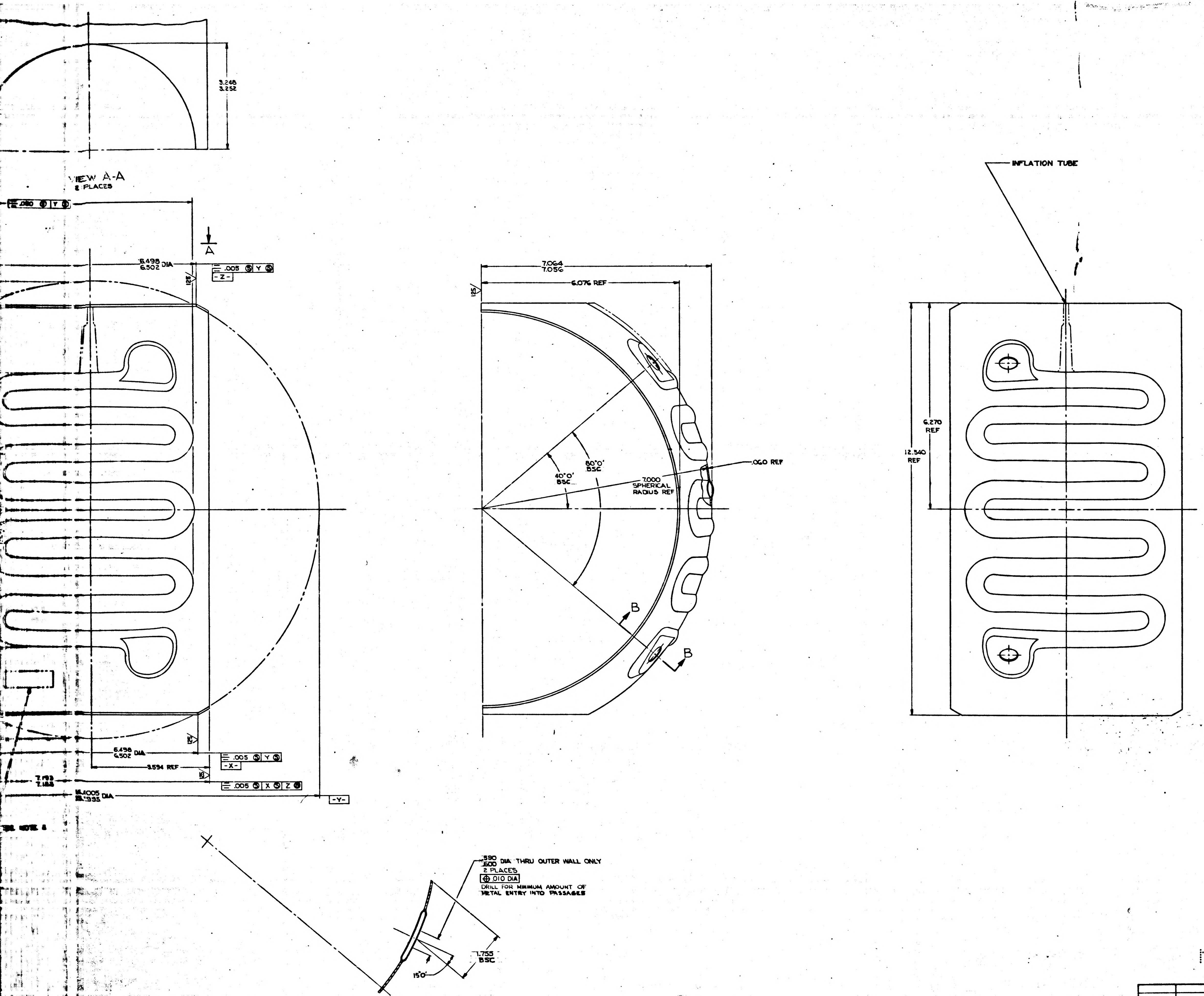
SECTION A-A
2 PLACES

THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS-ANNULAR TOOL MARKS UP TO 32 MICRO INCHES MAX WILL BE PERMISSABLE

1000154	REV	SH
		1

REVISIONS TDRR 07376

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



3.248
3.252
VIEW A-A
2 PLACES
.080
Y
A
6.498
6.502 DIA
125
.005 Y
-Z-
6.498
6.502 DIA
3.594 REF
125
.005 Y
-X-
7.193
7.188
14.005
13.995 DIA
.005 X Z
-Y-
SEE NOTE 4
7.064
7.056
6.076 REF
125
80°0'
BSC
40°0'
BSC
7.000
SPHERICAL
RADIUS REF
.060 REF
B
B
INFLATION TUBE
6.270
REF
12.540
REF
.590
.600 DIA THRU OUTER WALL ONLY
2 PLACES
.010 DIA
DRILL FOR MINIMUM AMOUNT OF
METAL ENTRY INTO PASSAGES
1.755
BSC
15°0'

SECTION B-B
2 PLACES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1001553	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

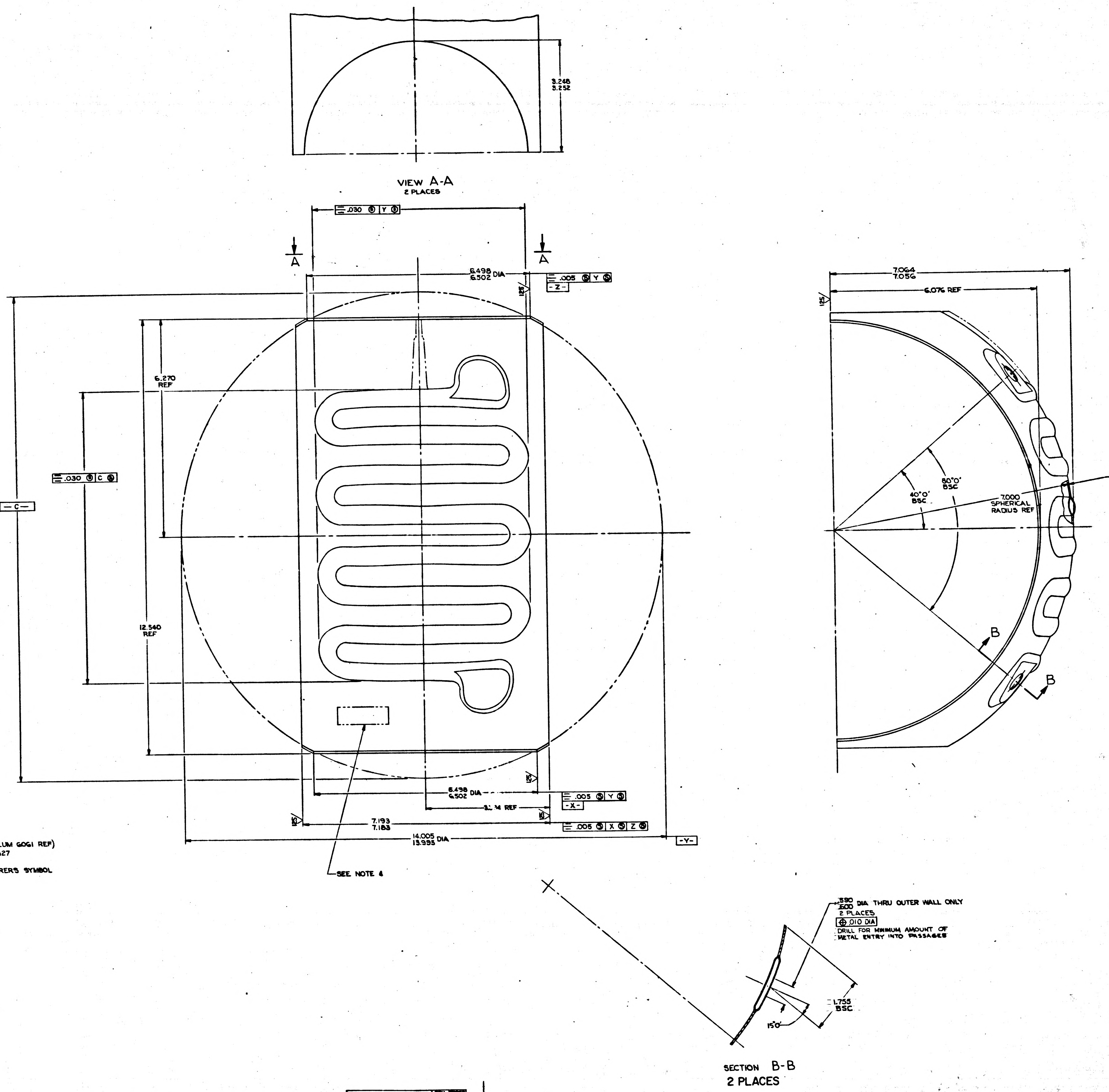
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN L.G.S. 2-17-64
APPROVED FOR MSC
MIT/IL APPROVAL
DATE

HEMISPHERE CASE
ROLL BONDED

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
Cambridge, Mass.
JOB NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000155
SHEET 1 OF 1

1000155


3.248
3.252
VIEW A-A
2 PLACES
.030 Ⓢ Y Ⓢ
A
A
6.498
6.502 DIA
.005 Ⓢ Y Ⓢ
-Z-
125
6.270
REF
.030 Ⓢ C Ⓢ
-C-
12.540
REF
SEE NOTE 4
6.498
6.502 DIA
.005 Ⓢ Y Ⓢ
-X-
REF
.005 Ⓢ X Ⓢ Z Ⓢ
7.193
7.183
14.005
13.995 DIA
-Y-
7.064
7.056
6.076 REF
80°0'
BSC
40°0'
BSC
7.000
SPHERICAL
RADIUS REF
.060 REF
B
B
1.755
BSC
15°

.590
.600 DIA THRU OUTER WALL ONLY
2 PLACES
⊕ .010 DIA
DRILL FOR MINIMUM AMOUNT OF
METAL ENTRY INTO PASSAGES

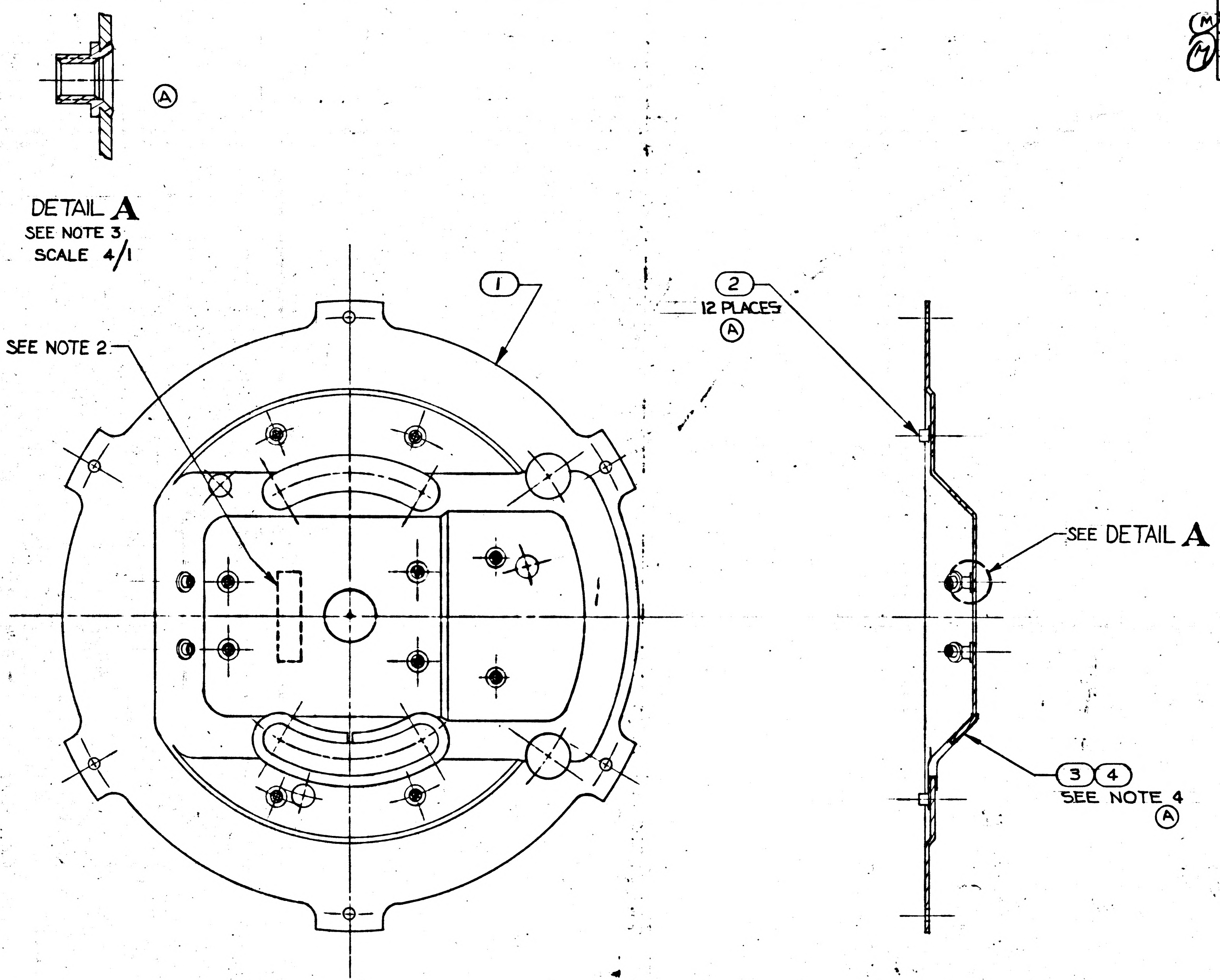
SECTION B-B
2 PLACES

NOTES
1. MAKE FROM NASA DWG NO. 1000298 (MATERIAL: ALUM 6061 REF)
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
4. IDENTIFY USING DWG NO., REV LETTER & MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER ND 1002019

1000155 | SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00256					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01038	1 MAY 63	ago	WK
	B	TDRR 04944	19 NOV 63		11/3



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & MAUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
3. INSTALL ITEM (2) TO ITEM (1)
4. BOND ITEM (3) TO ITEM (1) USING ITEM (4) AIR DRY 24 HOURS

(A)

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
AS REQ'D	ADHESIVE		MIL-A-5092	TYPE II	4
1	CHANNEL	1000180			3
12	NUT, CLINCH FLUSH MOUNTED	1000076-1			2
1	GUIDE, WIRE, BRG HSG 15 & 16 X O.A.	1000169			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000205	DL 1000201
1000007	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	1-16-63
CHECKED		
DRAWN	D.M.WHITE	12-20-62
APPROVED FOR MSC		
MIT/IL APPROVAL		DATE
	G J Nelson	1/16/63

GUIDE, WIRE
ASSEMBLY
BEARING HOUSING.
15 & 16 SPEED OUTER AXIS

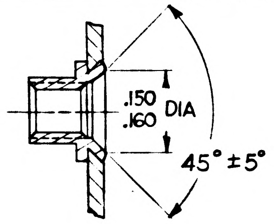
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000156
SHEET 1 OF 1

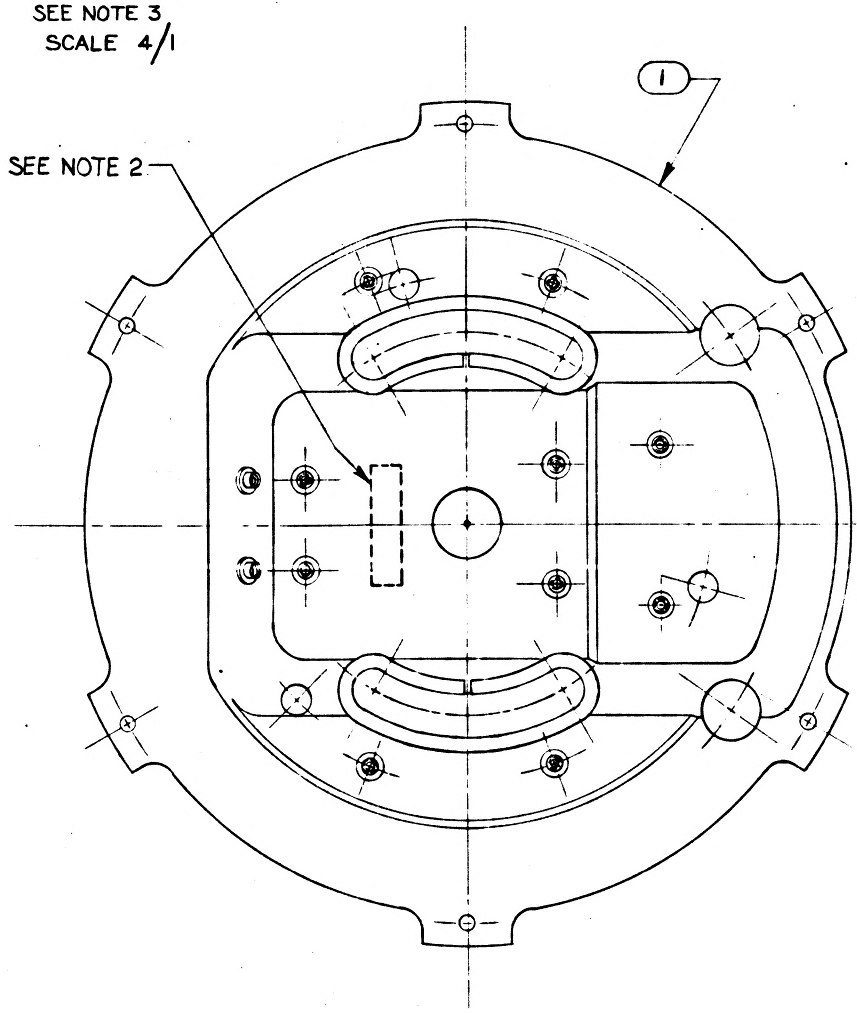
1000156 B

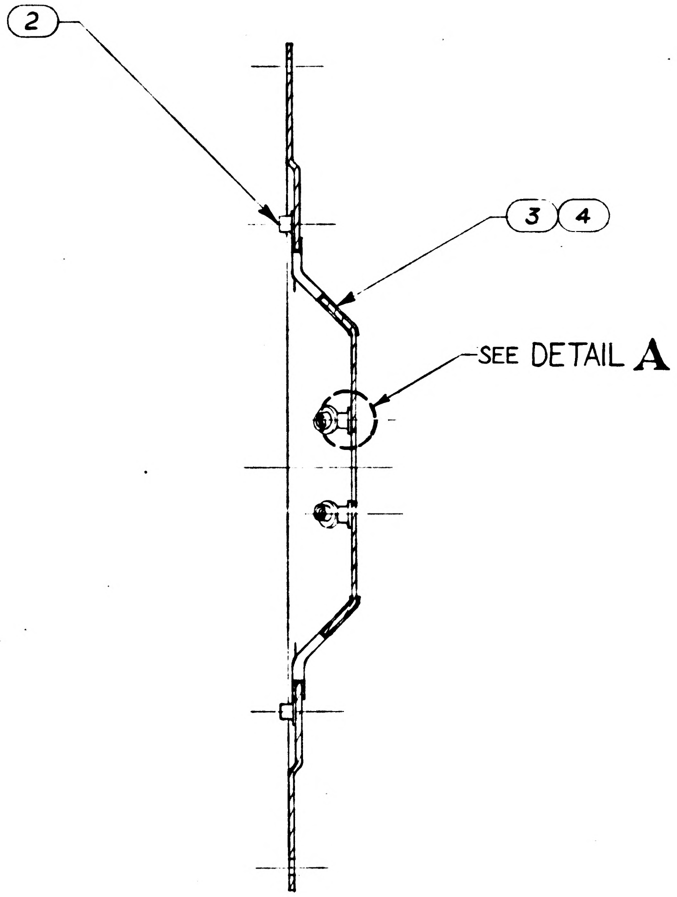
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00256				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



DETAIL **A**
SEE NOTE 3
SCALE 4/1





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, & MAUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
3. INSTALL ITEM (2) TO ITEM (1)
4. BOND ITEM (3) TO ITEM (1) USING ITEM (4) AIR DRY 24 HOURS

MASTER

AS REQ'D	ADHESIVE		MIL-A-5092	TYPE II	4
2	CHANNEL	1000180			3
12	NUT, CLINCH FLUSH MOUNTED	1000076-1			2
1	GUIDE, WIRE, BRG MT 15 & 16 X O.A.	1000169			1
QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000205	DL 1000201
1000007	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	1-16-63
CHECKED		
DRAWN	D.M.WHITE	12-20-62
APPROVED FOR MSC		1/16/63
MIT/IL APPROVAL		DATE
	E J Nelson	1/16/63

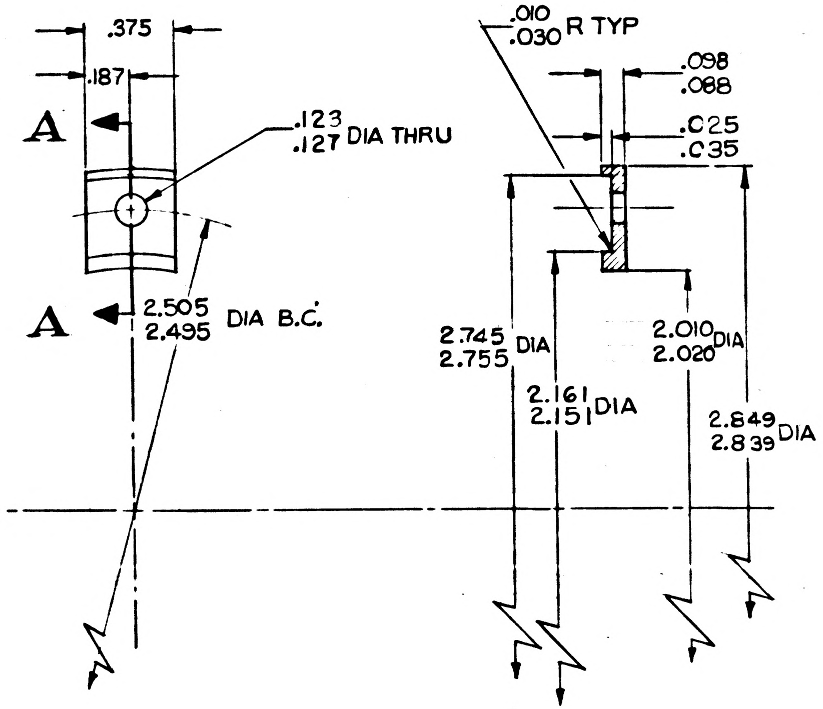
GUIDE, WIRE
ASSEMBLY
BEARING HOUSING
15 & 16 SPEED OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000156
SHEET 1 OF 1

Ⓜ

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


.375
.187
A
A
.123
.127 DIA THRU
2.505
2.495 DIA B.C.
.010
.030 R TYP
.098
.088
.025
.035
2.745
2.755 DIA
2.161
2.151 DIA
2.010
2.020 DIA
2.849
2.839 DIA

SECTION **A-A**

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ ALL OVER
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DWG NO., REVISION LETTER, AND MFR. SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	
1000002	DL1000202
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL 6061 TEMP T6 ALT SPEC QQ-A-327 TEMP T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	B. MARTIN	4-9-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL		DATE
W Kupfer		1 May 63

CLAMP, BLOWER

SCALE	UNIT WT.	CODE IDENT.
2/1		

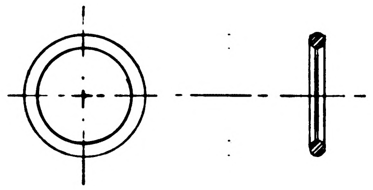
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000157
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000157

1000158

REVISIONS TDRR 00256				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES

1. THIS COMPRESSION-TYPE SEAL SHALL CONFORM TO MS 28778-4 EXCEPT MATERIAL. MATERIAL SHALL BE PARKER COMPOUND N 105-6, BUNA N.
2. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND 1015404 CLASS 3
3. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.

ORIGINAL SOURCE OF SUPPLY:
PARKER SEAL COMPANY
10567 JEFFERSON BLVD
CULVER CITY, CALIFORNIA
PART NO. 3-4
COMPOUND N 105-6, BUNA N

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	1-16-63
CHECKED		
DRAWN	J FUCHS	12-14-62

APPROVED FOR MSC
[illegible] 1/16/63

MIT/IL APPROVAL	DATE
G J Nielson	1/16/63

PACKING, PREFORMED
STRAIGHT THREAD TUBE
FITTING BOSS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000158

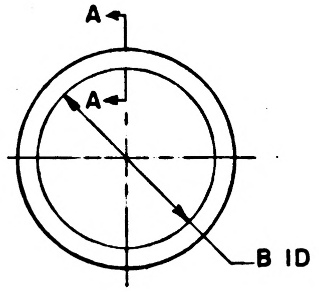
SHEET 1 OF 1

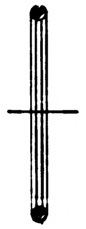
DASH NO.	W DIA	B ID
1000159 - 1	.139 ± .004	12.380 ± .030
1000159 - 2	.139 ± .004	7.484 ± .030
1000159 - 3	.103 ± .003	2.050 ± .010

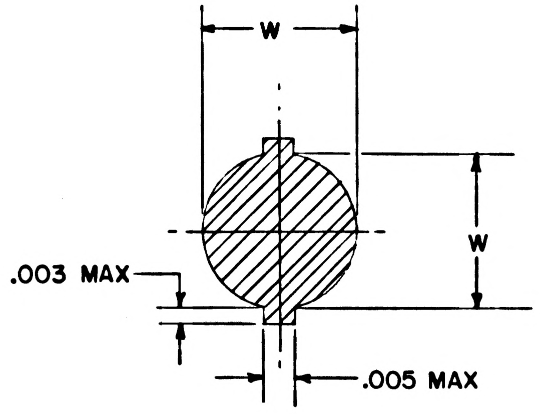
REVISIONS TDRR 00256

Ⓜ ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
4 - B	A	TDRR 00648	3-27-63	AJB	WK.

ALL DIA. OF CROSS SECTIONS SHALL EQUAL W







SECTION AA
ENLARGED

NOTES

1. MATERIAL SHALL BE PARKER COMPOUND B318-7 PER MIL-G-22050 Ⓐ
2. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND 1015404 CLASS 3
3. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130

ORIGINAL SOURCE OF SUPPLY:
PARKER SEAL COMPANY
10567 JEFFERSON BLVD
CULVER CITY, CALIFORNIA

NASA NO	PARKER NO	PARKER COMPOUND
1000159-1	5-487	B-318-7
1000159-2	2-264	B-318-7
1000159-3	2-137	B-318-7

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000001	DL1000001
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ⌿ DECIMALS ⌿ ANGLES ⌿
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	1-16-63
CHECKED		
DRAWN	J FUCHS	12-14-62

APPROVED FOR MSC
Jack Barnard 1/16/63
BY DIRECTION
MIT APPROVAL G J Hudson 1/16/63

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
⌿		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

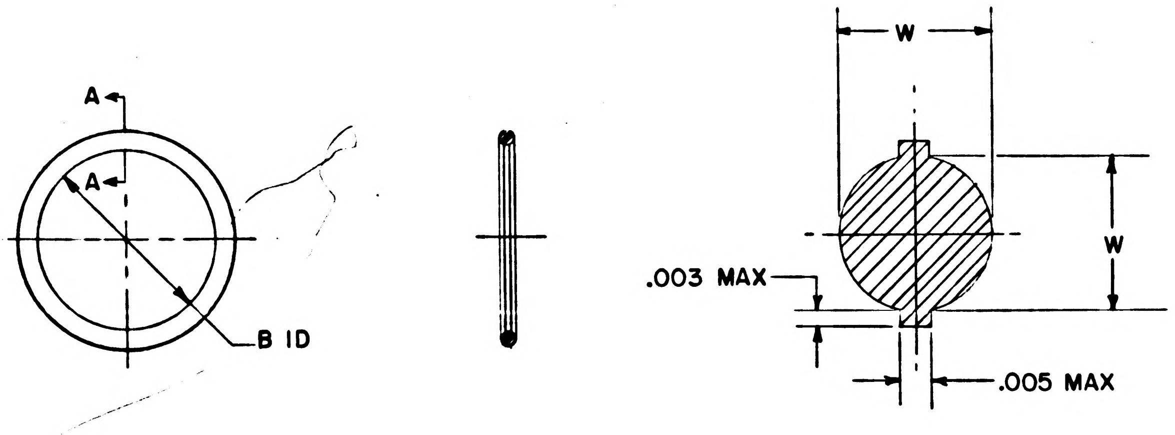
NASA DRAWING NO.
1000159

SHEET 1 OF 1

PART NO.	W DIA	B ID	
1000159 - 1	.139 ± .004	12.380 ± .030	
1000159 - 2	.139 ± .004	7.484 ± .030	
1000159 - 3	.103 ± .003	2.050 ± .010	
1000159 - 4	.064 ± .003	.239 ± .005	Ⓑ
1000159 - 5	.064 ± .003	.301 ± .005	Ⓑ
1000159 - 6	.072 ± .003	.351 ± .005	Ⓑ

REVISIONS TDRR 00256					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
4-B	A	TDRR 00648	3-27-63	ajB	wk.
	B	TDRR 00844	4-17-63	sam	uk

ALL DIA. OF CROSS SECTIONS SHALL EQUAL W



SECTION AA
ENLARGED

NOTES Ⓐ
1. MATERIAL SHALL BE PARKER COMPOUND B318-7 PER MIL-G-22050
2. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND 1015404 CLASS 3
3. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130

ORIGINAL SOURCE OF SUPPLY:
PARKER SEAL COMPANY
10567 JEFFERSON BLVD
CULVER CITY, CALIFORNIA

NASA NO	PARKER NO	PARKER COMPOUND	
1000159-1	5-487	B-318-7	
1000159-2	2-264	B-318-7	
1000159-3	2-137	B-318-7	
1000159-4	3-2	B-318-7	Ⓑ
1000159-5	3-3	B-318-7	Ⓑ
1000159-6	3-4	B-318-7	Ⓑ

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
MULTIPLE	DL1000001
USAGE	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±/ DECIMALS ±/ ANGLES ±/
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	1-16-63
CHECKED		
DRAWN	J FUCHS	12-14-62

APPROVED FOR MSC
Jack Barnard 1/16/63
BY DIRECTION
MIT APPROVAL G J Hudson 1/16/63

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
±/		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000159
SHEET 1 OF 1

1000159 B

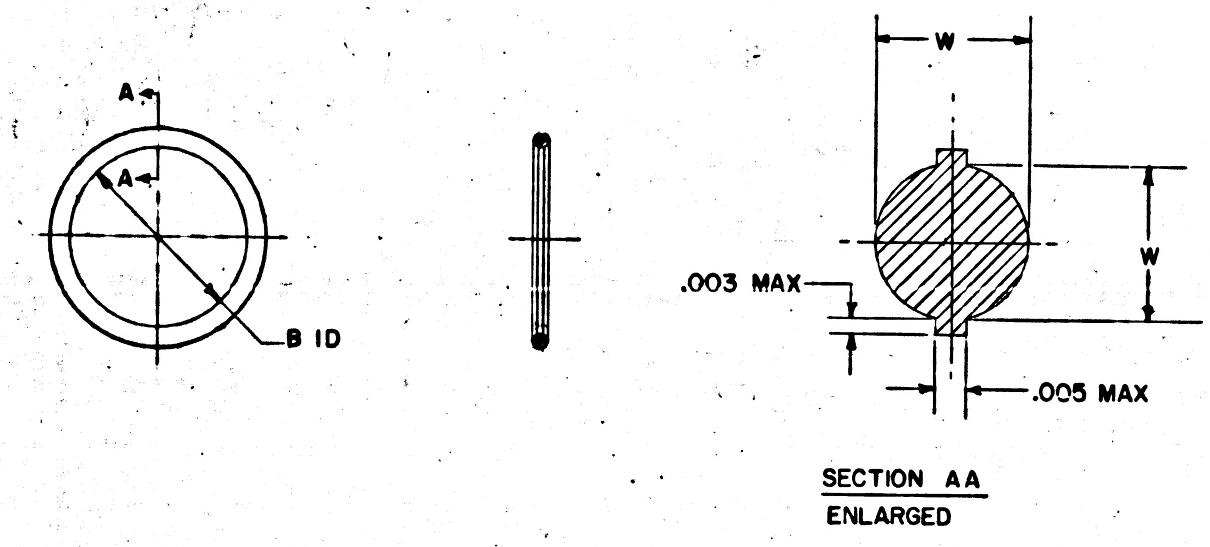
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	W DIA	B ID	
1000159-1	.139 ± .004	12.380 ± .030	
1000159-2	.139 ± .004	7.484 ± .030	
1000159-3	.103 ± .003	2.050 ± .010	
1000159-4	.064 ± .003	.239 ± .005	Ⓑ
1000159-5	.064 ± .003	.301 ± .005	Ⓑ
1000159-6	.072 ± .003	.351 ± .005	Ⓑ
1000159-7	.070 ± .003	.614 ± .005	Ⓒ
1000159-8	.070 ± .003	1.864 ± .010	
1000159-9	.070 ± .003	.176 ± .005	
1000159-10	.070 ± .003	1.364 ± .006	
1000159-11	.070 ± .003	.145 ± .005	
1000159-12	.070 ± .003	1.989 ± .010	

REVISIONS TDRR 00256

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
4-B	A	TDRR 00648	3-27-63	ajB	wk.
	B	TDRR 00844	4-17-63		uk
	C	TDRR 02323	7-30-63	ajB	

ALL DIA. OF CROSS SECTIONS SHALL EQUAL W



SECTION AA
ENLARGED

NOTES

1. MATERIAL SHALL BE PARKER COMPOUND B318-7 PER MIL-G-22050 Ⓐ
2. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND 1015404 CLASS 3
3. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130

ORIGINAL SOURCE OF SUPPLY:
PARKER SEAL COMPANY
10567 JEFFERSON BLVD
CULVER CITY, CALIFORNIA

NASA NO	PARKER NO	PARKER COMPOUND	
1000159-1	5-487	B-318-7	
1000159-2	2-264	B-318-7	
1000159-3	2-137	B-318-7	
1000159-4	3-2	B-318-7	Ⓑ
1000159-5	3-3	B-318-7	Ⓑ
1000159-6	3-4	B-318-7	Ⓑ
1000159-7	2-16	B-318-7	Ⓒ
1000159-8	2-32	B-318-7	
1000159-9	2-8	B-318-7	
1000159-10	2-28	B-318-7	
1000159-11	2-7	B-318-7	
1000159-12	2-33	B-318-7	

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000001
USAGE	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ⌿ DECIMALS ⌿ ANGLES ⌿
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	1-16-63
CHECKED		
DRAWN	J FUCHS	12-4-62

APPROVED FOR MSC
BY DIRECTION
MIT APPROVAL 1/16/63

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
⌿		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000159

SHEET 1 OF 1

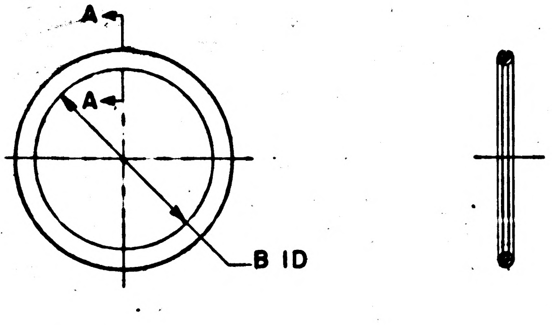
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

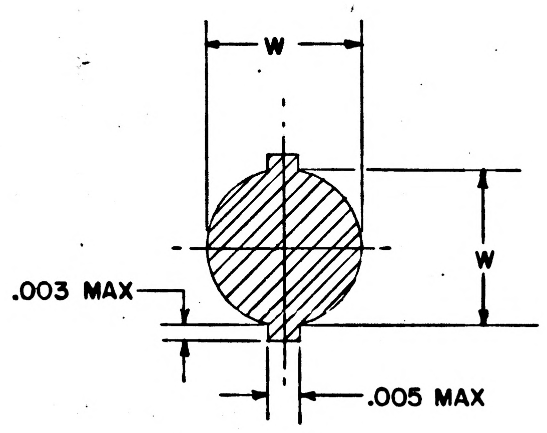
PART NO.	W DIA	B ID	
1000159-1 *	.139 ± .004	12.380 ± .030	
1000159-2	.139 ± .004	7.484 ± .030	
1000159-3	.103 ± .003	2.050 ± .010	
1000159-4	.064 ± .003	.239 ± .005	Ⓑ
1000159-5	.064 ± .003	.301 ± .005	Ⓑ
1000159-6	.072 ± .003	.351 ± .005	Ⓑ
1000159-7	.070 ± .003	.614 ± .005	Ⓒ
1000159-8	.070 ± .003	1.864 ± .010	
1000159-9	.070 ± .003	.176 ± .005	
1000159-10	.070 ± .003	1.364 ± .006	
1000159-11	.070 ± .003	.145 ± .005	
1000159-12	.070 ± .003	1.989 ± .010	
1000159-13	.070 ± .003	.301 ± .005	Ⓓ
1000159 14	.070 ± .003	.426 ± .005	

REVISIONS TDRR 00256

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
4-B	A	TDRR 00648	3-27-63	ajB	wh
	B	TDRR 00844	4-17-63		uk
	C	TDRR 02323	7-30-63	ajB	
	D	TDRR 02507	8-14-63	ajB	

ALL DIA. OF CROSS SECTIONS SHALL EQUAL W





SECTION AA
ENLARGED

NOTES Ⓐ

1. MATERIAL SHALL BE PARKER COMPOUND B318-7 PER MIL-G-22050
2. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND 1015404 CLASS 3
3. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130

ORIGINAL SOURCE OF SUPPLY:
PARKER SEAL COMPANY
10567 JEFFERSON BLVD
CULVER CITY, CALIFORNIA

NASA NO	PARKER NO	NASA NO	PARKER NO	
1000159-1	[illegible]-487	1000159-13	2-11	Ⓓ
1000159-2	2-264	1000159-14	2-13	
1000159-3	2-137			
1000159-4	3-2			
1000159-5	3-3			
1000159-6	3-4			
1000159-7	2-16			
1000159-8	2-32			
1000159-9	2-8			
1000159-10	2-28			
1000159-11	2-7			
1000159-12	2-33			

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000001	
USAGE	DL1000201	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	1-16-63
CHECKED		
DRAWN	J FUCHS	12-14-62
APPROVED FOR MSC		
BY DIRECTION		
MIT APPROVAL		1/16/63

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
—		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000159

SHEET 1 OF 1

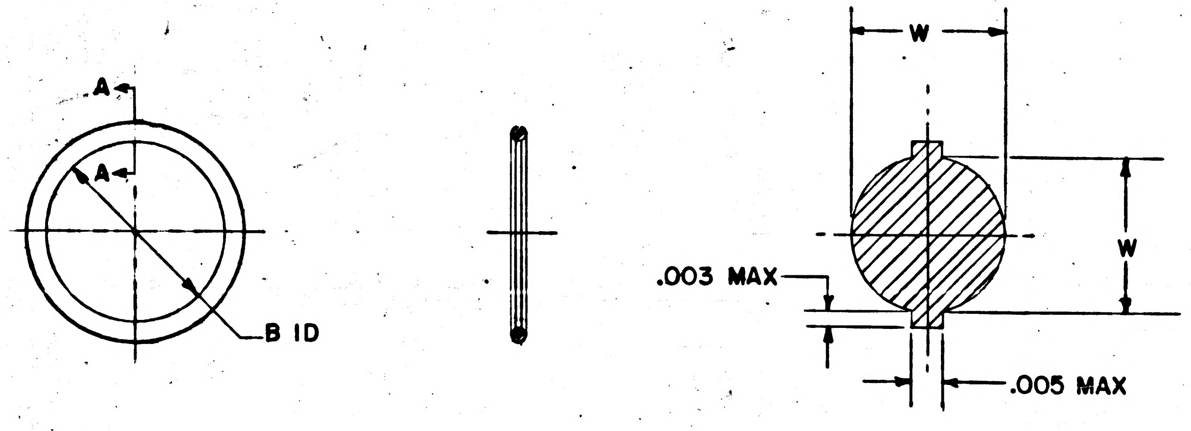
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	W DIA	B ID	
1000159-1	.139 ± .004	12.380 ± .030	
1000159-2	.139 ± .004	7.484 ± .030	
1000159-3	.103 ± .003	2.050 ± .010	
1000159-4	.064 ± .003	.239 ± .005	Ⓑ
1000159-5	.064 ± .003	.301 ± .005	Ⓑ
1000159-6	.072 ± .003	.351 ± .005	Ⓑ
1000159-7	.070 ± .003	.614 ± .005	Ⓒ
1000159-8	.070 ± .003	1.864 ± .010	
1000159-9	.070 ± .003	.176 ± .005	
1000159-10	.070 ± .003	1.364 ± .006	
1000159-11	.070 ± .003	.145 ± .005	
1000159-12	.070 ± .003	1.989 ± .010	
1000159-13	.070 ± .003	.301 ± .005	Ⓓ
1000159 14	.070 ± .003	.426 ± .005	

REVISIONS TDRR 00256

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
4-B	A	TDRR 00648	3-27-63	ajB	wk.
	B	TDRR 00844	4-17-63		uk
	C	TDRR 02323	7-30-63	ajB	
	D	TDRR 02507	8-14-63	ajB	
	E	REPLACED BY REV F WITH CHANGES TDRR 07686	16APR64		

ALL DIA. OF CROSS SECTIONS SHALL EQUAL W



SECTION AA
ENLARGED

NOTES Ⓐ

1. MATERIAL SHALL BE PARKER COMPOUND B318-7 PER MIL-G-22050
2. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND 1015404 CLASS 3
3. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130

Ⓔ REPLACED BY REV F WITH CHANGES

ORIGINAL SOURCE OF SUPPLY:
PARKER SEAL COMPANY
10567 JEFFERSON BLVD
CULVER CITY, CALIFORNIA

NASA NO	PARKER NO	NASA NO	PARKER NO
1000159-1	2-487	1000159-13	2-11
1000159-2	2-264	1000159-14	2-13
1000159-3	2-137		
1000159-4	3-2		
1000159-5	3-3		
1000159-6	3-4		
1000159-7	2-16		
1000159-8	2-32		
1000159-9	2-8		
1000159-10	2-28		
1000159-11	2-7		
1000159-12	2-33		

Ⓓ

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000001
USAGE	DL1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ⌗ DECIMALS ⌗ ANGLES ⌗
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A. J. Boyce	1-16-63
CHECKED		
DRAWN	J FUCHS	12-14-62

APPROVED FOR MSC
Jack Barnard
BY DIRECTION
MIT APPROVAL 1/16/63

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
⌗		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000159
SHEET 1 OF 1

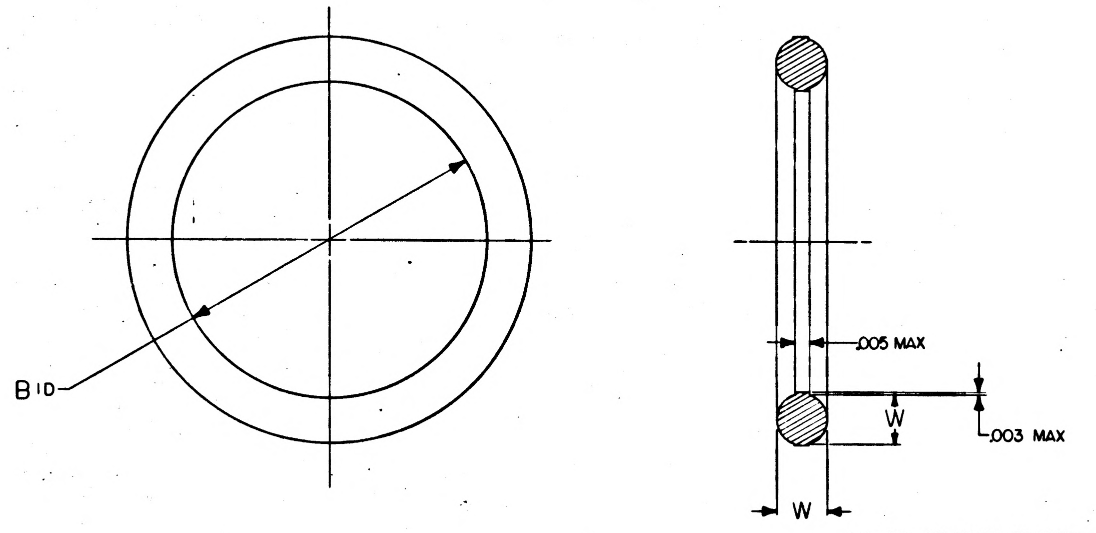
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	F	REPLACES REV E WITH CHANGES TDRR 07686	4/24/64	WR

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS AS SPECIFIED IN ND1015404, CLASS 3.
   - C. PACKING AND SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-116, SUB-METHOD IA-8.
2. INSPECTION AND ACCEPTANCE
   - A. ITEM SHALL BE MARKED WITH NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, MANUFACTURER'S IDENTIFICATION AND RUBBER CURE DATE IN ACCORDANCE WITH ND1002019.
   - B. DIMENSIONS: AS INDICATED
   - C. CURE DATE: WITHIN 1 YEAR OF DATE OF SHIPMENT
3. DESIGN REQUIREMENTS
   - A. MATERIAL: SHALL BE A CO-POLYMERIZED ISO-BUTYLENE WITH SUFFICIENT ISOPRENE TO PERMIT VULCANIZATION.
   - B. MATERIAL: SHALL BE CAPABLE OF MEETING THE REQUIREMENTS MIL-G-22050, EXCEPT FOR HYDRAULIC FLUID IMMERSION REQUIREMENTS AND INITIAL PROPERTIES WHICH SHALL BE AS LISTED BELOW:
     - 1) HARDNESS, SHORE A: 70 ± 5 POINTS
     - 2) ULTIMATE ELONGATION: 230 PER CENT MINIMUM
   - C. SHELF LIFE: 5 YEARS MINIMUM, FROM CURE DATE, AS PACKAGED.

PART NO.	W DIA	B ID
1000159-1	.139 ± .004	12.380 ± .030
1000159-2	.139 ± .004	7.484 ± .030
1000159-3	.103 ± .003	2.050 ± .010
1000159-4	.064 ± .003	.239 ± .005
1000159-5	.064 ± .003	.301 ± .005
1000159-6	.072 ± .003	.351 ± .005
1000159-7	.070 ± .003	.614 ± .005
1000159-8	.070 ± .003	1.864 ± .010
1000159-9	.070 ± .003	.176 ± .005
1000159-10	.070 ± .003	1.364 ± .006
1000159-11	.070 ± .003	.145 ± .005
1000159-12	.070 ± .003	1.989 ± .010
1000159-13	.070 ± .003	.301 ± .005
1000159-14	.070 ± .003	.426 ± .005
1000159-15	.139 ± .004	11.484 ± .030
1000159-16	.139 ± .004	5.359 ± .023



ALL DIA OF CROSS SECTIONS
SHALL EQUAL W

Ⓕ REPLACES REV E WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE USAGE	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 4-21-64
CHECKED
DRAWN J. Morse 3-31-64
APPROVED FOR MSC 4/24/64
MIT/IL APPROVAL DATE 4/24/64

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING
SCALE | UNIT WT. | CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000159
SHEET 1 OF 1 SHEET

1000159 F

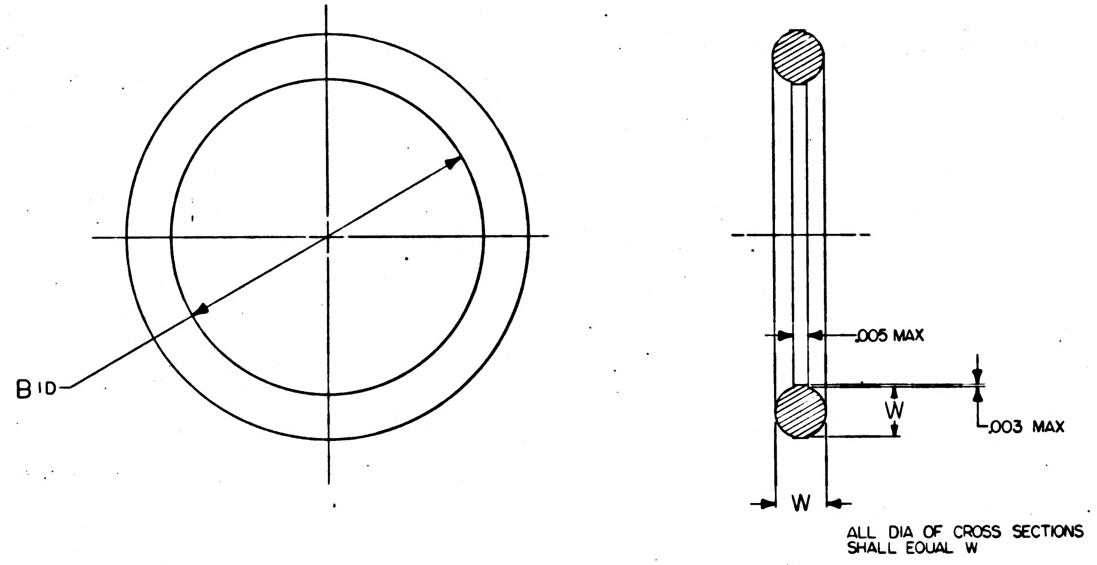
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	F	REPLACES REV E WITH CHANGES TDRR 07686	4/21/64	
	G	REVISED TDRR 12134	9-1-64	

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS AS SPECIFIED IN ND1015404, CLASS 3.
   - C. PACKING AND SHIPPING CONTAINERS SHALL BE IN ACCORDANCE WITH MIL-P-116, SUB-METHOD IA-8.
2. INSPECTION AND ACCEPTANCE
   - A. ITEM SHALL BE MARKED WITH NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, MANUFACTURER'S IDENTIFICATION AND RUBBER CURE DATE IN ACCORDANCE WITH ND1002019.
   - B. DIMENSIONS: AS INDICATED
   - C. CURE DATE: WITHIN 1 YEAR OF DATE OF SHIPMENT
3. DESIGN REQUIREMENTS
   - A. MATERIAL: SHALL BE A CO-POLYMERIZED ISO-BUTYLENE WITH SUFFICIENT ISOPRENE TO PERMIT VULCANIZATION.
   - B. MATERIAL: SHALL BE CAPABLE OF MEETING THE REQUIREMENTS MIL-G-22050, EXCEPT FOR HYDRAULIC FLUID IMMERSION REQUIREMENTS AND INITIAL PROPERTIES WHICH SHALL BE AS LISTED BELOW:
     - 1) HARDNESS, SHORE A: 70 ± 5 POINTS
     - 2) ULTIMATE ELONGATION: 230 PER CENT MINIMUM
   - C. SHELF LIFE: 5 YEARS MINIMUM, FROM CURE DATE, AS PACKAGED.

PART NO.	W DIA	B ID
1000159-1	.139 ± .004	12.380 ± .030
1000159-2	.139 ± .004	7.484 ± .030
1000159-3	.103 ± .003	2.050 ± .010
1000159-4	.064 ± .003	.239 ± .005
1000159-5	.064 ± .003	.301 ± .005
1000159-6	.072 ± .003	.351 ± .005
1000159-7	.070 ± .003	.614 ± .005
1000159-8	.070 ± .003	1.864 ± .010
1000159-9	.070 ± .003	.176 ± .005
1000159-10	.070 ± .003	1.364 ± .006
1000159-11	.070 ± .003	.145 ± .005
1000159-12	.070 ± .003	1.989 ± .010
1000159-13	.070 ± .003	.301 ± .005
1000159-14	.070 ± .003	.426 ± .005
1000159-15	.139 ± .004	11.484 ± .030
1000159-16	.139 ± .004	5.359 ± .023
1000159-17	.072 ± .003	.414 ± .005



ALL DIA OF CROSS SECTIONS SHALL EQUAL W

Ⓕ REPLACES REV E WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE
USAGE
NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED | DATE 4-21-64
CHECKED
DRAWN U. Morse 3-31-64
APPROVED FOR MSC
MIT/IL APPROVAL | DATE

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING

SCALE | UNIT WT. | CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000159
SHEET 1 OF 1 SHEET

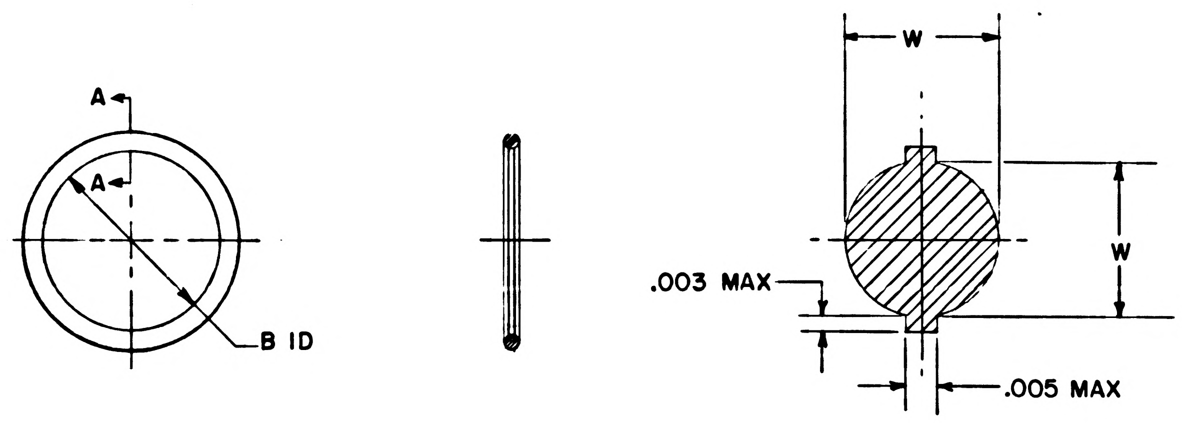
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

DASH NO.	W DIA	B ID
1000159 - 1	.139 ± .004	12.380 ± .030
1000159 - 2	.139 ± .004	7.484 ± .030
1000159 - 3	.103 ± .003	2.050 ± .010

REVISIONS TDRR 00256

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

ALL DIA. OF CROSS SECTIONS SHALL EQUAL W



SECTION AA
ENLARGED

NOTES

1. MATERIAL SHALL BE PARKER COMPOUND B318-7 PER AMS 3238A
2. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND 1015404 CLASS 3
3. IDENTIFY USING DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130

ORIGINAL SOURCE OF SUPPLY:
PARKER SEAL COMPANY
10567 JEFFERSON BLVD
CULVER CITY, CALIFORNIA

NASA NO	PARKER NO	PARKER COMPOUND
1000159-1	5-487	B-318-7
1000159-2	2-264	B-318-7
1000159-3	2-137	B-318-7

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000001	DL1000001
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	1-16-63
CHECKED		
DRAWN	J FUCHS	12-14-62
APPROVED FOR MSC	Jack Barnard	1/16/63
BY DIRECTION		
MIT APPROVAL	[illegible]	1/16/63

PACKING, PREFORMED
"O" RING

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
±		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

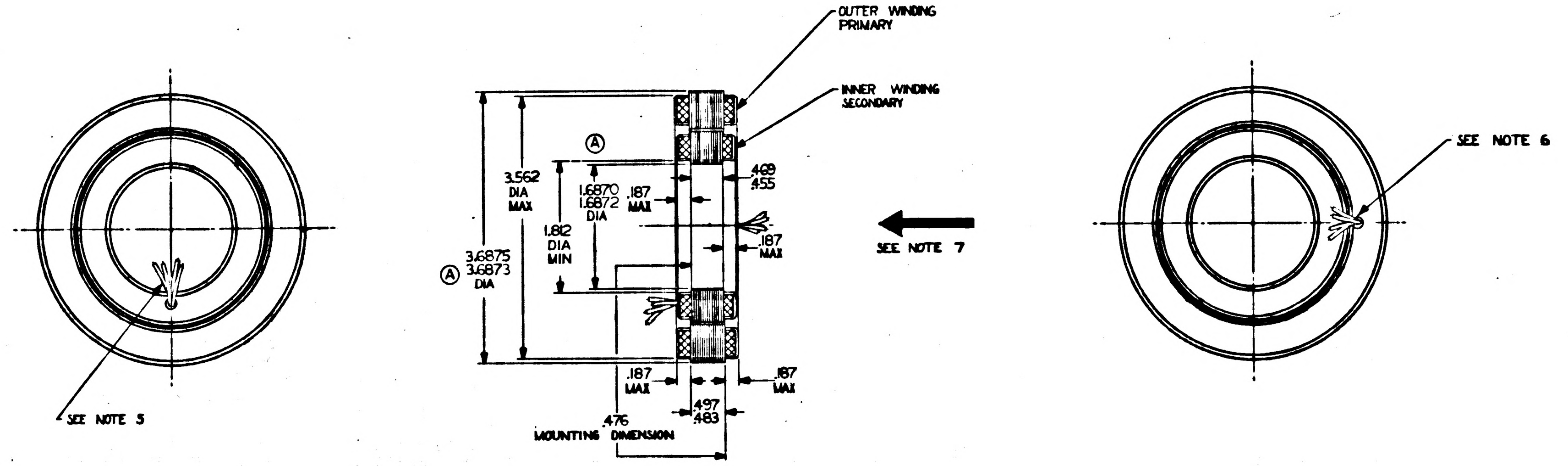
DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

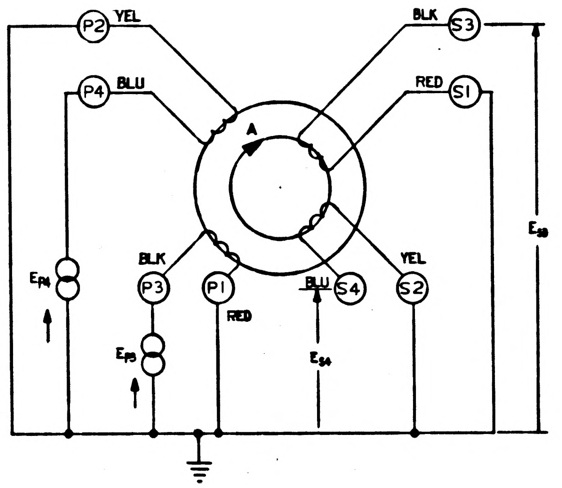
NASA DRAWING NO.
1000159

SHEET 1 OF 1

REVISIONS TDR 00183				
ZONE	SYM	DESCRIPTION	DATE	APPPOVAL
	A	TDRR 01242	5-15-53	WK



OUTER WINDING PRIMARY
INNER WINDING SECONDARY
Ⓐ
3.562 DIA MAX
1.6870 1.6872 DIA
.187 MAX
.469 .455
1.812 DIA MIN
.187 MAX
Ⓐ 3.6875 3.6873 DIA
.187 MAX
.187 MAX
.497 .483
.476 MOUNTING DIMENSION
SEE NOTE 7
SEE NOTE 5
SEE NOTE 6



P2 YEL
P4 BLU
BLK S3
RED S1
A
E_{P4}
BLK P3
P1 RED
BLU S4
YEL S2
E_{P3}
E_{S4}
E_{S8}

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° WHEN LEADS ARE POSITIONED AS SHOWN.
3. LEADS TO BE 12" MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
4. PART MUST CONFORM TO SPEC PS-1000160.
5. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1" R.
6. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1.450" R.
7. A POSITIVE RESOLVER ANGLE "A" RESULTS WHEN THE INNER RESOLVER WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTIONAL VIEW. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S8} = K\left[E_{P3} \cos 16A - E_{P4} \sin 16A\right]$$

$$E_{S4} = K\left[E_{P3} \sin 16A + E_{P4} \cos 16A\right]$$

WHERE "K" IS THE TRANSFORMATION RATIO. AT ELECTRICAL ZERO (A=0) $E_{S8} = KE_{P3}$ AND $E_{S4} = KE_{P4}$.

ORIGINAL SOURCES OF SUPPLY:

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY
PART NO.

CLIFTON PRECISION PRODUCTS CO., INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA
PART NO.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000161	
1000162	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —

DO NOT SCALE THIS DRAWING

MATERIAL: —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	10/17/62
CHECKED		
DRAWN	PALERMO	10-11-62

APPROVED FOR MSC
W J Klein 12-19-62
BY DIRECTION MIT APPROVAL
W A Hoffer 19 Dec 62

RESOLVER

SIXTEEN SPEED TRANSMITTER SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
1—1	—	—

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000160

SHEET OF

1000160 A

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PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4W8

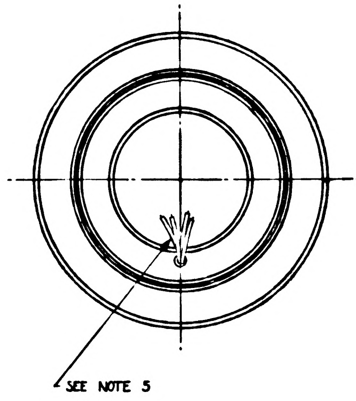
Record of Revisions

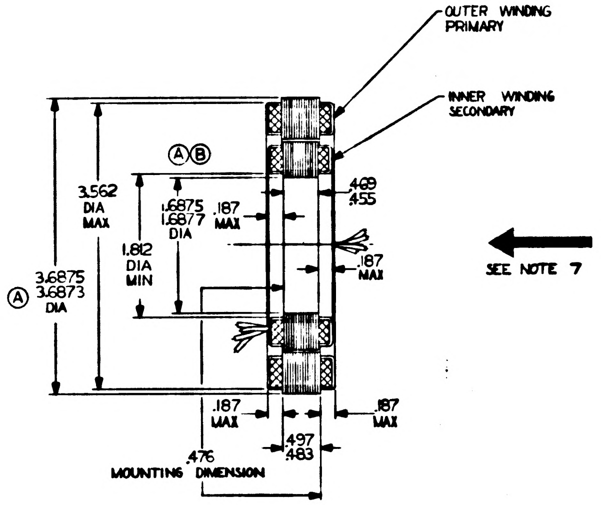
Revision Letter	TDRR #	Pages Revised	Approvals	
			MIT	NASA
A	00739	Title page, 1 through 5 inclusive, iiii eliminated.	WK	

This specification consists of pages i through iiii and 1 to 5 inclusive.

REV. A

REVISIONS TDR 00183				
ZONE	SYM	DESCRIPTION	DATE	APPPOVAL
	A	TDRR 01242	5-15-63	ajB WK
	B	TDRR 01329	5-21-63	ajB

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INNER WINDING SECONDARY
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1.6875 1.6877 DIA
1.812 DIA MIN
.187 MAX
.469 .455
.187 MAX
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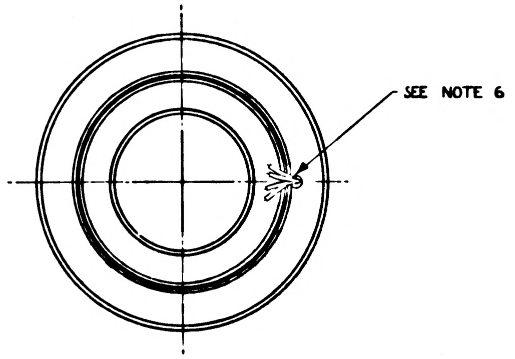
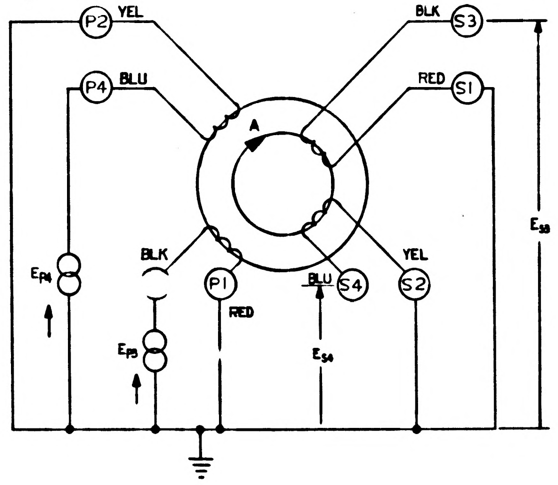
.497 .483
.476 MOUNTING DIMENSION
SEE NOTE 7

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YEL
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E_{S3}

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° WHEN LEADS ARE POSITIONED AS SHOWN.
3. LEADS TO BE 12" MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
4. PART MUST CONFORM TO SPEC PS-1000160.
5. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1" R.
6. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1.450" R.
7. A POSITIVE RESOLVER ANGLE "A" RESULTS WHEN THE INNER RESOLVER WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTIONAL VIEW. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\ \mathrm{COS}\ 16A - E_{P4}\ \mathrm{SIN}\ 16A\right]$$

$$E_{S4} = K\left[E_{P3}\ \mathrm{SIN}\ 16A + E_{P4}\ \mathrm{COS}\ 16A\right]$$

WHERE "K" IS THE TRANSFORMATION RATIO. AT ELECTRICAL ZERO (A=0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$.

ORIGINAL SOURCES OF SUPPLY:

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY
PART NO.

CLIFTON PRECISION PRODUCTS CO., INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA
PART NO.

MASTER

INCHES
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PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000161	
1000162	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	10/17/62
CHECKED		
DRAWN	PALERMO	10-11-62

APPROVED FOR MSC
WJ Rhine 12-19-62
BY DIRECTION MIT APPROVAL
WA Dyffer 19 Dec 62

RESOLVER
SIXTEEN SPEED TRANSMITTER SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
1-1	—	—

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000160
SHEET OF

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1000160 B

[redacted] Apollo G and N Specification
PS-1000160
Class A
TDRR00210
28 December 1962

PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 ~~through~~ 5 inclusive, iiii eliminated.	WK		
B	02411	All Pages	WK		12 Aug 63

This specification consists of pages i through iii and 1 to 5 inclusive.

Apollo G&N Specification
PS-1000160

28 December 1962
Class A Release
TDRR 00210

This document has been prepared for the purchase of material used in the manufacture of components; the performance requirements and tolerance of the components; the construction specifications; and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

W.H. Kupfer 28 Dec '62
MIT Instrumentation Laboratory Date

F.B. Michaels 12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the Sixteen Speed Resolver Transmitter, Type 37RU4N8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATION

Apollo G&N

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

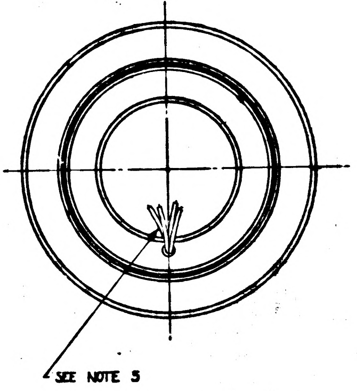
DRAWINGS

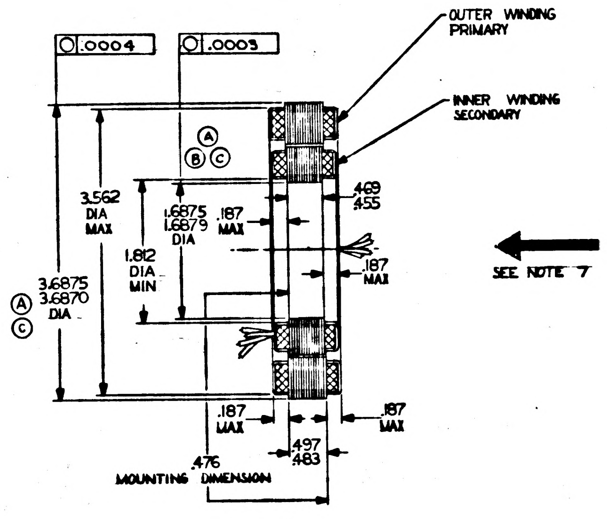
Apollo G&N

1000161	16X Resolver Assembly, Outer Axi
1000162	16X Resolver Assembly, Inner & Middle Axis
1000160	Resolver, Sixteen Speed Transmit Specification Control Drawing

ZONE	SYM	DESCRIPTION	DATE	APPPOVAL	
	A	TDRR 01242	5-15-63	ajb	WK
	B	TDRR 01329	5-21-63	ajB	WK
	C	TDRR 04560	1-12-63	ADM	WK

REVISIONS TDR 00183

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INNER WINDING SECONDARY
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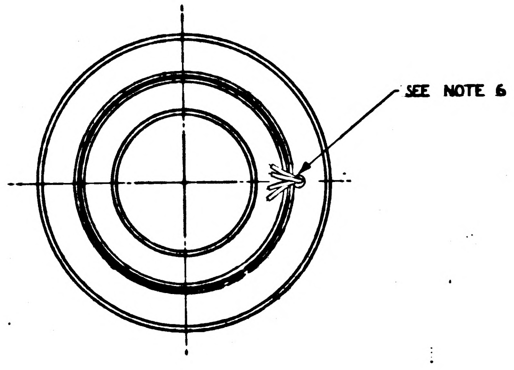
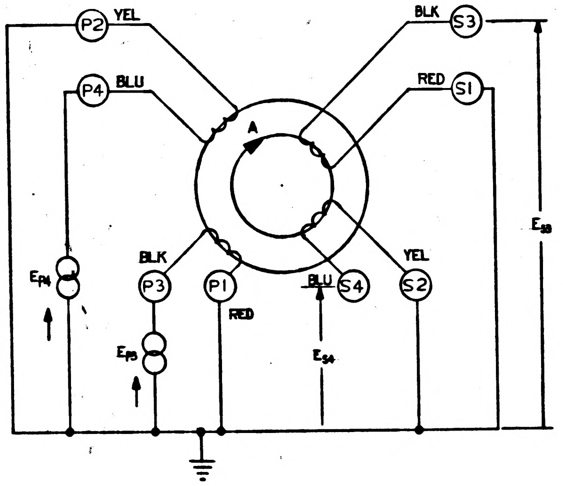
.476 MOUNTING DIMENSION
SEE NOTE 7

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NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
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5. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1" R.
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$$E_{S3} = K\left[E_{P3} \cos 16A - E_{P4} \sin 16A\right]$$

$$E_{S4} = K\left[E_{P3} \sin 16A + E_{P4} \cos 16A\right]$$

WHERE "K" IS THE TRANSFORMATION RATIO. AT ELECTRICAL ZERO (A=0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$.

Ⓒ PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

INCHES
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PHOTOGRAPHIC SCALE ONLY

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000161	
1000162	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DATE
APPROVED AJ Boyce 10/17/62
CHECKED
DRAWN PALERMO 10-11-62
APPROVED FOR MSC W J Rhine 12-19-62
BY DIRECTION MIT APPROVAL
W.A. Dopfer 19 Dec 62

RESOLVER
SIXTEEN SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

SCALE 1—1
UNIT WT. —
CODE IDENT. —

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000160
SHEET OF

INCHES
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PHOTOGRAPHIC SCALE ONLY

[illegible] Apollo G and N Specification
PS-1000160

Class A
TDRR00210
28 December 1962

PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	00739	Title page, 1 ~~through~~ 5 inclusive, iiii eliminated.	WK		
B	02411	All Pages	WK	[illegible]	12 Aug 63
C	03693	2,3, and 4	WK	WGR 10-8-63	8 Oct 63

This specification consists of pages i through iii and 1 to 5 inclusive.

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28 December 1962
Class A Release
TDRR 00210

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This document does not supersede any existing publication or instructions.

WA Koppen 28 Dec '62
MIT Instrumentation Laboratory Date

JB Michaels 12/28/62
NASA/MSC Approval Date

PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the Sixteen Speed Resolver Transmitter, Type 37RU4N8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATION

Apollo G&N

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G&N

1000161	16X Resolver Assembly, Outer Axis
1000162	16X Resolver Assembly, Inner & Middle Axis
1000160	Resolver, Sixteen Speed Transmitter, Specification Control Drawing

[illegible] Apollo G and N Specification
PS-1000160

Class A
TDRR00210
28 December 1962

PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
			MIT	NASA	
A	C0739	Title page, 1 through 5 inclusive, iiii eliminated.	WK		
B	02411	All Pages	WK		12 Aug 63
C	03693	2,3, and 4	WK	WgR 10-[illegible]-63	8 Oct 63

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REV. A
(Rev. B)

28 December 1962
ClassA Release
TDRR 00210

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[illegible]
MIT Instrumentation Laboratory Date

12/21/62
NASA/MSC Approval Date

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

EXAMINED AND APPROVED

	AST-Contl & Guidance Engr. Mgr.	12/20/62
APPROVED BY	TITLE	DATE
APPROVED BY	TITLE	DATE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Robert J Therrien	Staff Member	28 December 1962
EXAMINED BY	TITLE	DATE
John E. Miller	Director-IMU	28 December 1962
APPROVED BY	TITLE	DATE
David G Hoag	Tech Dir	28 Dec 62
APPROVED BY	TITLE	DATE

AC SPARK PLUG DIVISION, GENERAL MOTORS CORPORATION

Henry J Kaczmarczyk	Sr. Specification Writer	28 December 1962
PREPARED BY	TITLE	DATE
A J Italiano		28 Dec 1962
ACCEPTED BY	TITLE	DATE

PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4N8

1. SCOPE

1.1 This specification establishes the requirements for the procurement of the Sixteen Speed Resolver Transmitter, Type 37RU4N8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATION

Apollo G&N

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification.

DRAWINGS

Apollo G&N

1000161	16X Resolver Assembly, Outer Axis
1000162	16X Resolver Assembly, Inner & Middle Axis
1000160	Resolver, Sixteen Speed Transmitter, Specification Control Drawing

3. REQUIREMENTS

3.1 GENERAL The resolver shall conform to the requirements of Specification MD-1002013 with the following exceptions or additions.

a. The resolver shall be tested as an RX only with black excited high, red grounded, and the yellow and blue primary windings commoned and ungrounded.

b. The following paragraphs of Specification MD-1002013 are not applicable.

1. Phase Shift Variation Due to Voltage
2. Angular Error Versus Voltage
3. Angular Error Versus Frequency
4. Primary Impedance Unbalance
5. Temperature Rise
6. Friction Torque
7. Brush Slip Ring continuity
8. Phase Shift Versus Rotation

c. Measurement of air gap per side shall be made and shall conform to that value listed in 3.5m.

d. Alignment of slots A and B at electrical zero in accordance with drawings 1000161 and 1000162 shall be as specified in 3.5p.

3.2 DESIGN AND CONSTRUCTION The resolver shall be of the design, construction, and physical dimensions shown on drawing 1000160. The manufacture, materials, and mechanical and electrical construction of the resolver shall be in accordance with the requirements of Specification MD-1002013.

3.3 FINISHES AND PROTECTIVE TREATMENT The resolver finishes, protective treatment, and moisture, fungus, and corrosion treatments shall be in accordance with the requirements of Specification MD-1002013 and drawing 1000160.

3.4 QUALIFICATION PERFORMANCE CHARACTERISTICS AND CONDITIONS

3.4.1 **GENERAL** The qualification testing shall conform to the requirements of Specification ND-1002013 with the following exceptions or additions.

3.4.1.1 Environmental

3.4.1.1.1 Vibration, Operating With the resolver tested as specified, the angular deviation shall not exceed 5 arc seconds, peak.

3.4.1.1.2 Shock, Operating With the resolver tested as specified, the angular deviation shall not exceed 5 arc seconds, peak.

3.4.1.1.3 Low Temperature, Operating With the resolver subjected to a temperature of -17.8°C ±2.8°C (0°±5°F) and tested as specified, the angular deviation shall not exceed 5 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 10 mv, rms.

3.4.1.1.4 High Temperature, Operating With the resolver subjected to a temperature of 93.3° ±2.8°C (200°F ±5°F) and tested as specified, the angular deviation shall not exceed 5 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 10 mv, rms.

3.4.1.1.5 52°C Temperature, Operating With resolver subjected to a temperature of 52° ±1°C (125.6°F ±1.8°F) and tested as specified, the angular deviation shall not exceed 4 arc seconds, peak and the bridge fundamental null voltage variations shall not exceed 5 mv, rms.

3.4.1.1.6 Thermal Shock The resolver shall be tested as specified with the low temperature as indicated in 3.4.1.1.3.

3.4.1.1.7 Humidity, Operating With the resolver tested as specified, the angular deviation shall not exceed 5 arc seconds, peak.

3.4.1.1.8 Thermal Vacuum The resolver shall be tested as specified while exposed to a vacuum level of 1×10^{-4} mm, Hg and the low and high temperatures specified in 3.4.1.1.3 and 3.4.1.1.4 respectively.

3.4.1.2 Endurance During the applicable portions of endurance testing, the following conditions shall be maintained:

a) **Low Temperature**	21.1° ±2.8°C (70° ±5°F)
b) **High Temperature**	82.2° ±2.8°C (180° ±5°F)
c) **Operating Speed**	0 rpm

3.5 **DETAIL PERFORMANCE CHARACTERISTICS** The resolver shall have the following specific characteristics when tested at the applicable ambient conditions as specified in Specification MD-1002013.

a.	Primary	Outer member
b.	Test Voltage	28V ±2%
c.	Test Frequency	800 cps ±0.5%
d.	Impedance	
	(1) Zpo	40 ohms +15% + j 360 ohms ±10%
	(2) Zps	75 + j 245 ohms, nominal
	(3) Zso	395 ohms +15% + j 1050 ohms ±10%
	(4) Zss	420 + j 690 ohms, nominal
e.	Null Voltages	
	(1) Total	20 millivolts, maximum
	(2) Fundamental	15 millivolts, maximum
f.	Phase Shift	$5.5^\circ \pm 1.5^\circ$
g.	Transformation Ratio	1.00 ±3%
h.	Angular Error	20 arc seconds peak, of one speed mechanical shaft maximum; 10 arc seconds rms, of one speed mechanical shaft maximum.
	Angular Interval for Accuracy Measurement	16° electrical
i.	Impedance Unbalance, Secondary	2 Z-sec maximum of one speed mechanical shaft
	Angle for Impedance Unbalance Measurement	45° and 315° of second electrical cycle
j.	Input Current, Unloaded	80 milliamperes, nominal
k.	Input Power, Unloaded	0.25 watt, nominal
m.	DC Resistance	
	(1) Primary	35.0 ohms +15%
	(2) Secondary	380 ohms ±15%
n.	Air Gap Per Side	0.0045 inch minimum
p.	Alignment, Slots A and B	$90^\circ \pm 0^\circ$ 1 minute

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL Sampling, inspection, and testing shall be in accordance with the requirements of Specification ND-1002013, and as specified herein.

5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery shall be in accordance with the requirements of Specification ND-1002013.

6. NOTES

6.1 The notes specified in Specification ND-1002013 are applicable to this resolver.

[redacted] Apollo G and N Specification
PS-1000160 D

Class A
TDRR00210
28 December 1962

PROCUREMENT SPECIFICATION

SIXTEEN SPEED RESOLVER TRANSMITTER

TYPE 37RU4N8

Record of Revisions

Revision Letter	TDRR #	Pages Revised	Approvals		DATE
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A	C0739	Title page,1 through 5 inclusive, iiii eliminated.	WK		
B	02411	All Pages	WK		12 Aug 63
C	03693	2,3, and 4	WK	10-8-63	8 Oct 63
D	26937	3 RDG/ac	WK	----	3/8/66

This specification consists of pages i through iii and 1 to 5 inclusive.

(Rev. B)

3.4 QUALIFICATION PERFORMANCE CHARACTERISTICS AND CONDITIONS

3.4.1 GENERAL. The qualification testing shall conform to the requirements of Specification ND-1002013 with the following exceptions or additions.

3.4.1.1 Environmental

3.4.1.1.1 Vibration, Operating. With the resolver tested as specified, the angular deviation shall not exceed 7.5 arc seconds, peak.

3.4.1.1.2 Shock, Operating. With the resolver tested as specified, the angular deviation shall not exceed 7.5 arc seconds, peak.

3.4.1.1.3 Low Temperature, Operating. With the resolver subjected to a temperature of -17.8°C ±2.8°C (0° ±5°F) and tested as specified, the angular deviation shall not exceed 7.5 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 10 mv, rms.

3.4.1.1.4 High Temperature, Operating. With the resolver subjected to a temperature of 93.3° ±2.8° (200°F ±5°F) and tested as specified, the angular deviation shall not exceed 7.5 arc seconds, peak and the bridge fundamental null voltage variation shall not exceed 10 mv, rms.

3.4.1.1.5 52°C Temperature, Operating. With resolver subjected to a temperature of 52° ±1°C (125.6°F ±1.8°F) and tested as specified, the angular deviation shall not exceed 7.5 arc seconds, peak and the bridge fundamental null voltage variations shall not exceed 10 mv rms.

3.4.1.1.6 Thermal Shock. The resolver shall be tested as specified with the low temperature as indicated in 3.4.1.1.3.

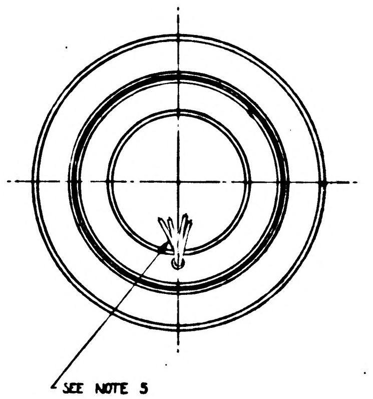
3.4.1.1.7 Humidity, Operating. With the resolver tested as specified, the angular deviation shall not exceed 40 arc seconds, peak.

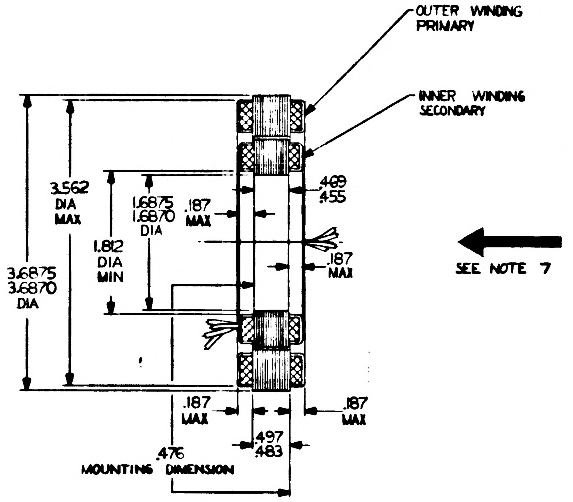
3.4.1.1.8 Thermal Vacuum. The resolver shall be tested as specified while exposed to a vacuum level of 1 x 10^{-4} mm, Hg and the low and high temperature specified in 3.4.1.1.3 and 3.4.1.1.4 respectively.

3.4.1.2 Endurance. During the applicable portions of endurance testing, the following conditions shall be maintained:

a) Low Temperature	21.1° ±2.8°C (70° ±5°F)
b) High Temperature	82.2° ±2.8°C (180° ±5°F)
c) Operating Speed	0 rpm

REVISIONS TDR 00183				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

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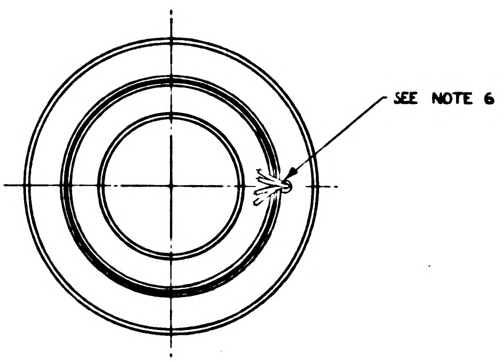
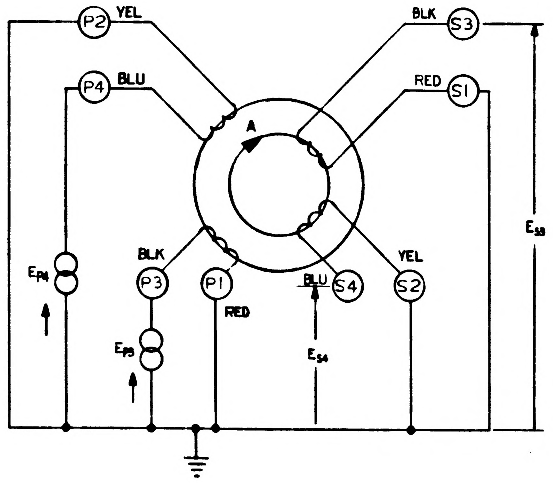
MOUNTING DIMENSION
SEE NOTE 7

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S2
E_{P4}
E_{P3}
E_{S4}
E_{S3}

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. RESOLVERS SHALL BE AT ELECTRICAL ZERO WITHIN ±2° WHEN LEADS ARE POSITIONED AS SHOWN.
3. LEADS TO BE 12" MINIMUM LENGTH PER MIL-W-16878 TYPE E-28.
4. PART MUST CONFORM TO SPEC PS-1000160.
5. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1" R.
6. LEADS TO EXIT THRU A .156 DIA HOLE LOCATED ON A 1.450" R.
7. A POSITIVE RESOLVER ANGLE "A" RESULTS WHEN THE INNER RESOLVER WINDING IS ROTATED CLOCKWISE FROM ELECTRICAL ZERO AS VIEWED IN THE DIRECTION INDICATED BY THE ORIENTATION ARROW IN SECTIONAL VIEW. POLARITY IS SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$$E_{S3} = K\left[E_{P3}\ \mathrm{COS}\ 16A - E_{P4}\ \mathrm{SIN}\ 16A\right]$$

$$E_{S4} = K\left[E_{P3}\ \mathrm{SIN}\ 16A + E_{P4}\ \mathrm{COS}\ 16A\right]$$

WHERE "K" IS THE TRANSFORMATION RATIO. AT ELECTRICAL ZERO (A=0) $E_{S3} = KE_{P3}$ AND $E_{S4} = KE_{P4}$.

ORIGINAL SOURCES OF SUPPLY:

THE BENDIX CORPORATION
TETERBORO, NEW JERSEY
PART NO.

CLIFTON PRECISION PRODUCTS CO., INC.
MARPLE AT BROADWAY
CLIFTON HEIGHTS, PENNSYLVANIA
PART NO.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000161	
1000162	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	J.J. Boyce	10/17/62
CHECKED		
DRAWN	PALERMO	10-11-62
APPROVED FOR MSC	W.J. Rhine	12-19-62
BY DIRECTION	MIT APPROVAL	
	W.A. Hopper	19 Dec 62

RESOLVER
SIXTEEN SPEED TRANSMITTER
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
1-1	—	—

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000160
SHEET OF

1000160

NASA DOCUMENT
~~ND~~ PS-1000160
26 December 1962
Class A Release
TDRR-00210

This document has been prepared for the purchase of material used in the manufacture of components the performance requirements and tolerance of the components; the construction specifications and inspection and test procedures for the components, used on Apollo G&N Equipment.

This document shall be used to check that parts and materials are procured, assembled, and tested to the latest approved and/or authenticated documentation. In case of conflict between this document and drawings and/or specifications the document with the latest date applies.

This document does not supersede any existing publication or instructions.

25Dec'62
MIT Instrumentation Laboratory Date

12/21/62
NASA/MSC Approval Date

NASA PROCUREMENT
SPEC NO. PS-1000160
20 December 1962
Class A
TDRR

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
SIXTEEN SPEED RESOLVER TRANSMITTER
TYPE 37RU N8
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions and Amendments

Revision Letter	Amendment Number	Date of Revision or Amendment

This specification consists of page i to iii and 1 to 5 inclusive

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DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
SIXTEEN SPEED RESOLVER TRANSMITTER
TYPE 37RU N8

TABLE OF CONTENTS

Section	Title	Page
1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	2
4	QUALITY ASSURANCE PROVISIONS	5
5	PREPARATION FOR DELIVERY	5
6	NOTES	5

DESCRIPTION AND REQUIREMENTS PUBLICATION
FOR
PROCUREMENT OF
SIXTEEN SPEED RESOLVER TRANSMITTER
TYPE 37RU N8

1. SCOPE

1.1 SCOPE. This specification establishes the requirements for the procurement of the Sixteen Speed Resolver Transmitter, Type 37RU N8, hereinafter called resolver.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids form a part of this specification to the extent specified herein.

SPECIFICATION

NASA

ND-1002013	Description and Requirements Publication for Procurement of Resolvers, Electrical, AC, General Specification for National Aeronautics and Space Administration

DRAWINGS

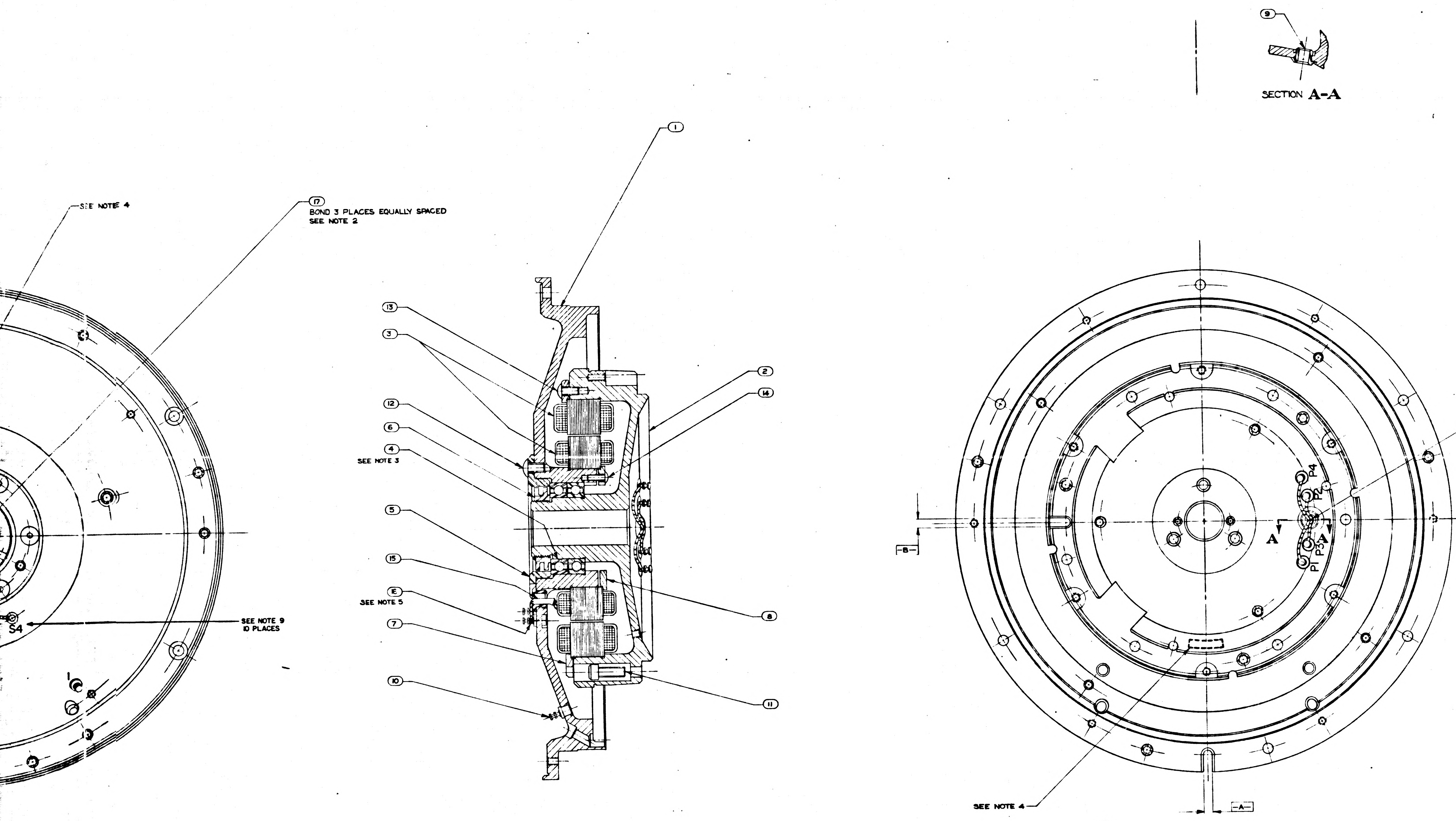
NASA

1000161	Mtg. Resolver Assembly, [illegible] Axis, Preliminary Outline
1000162	Mtg. Resolver Assembly, Inner & Middle Axis, Preliminary Outline
1000160	Resolver, Sixteen Speed Transmitter, Specification Control Drawing

(Copies of specifications and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00362	2-12-63	

REVISIONS TDRR 00183



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QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 10	18
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-5583		17
AS REQ'D	SOLDER, (TIN, LEAD, SILVER)	SN10WARP2	QQ-S-571		16
AS REQ'D	TUB., INS, ELECTRICAL		MIL-I-22129		15
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-3			14
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-14			13
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-25			12
6	SCR, CAP, SOC HD, HEX	[illegible]-7			11
10	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15X RSVR	1000084			8
1	CLAMP, OUTER RING 15X RSVR	1000079			7
1	NUT, BRG RET	1000086			6
1	RET, BRG OUTER AXIS	1000091			5
1	BRG, BALL, DUPLEX	1000029			4
1	RESOLVER, 16X TRANSMITTER	1000160			3
1	SHAFT, STUB 15X OUTER AXIS	1000053			2
1	HSG, BRG 15X OUTER AXIS	1000080			1

LIST OF PARTS AND MATERIALS

MASTER

Ⓐ

1000205	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

INCHES
PHOTOGRAPHIC SCALE ONLY

MIT
INSTRUMENTATION LAB
CONTRACT
NAS

APPROVED DATE
CHECKED
DRAWN DMWHITE 9-7-62
APPROVED
W J Rhine 12-6-62
MIT APPROVAL 19 Dec 62

16X RESOLVER ASSEMBLY
OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS

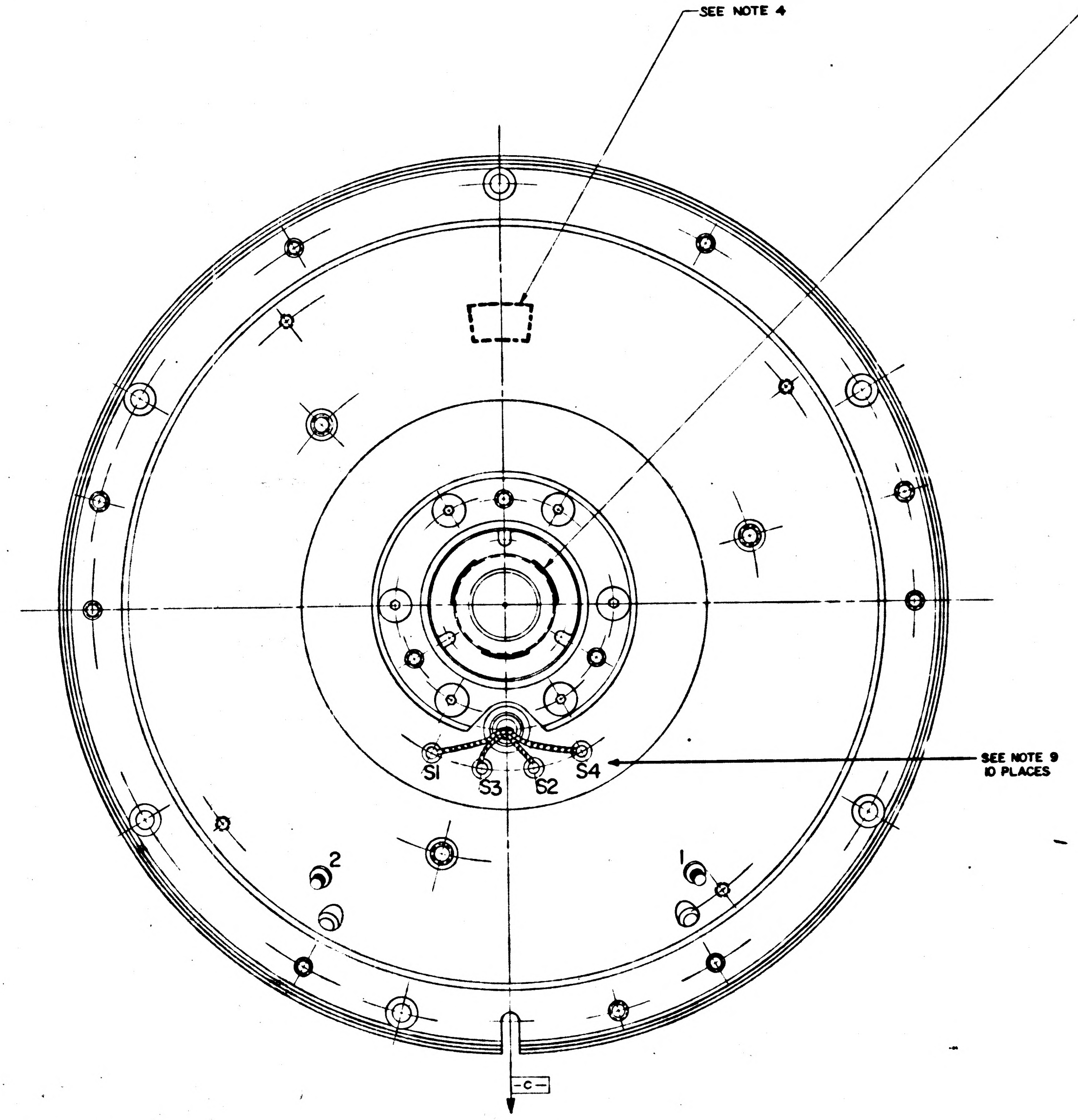
DWG NO

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

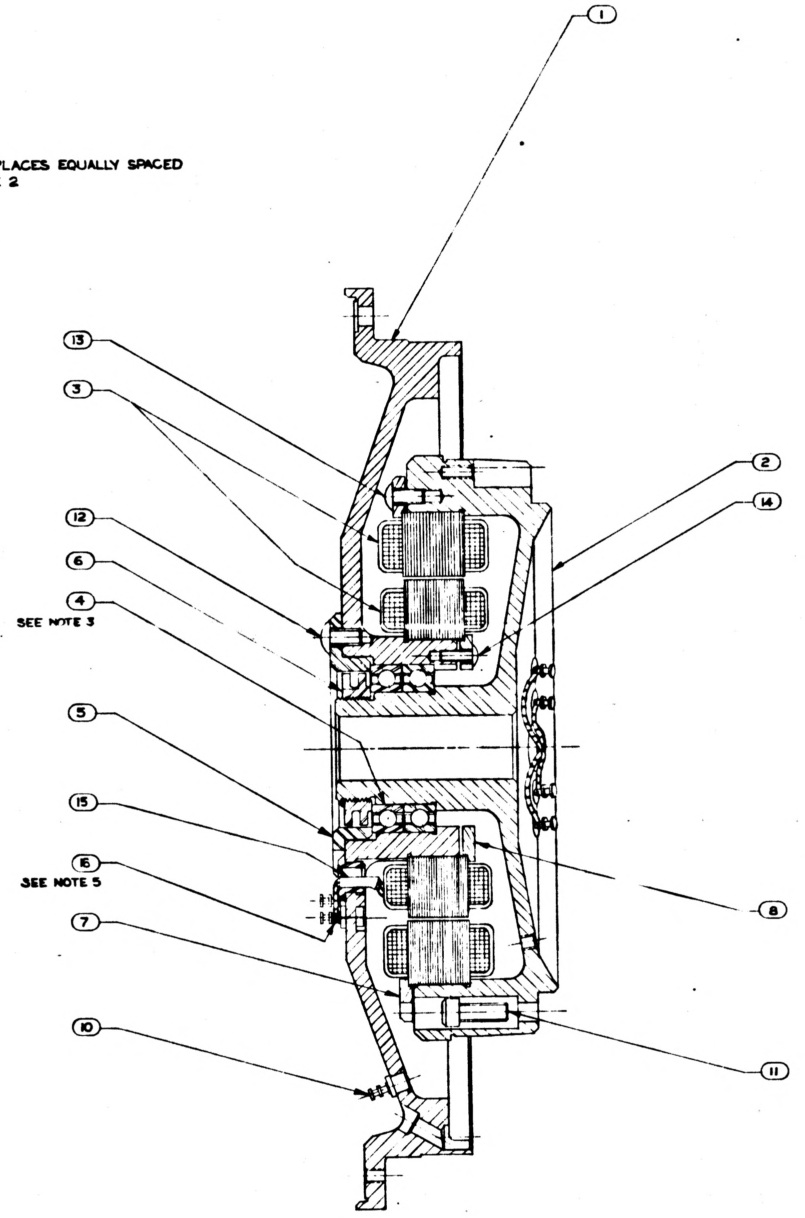
NASA DRAWING NO.
1000161
SHEET 1 OF 1

1000161 A

WIRING LIST	
TERM	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU



SEE NOTE 4
⑰
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
S1
S3
S2
S4
SEE NOTE 9
10 PLACES
2
1
-C-



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⑥
④
SEE NOTE 3
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⑮
⑥
SEE NOTE 5
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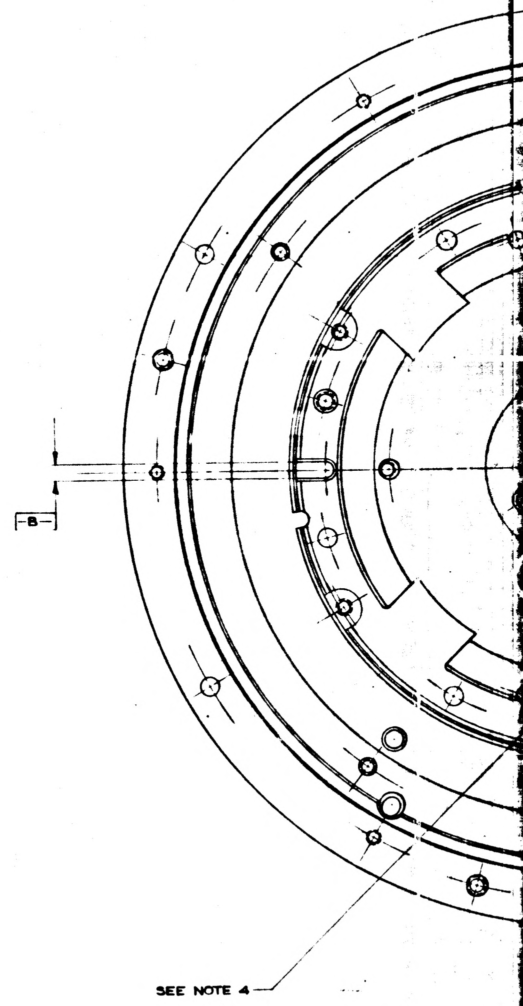
⑪



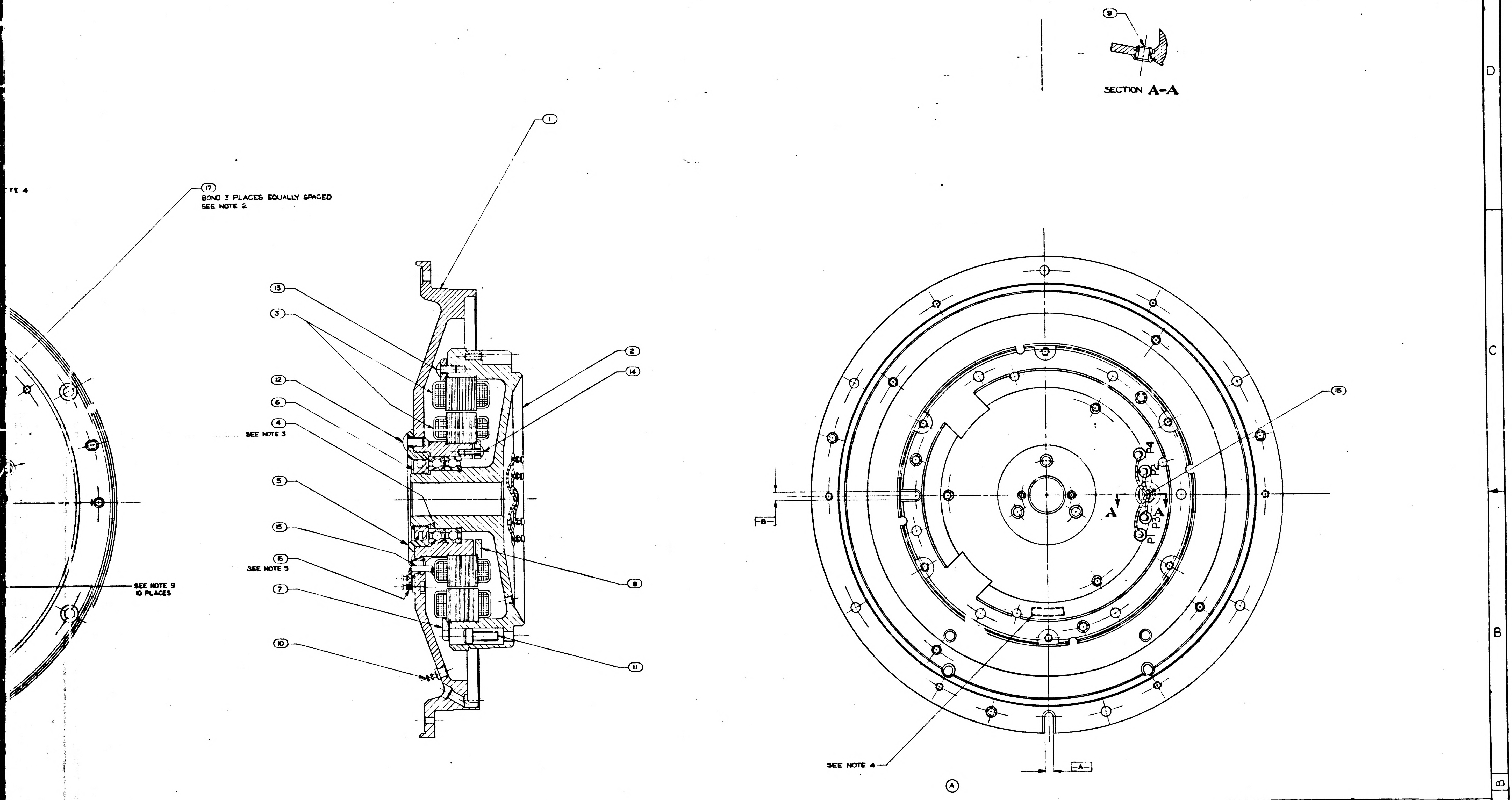
Ⓐ

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY ⑰ TO ② & ⑥ AFTER ASSEMBLY
3. ECCENTRICITY MARKS ON BOTH RACES OF ④ TO BE ALIGNED WITHIN 5° OF -C- & IN THE DIRECTION OF THE ARROW SHOWN WHEN ( ) & ② ARE IN POSITION SHOWN
4. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO., ON ① & MATCHED SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130
5. SOLDER PER MIL-STD-440 USING ⑯
6. ASSEMBLE PER AP100016
7. ASSEMBLY TO MEET REQUIREMENTS OF PS1000160.
8. SCREW TORQUE REQUIREMENTS ± 7%
   - ⑥ 400 IN LB
   - ⑫ 10.0 IN LB
   - ⑬ 5.0 IN LB
   - ⑭ 3.5 IN LB
9. MARK LETTERS 1/8 HIGH WITH ITEM ⑱ AT LOCATIONS SHOWN
10. ITEM ⑫ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508.
11. Ⓐ RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN.
12. MAX. ALLOWABLE TORQUE: 1 OZ-IN.

	REV	SHEET
1000161	A	1

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDRR 00185			
A	TDRR 00362	2-12-63		VK
B	TDRR 00484	3-5-63		WR.



QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 10	18
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-13883		17
AS REQ'D	SOLDER, (TIN, LEAD, SILVER)	SN10WARP2	QQ-S-571		16
AS REQ'D	TUB., INS, ELECTRICAL		MIL-I-22129		15
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-3			14
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-14			13
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-25			12
6	SCR, CAP, SOC HD, HEX	000110-7			11
10	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15× RSVR	1000084			8
1	CLAMP, OUTER RING 15× RSVR	1000079			7
1	NUT, BRG RET	1000086			6
1	RET, BRG OUTER AXIS	1000091			5
1	BRG, BALL, DUPLEX	1000029			4
1	RESOLVER, 16 X TRANSMITTER	1000160			3
1	SHAFT, STUB 15X OUTER AXIS	1000053			2
1	HSG, BRG 15X OUTER AXIS	1000080			1

LIST OF PARTS AND MATERIALS

(A)

MASTER

(A)

1000205	BL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —||—

M I T
INSTRUMENTATION LAB
CONTRACT
APPROVED
CHECKED
DRAWN DMWHITE 9-7-62
APPROVED
W J Rhine 12-19-62
MIT APPROVAL 19 Dec 62

16X RESOLVER ASSEMBLY
OUTER AXIS

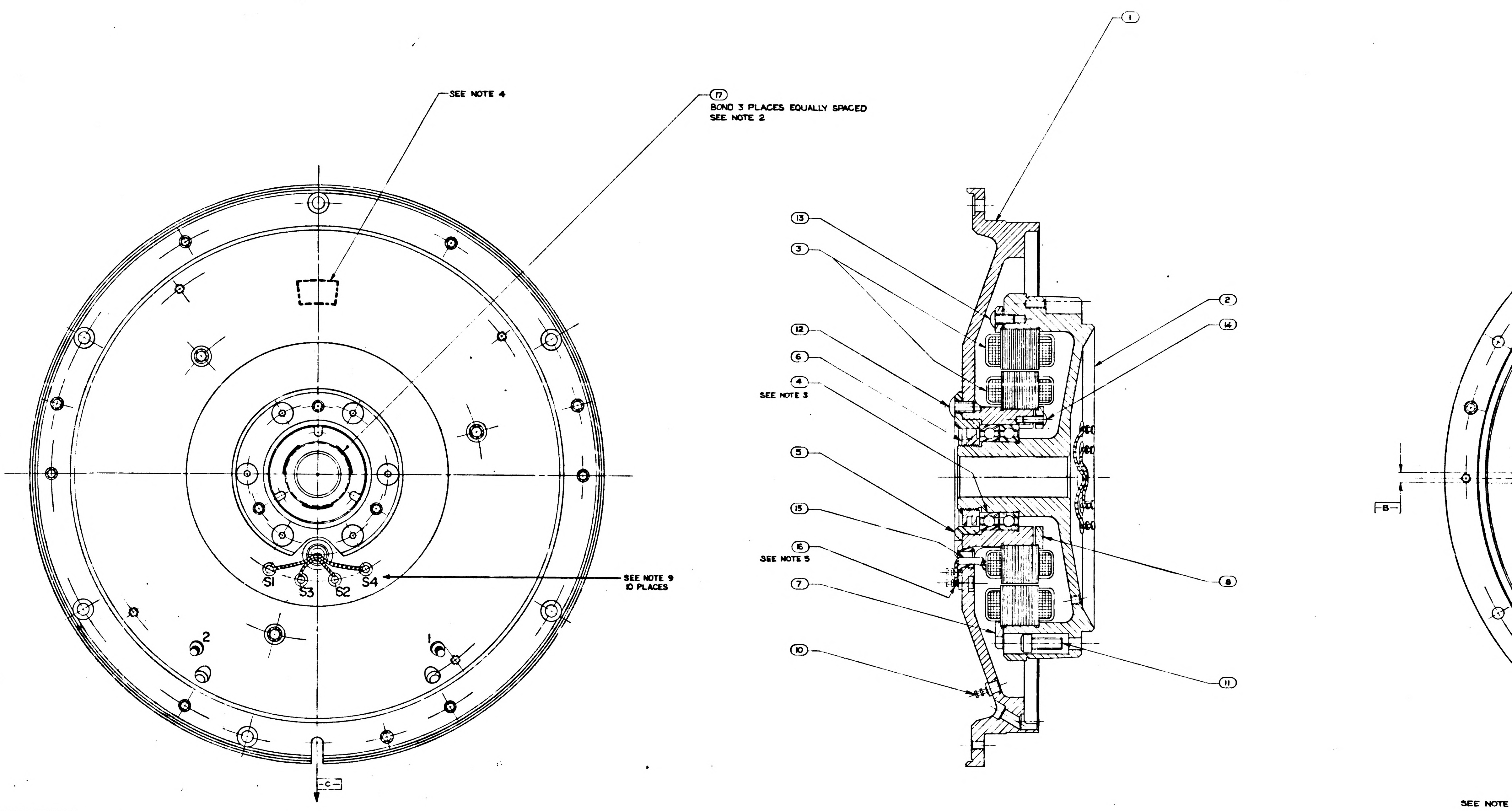
SCALE 2/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
NASA DRAWING NO. 1000161
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000161 B

WIRING LIST	
TERM	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
⑰
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
S1
S3
S2
S4
SEE NOTE 9
10 PLACES
1
2
-C-
①
⑬
③
⑫
⑥
④
SEE NOTE 3
⑤
⑮
⑯
SEE NOTE 5
⑦
⑩
②
⑭
⑧
⑪
-B-
SEE NOTE

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY ⑰ TO ② & ⑥ AFTER ASSEMBLY
3. ECCENTRICITY MARKS ON BOTH RACES OF ④ TO BE ALIGNED WITHIN 5° OF -C- & IN THE DIRECTION OF THE ARROW SHOWN WHEN ① & ② ARE IN POSITION SHOWN
4. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO., ON ① & MATCHED SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130
5. SOLDER PER MIL-STD-440 USING ⑯

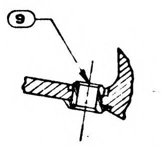
Ⓑ ~~6. ASSEMBLE PER AP1000161~~

7. ASSEMBLY TO MEET REQUIREMENTS OF PS1000160.
8. SCREW TORQUE REQUIREMENTS ± 7%
   - ⑥ 400 IN LB
   - ⑫ 10.0 IN LB
   - ⑬ 5.0 IN LB
   - ⑭ 3.5 IN LB
9. MARK LETTERS 1/8 HIGH WITH ITEM ⑱ AT LOCATIONS SHOWN
10. ITEM ⑱ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508.
11. RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN. Ⓐ
12. MAX. ALLOWABLE TORQUE: 1 OZ-IN.

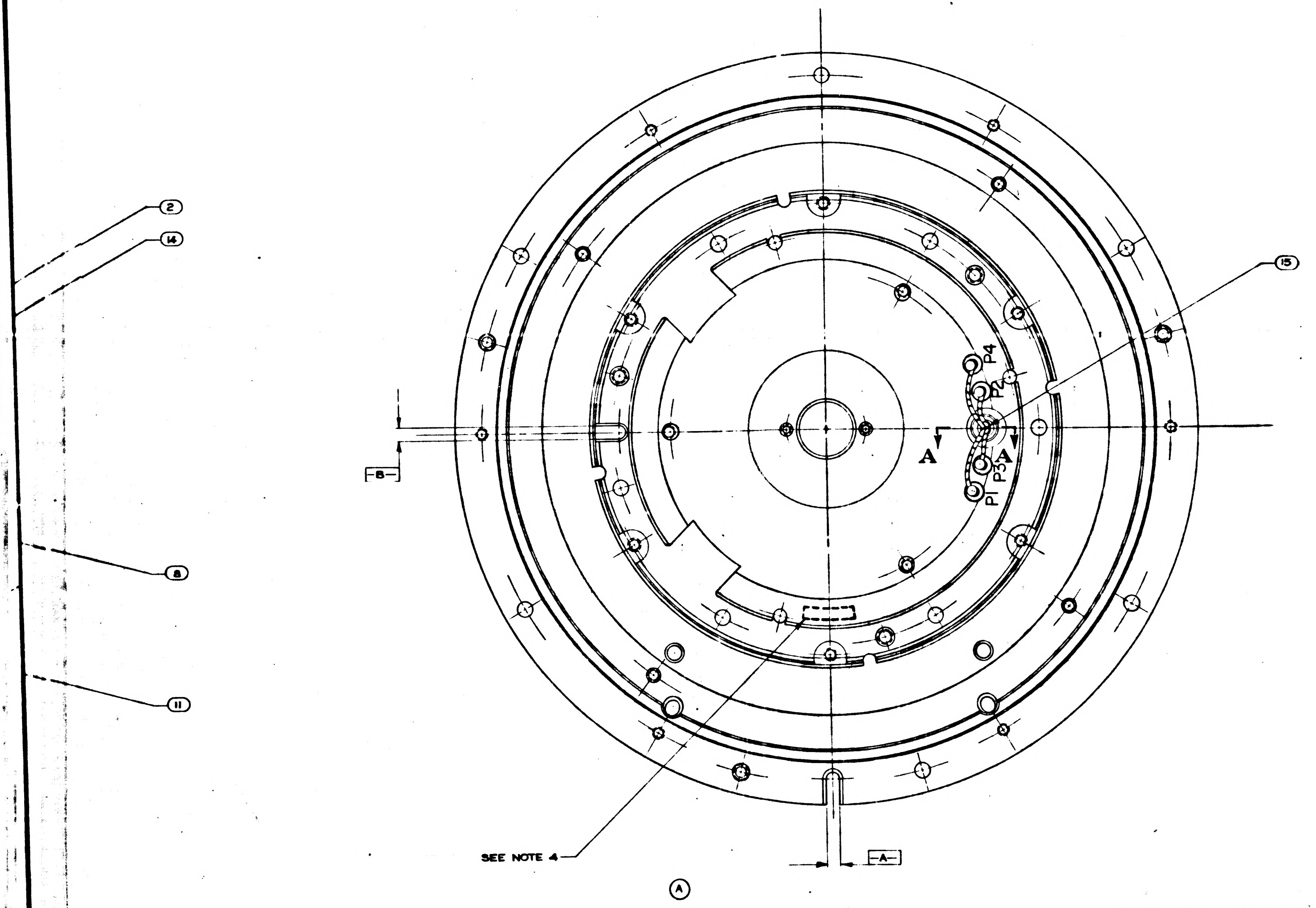
1000161	REV	SHEET
	B	1

REVISIONS TDRR 00183

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00362	2-12-63		VK
B	TDRR 00484	3-5-63		WR.
C	TDRR 01426	6-3-63		WR



SECTION A-A



QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 10	18
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-13883		17
AS REQ'D	SOLDER, (TIN, LEAD, SILVER)	SN10WARP2	QQ-S-571		16
AS REQ'D	TUB., INS, ELECTRICAL		MIL-I-22129		15
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-3			14
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-14			13
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-25			12
6	SCR, CAP, SOC HD, HEX	1000110-7			11
10	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15× RSVR	1000084			8
1	CLAMP, OUTER RING 15× RSVR	1000079			7
1	NUT, BRG RET	1000086			6
1	RET, BRG OUTER AXIS	1000091			5
1	BRG, BALL, DUPLEX	1000029			4
1	RESOLVER, 16 X TRANSMITTER	1000160			3
1	SHAFT, STUB 16X OUTER AXIS	1000295			2
1	HSG, BRG 15X OUTER AXIS	1000080			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000205	BL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CONTRACT NAS 9-153 DATE
APPROVED
CHECKED
DRAWN DM WHITE 3-7-62
APPROVED FOR MFG W J Rhine
MIT APPROVAL

16 X RESOLVER ASSEMBLY
OUTER AXIS

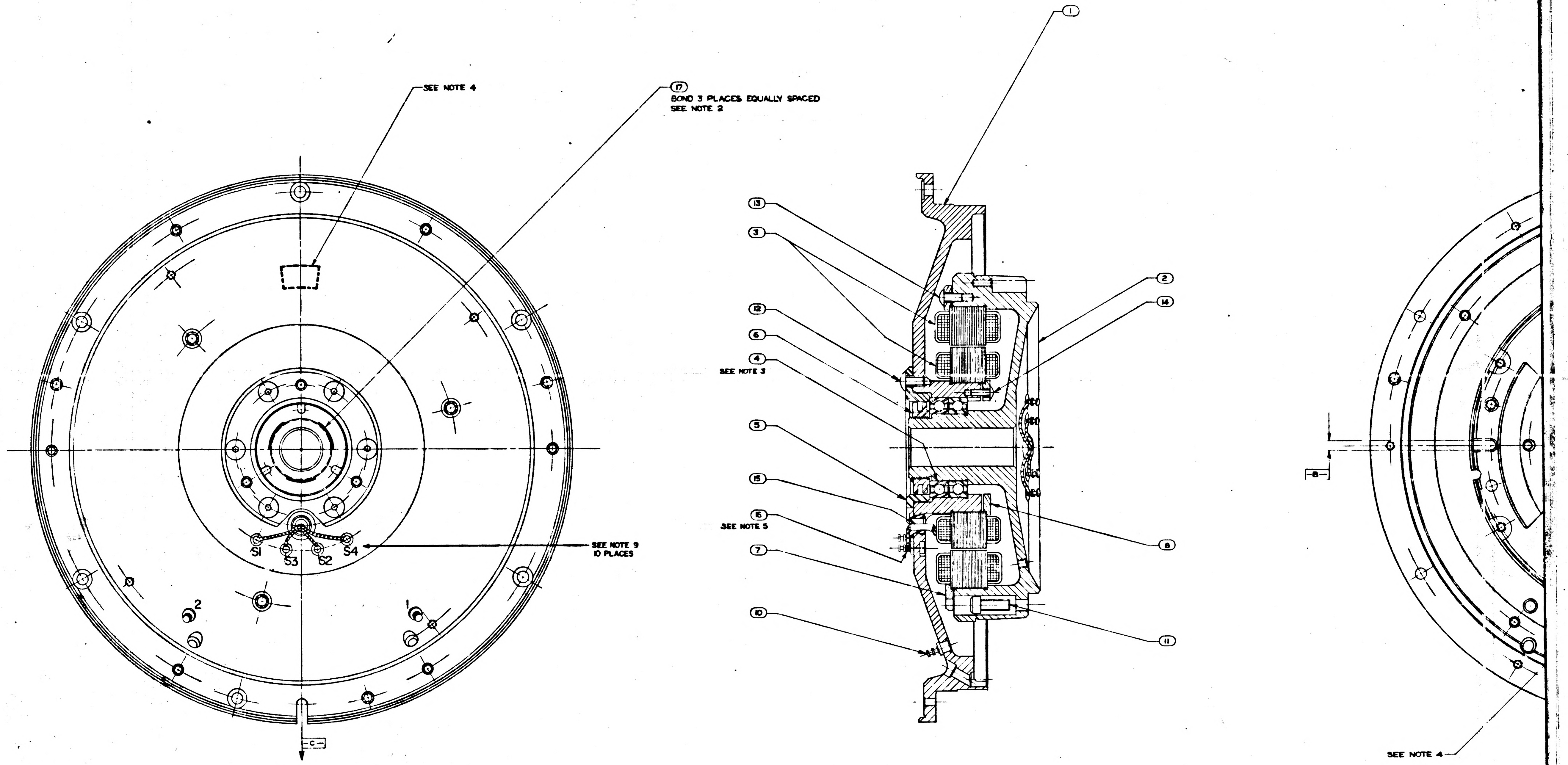
SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000161
SHEET 1 OF 1

1000161

INCHES
0 2
PHOTOGRAPHIC SCALE ONLY

WIRING LIST	
TERM	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
(17)
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
S1
S3
S2
S4
SEE NOTE 9
10 PLACES
2
1
-C-
(1)
(13)
(3)
(12)
(6)
(4)
SEE NOTE 3
(5)
(15)
(16)
SEE NOTE 5
(7)
(10)
(2)
(14)
(8)
(11)
-B-

SEE NOTE 4

Ⓐ

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY (17) TO (2) & (6) AFTER ASSEMBLY
3. ECCENTRICITY MARKS ON BOTH RACES OF (4) TO BE ALIGNED WITHIN 5° OF -C- & IN THE DIRECTION OF THE ARROW SHOWN WHEN (1) & (2) ARE IN POSITION SHOWN
4. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO., ON (1) & MATCHED SERIAL NO. ON (2) AT INDICATED LOCATIONS PER MIL-STD-130
5. SOLDER PER MIL-STD-440 USING (16)

Ⓑ ~~6. [illegible]~~

7. ASSEMBLY TO MEET REQUIREMENTS OF PS1000160.
8. SCREW TORQUE REQUIREMENTS ± 7%
   - ⑥ 400 IN LB
   - ⑫ 10.0 IN LB
   - ⑮ 5.0 IN LB
   - ⑭ 3.5 IN LB
9. MARK LETTERS 1/8 HIGH WITH ITEM (18) AT LOCATIONS SHOWN
10. ITEM (18) TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508.

Ⓐ 11. RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN.

12. MAX. ALLOWABLE TORQUE: 1 OZ-IN.

	REV	SHEET
1000161	C	1

INCHES
PHOTOGRAPHIC SCALE ONLY

WIRING LIST	
TERM	COLOR
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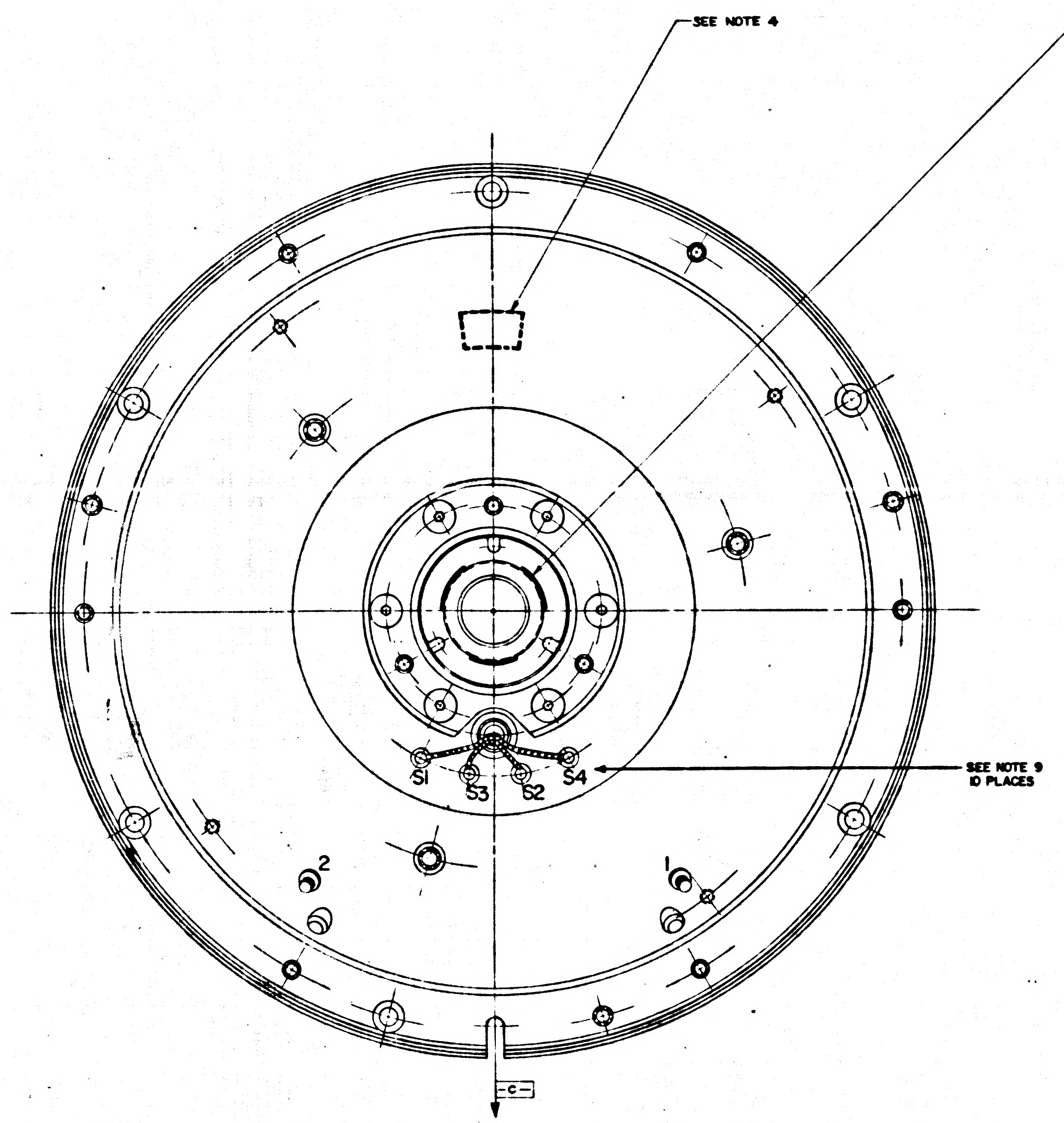
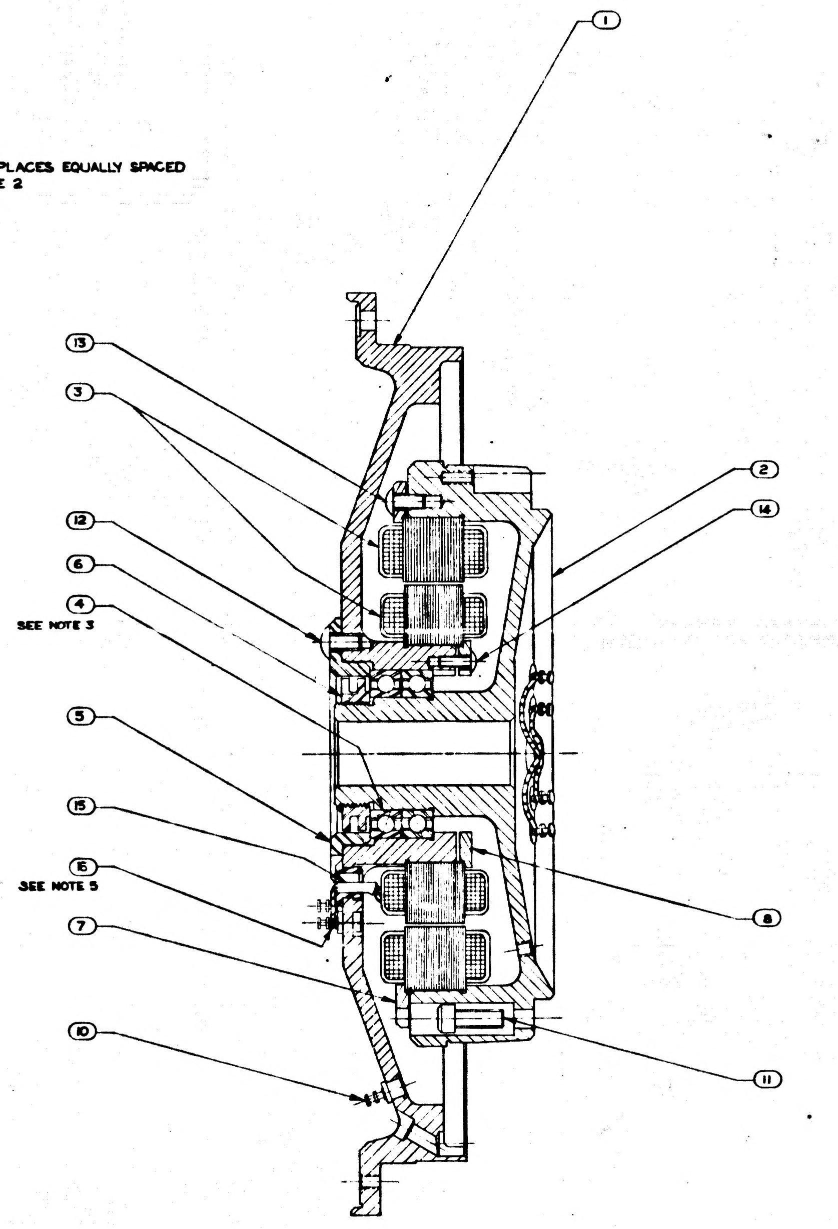
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
⑰
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
S1
S3
S2
S4
2
1
-C-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SEE NOTE 3
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SEE NOTE 5
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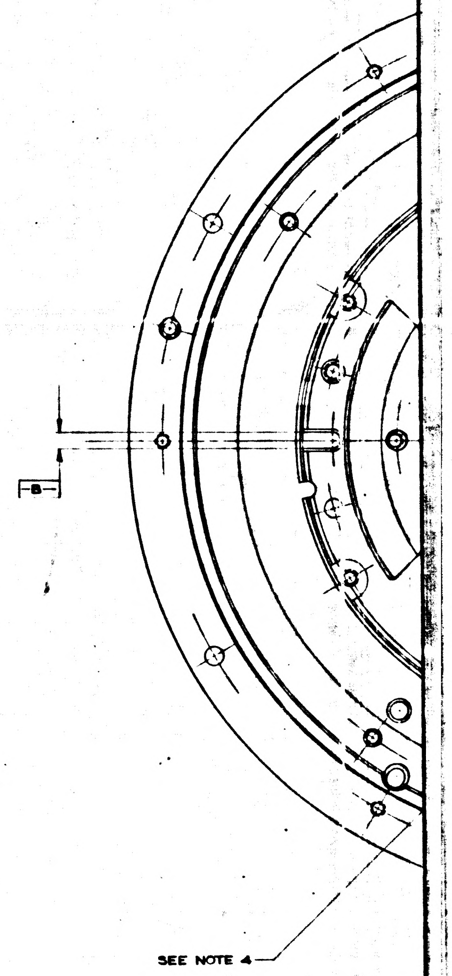

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NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY ⑰ TO ② & ⑥ AFTER ASSEMBLY
3. ECCENTRICITY MARKS ON BOTH RACES OF ④ TO BE ALIGNED WITHIN 5° OF -C- & IN THE DIRECTION OF THE ARROW SHOWN WHEN ① & ② ARE IN POSITION SHOWN
4. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO., ON ① & MATCHED SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130
5. SOLDER PER MIL-STD-440 USING ⑯

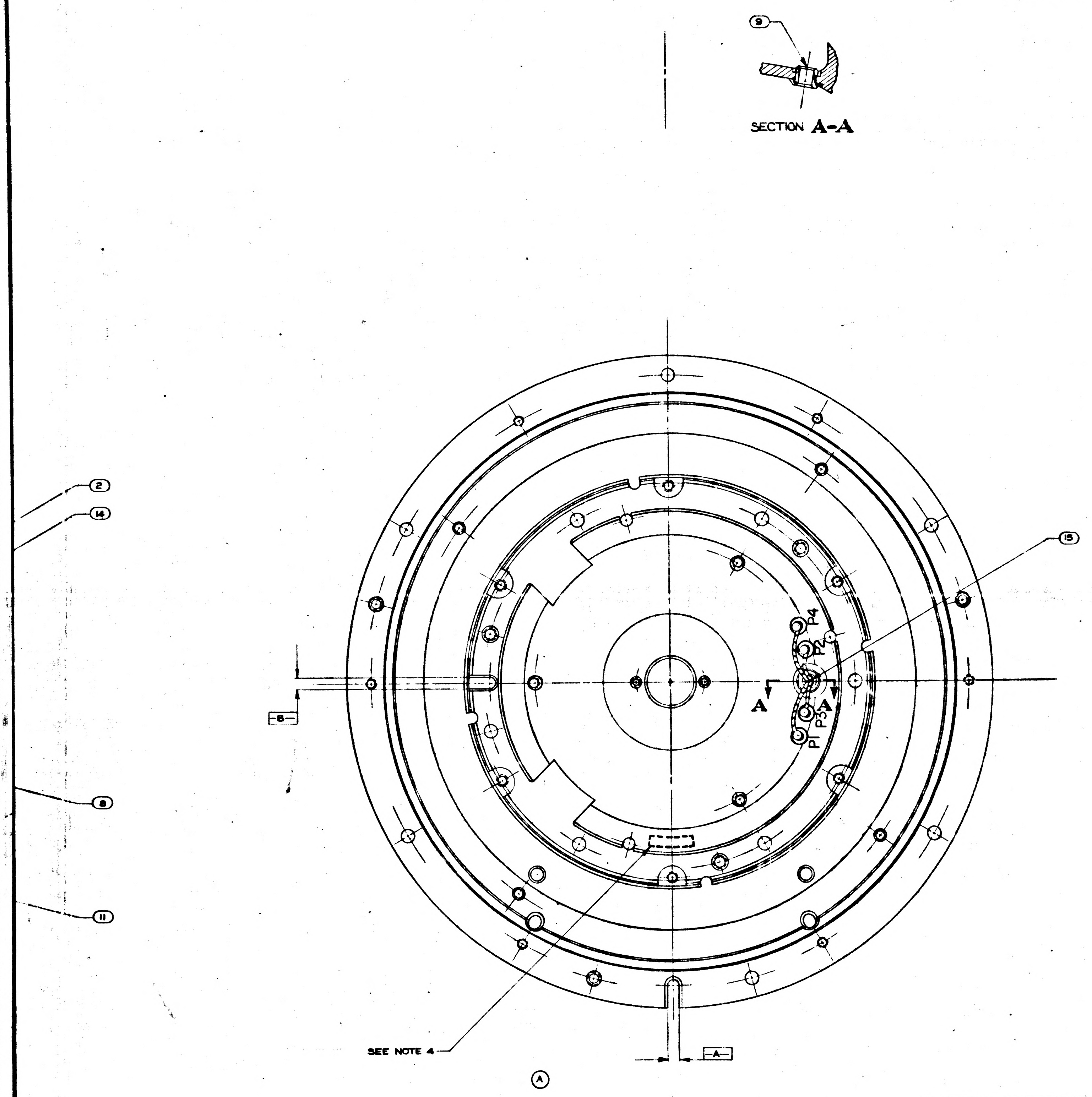
Ⓑ ~~[illegible]~~

7. ASSEMBLY TO MEET REQUIREMENTS OF PS1000160.
8. SCREW TORQUE REQUIREMENTS ± 7%
   - ⑥ 400 IN LB
   - ⑫ 10.0 IN LB
   - ⑬ 5.0 IN LB
   - ⑭ 3.5 IN LB
9. MARK LETTERS 1/8 HIGH WITH ITEM ⑱ AT LOCATIONS SHOWN
10. ITEM ⑮ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508.

Ⓐ

11. RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN.
12. MAX. ALLOWABLE TORQUE: 1 OZ-IN.

SYM	DESCRIPTION	DATE	APPROVAL	
	REVISIONS TDRR 00163			
A	TDRR 00362	2-12-63		VK
B	TDRR 00484	3-5-63		WK.
C	TDRR 01426	6-3-63		WK.
D	TDRR 01675	6-19-63		WK



QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 10	18
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL A-13883		17
AS REQ'D	SOLDER, (TIN, LEAD, SILVER)	SNOWARP2	QQ-S-571		16
AS REQ'D	TUB., INS, ELECTRICAL		MIL-I-22129		15
6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-3			14
6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-14			13
6	SCR, BUT. HD, SELF LKG, HEX SOC	[illegible]			12
6	SCR, CAP, SOC HD, HEX	1000110-7			11
10	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15× RSVR	1000084			8
1	CLAMP, OUTER RING 15× RSVR	1000079			7
1	NUT, BRG RET	1000086			6
1	RET, BRG OUTER AXIS	1000091			5
1	BRG, BALL, DUPLEX	1000029			4
1	RESOLVER, 16 X TRANSMITTER	1000160			3
1	SHAFT, STUB 16X OUTER AXIS	1000295			2
1	HSG, BRG 16X OUTER AXIS	1000080			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000205	BL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
DRAWN D.A. WHITE 12-5-62
APPROVED W J Rhine 12-6-62

16X RESOLVER ASSEMBLY
OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000161
SHEET 1 OF 1

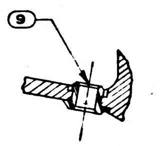
D 1000161

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

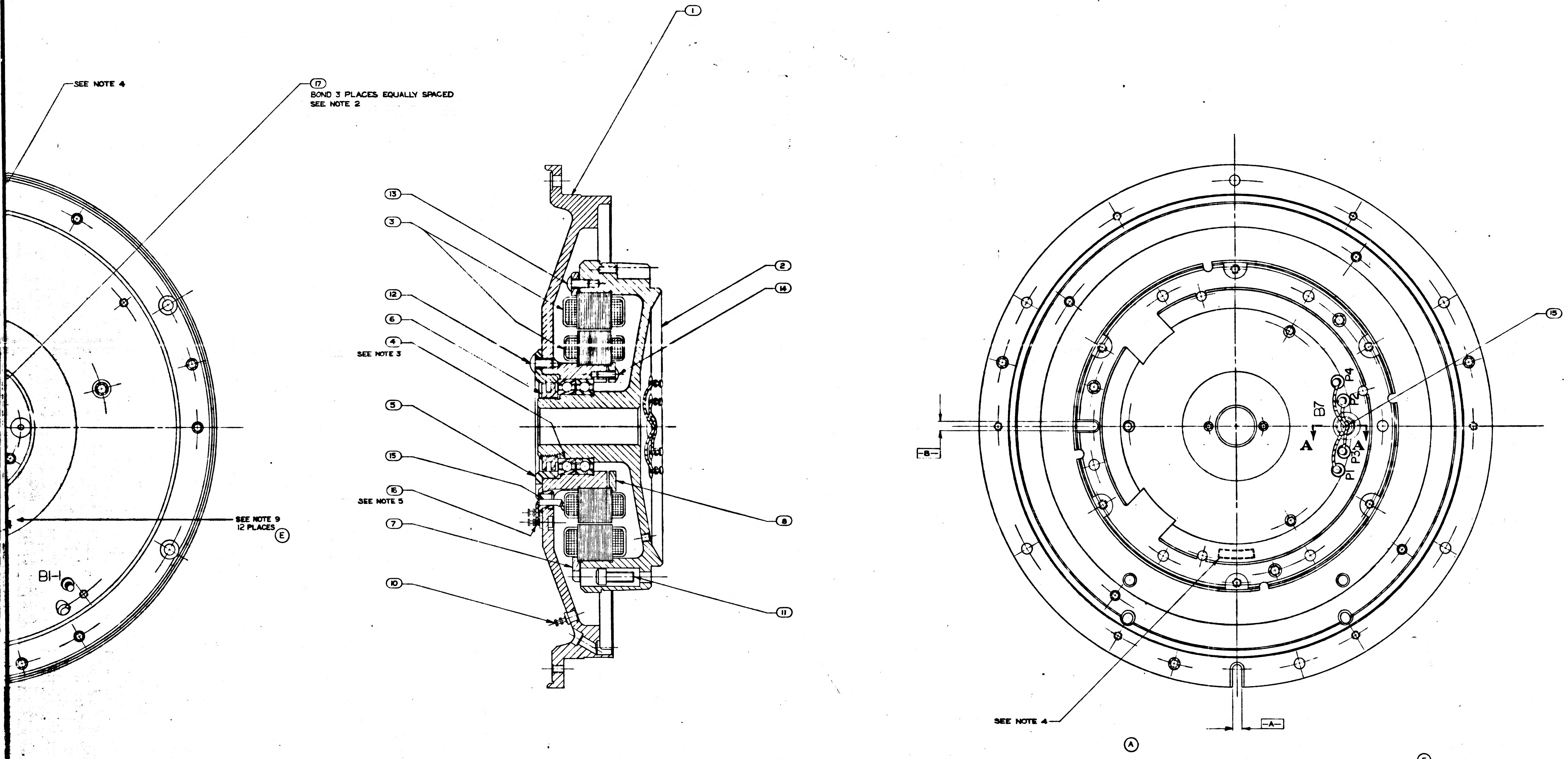
F2

REVISIONS TDRR 00185

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00362	2-12-63	[illegible]	K
B	TDRR 00484	3-5-63	[illegible]	WK
C	TDRR 01426	6-3-63	[illegible]	WK
D	TDRR 01675	6-19-63	[illegible]	WK
E	TDRR 01982	7-16-63	[illegible]	WK



SECTION A-A



QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
~~AS REQ'D~~	~~INK, BLACK, FUNGUS PROOF~~		~~TT-I-558~~	~~SEE NOTE 10~~	~~18~~
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-13883		17
AS REQ'D	SOLDER,	SN10WARP2	QQ-S-571		16
2	INSULATION SLEEVING ELEC	1006776-9		5/16" LONG	15
6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-3			14
6	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-14			13
6	SCR, BUT. HD, SELF LKG, HEX SOC	~~1000088-25~~			12
6	SCR, CAP, SOC HD, HEX	1000110-7			11
10	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 16X RSVR	1000084			8
1	CLAMP, OUTER RING 16X RSVR	1000079			7
1	NUT, BRG RET	1000086			6
1	RET, BRG OUTER AXIS	1000091			5
1	BRG, BALL, DUPLEX	1000029			4
1	RESOLVER, 16X TRANSMITTER	1000160			3
1	SHAFT, STUB 16X OUTER AXIS	1000295			2
1	HSG, BRG 16X OUTER AXIS	1000080			1

LIST OF PARTS AND MATERIALS

MASTER

1000205	BL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —||—

M I T INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED DATE
CHECKED
DRAWN D.M.WHITE 9-7-62
APPROVED FOR MSC
W J Rhine
BY DIRECTION
MIT APPROVAL

16X RESOLVER ASSEMBLY
OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

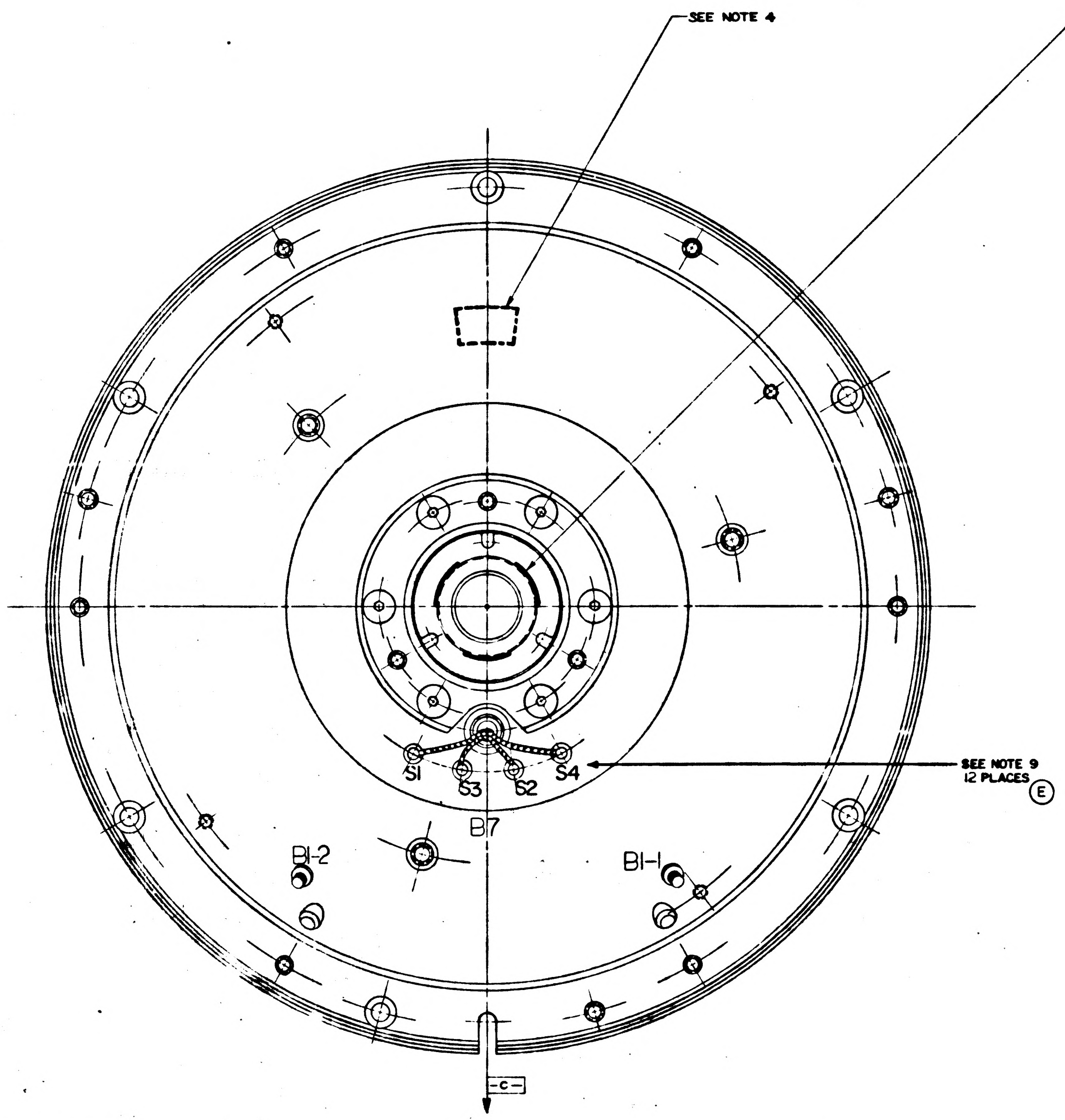
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG. NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000161
SHEET 1 OF 1

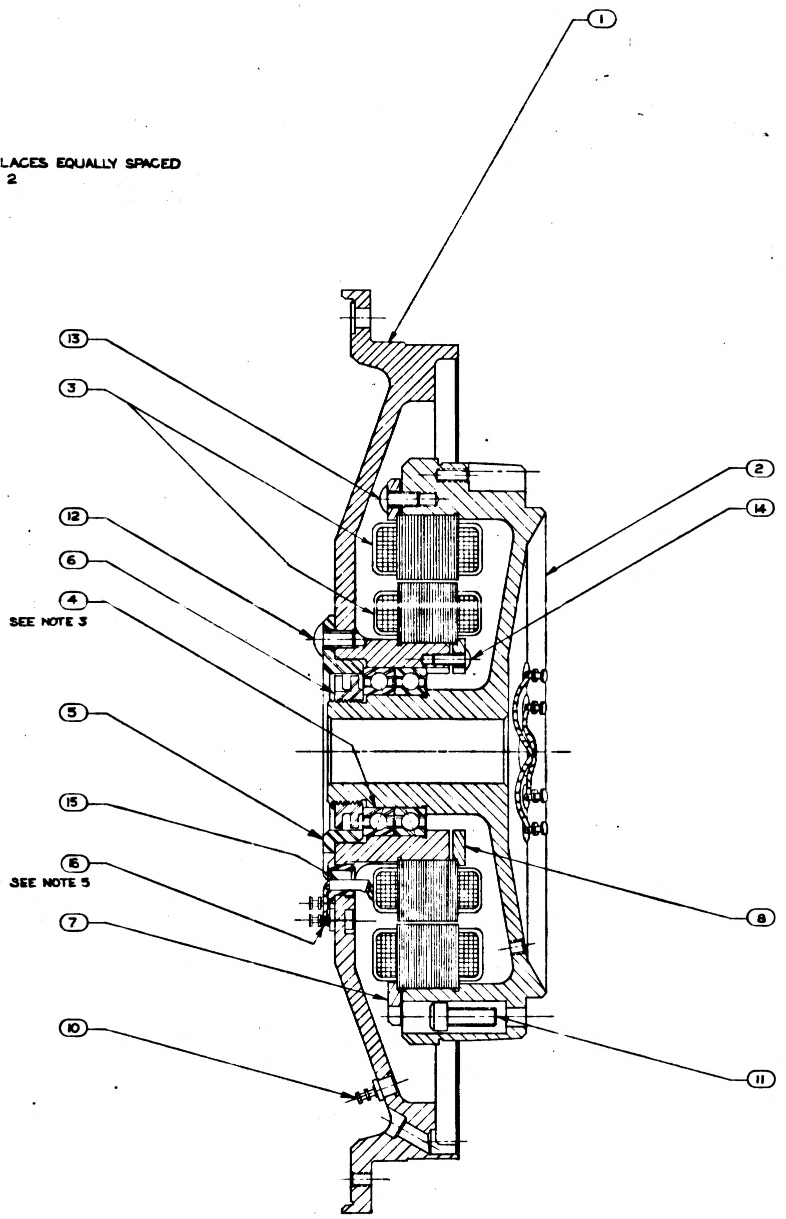
1000161 E

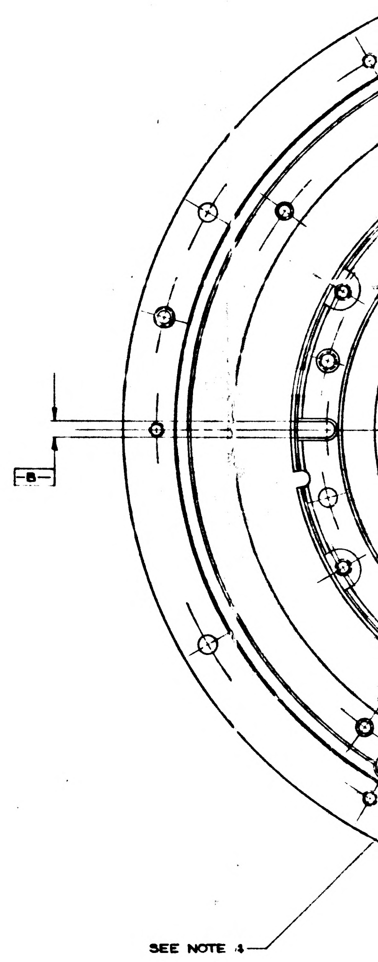
INCHES
PHOTOGRAPHIC SCALE ONLY

E-2

WIRING LIST	
TERM	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
⑰
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
S1
S3
S2
S4
SEE NOTE 9
12 PLACES Ⓔ
B7
B1-2
B1-1
-C-


①
⑬
③
②
⑭
⑫
⑥
④
SEE NOTE 3
⑤
⑮
⑯
SEE NOTE 5
⑦
⑩
⑧
⑪



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY ⑰ TO ② & ⑥ AFTER ASSEMBLY
3. ECCENTRICITY MARKS ON BOTH RACES OF ④ TO BE ALIGNED WITHIN 5° OF -C- & IN THE DIRECTION OF THE ARROW SHOWN WHEN ① & ② ARE IN POSITION SHOWN

Ⓔ 4. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO., ON ① & MATCHED SERIAL NO. ON ② AT INDICATED LOCATIONS PER NOTE 9

Ⓔ 5. SOLDER PER MIL-STD-440 USING ⑯: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓑ ~~6. ASSEMBLE PER AP1000161~~

7. ASSEMBLY TO MEET REQUIREMENTS OF PS1000160.
8. SCREW TORQUE REQUIREMENTS ± 7%
   - ⑥ 400 IN LB
   - ⑫ 10.0 IN LB
   - ⑬ 5.0 IN LB
   - ⑭ 3.5 IN LB

Ⓔ 9. MARK CHARACTERS $\frac{10}{14}$ HIGH COLOR BLACK PER ND1002019 AT LOCATIONS SHOWN

Ⓔ ~~10. ITEM ⑱ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 308.~~

Ⓔ Ⓐ 11. RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN.

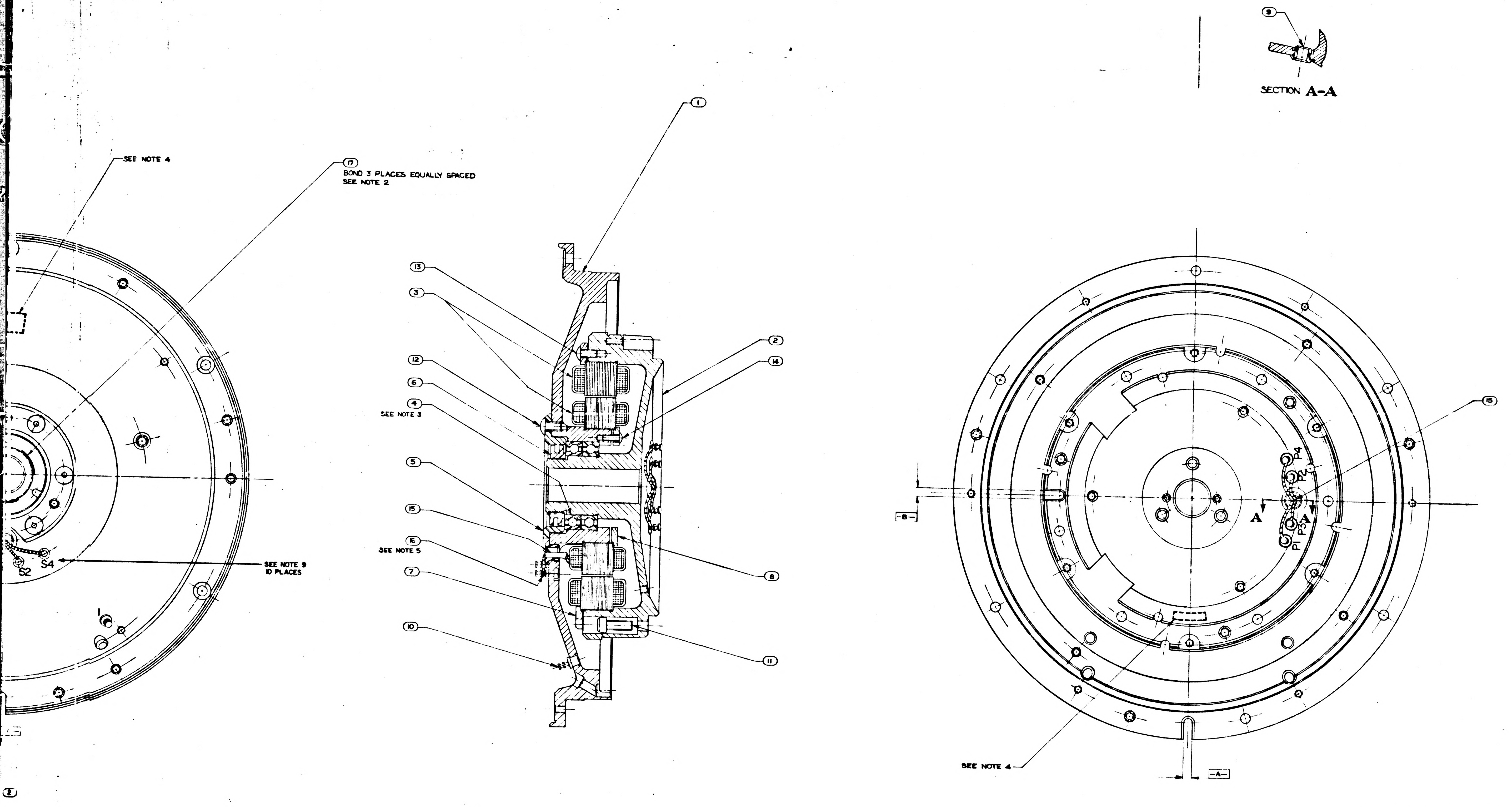
Ⓔ 12. MAX. ALLOWABLE TORQUE: 3 OZ-IN.

	REV	SHEET
1000161	E	1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00183

SYM	DESCRIPTION	DATE	APPROVAL



SECTION A-A
9
1
17
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 4
13
3
12
6
4
SEE NOTE 3
5
15
16
SEE NOTE 5
7
10
2
14
8
11
S2
S4
SEE NOTE 9
10 PLACES
15
P4
P2
P3
P1
A
A
B
A
SEE NOTE 4

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF		TT-I-558	SEE NOTE 10	18
AS REQ'D	ADH, RUB. RESIN, SYN		122-3[illegible]0-5	FSN	17
AS REQ'D	SOLDER, (TIN, LEAD, SILVER)	SN10WARP2	QQ-S-571		16
AS REQ'D	TUB., INS, ELECTRICAL		MIL-[illegible]-22129		15
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-3			14
2	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-14			13
6	SCR, BUT. HD, SELF LKG, HEX SOC	1000093-25			12
6	SCR, CAP, SOC HD, HEX	[illegible]			11
10	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15X RSVR	1000084			8
1	CLAMP, OUTER RING 15X RSVR	1000079			7
1	NUT, BRG RET	1000086			6
1	RET, BRG OUTER AXIS	1000091			5
1	BRG, BALL, DUPLEX	1000029			4
1	RESOLVER, 16X TRANSMITTER	1000[illegible]			3
1	SHAFT, STUB 15X OUTER AXIS	1000053			2
1	HSG, BRG 15X OUTER AXIS	1000060			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	1000205
USED ON	DL 1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL —

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

M I T
INSTRUMENTATION LAB
CONTRACT
NAS [illegible]

APPROVED AJ Boyce
DRAWN D.M.WHITE 3-7-63
APPROVED W J Rhine 12-6-63
MIT APPROVAL

16X RESOLVER ASSEMBLY
OUTER AXIS

SCALE	UNIT WT	CODE IDENT
2/1		

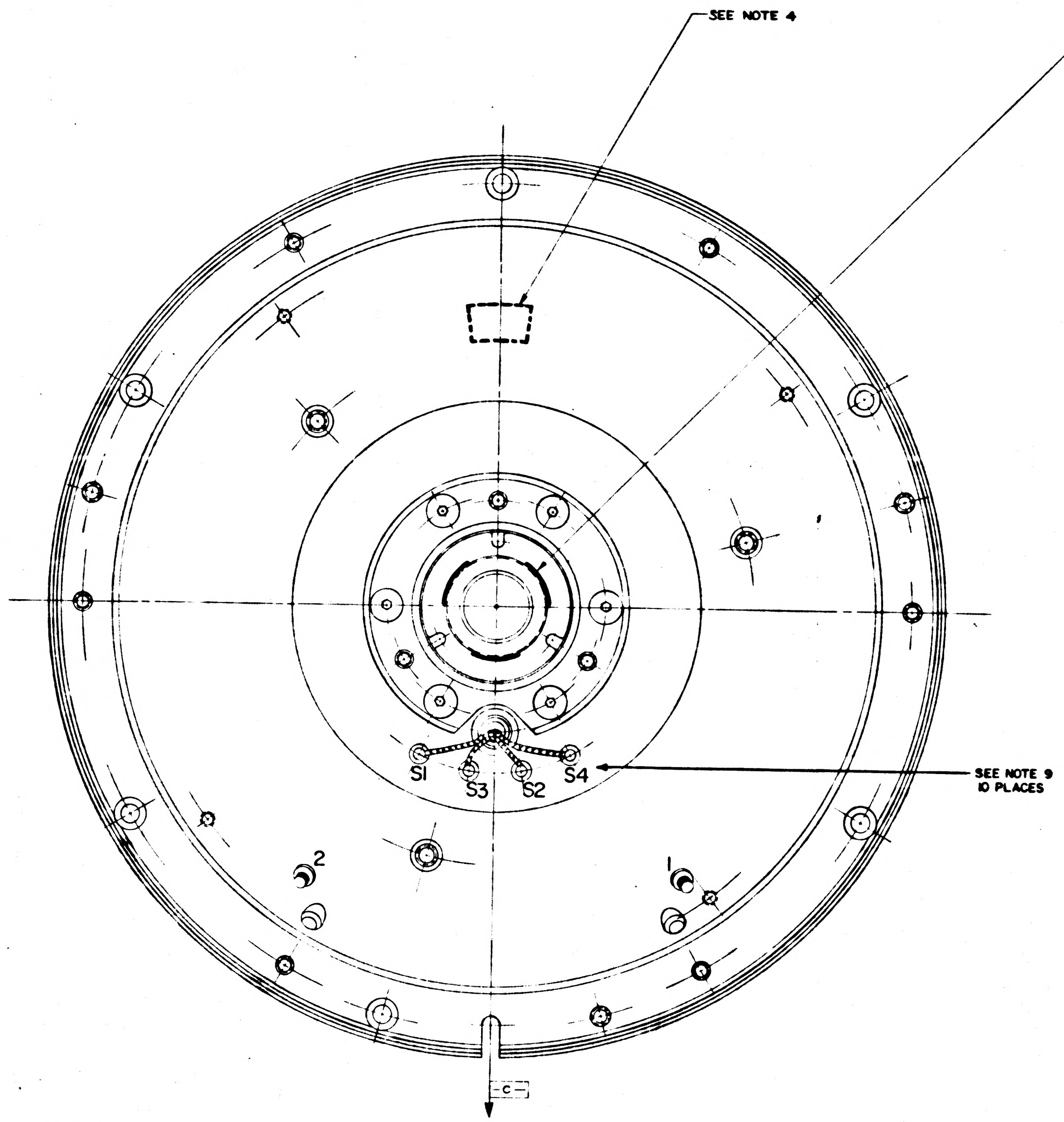
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

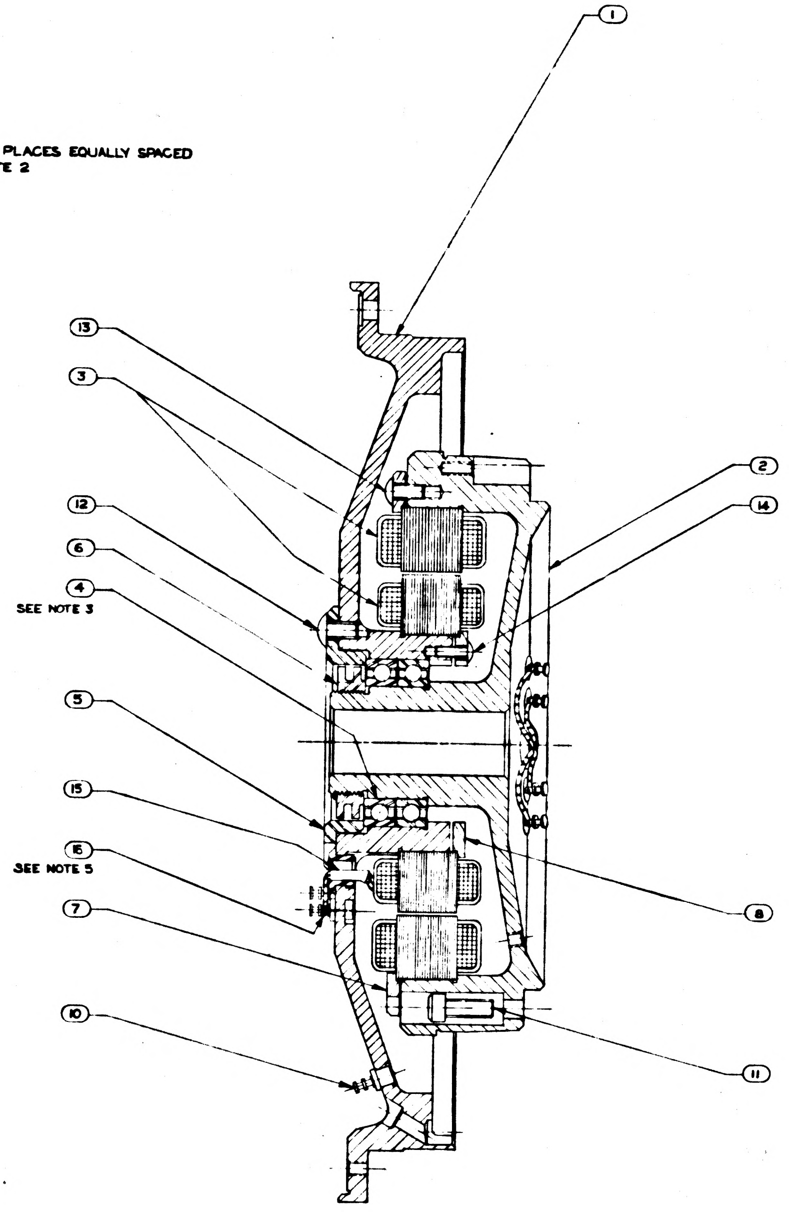
NASA DRAWING NO.
1000[illegible]61

SHEET 1 OF 1

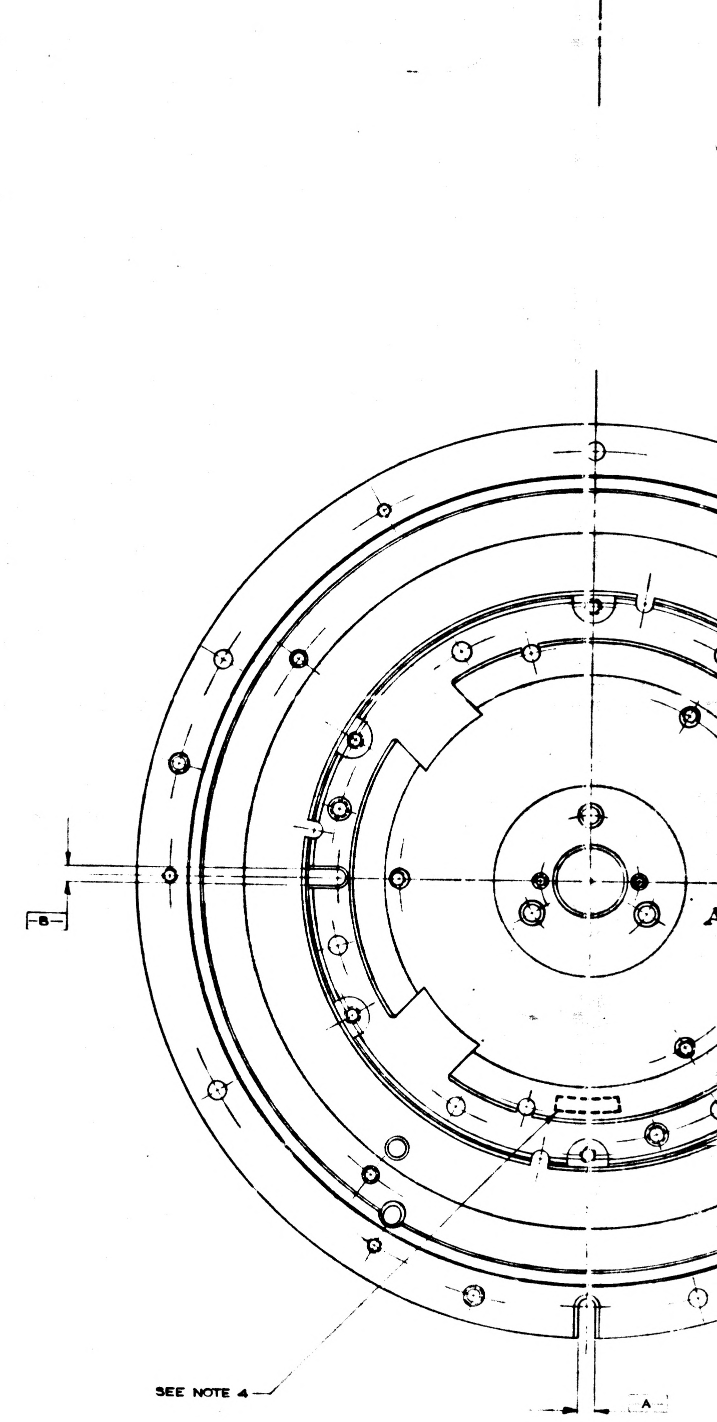
WIRING LIST	
TERM	COLOR
R1	RED
R2	YEL
R3	BLK
R4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU



SEE NOTE 4
S1
S3
S2
S4
2
1
SEE NOTE 9
10 PLACES
-C-



1
17
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
13
3
12
6
4
SEE NOTE 3
5
15
6
SEE NOTE 5
7
10
2
14
8
11



-B-
SEE NOTE 4
A

NOTES:

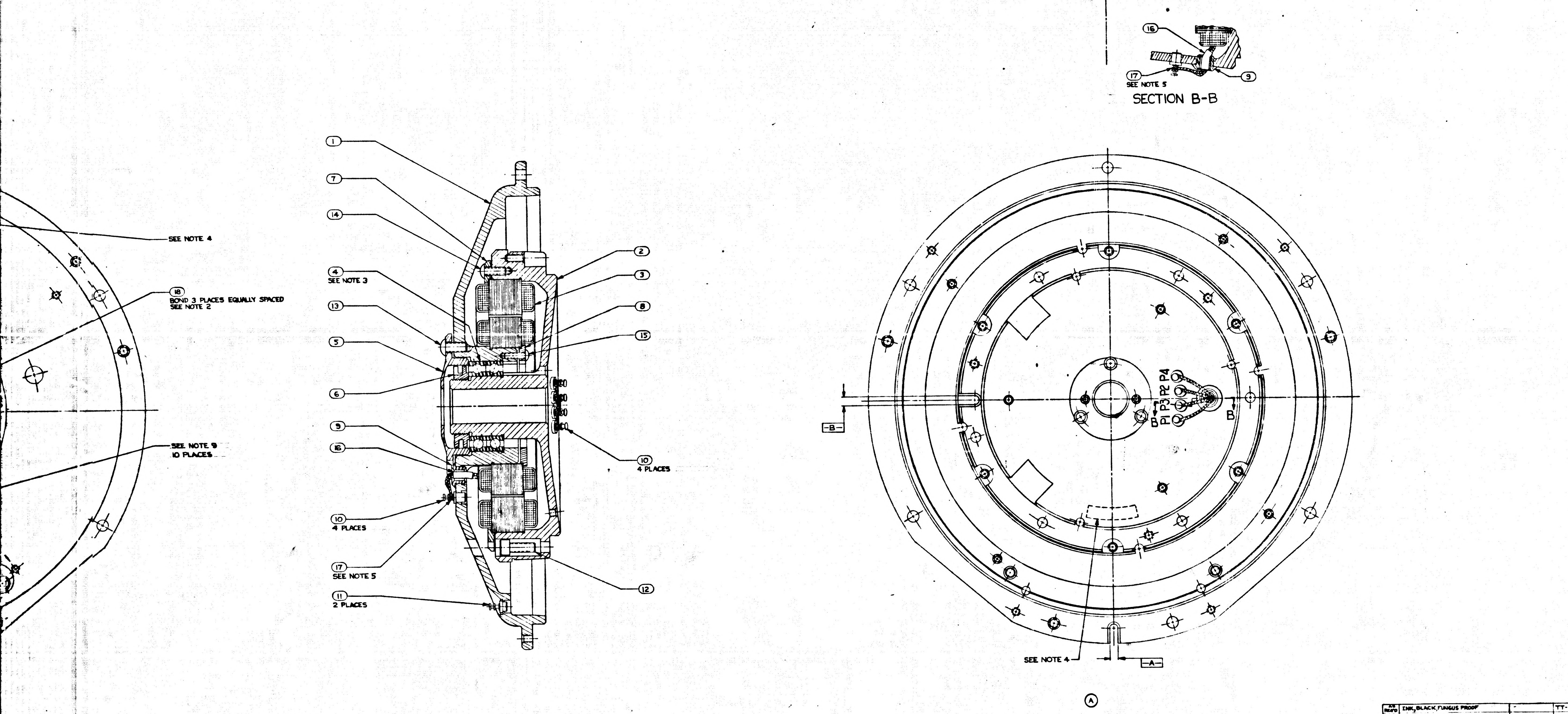
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY (17) TO (2) & (6) AFTER ASSEMBLY
3. ECCENTRICITY MARKS ON BOTH RACES OF (4) TO BE ALIGNED WITHIN 5° OF -C- & IN THE DIRECTION OF THE ARROW SHOWN WHEN ( ) & (2) ARE IN POSITION SHOWN
4. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANUFACTURERS SYMBOL & SERIAL NO., ON (1) & MATCHED SERIAL NO. ON (2) AT INDICATED LOCATIONS PER MIL-STD-130
5. SOLDER PER MIL-STD-440 USING (16)
6. ASSEMBLE PER AP100016
7. ASSEMBLY TO MEET REQUIREMENTS OF PS1000160.
8. SCREW TORQUE REQUIREMENTS ± 7%
   - ⑥ 400 IN LB
   - ⑫ 10.0 IN LB
   - ⑬ 5.0 IN LB
   - ⑭ 3.5 IN LB
9. MARK LETTERS 1/8 HIGH WITH ITEM 18 AT LOCATIONS SHOWN
10. ITEM (19) TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508.

INCHES

PHOTOGRAPHIC SCALE ONLY

	REV	SHEET
1000161		1

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS TDRR 00183		
A	TDRR 00363	2-12-63	4/6 WK



SEE NOTE 4
18 BOND 3 PLACES EQUALLY SPACED SEE NOTE 2
SEE NOTE 9 10 PLACES
1
7
14
4 SEE NOTE 3
13
5
6
9
16
10 4 PLACES
17 SEE NOTE 5
11 2 PLACES
2
3
8
15
10 4 PLACES
12
16
17 SEE NOTE 5
9
SECTION B-B
B
P1 P2 P3 P4
-B-
SEE NOTE 4
-A-
A

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF	-	TT-I-558	SEE NOTE 10	19
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-13883B		18
AS REQ'D	SOLDER (TIN LEAD SILVER)	SN10WARP2	QQ-S-571		17
AS REQ'D	TUBING INSULATOR ELECTRICAL		MIL-I-22129		16
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-3			15
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-4			14
6	SCREW, BUT HD. SELF LKG HEX SOC	1000093-25			13
6	SCREW, CAP SOC HD HEX	1000110-7			12
2	TERMINAL, INSULATED	1000100-2			11
8	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15X RESOLVER	1000084			8
1	CLAMP, OUTER RING 15X RESOLVER	1000079			7
1	NUT, BEARING RETAINER	1000086			6
1	RETAINER, BEARING IA & MA	1000090			5
1	BEARING, BALL DUPLEX	1000029			4
1	RESOLVER 16X TRANSMITTER	1000160			3
1	SHAFT, STUB 15X IA & MA	1000035			2
1	HOUSING, BEARING 15X IA & MA	1000052			1

LIST OF PARTS AND MATERIALS

MASTER

Ⓐ

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NEXT ASSY	USED ON
1000207	
1000206	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± 1/64
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN G QUINN 12/3/62
APPROVED MSC W J Rhine 12-19-62
BY DIRECTION MIT APPROVAL W I Tupper 19 Dec 1962

16X RESOLVER ASSEMBLY
INNER & MIDDLE AXIS

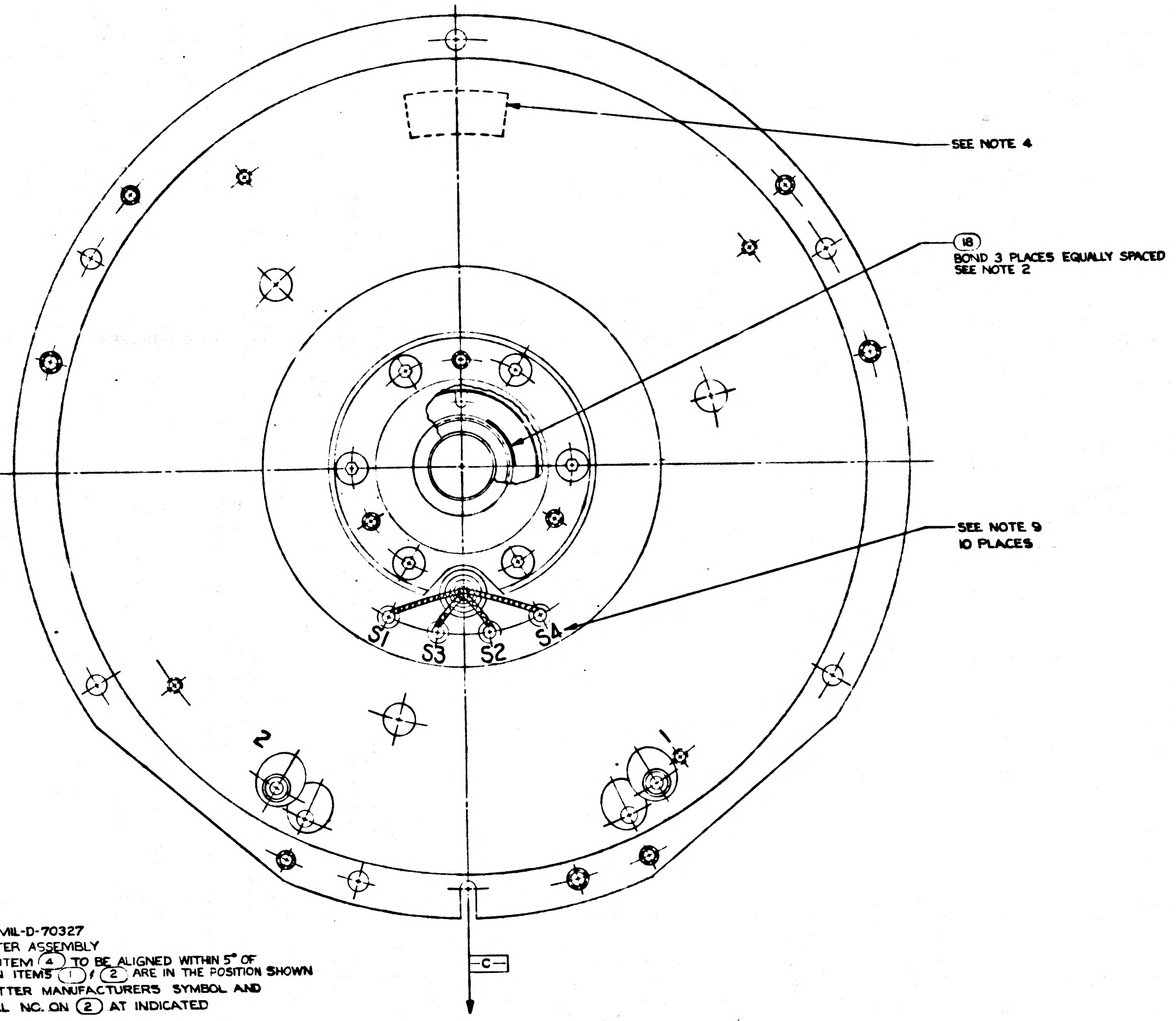
SCALE 2/1
UNIT WT.
CODE IDENT

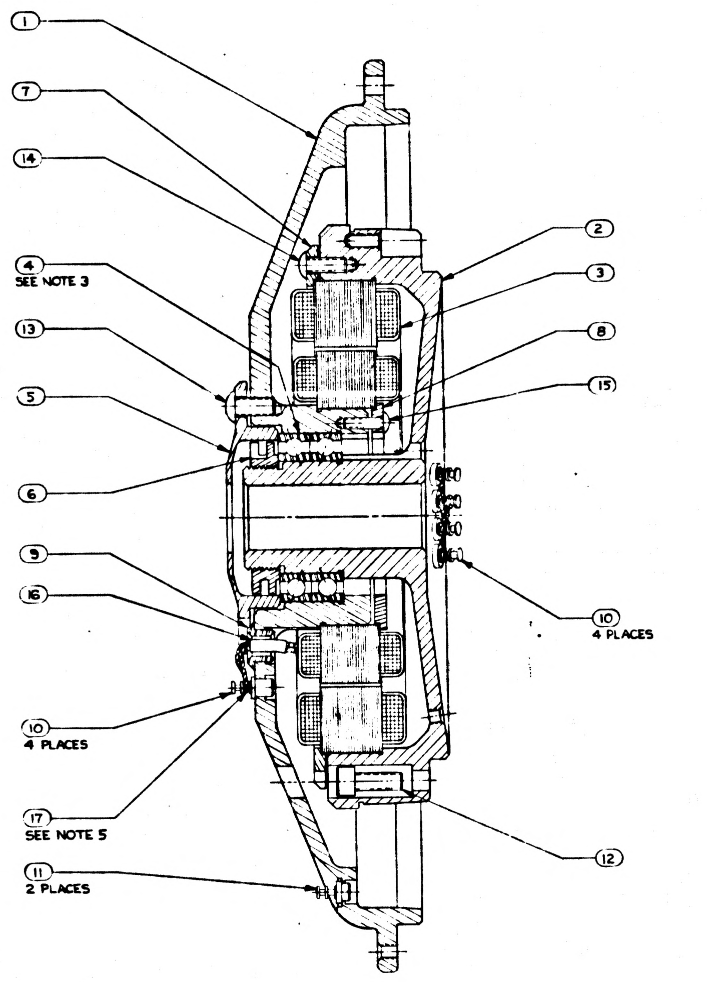
MIT INSTRUMENTATION LABORATORY
Cambridge, Mass
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000162
SHEET 1

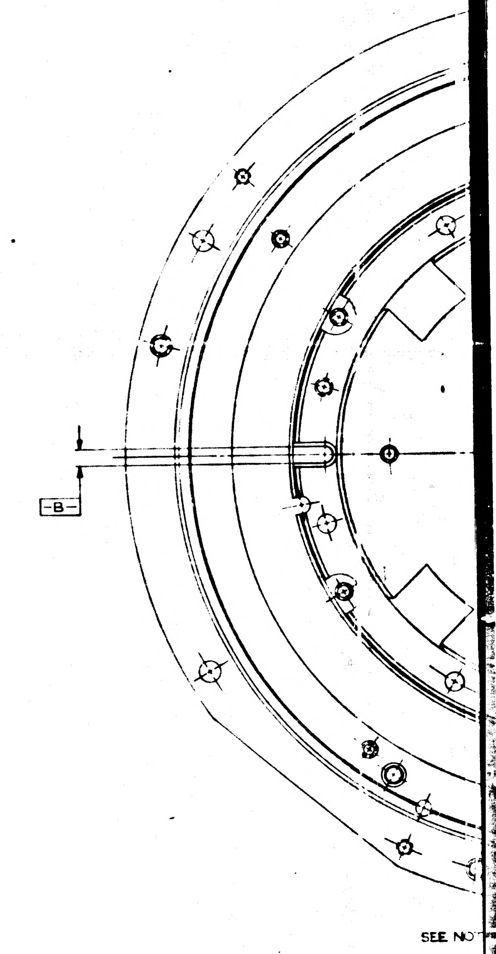
1000162

1000162 REV A SHEET 1

WIRING LIST	
TERMINAL NO.	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
⑱
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
S1
S3
S2
S4
2
1
-C-


①
⑦
⑭
④
SEE NOTE 3
⑬
⑤
⑥
⑨
⑯
⑩
4 PLACES
⑰
SEE NOTE 5
⑪
2 PLACES
②
③
⑧
⑮
⑩
4 PLACES
⑫

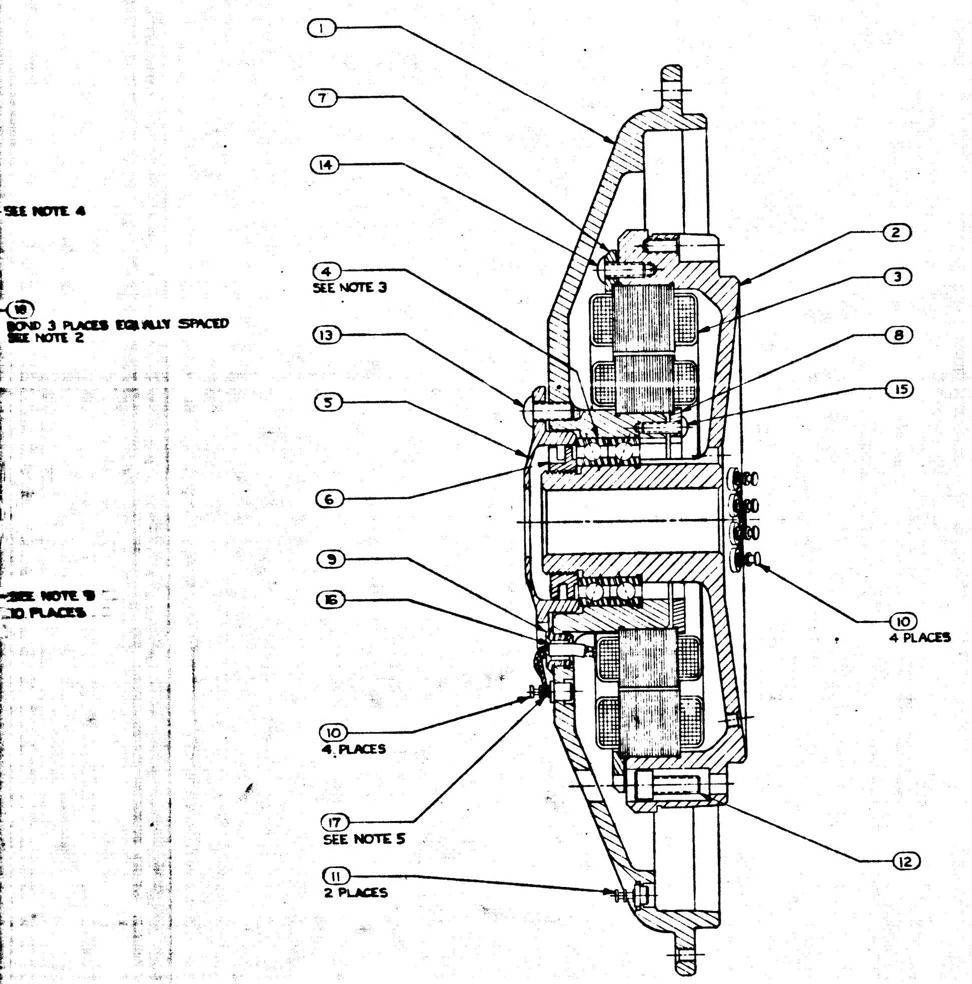


NOTES

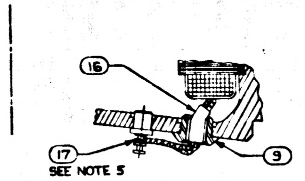
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 APPLY ITEM ⑱ TO ITEMS ② ∮ ⑥ AFTER ASSEMBLY
3 ECCENTRICITY MARKS ON BOTH RACES OF ITEM ④ TO BE ALIGNED WITHIN 5° OF -C- ∮ IN DIRECTION OF THE ARROW WHEN ITEMS ① ∮ ② ARE IN THE POSITION SHOWN
4 IDENTIFY USING DRAWING NO. REVISION LETTER MANUFACTURERS SYMBOL AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130
5 SOLDER PER MIL-STD-440 USING ITEM ⑰ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ASSEMBLE PER AP 1000162.
7 ASSEMBLY TO MEET REQUIREMENTS OF PS 1000160.
8 SCREW TORQUE REQUIREMENTS ± 7%
   - ⑥ 400 IN LB
   - ⑬ 10.0 IN LB
   - ⑭ 5.0 IN LB
   - ⑮ 3.5 IN LB
9 MARK 1/8 HIGH CHARACTERS WITH ITEM ⑲ IN LOCATIONS INDICATED
10 ITEM ⑲ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
11 RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS 1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN Ⓐ
12 MAX ALLOWABLE TORQUE: 1 OZ.-IN.

	REV	SHEET
1000162	A	1

SYM	DESCRIPTION	DATE	APPROVAL	
REVISIONS TDRR 00183				
A	TDRR 00363	2-12-63	4/6	WK
B	TDRR 00485	3-5-63	2/15	WK

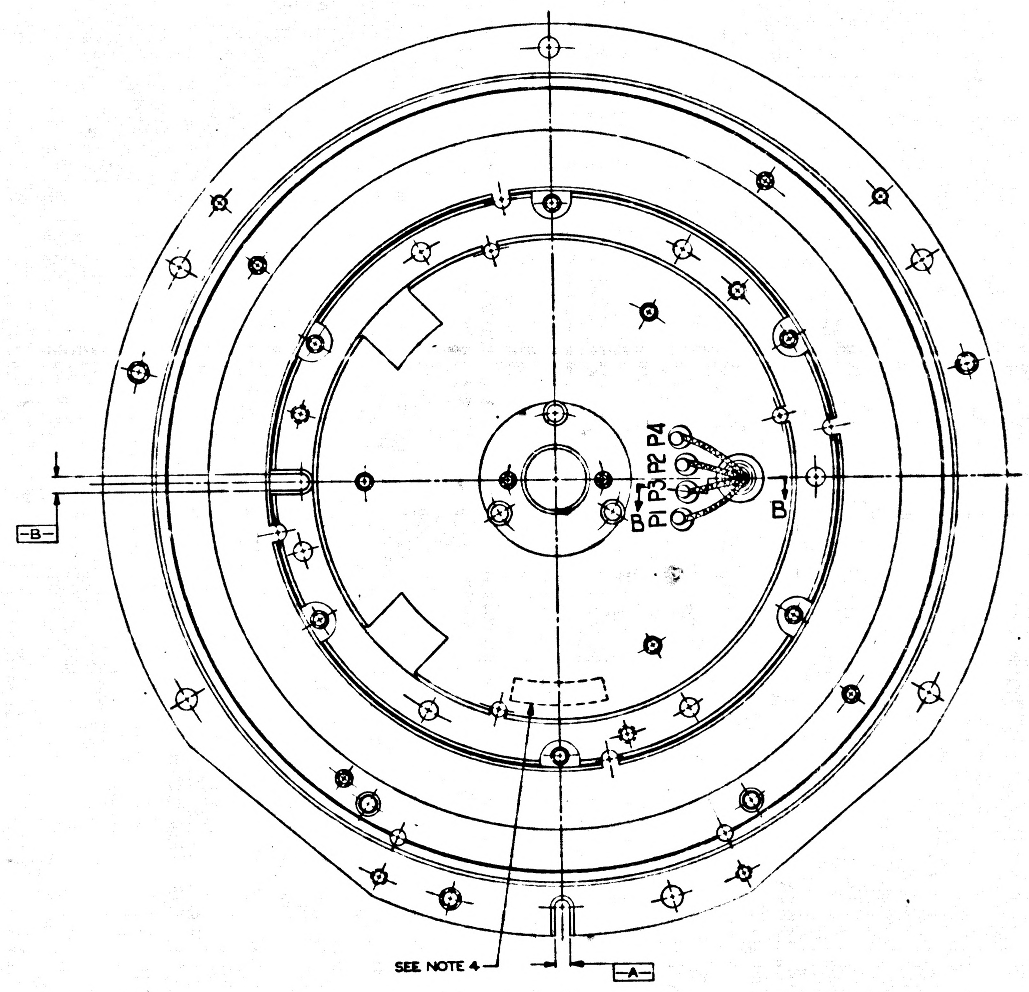


SEE NOTE 4
(18) BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
(1)
(7)
(14)
(4) SEE NOTE 3
(13)
(5)
(6)
(9)
(16)
(10) 4 PLACES
(17) SEE NOTE 5
(11) 2 PLACES
(2)
(3)
(8)
(15)
(10) 4 PLACES
(12)



(16)
(17)
SEE NOTE 5
(9)

SECTION B-B



P1
P2
P3
P4
B
B
-B-
SEE NOTE 4
-A-

(A)

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF	-	TT-I-558	SEE NOTE 10	19
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-13883B		18
AS REQ'D	SOLDER (TIN LEAD SILVER)	SN10WARP2	QQ-S-571		17
AS REQ'D	TUBING INSULATOR ELECTRICAL		MIL-I-22129		16
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-3			15
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-14			14
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			13
6	SCREW, CAP SOC HD HEX	1000110-7			12
2	TERMINAL, INSULATED	1000100-2			11
8	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15X RESOLVER	1000084			8
1	CLAMP, OUTER RING 15X RESOLVER	1000079			7
1	NUT, BEARING RETAINER	1000086			6
1	RETAINER, BEARING IA & MA	1000090			5
1	BEARING, BALL DUPLEX	1000029			4
1	RESOLVER 16X TRANSMITTER	1000160			3
1	SHAFT, STUB 15X IA & MA	1000035			2
1	HOUSING, BEARING 15X IA & MA	1000052			1

LIST OF PARTS AND MATERIALS

MASTER

(A)

NEXT ASSY	USED ON
1000207	
1000206	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± 1/64
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN G QUINN
APPROVED FOR MSC
WJ Rhine 12-19-62
MIT APPROVAL
19 Dec 1962

16X RESOLVER ASSEMBLY
INNER & MIDDLE AXIS

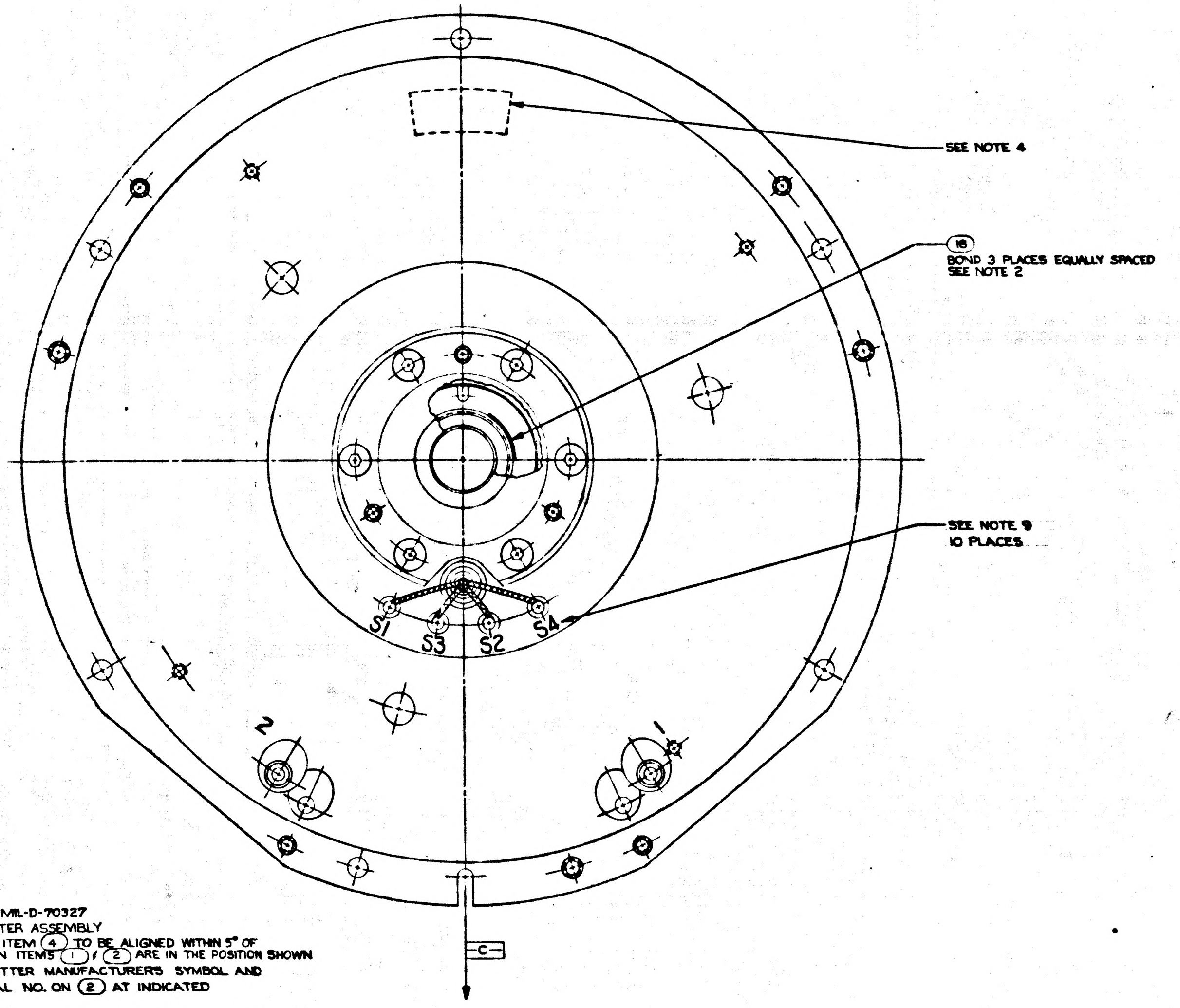
M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000162

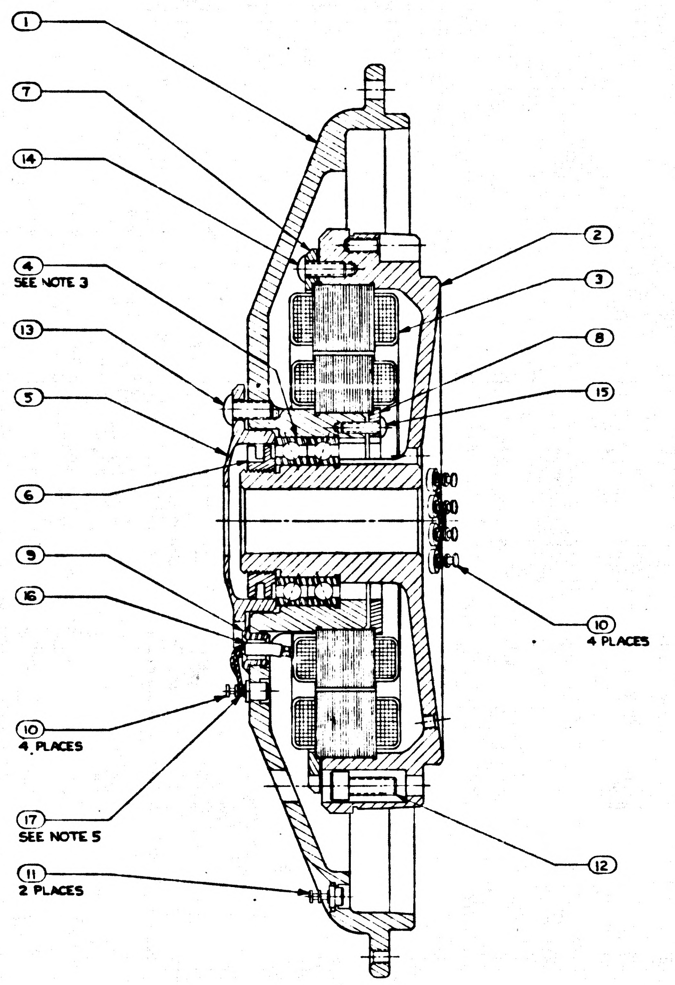
SCALE 2/1
UNIT WT
CODE IDENT
SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

1000162

WIRING LIST	
TERMINAL NO.	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
⑱
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
S1
S3
S2
S4
2
1
-C-


①
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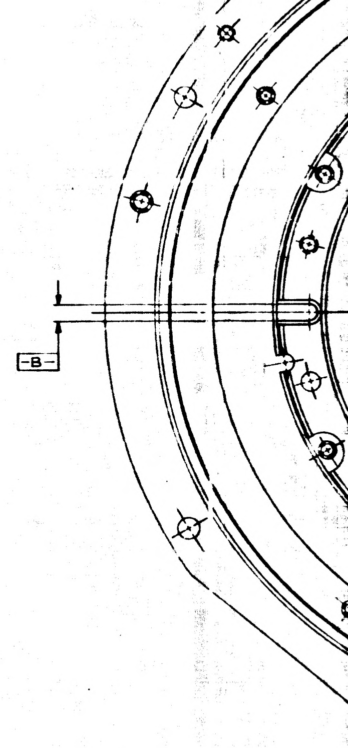
④
SEE NOTE 3
⑬
⑤
⑥
⑨
⑯
⑩
4 PLACES
⑰
SEE NOTE 5
⑪
2 PLACES
②
③
⑧
⑮
⑩
4 PLACES
⑫



NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 APPLY ITEM ⑱ TO ITEMS ② & ⑥ AFTER ASSEMBLY

3 ECCENTRICITY MARKS ON BOTH RACES OF ITEM ④ TO BE ALIGNED WITHIN 5° OF -C- & IN DIRECTION OF THE ARROW WHEN ITEMS ① & ② ARE IN THE POSITION SHOWN

4 IDENTIFY USING DRAWING NO. REVISION LETTER MANUFACTURERS SYMBOL AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130

5 SOLDER PER MIL-STD-440 USING ITEM ⑰ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

Ⓑ 6 ~~[illegible]~~

7 ASSEMBLY TO MEET REQUIREMENTS OF PS 1000160.

8 SCREW TORQUE REQUIREMENTS ± 7%

⑥ 400 IN LB
⑬ 10.0 IN LB
⑭ 5.0 IN LB
⑮ 3.5 IN LB

9 MARK 1/8 HIGH CHARACTERS WITH ITEM ⑲ IN LOCATIONS INDICATED

10 ITEM ⑲ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508

Ⓐ 11 RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS 1000160 WHEN SLOT -A- AND SLOT -B- ARE 90° 0' ±1' APART AS SHOWN

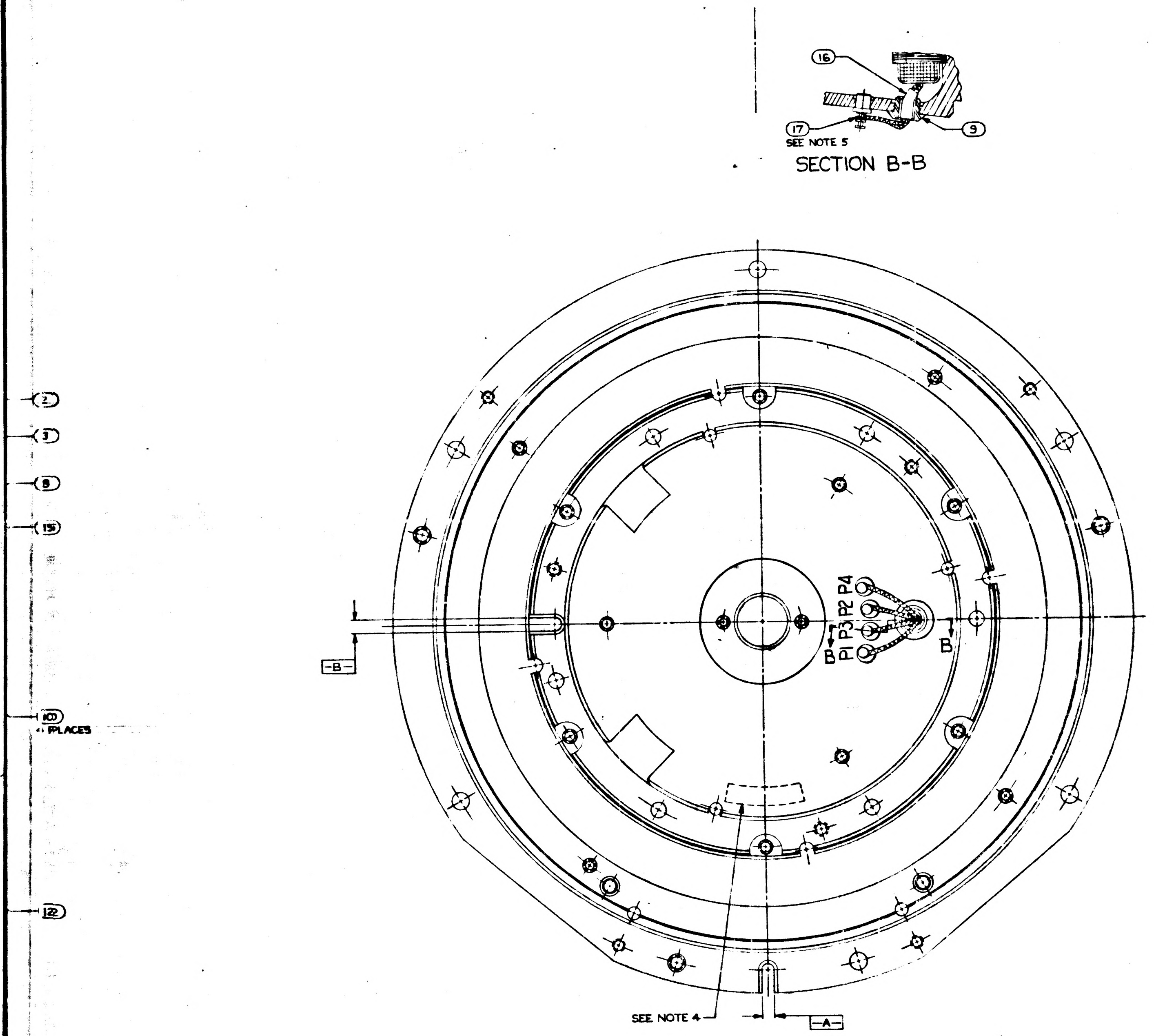
12 MAX ALLOWABLE TORQUE: 1 OZ.-IN.

1000162

	REV	SHEET
1000162	B	1

REVISION TDRR 00183

SYM	DESCRIPTION	DATE	APPROVAL	
A	TDRR 00363	2-12-63	4/6	WK
B	TDRR 00485	3-5-63	3/15	WK
C	TDRR 01426	6-3-63	6/18	WK



Ⓐ

Ⓒ

MASTER

Ⓐ

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK, FUNGUS PROOF	-	TT-I-558	SEE NOTE 10	19
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-13883B		18
AS REQ'D	SOLDER (TIN LEAD SILVER)	SN10WARP2	QQ-S-571		17
AS REQ'D	TUBING INSULATOR ELECTRICAL		MIL-I-22129		16
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-3			15
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-14			14
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			13
6	SCREW, CAP SOC HD HEX	1000110-7			12
2	TERMINAL, INSULATED	1000100-2			11
8	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15X RESOLVER	1000084			8
1	CLAMP, OUTER RING 15X RESOLVER	1000079			7
1	NUT, BEARING RETAINER	1000086			6
1	RETAINER, BEARING IA & MA	1000090			5
1	BEARING, BALL DUPLEX	1000029			4
1	RESOLVER 16X TRANSMITTER	1000160			3
1	SHAFT, STUB 16X IA & MA	1000294			2
1	HOUSING, BEARING 15X IA & MA	1000052			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
1000206	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
±
DO NOT SCALE THIS DRAWING
MATT NBR:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153 DATE
APPROVED
CHECKED
DRAWN G QUINN 12/3/62
APPROVED FOR MSC
W.J. Kline 12-19-62
BY MIT APPROVAL
19 Dec 1962

16X RESOLVER ASSEMBLY
INNER & MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000162
SHEET 1

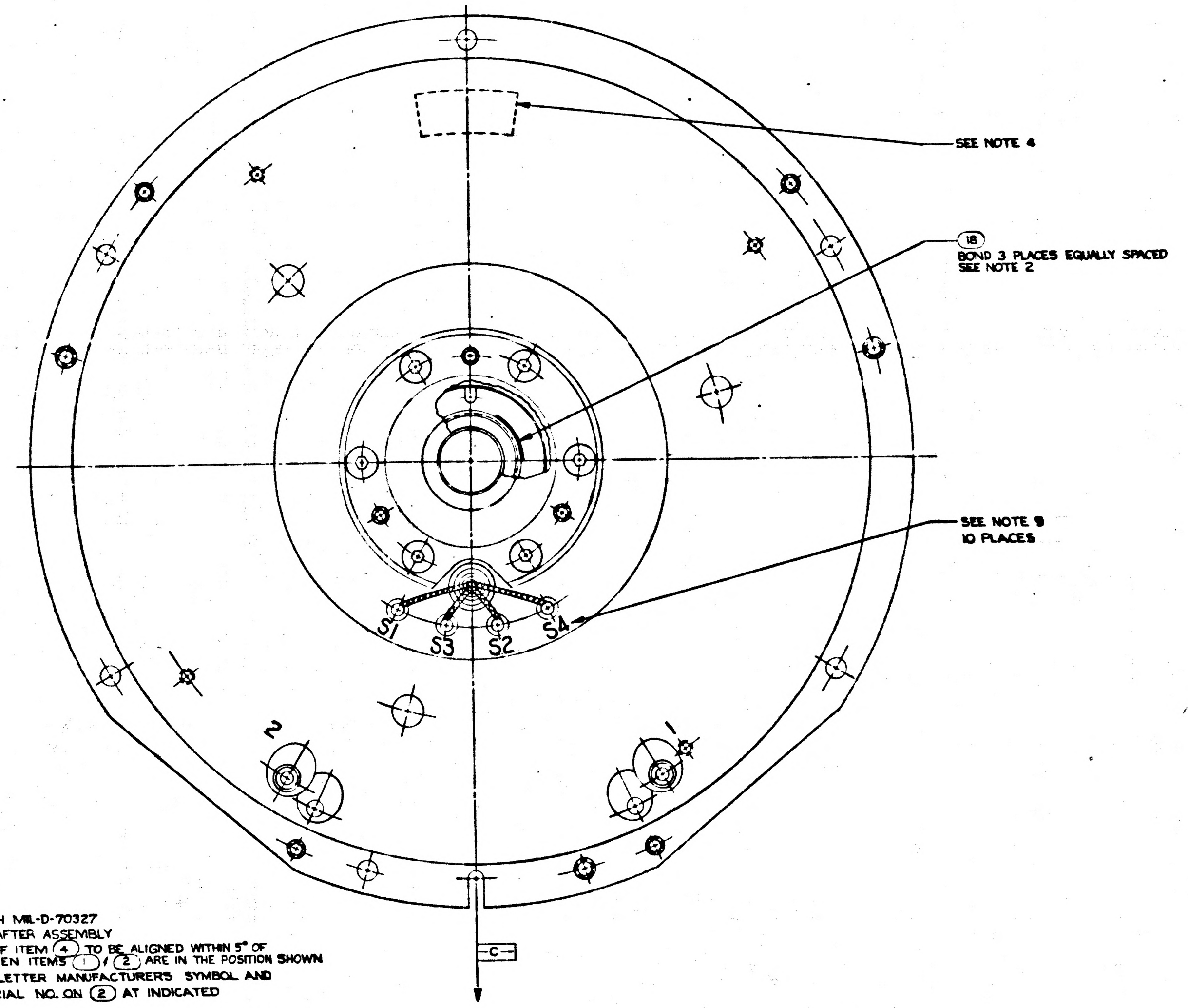
1000162

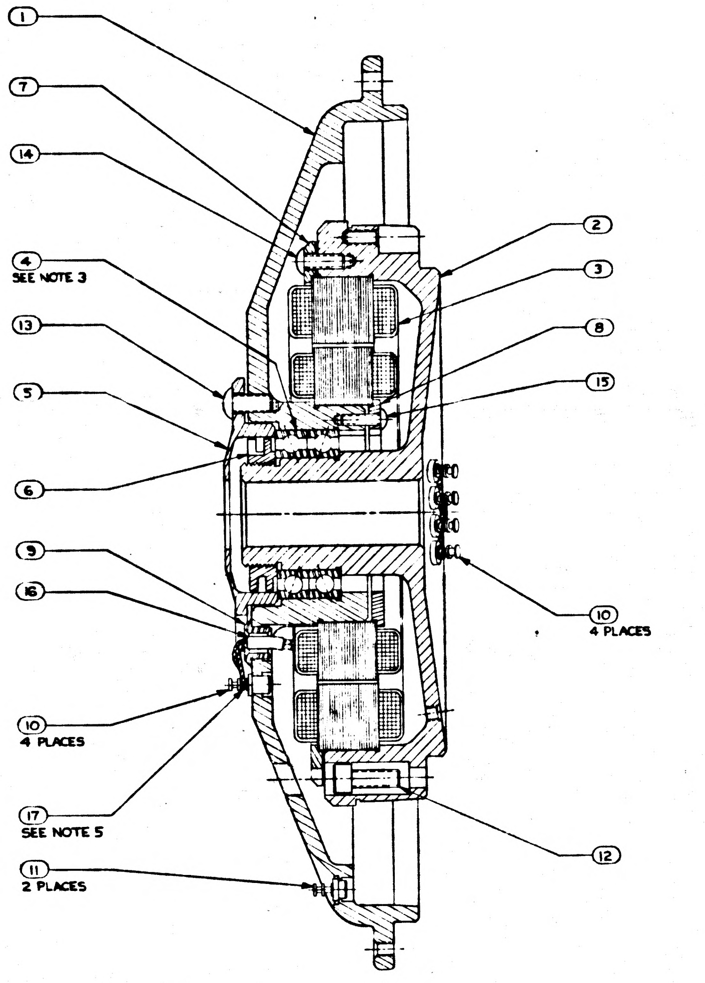
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

WIRING LIST

TERMINAL NO.	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
⑱
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
S1
S3
S2
S4
2
1
-C-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④
SEE NOTE 3
⑬
⑤
⑥
⑨
⑯
⑩
4 PLACES
⑰
SEE NOTE 5
⑪
2 PLACES
②
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⑧
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4 PLACES
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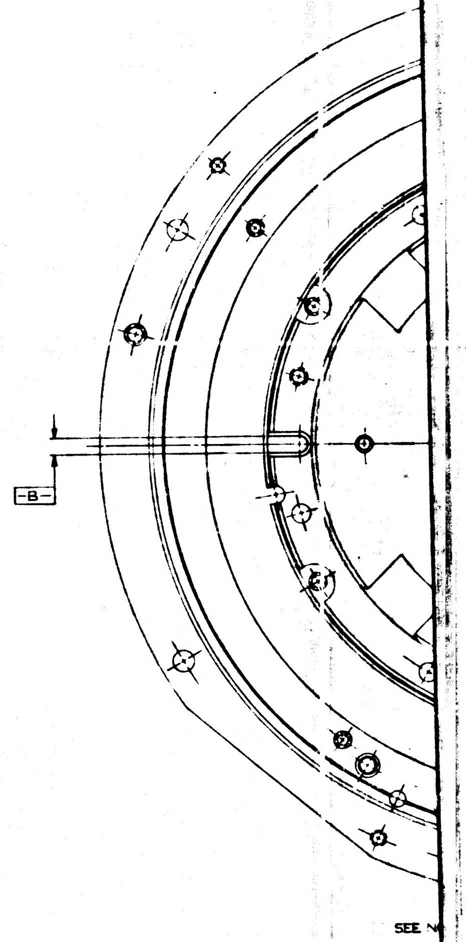


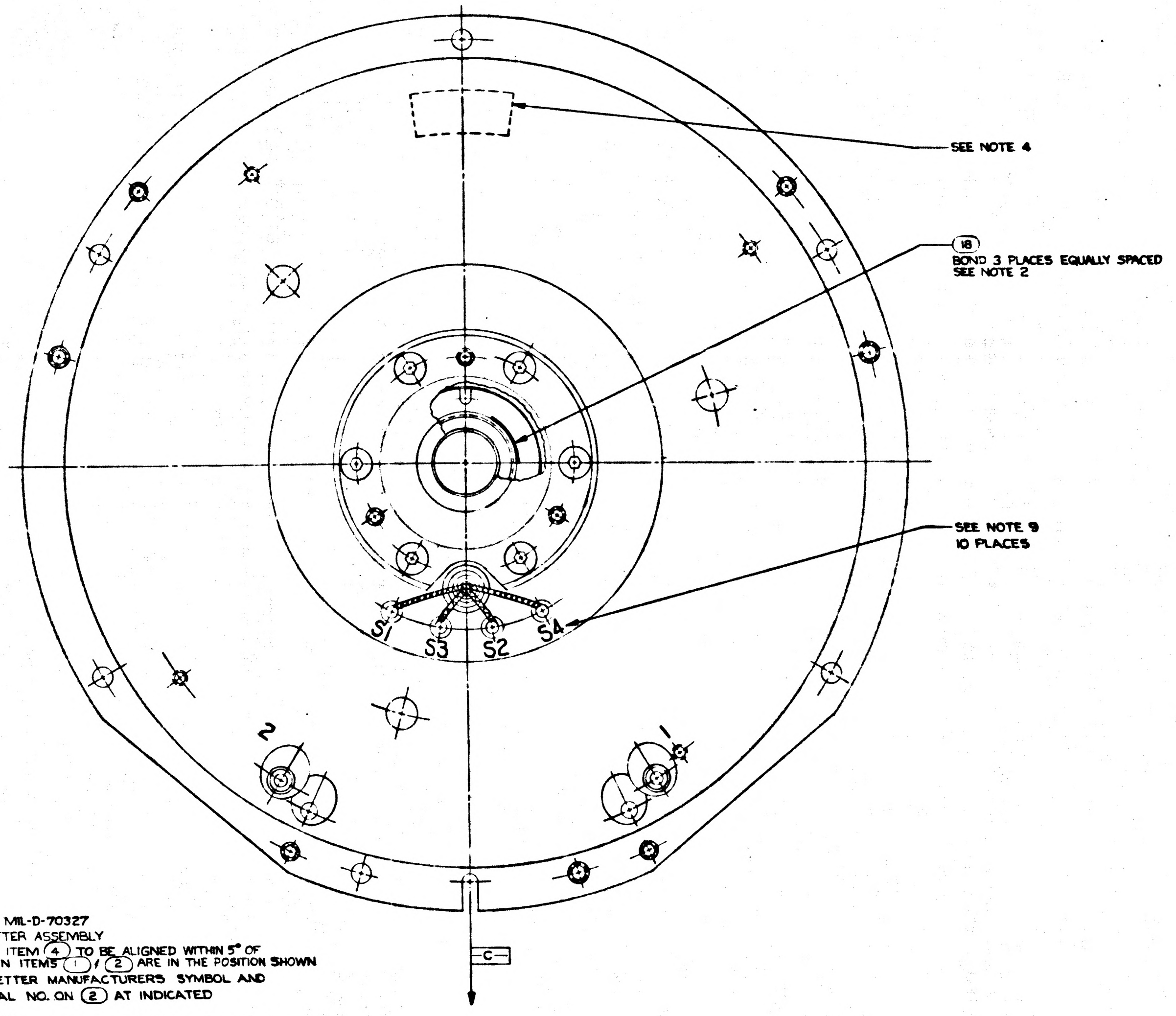
NOTES

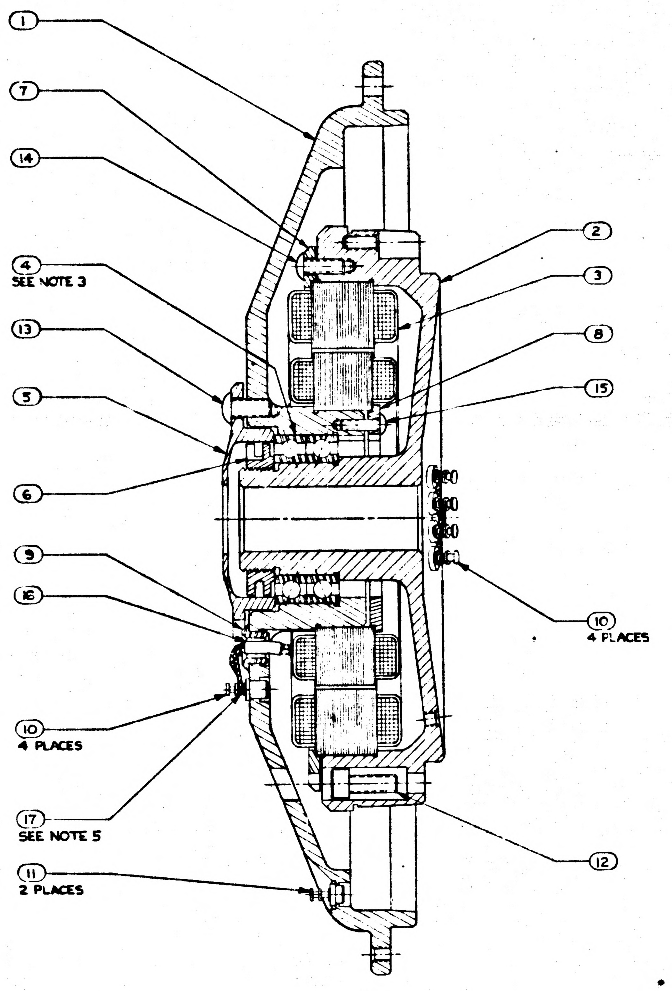
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 APPLY ITEM ⑱ TO ITEMS ② & ⑥ AFTER ASSEMBLY
3 ECCENTRICITY MARKS ON BOTH RACES OF ITEM ④ TO BE ALIGNED WITHIN 5° OF -C- & IN DIRECTION OF THE ARROW WHEN ITEMS ① & ② ARE IN THE POSITION SHOWN
4 IDENTIFY USING DRAWING NO. REVISION LETTER MANUFACTURERS SYMBOL AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130
5 SOLDER PER MIL-STD-440 USING ITEM ⑰ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
Ⓑ 6 ~~[illegible]~~
7 ASSEMBLY TO MEET REQUIREMENTS OF PS 1000160.
8 SCREW TORQUE REQUIREMENTS ± 7%
⑥ 400 IN LB
⑬ 10.0 IN LB
⑭ 5.0 IN LB
⑮ 3.5 IN LB
9 MARK 1/8 HIGH CHARACTERS WITH ITEM ⑲ IN LOCATIONS INDICATED
10 ITEM ⑲ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
11 RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS 1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN
Ⓐ 12 MAX ALLOWABLE TORQUE: 1 OZ.-IN.

	REV	SHEET
1000162	C	1

INCHES
PHOTOGRAPHIC SCALE ONLY

WIRING LIST	
TERMINAL NO.	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU


SEE NOTE 4
⑱
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
S1
S3
S2
S4
2
1
-C-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SEE NOTE 3
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⑩
4 PLACES
⑰
SEE NOTE 5
⑪
2 PLACES
②
③
⑧
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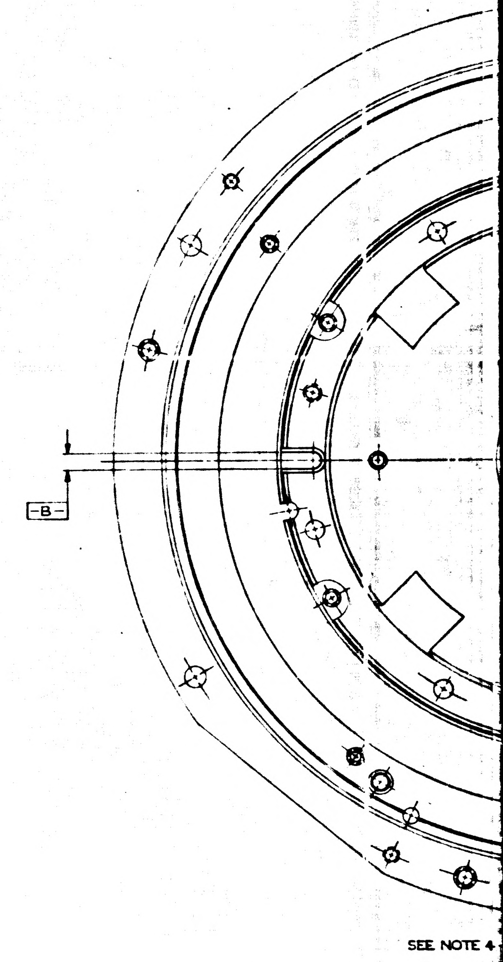
⑩
4 PLACES
⑫



NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 APPLY ITEM ⑱ TO ITEMS ② & ⑥ AFTER ASSEMBLY
3 ECCENTRICITY MARKS ON BOTH RACES OF ITEM ④ TO BE ALIGNED WITHIN 5° OF -C- & IN DIRECTION OF THE ARROW WHEN ITEMS ① & ② ARE IN THE POSITION SHOWN
4 IDENTIFY USING DRAWING NO. REVISION LETTER MANUFACTURERS SYMBOL AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130
5 SOLDER PER MIL-STD-440 USING ITEM ⑰ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
Ⓑ 6 [illegible]
7 ASSEMBLY TO MEET REQUIREMENTS OF PS 1000160.
8 SCREW TORQUE REQUIREMENTS ± 7%
⑥ 400 IN LB
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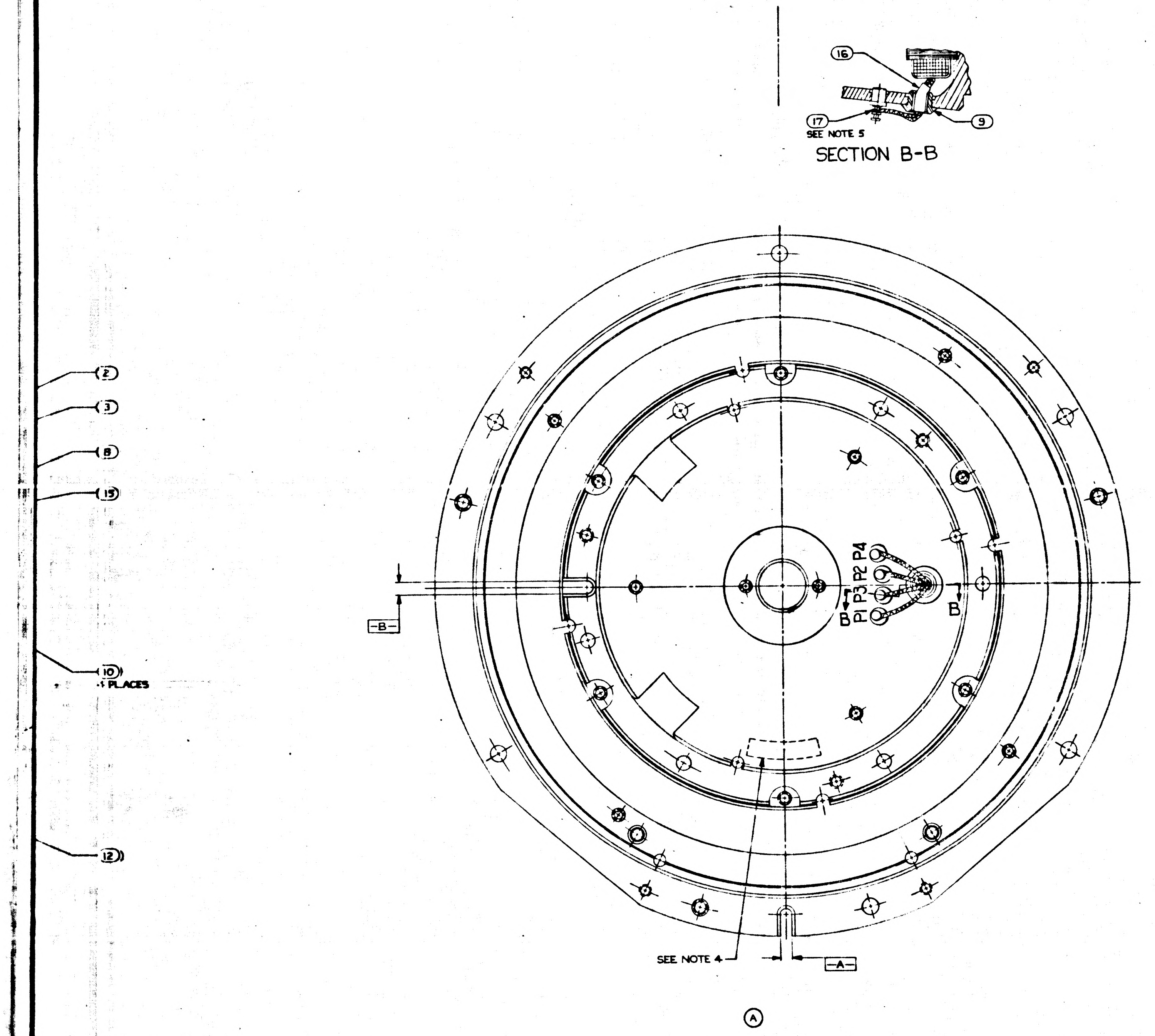
⑭ 5.0 IN LB
⑮ 3.5 IN LB
9 MARK 1/8 HIGH CHARACTERS WITH ITEM ⑲ IN LOCATIONS INDICATED
10 ITEM ⑲ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508
Ⓐ 11 RESOLVER MUST BE AT ELECTRICAL NULL AS DEFINED BY PS 1000160 WHEN SLOT -A- AND SLOT -B- ARE 90°0' ±1' APART AS SHOWN
12 MAX ALLOWABLE TORQUE: 1 OZ.-IN.

	REV	SHEET
1000162	D	1

INCHES
PHOTOGRAPHIC SCALE ONLY

F-1

REVISIONS TDRR 00183			
SYM	DESCRIPTION	DATE	APPROVAL
A	TDRR 00363	2-12-63	WK
B	TDRR 00485	3-5-63	WK
C	TDRR 01426	6-3-63	WK
D	TDRR 01676	6-19-63	WK



MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	NO
AS REQ'D	INK, BLACK, FUNGUS PROOF	-	TT-I-558	SEE NOTE 10	19
AS REQ'D	ADH, GOODYEAR CPA 923 A		MIL-A-13883B		18
AS REQ'D	SOLDER (TIN LEAD SILVER)	SN10WARP2	QQ-S-571		17
AS REQ'D	TUBING INSULATOR ELECTRICAL		MIL-I-22129		16
Ⓓ 6	SCREW, BUT HD SELF LKG SPL SOC	1000250-3			15
Ⓓ 6	SCREW, BUT HD SELF LKG SPL SOC	1000250-14			14
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			13
6	SCREW, CAP SOC HD HEX	1000110-7			12
2	TERMINAL, INSULATED	1000100-2			11
8	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15X RESOLVER	1000084			8
1	CLAMP, OUTER RING 15X RESOLVER	1000079			7
1	NUT, BEARING RETAINER	1000086			6
1	RETAINER, BEARING IA & MA	1000090			5
1	BEARING, BALL DUPLEX	1000029			4
1	RESOLVER 16X TRANSMITTER	1000160			3
Ⓒ 1	SHAFT, STUB 16X IA & MA	1000294			2
1	HOUSING, BEARING 15X IA & MA	1000052			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
1000206	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN G QUINN
APPROVED FOR MSC W. J. Rhine 12-14-62
BY DIRECTION MIT APPROVAL
W. Wipfli 19 Dec 1962

16X RESOLVER ASSEMBLY
INNER & MIDDLE AXIS

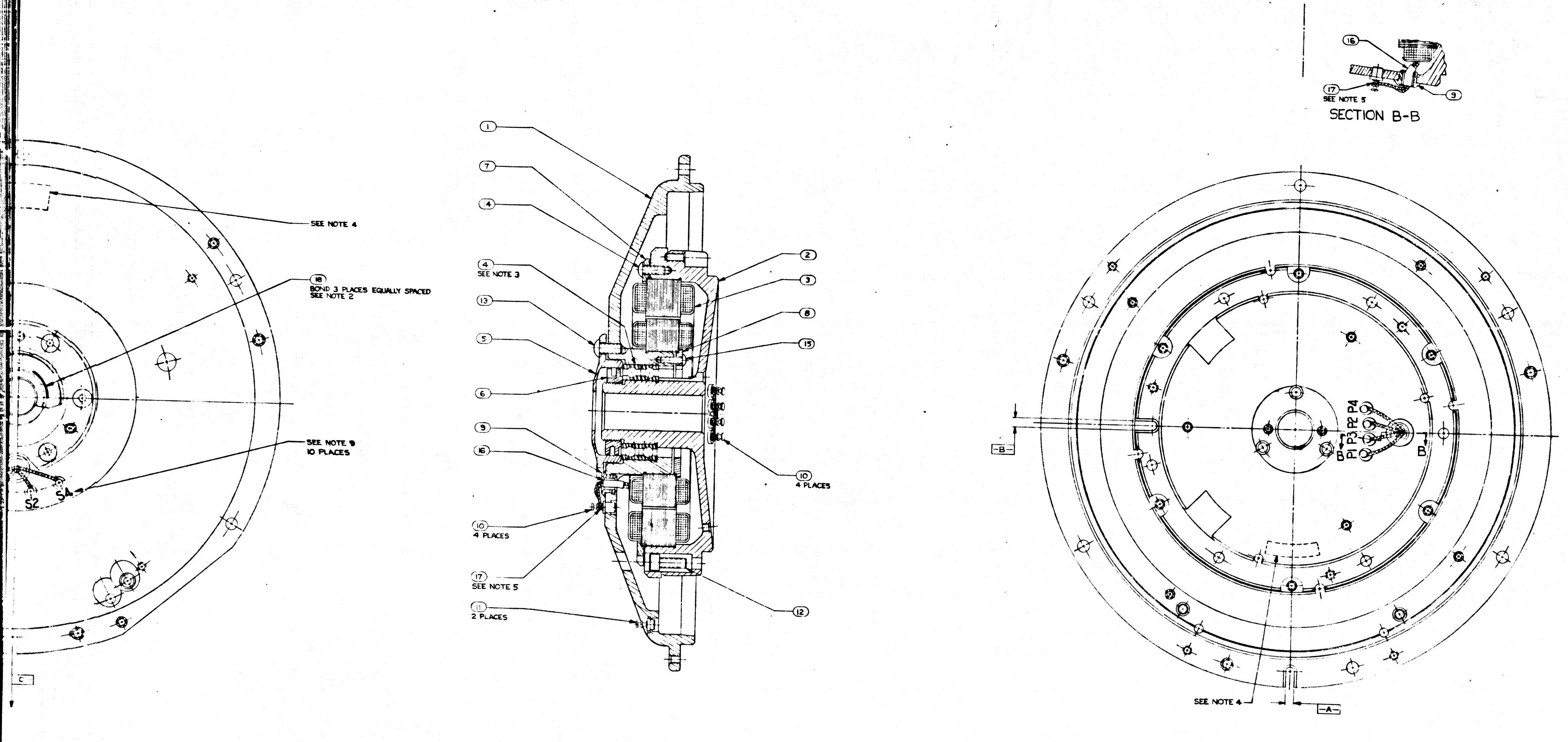
SCALE 2/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000162
SHEET 1 OF 1

1000162

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F-2



16
17
SEE NOTE 5
9
SECTION B-B
SEE NOTE 4
18
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
S2
S4
C
1
7
4
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SEE NOTE 3
13
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6
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16
10
4 PLACES
17
SEE NOTE 5
11
2 PLACES
2
3
8
15
10
4 PLACES
12
P1 P3 P2 P4
B
B
-B-
SEE NOTE 4
-A-

QTY REQ'D	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
AS REQ'D	INK, BLACK FUNGUS PROOF		TT-I-558	SEE NOTE 10	19
AS REQ'D	ADH, RUB RESIN, SYN		ZZ-30000-5	FSN	18
AS REQ'D	SOLDER (TIN LEAD SILVER)	SN10WARP2	QQ-S-571		17
AS REQ'D	TUBING INSULATOR ELECTRICAL		MIL-I-22129		16
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-3			15
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-4			14
6	SCREW, BUT HD SELF LKG HEX SOC	1000093-25			13
6	SCREW, CAP SOC HD HEX	1000110-7			12
2	TERMINAL, INSULATED	1000100-2			11
8	TERMINAL, INSULATED	1000100-1			10
2	BUSHING, INSULATOR	1000036			9
1	CLAMP, INNER 15X RESOLVER	1000084			8
1	CLAMP, OUTER RING 15X RESOLVER	1000079			7
1	NUT, BEARING RETAINER	1000086			6
1	RETAINER, BEARING IA & MA	1000090			5
1	BEARING, BALL DUPLEX	1000029			4
1	RESOLVER 16X TRANSMITTER	1000160			3
1	SHAFT, STUB 15X IA & MA	1000035			2
1	HOUSING, BEARING 15X IA & MA	1000052			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000207	
1000206	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DRAWN G QUINN 12/62
APPROVED MSC
W J Kline 12-14-62
MIT APPROVAL
W Keppler 19 Dec 1962

16X RESOLVER ASSEMBLY
INNER & MIDDLE AXIS

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000162

SCALE 2/1
UNIT WT
CODE IDENT
SHEET 1 OF 1

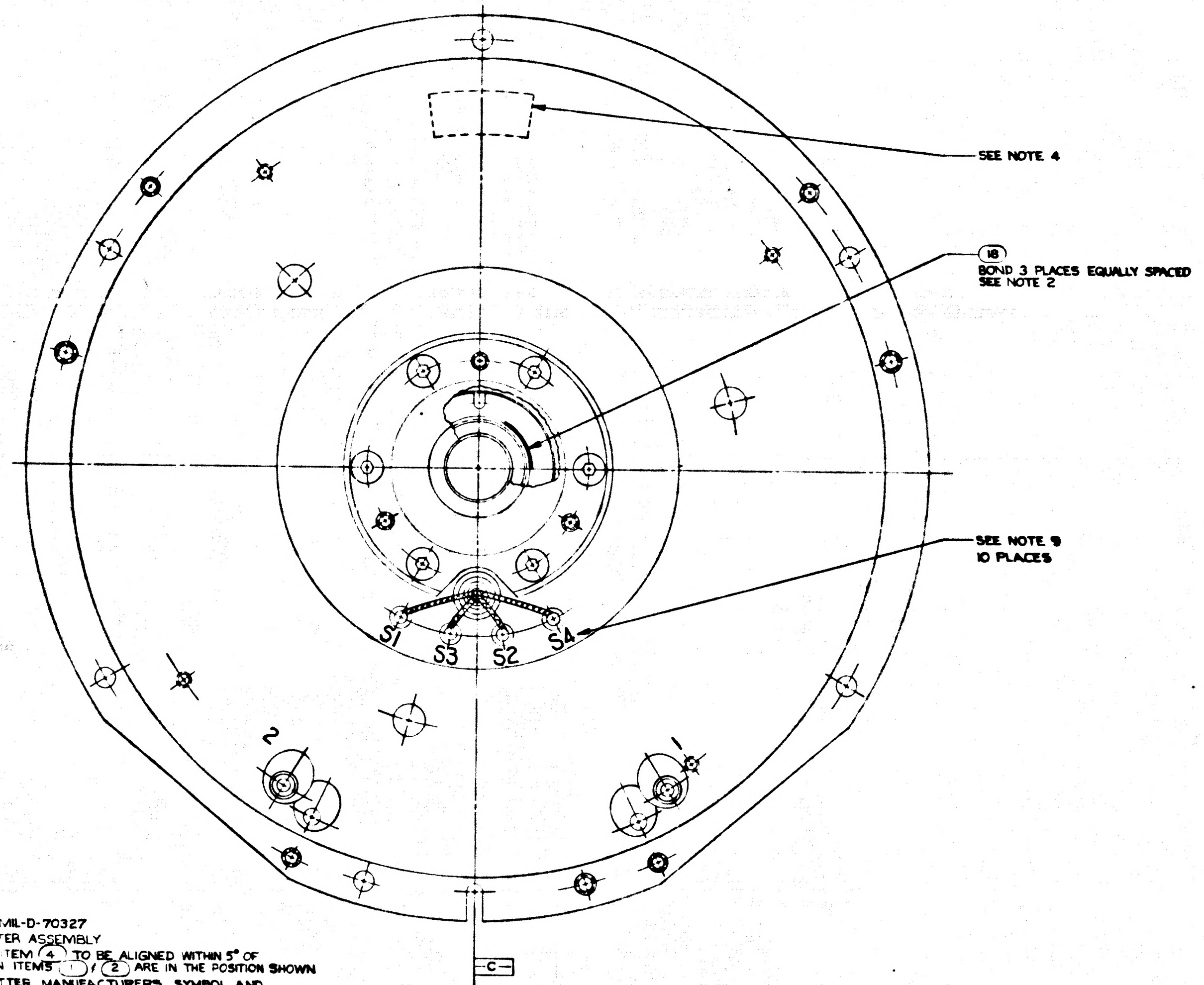
REVISIONS
DESCRIPTION DATE APPROVAL

INCHES
PHOTOGRAPHIC SCALE ONLY

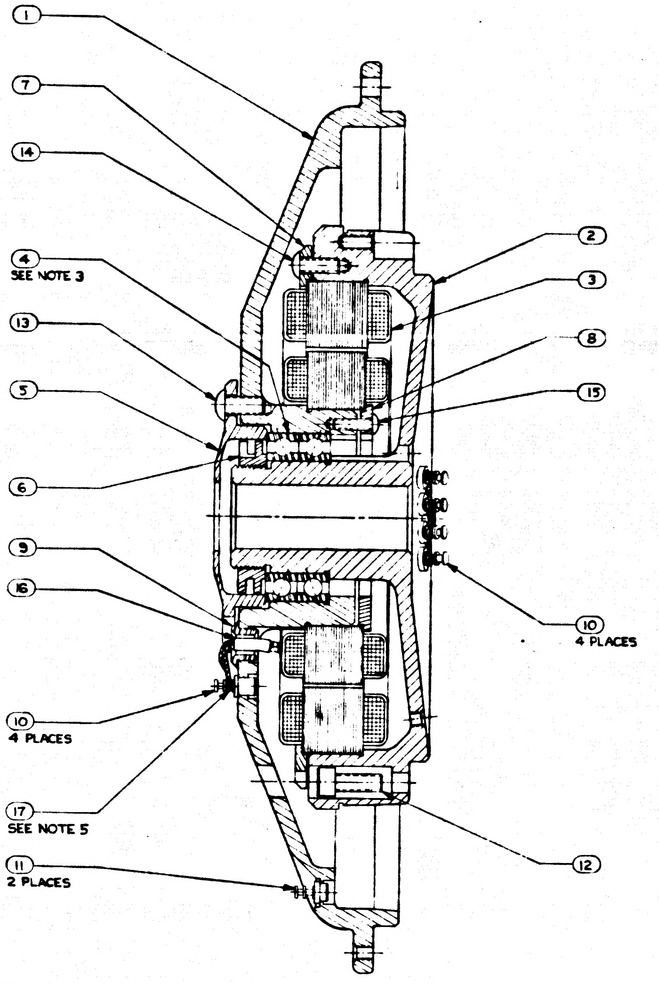
1000162 REV SHEET 1

1000162

WIRING LIST	
TERMINAL NO.	COLOR
P1	RED
P2	YEL
P3	BLK
P4	BLU
S1	RED
S2	YEL
S3	BLK
S4	BLU



SEE NOTE 4
⑱
BOND 3 PLACES EQUALLY SPACED
SEE NOTE 2
SEE NOTE 9
10 PLACES
S1
S3
S2
S4
2
1
-C-



①
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SEE NOTE 3
⑬
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⑯
⑩
4 PLACES
⑰
SEE NOTE 5
⑪
2 PLACES
②
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4 PLACES
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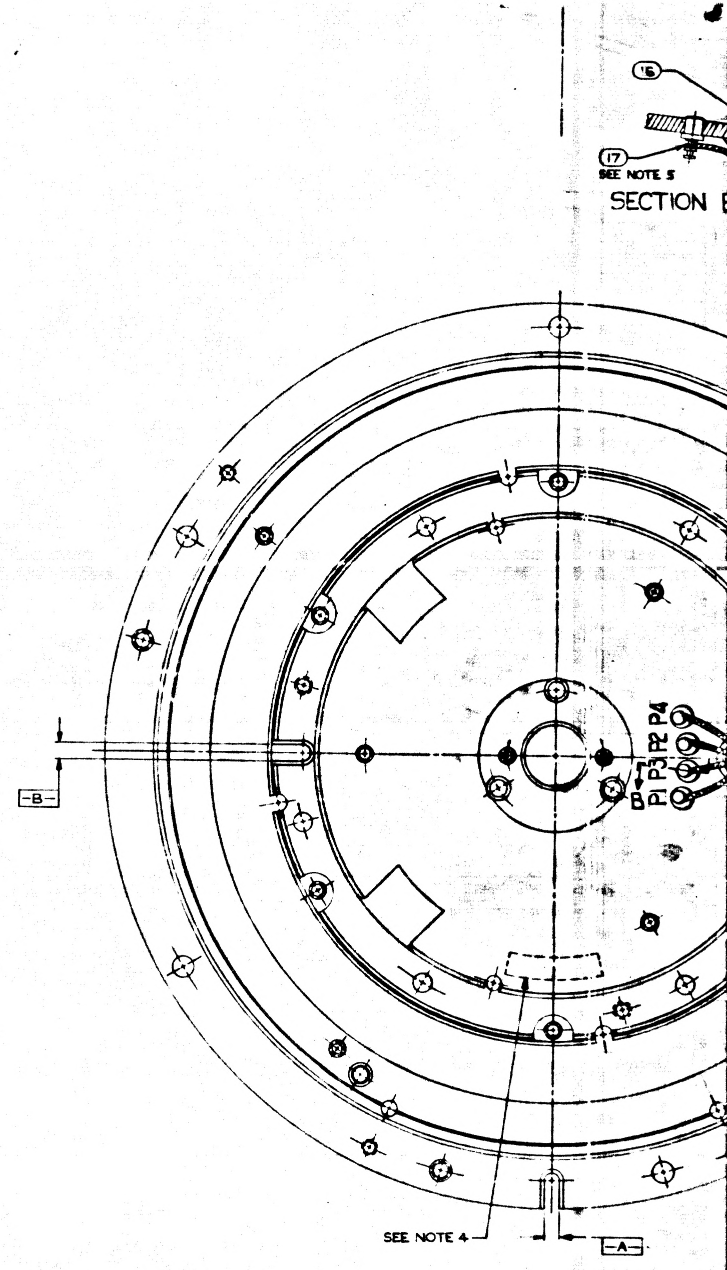


⑯
⑰
SEE NOTE 5
SECTION
-B-
P1 P3 P2 P4
B
SEE NOTE 4
-A-

NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

2 APPLY ITEM ⑰ TO ITEMS ② & ⑥ AFTER ASSEMBLY

3 ECCENTRICITY MARKS ON BOTH RACES OF ITEM ④ TO BE ALIGNED WITHIN 5° OF -C- / IN DIRECTION OF THE ARROW WHEN ITEMS ① & ② ARE IN THE POSITION SHOWN

4 IDENTIFY USING DRAWING NO. REVISION LETTER MANUFACTURERS SYMBOL AND SERIAL NO. ON ① AND MATCHING SERIAL NO. ON ② AT INDICATED LOCATIONS PER MIL-STD-130

5 SOLDER PER MIL-STD-440 USING ITEM ⑰ : WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

6 ASSEMBLE PER AP 1000162.

7 ASSEMBLY TO MEET REQUIREMENTS OF PS 1000160.

8 SCREW TORQUE REQUIREMENTS ± 7%

⑥ 400 IN LB

⑬ 10.0 IN LB

⑭ 5.0 IN LB

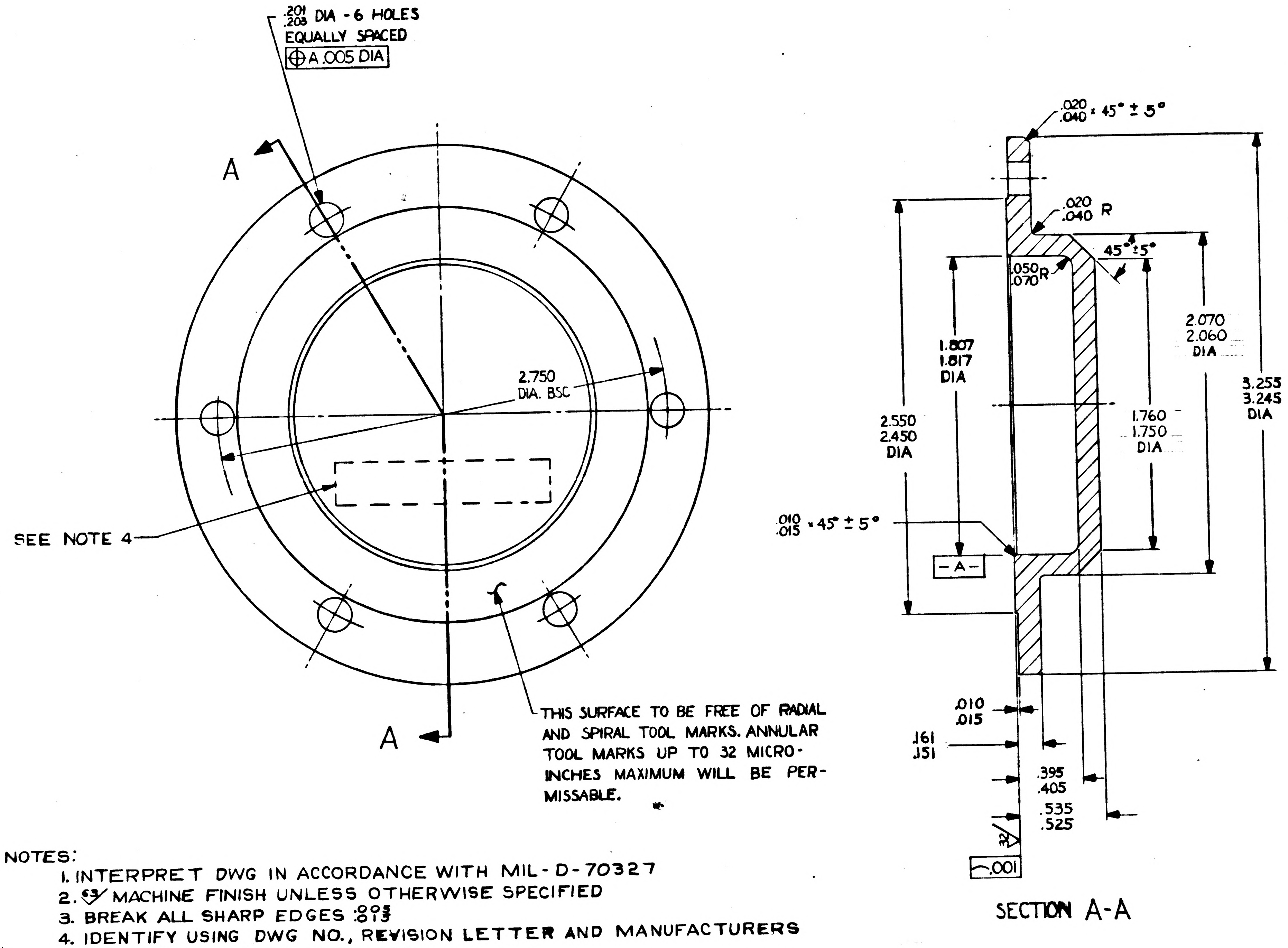
⑮ 3.5 IN LB

9 MARK 1/8 HIGH CHARACTERS WITH ITEM ⑲ IN LOCATIONS INDICATED

10 ITEM ⑲ TO MEET REQUIREMENTS OF MIL-STD-810 METHOD 508

1000162	REV	SHEET
		1

REVISIONS TDRR 00195				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



.201 .203 DIA - 6 HOLES EQUALLY SPACED
⊕ A .005 DIA
A
2.750 DIA. BSC
SEE NOTE 4
A
THIS SURFACE TO BE FREE OF RADIAL AND SPIRAL TOOL MARKS. ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAXIMUM WILL BE PERMISSABLE.
.020 .040 × 45° ± 5°
.020 .040 R
45° ± 5°
.050 .070 R
1.807 1.817 DIA
2.070 2.060 DIA
3.255 3.245 DIA
2.550 2.450 DIA
1.760 1.750 DIA
.010 .015 × 45° ± 5°
-A-
.010 .015
.161 .151
.395 .405
.535 .525
32
.001
SECTION A-A

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
3. BREAK ALL SHARP EDGES .005 .015
4. IDENTIFY USING DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130
5. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
1000001	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY 6061
TEMP T6 ALT SPEC
QQ-A-325 B

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	J Boyce	12/28/62
CHECKED		
DRAWN	PALERMO	12-3-62

APPROVED FOR MSC
K Michael 12/27/62
BY DIRECTION
MIT APPROVAL W. Kupfer 28 Dec 62

COVER, ACCESS
RESOLVER MODULE

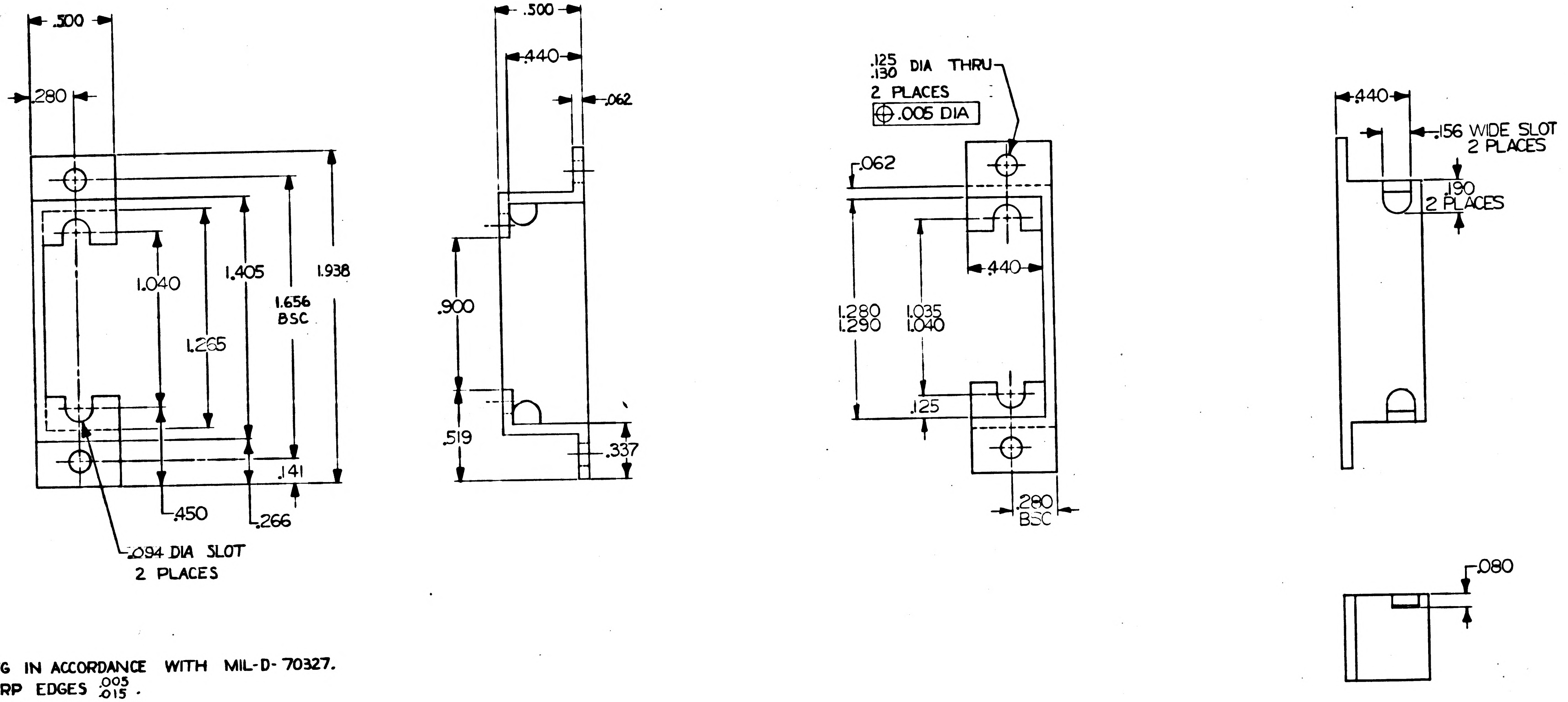
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000163
SHEET 1 OF 1

1000163

REVISIONS TDRR 00761

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	GENERAL CHANGES		
	B	GENERAL CHANGES	4-9-63	ajB



.500
.280
1.040
1.265
1.405
1.656 BSC
1.938
.141
.450
.266
.094 DIA SLOT
2 PLACES
.500
.440
.062
.900
.519
.337
.125
.130 DIA THRU
2 PLACES
⊕ .005 DIA
.062
.440
1.280
1.290
1.035
1.040
.125
.280 BSC
.440
.156 WIDE SLOT
2 PLACES
.190
2 PLACES
.080

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
3. $\overset{63}{\vee}$ MACHINE FINISH ALL OVER.
4. INSIDE CORNERS .010 R MAX
5. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS FIBER BASE, PER MIL-P-18177 TYPE GEE
6. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL, PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL 1000201
1000005	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a.J. Boyce	4-9-63
CHECKED		
DRAWN	PALERMO	12-5-62
APPROVED FOR MSC BY DIRECTION	E. J. Swift	4/10/63
MIT APPROVAL		10 Apr 63

COVER, BRACKET, CONNECTOR

HARNESS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

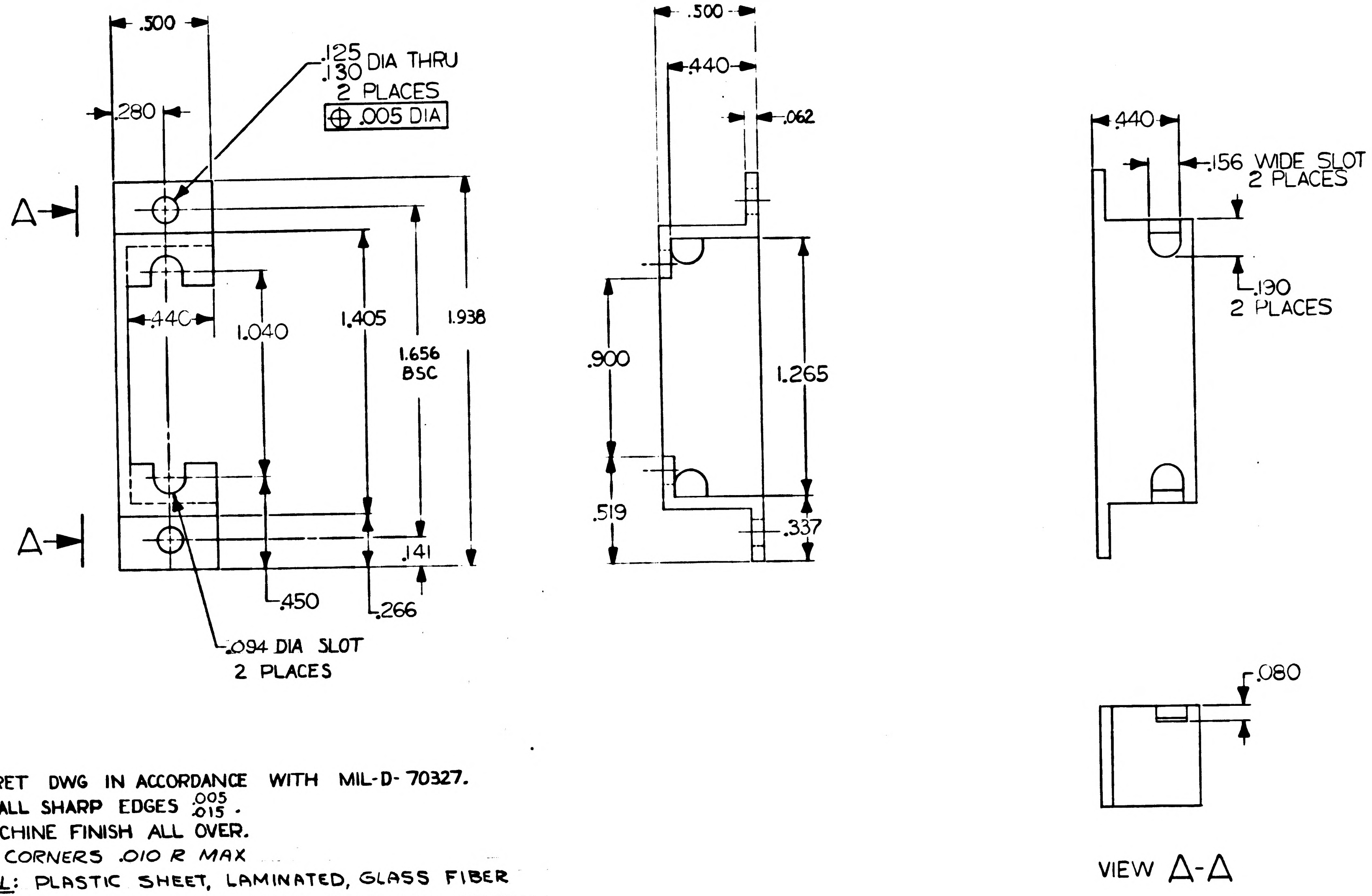
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000164

SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	GENERAL CHANGES			
	B	GENERAL CHANGES	4-9-63	ajB	
	C	TDRR 00852	4-17-63		WK


.500
.125
.130 DIA THRU
2 PLACES
⊕ .005 DIA
.280
A
A
.440
1.040
1.405
1.656
BSC
1.938
.141
.450
.266
.094 DIA SLOT
2 PLACES
.500
.440
.062
.900
.519
1.265
.337
.440
.156 WIDE SLOT
2 PLACES
.190
2 PLACES
.080
VIEW A-A

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
3. $\overset{63}{\nabla}$ MACHINE FINISH ALL OVER.
4. INSIDE CORNERS .010 R MAX
5. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS FIBER BASE, PER MIL-P-18177 TYPE GEE
6. IDENTIFY USING DRAWING NUMBER, REVISION LETTER, AND MANUFACTURERS SYMBOL, PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000005	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	PALERMO	12-5-62
APPROVED FOR MSC	E. S. Swift	4/10/63
BY DIRECTION		
MIT APPROVAL		10 Apr 63

COVER,
BRACKET, CONNECTOR
HARNESS ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

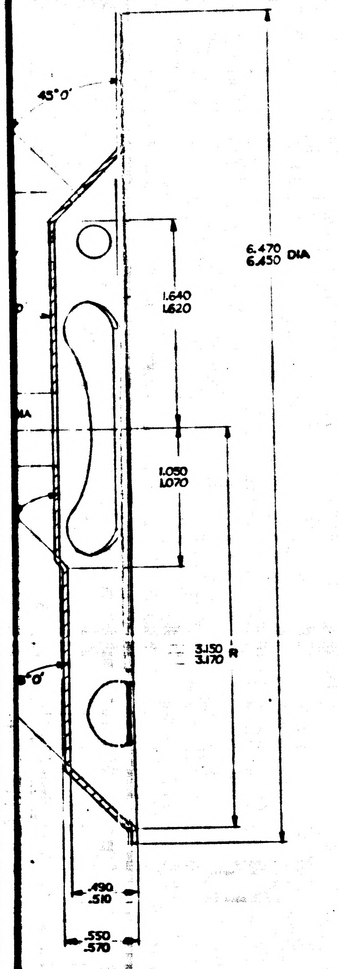
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000164
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS	TDRR 00256			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00644	3-27-63	4/18 WK.

D



SECTION B—B

C

B

A

100169

A

1000169

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000201
1000156	DL 1000 [illegible]
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
——— ——— ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 6

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
MIT/IL APPROVAL DATE

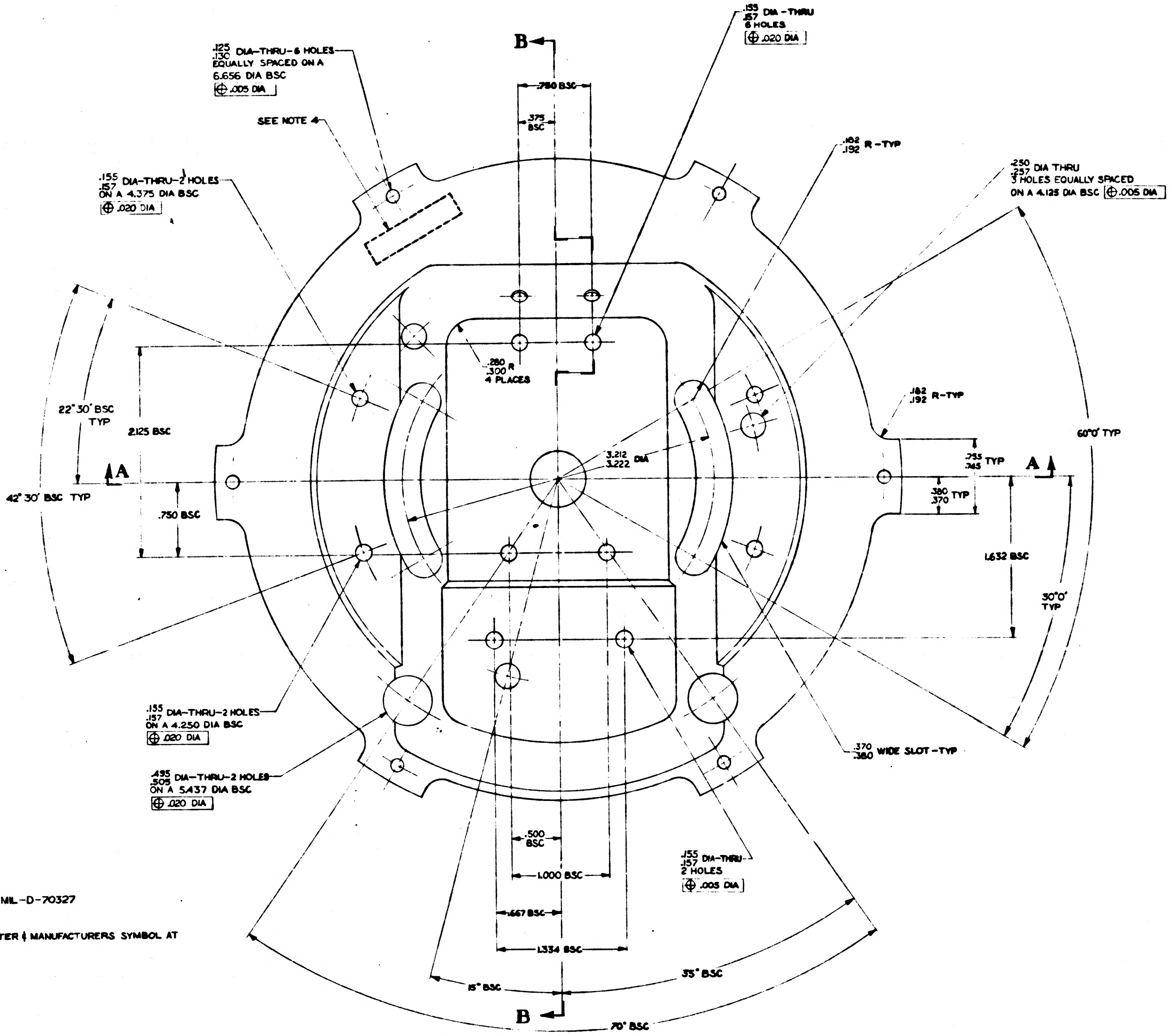
GUIDE, WIRE,
BEARING HOUSING
15 & 16 SPEED OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000169
SHEET 1 OF 1

1000169 A

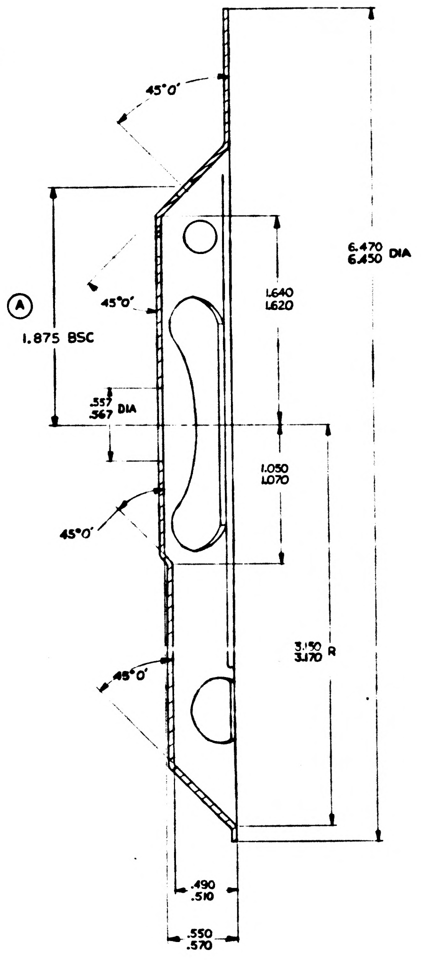
ZONE	SYM	DESCRIPTION	DATE
	A	TDRR 00644	3-27-65



.125 .130 DIA-THRU-8 HOLES EQUALLY SPACED ON A 6.656 DIA BSC ⌖ .005 DIA
.153 .157 DIA-THRU 6 HOLES ⌖ .020 DIA
SEE NOTE 4
.780 BSC
.375 BSC
.155 .157 DIA-THRU-2 HOLES ON A 4.375 DIA BSC ⌖ .020 DIA
.182 .192 R-TYP
.250 .257 DIA THRU 3 HOLES EQUALLY SPACED ON A 4.125 DIA BSC ⌖ .005 DIA
.280 .300 R 4 PLACES
22°30' BSC TYP
2.125 BSC
42°30' BSC TYP
.750 BSC
3.212 3.222 DIA
.182 .192 R-TYP
.755 .765 TYP
.380 .370 TYP
60°0' TYP
1.632 BSC
30°0' TYP
.155 .157 DIA-THRU-2 HOLES ON A 4.250 DIA BSC ⌖ .020 DIA
.495 .505 DIA-THRU-2 HOLES ON A 5.437 DIA BSC ⌖ .020 DIA
.370 .380 WIDE SLOT-TYP
.500 BSC
1.000 BSC
.667 BSC
1.334 BSC
.155 .157 DIA-THRU 2 HOLES ⌖ .005 DIA
15° BSC
35° BSC
70° BSC
A
A
B
B

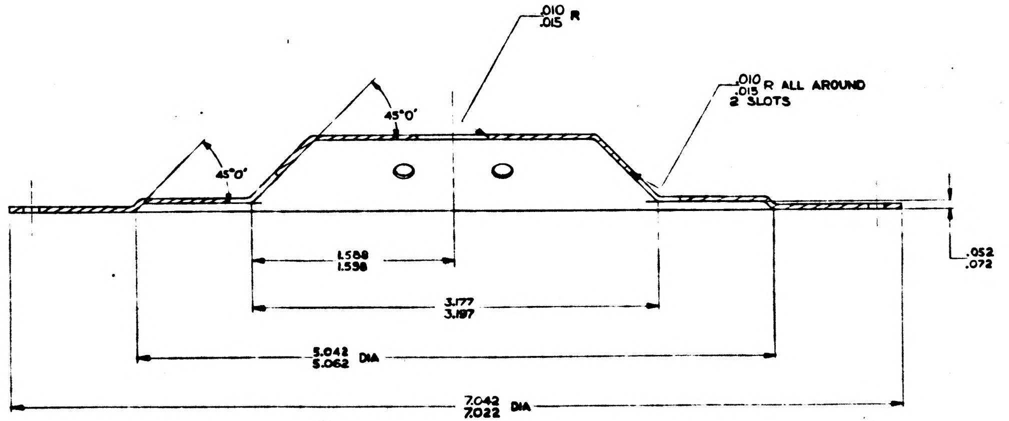
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS & BREAK SHARP EDGES $^{.005}_{.015}$
3. $\overset{250}{\surd}$ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
5. $^{.062}_{.052}$ R UNLESS OTHERWISE SPECIFIED
6. MATERIAL: AL ALY SH 3003-0
   ALT SPEC QQ-A-359D
   THICKNESS $^{.033}_{.028}$
7. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR



45°0'
45°0'
45°0'
45°0'
Ⓐ 1.875 BSC
.357 .367 DIA
1.640 1.620
1.050 1.070
6.470 6.450 DIA
3.150 3.170 R
.490 .510
.550 .570

SECTION B-B



.010 .015 R
.010 .015 R ALL AROUND 2 SLOTS
45°0'
45°0'
1.588 1.598
3.177 3.187
5.042 5.062 DIA
7.042 7.022 DIA
.052 .072

SECTION A-A

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION

LIST OF PARTS AND MATERIALS

MASTER

	DL 1000201
1000156	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 6

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9 153

		DATE
APPROVED	[illegible]	[illegible]
CHECKED		
DRAWN	D.M.WHITE	[illegible]

APPROVED FOR MSC
MIT/IL APPROVAL DATE 4/4/65

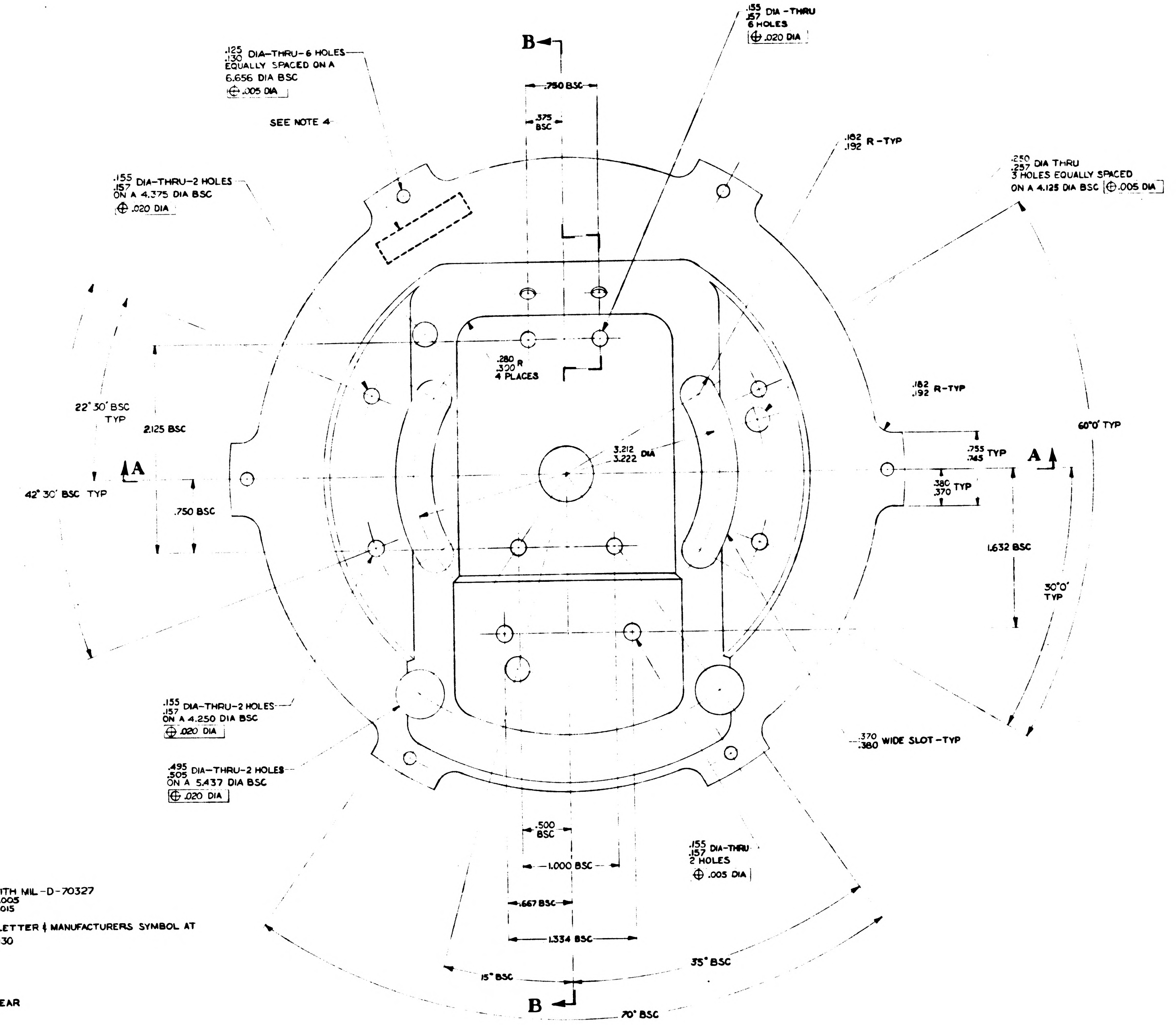
GUIDE, WIRE,
BEARING HOUSING
15 & 16 SPEED OUTER AXIS

SCALE	UNIT WT	CODE IDENT
2/1		

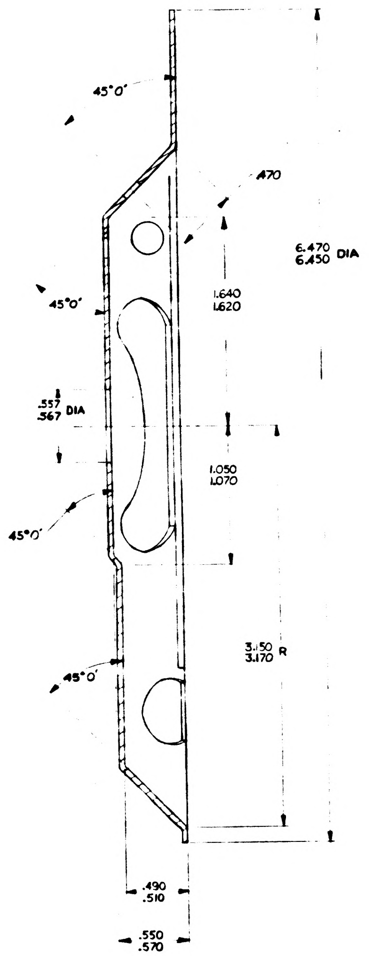
INSTRUMENTATION LABORATORY
SPACECRAFT
SHEET 1

1000169 A 1

REVISIONS	TDRR 00256			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



B
.125 .130 DIA-THRU-6 HOLES EQUALLY SPACED ON A 6.656 DIA BSC
⊕ .005 DIA
SEE NOTE 4
.750 BSC
.375 BSC
.155 .157 DIA-THRU 6 HOLES
⊕ .020 DIA
.182 .192 R-TYP
.250 DIA THRU .257 3 HOLES EQUALLY SPACED ON A 4.125 DIA BSC ⊕ .005 DIA
.155 .157 DIA-THRU-2 HOLES ON A 4.375 DIA BSC
⊕ .020 DIA
.280 .320 R 4 PLACES
22° 30' BSC TYP
2.125 BSC
3.212 3.222 DIA
.182 .192 R-TYP
60°0' TYP
.755 .745 TYP
A
.380 .370 TYP
42° 30' BSC TYP
.750 BSC
1.632 BSC
30°0' TYP
.155 .157 DIA-THRU-2 HOLES ON A 4.250 DIA BSC
⊕ .020 DIA
.370 .380 WIDE SLOT-TYP
.495 .505 DIA-THRU-2 HOLES ON A 5.437 DIA BSC
⊕ .020 DIA
.500 BSC
1.000 BSC
.155 .157 DIA-THRU 2 HOLES
⊕ .005 DIA
.667 BSC
1.334 BSC
15° BSC
35° BSC
70° BSC

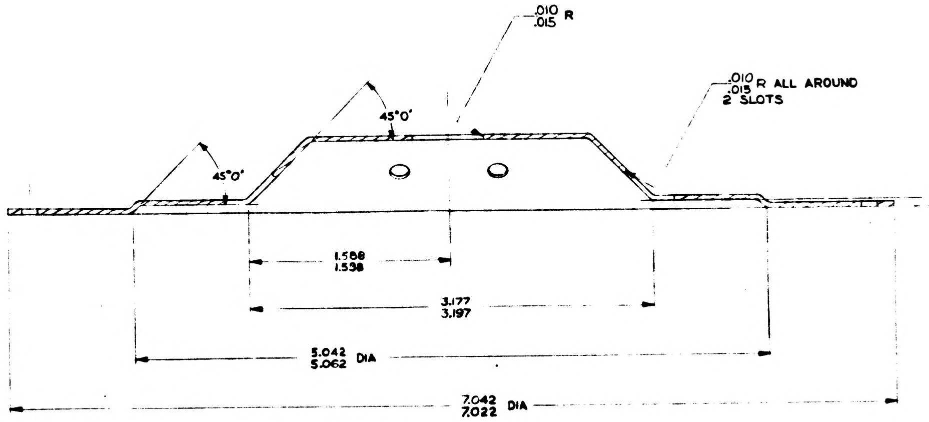


45°0'
.470
6.470 6.450 DIA
1.640 1.620
45°0'
.557 .567 DIA
1.050 1.070
45°0'
3.150 3.170 R
45°0'
.490 .510
.550 .570

SECTION **B-B**

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE BURRS & BREAK SHARP EDGES $^{.005}_{.015}$
3. $\overset{250}{\checkmark}$ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130
5. $^{.062}_{.052}$ R UNLESS OTHERWISE SPECIFIED
6. MATERIAL: AL ALY SH 3003-0
   ALT SPEC QQ-A-359D
   THICKNESS $^{.033}_{.028}$
7. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR



.010 .015 R
.010 .015 R ALL AROUND 2 SLOTS
45°0'
45°0'
.052 .072
1.588 1.538
3.177 3.197
5.042 5.062 DIA
7.042 7.022 DIA

SECTION **A-A**

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

	DL 1000201
1000156	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 6

M.I.T. INSTRUMENTATION LAB
APPROVED C J Rogers 1-16-63
CHECKED
DRAWN D M WHITE 12-18-62
APPROVED FOR MSC
M.I.T. APPROVAL T J Nilson DATE 1/4/63

GUIDE, WIRE,
BEARING HOUSING
15 & 16 SPEED OUTER AXIS

SCALE 2/1 | UNIT WT | CODE IDENT

M.I.T. INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000169
SHEET 1 OF 1

1000169 REV SHEET 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

▽ 1000170

REVISIONS TDRR 01695

SYM	DESCRIPTION	DATE	APPROVAL
-	ORIGINATED		
A	REPLACED BY REV B PER TDRR 03550	1 OCT 63	JAM WK

NOTES:

1. REQUIREMENTS:

A. ELECTRICAL:

(1) VOLTAGE RATING: 125 VOLTS MAXIMUM.

(2) TEST SPECIFICATIONS:

(a) CHARACTERISTIC A - CARRY 100 PERCENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 200 PERCENT OF RATED LOAD. SEE TABLE I.

(b) CHARACTERISTIC B - CARRY 100 PERCENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 150 PERCENT OF RATED LOAD. SEE TABLE I.

B. CONSTRUCTION AND MECHANICAL:

(1) ENCLOSURE: GLASS BODY, METAL END CAPS, HERMETICALLY SEALED.

(2) LEAD MATERIAL SHALL BE IRON-NICKEL-COBALT ALLOY, GOLD PLATED PER NASA DOCUMENT PS 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.

(3) LEAD BEND TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING LEAD BEND TEST. THE COMPONENT BODY SHALL BE HELD IN A VERTICAL POSITION WITH A TWO POUND WEIGHT SUSPENDED FROM THE LEAD UNDER TEST. 2 CYCLES OF BENDS SHALL BE ACCOMPLISHED, A CYCLE CONSISTING OF MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90 DEGREES IN ONE DIRECTION, THEN 180 DEGREES IN THE OPPOSITE DIRECTION AND BACK 90 DEGREES TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.

(4) LEAD PULL TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING AN AXIAL PULL OF 4 POUNDS MINIMUM.

C. PACKAGE MARKING: UNIT PACKAGES SHALL BE LEGIBLY MARKED WITH THE MANUFACTURER'S IDENTIFICATION, PART NUMBER AND CURRENT RATING.

D. ENVIRONMENTAL: UNITS SHALL BE CAPABLE OF WITHSTANDING THE ENVIRONMENTAL TESTS SPECIFIED IN NASA DOCUMENT ND 1000200.

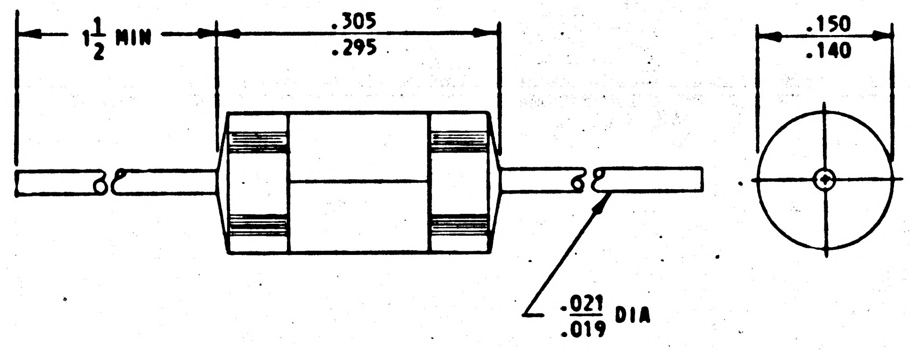
E. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS II.

2. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

TABLE I

DASH NO	CURRENT RATING AMPERES	TEST SPEC.	COLOR CODE	
			ONE END	OTHER END
1	0.05	A	YELLOW	YELLOW
2	0.0625	A	BROWN	BROWN
3	0.1	A	RED	RED
4	0.125	A	ORANGE	ORANGE
5	0.15	B	RED	YELLOW
6	0.2	B	RED	BLUE
7	0.25	B	RED	PURPLE
8	0.3	A	GREEN	GREEN
9	0.4	A	BLUE	BLUE
10	0.5	B	ORANGE	GREEN
11	0.6	B	ORANGE	BLUE
12	0.75	B	ORANGE	PURPLE
13	1.0	B	YELLOW	GREEN

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING



Ⓐ REPLACED BY REV B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

USAGE	DL1000201
MULTIPLE	DL1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN D. Bergman DATE 27 DEC 62
CHECKED 2 Jun 63
APPROVAL O J Boyce 6-1963
APPROVAL
NASA APPROVAL W J Rhine 6-26-63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FUSE, PIGTAIL, SUB-MINIATURE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1000170
SCALE NONE WT SHEET 1 OF 1

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B 1000170

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
–	ORIGNATED		
B	REPLACES REV A WITH CHANGES PER TDRR 03550	1 OCT 63	sam WK

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT 1015404, CLASS 2.

C. PACKAGE MARKING: UNIT PACKAGES SHALL BE LEGIBLY MARKED WITH THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, MANUFACTURER'S IDENTIFICATION, PART NUMBER AND CURRENT RATING.

D. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN PARAGRAPH 4.

2. INSPECTION AND ACCEPTANCE:

A. LEAD MATERIAL: TINNED COPPER

B. CURRENT RATING: PER TABLE I.

(1) CHARACTERISTIC A: CARRY 100 PERCENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 200 PER CENT OF RATED LOAD.

(2) CHARACTERISTIC B: CARRY 100 PER CENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 150 PER CENT OF RATED LOAD.

3. DESIGN:

A. ENCLOSURE: GLASS BODY, METAL END CAPS, HERMETICALLY SEALED.

B. VOLTAGE RATING: 125 VOLTS, MAXIMUM

C. LEAD BEND TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING LEAD BEND TEST. THE COMPONENT BODY SHALL BE HELD IN A VERTICAL POSITION WITH A TWO POUND WEIGHT SUSPENDED FROM THE LEAD UNDER TEST. 2 CYCLES OF BENDS SHALL BE ACCOMPLISHED. A CYCLE CONSISTING OF MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90 DEGREES IN ONE DIRECTION, THEN 180 DEGREES IN THE OPPOSITE DIRECTION AND BACK 90 DEGREES TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.

D. LEAD PULL TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING AN AXIAL PULL OF 4 POUNDS, MINIMUM.

E. ENVIRONMENTAL REQUIREMENTS: AS SPECIFIED IN PARAGRAPH 4.

4. QUALIFICATION: THIRTY SAMPLES, INCLUDING THE HIGHEST AND LOWEST CURRENT RATINGS SHALL BE SUBJECTED TO THE FOLLOWING TESTS. BEFORE AND AFTER EACH TEST THE FUSES SHALL BE VISUALLY INSPECTED AND SUBJECTED TO RATED CURRENT FOR 2 MINUTES.

A. TEMPERATURE CYCLING: PER MIL-STD-202, TEST CONDITION A (-55°C. TO +85°C.)

B. VIBRATION: UNIT SHALL BE LEAD MOUNTED AND SUBJECTED TO 20 G'S (LIMITED TO 0.12 DA), 5 CPS TO 2000 CPS TO 5 CPS AT 2 MINUTES/OCTIVE. LOGARITHMETIC SWEEP ONCE ALONG EACH OF TWO AXES (RADIAL AND AXIAL).

C. SHOCK: PER MIL-STD-810, METHOD 516, PROCEDURE V, EXCEPT 3 SHOCKS IN EACH DIRECTION ALONG EACH OF TWO AXES (AXIAL AND RADIAL), AT 50G'S.

D. LEAD BEND AND PULL: PER PARAGRAPH 3.C AND 3.D.

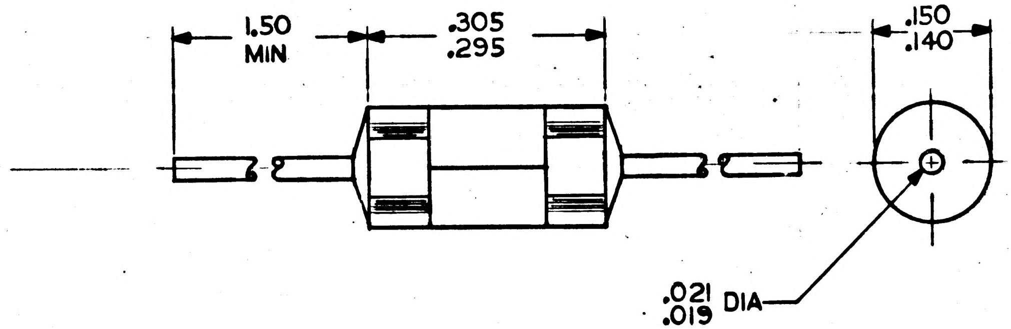
E. ELECTRICAL TEST: FOLLOWING QUALIFICATION TESTS, ALL UNITS SHALL BE SUBJECTED TO TESTS SPECIFIED IN TABLE I.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

TABLE I

DASH NO.	CURRENT RATING AMPERES	TEST SPEC.	COLOR CODE	
			ONE END	OTHER END
1	0.05	A	YELLOW	YELLOW
2	0.0625	A	BROWN	BROWN
3	0.1	A	RED	RED
4	0.125	A	ORANGE	ORANGE
5	0.15	B	RED	YELLOW
6	0.2	B	RED	BLUE
7	0.25	B	RED	PURPLE
8	0.3	A	GREEN	GREEN
9	0.4	A	BLUE	BLUE
10	0.5	B	ORANGE	GREEN
11	0.6	B	ORANGE	BLUE
12	0.75	B	ORANGE	PURPLE
13	1.0	B	YELLOW	GREEN



Ⓑ REPLACES REV A WITH CHANGES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

USAGE	DL1000201
MULTIPLE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTES
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN A Dampeki DATE 9/30/63
CHECKED A. Martz 9-30-63
APPROVAL Saxtoff 10-1-63
APPROVAL
NASA APPROVAL W J Rhine 10-2-63
MIT APPROVAL W Kupfer 2 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FUSE, PIGTAIL, SUB MINIATURE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000170
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

C 1000170

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
–	ORIGNATED		
B	REPLACES REV A WITH CHANGES PER TDRR 03550	1 OCT 63	sah WK
C	TDRR 04443	6 NOV 63	sah WK

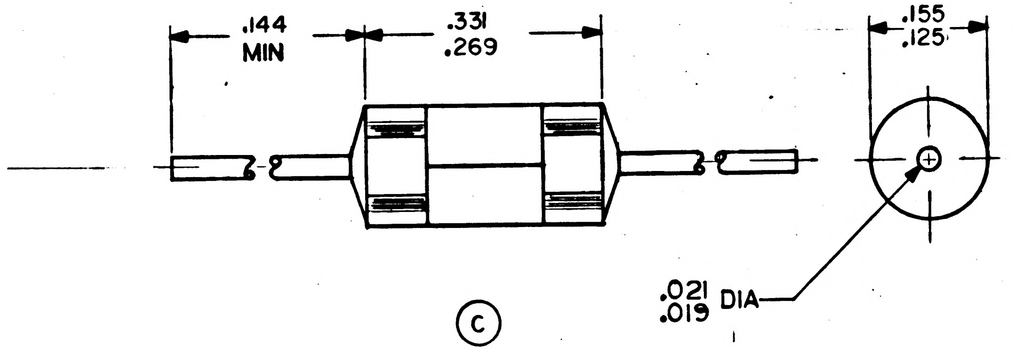
TABLE I

DASH NO.	CURRENT RATING AMPERES	TEST SPEC.	COLOR CODE	
			ONE END	OTHER END
1	0.05	A	YELLOW	YELLOW
2	0.0625	A	BROWN	BROWN
3	0.1	A	RED	RED
4	0.125	A	ORANGE	ORANGE
5	0.15	B	RED	YELLOW
6	0.2	B	RED	BLUE
7	0.25	B	RED	PURPLE
8	0.3	A	GREEN	GREEN
9	0.4	A	BLUE	BLUE
10	0.5	B	ORANGE	GREEN
11	0.6	B	ORANGE	BLUE
12	0.75	B	ORANGE	PURPLE
13	1.0	B	YELLOW	GREEN

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT 1015404, CLASS 2.
   - C. PACKAGE MARKING: UNIT PACKAGES SHALL BE LEGIBLY MARKED WITH THE NASA DRAWING NUMBER, DASH NUMBER, REVISION LETTER, MANUFACTURER'S IDENTIFICATION, PART NUMBER AND CURRENT RATING.
   - D. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN PARAGRAPH 4.
2. INSPECTION AND ACCEPTANCE:
   - A. LEAD MATERIAL: TINNED COPPER
   - B. CURRENT RATING: PER TABLE I.
     - (1) CHARACTERISTIC A: CARRY 100 PERCENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 200 PER CENT OF RATED LOAD.
     - (2) CHARACTERISTIC B: CARRY 100 PER CENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 150 PER CENT OF RATED LOAD.

     Ⓒ NOTE: (1) & (2) TO BE INSPECTED ON SAMPLE BASIS ONLY
3. DESIGN:
   - A. ENCLOSURE: GLASS BODY, METAL END CAPS, HERMETICALLY SEALED.
   - B. VOLTAGE RATING: 125 VOLTS, MAXIMUM
   - Ⓒ C. LEAD BEND TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING LEAD BEND TEST. THE COMPONENT BODY SHALL BE HELD IN A VERTICAL POSITION WITH A 1/2 POUND WEIGHT SUSPENDED FROM THE LEAD UNDER TEST. 2 CYCLES OF BENDS SHALL BE ACCOMPLISHED. A CYCLE CONSISTING OF MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90 DEGREES IN ONE DIRECTION, THEN 180 DEGREES IN THE OPPOSITE DIRECTION AND BACK 90 DEGREES TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
   - Ⓒ D. LEAD PULL TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING AN AXIAL PULL OF 1/2 POUNDS, MINIMUM.
   - E. ENVIRONMENTAL REQUIREMENTS: AS SPECIFIED IN PARAGRAPH 4.
4. QUALIFICATION: THIRTY SAMPLES, INCLUDING THE HIGHEST AND LOWEST CURRENT RATINGS SHALL BE SUBJECTED TO THE FOLLOWING TESTS. BEFORE AND AFTER EACH TEST THE FUSES SHALL BE VISUALLY INSPECTED AND SUBJECTED TO RATED CURRENT FOR 2 MINUTES.
   - A. TEMPERATURE CYCLING: PER MIL-STD-202, TEST CONDITION A (-55°C. TO +85°C.)
   - B. VIBRATION: UNIT SHALL BE LEAD MOUNTED AND SUBJECTED TO 20 G'S (LIMITED TO 0.12 DA), 5 CPS TO 2000 CPS TO 5 CPS AT 2 MINUTES/OCTIVE. LOGARITHMETIC SWEEP ONCE ALONG EACH OF TWO AXES (RADIAL AND AXIAL).
   - C. SHOCK: PER MIL-STD-810, METHOD 516, PROCEDURE V, EXCEPT 3 SHOCKS IN EACH DIRECTION ALONG EACH OF TWO AXES (AXIAL AND RADIAL), AT 50G'S.
   - D. LEAD BEND AND PULL: PER PARAGRAPH 3.C AND 3.D.
   - E. ELECTRICAL TEST: FOLLOWING QUALIFICATION TESTS, ALL UNITS SHALL BE SUBJECTED TO TESTS SPECIFIED IN TABLE I.



Ⓑ REPLACES REV A WITH CHANGES

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

USAGE	DL1000201
MULTIPLE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN D Dempski DATE 9/30/63
CHECKED a Marts 9-30-63
APPROVAL Sastoff 10-1-63
APPROVAL
NASA APPROVAL W J Rhine 10-2-63
MIT APPROVAL W Kupfer 2 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FUSE, PIGTAIL, SUB MINIATURE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1000170
SCALE NONE WT SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1000170

REVISIONS [illegible]RR [illegible]695			
SYM	DESCRIPTION	DATE	APPROVAL
-	ORIGINATED		

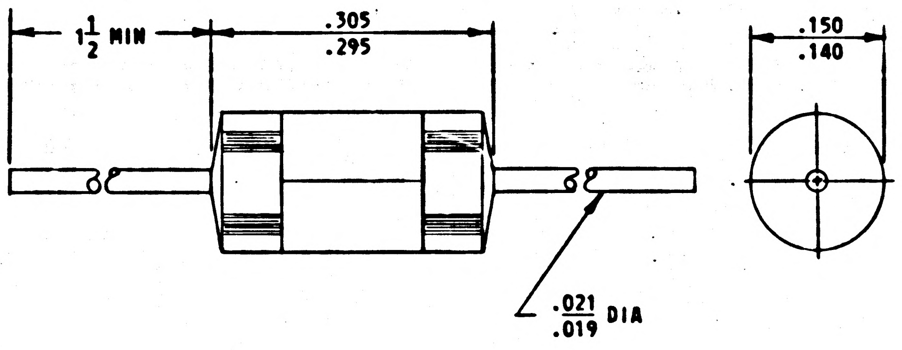
NOTES:

1. REQUIREMENTS:
   - A. ELECTRICAL:
     - (1) VOLTAGE RATING: 125 VOLTS MAXIMUM.
     - (2) TEST SPECIFICATIONS:
       - (a) CHARACTERISTIC A - CARRY 100 PERCENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 200 PERCENT OF RATED LOAD. SEE TABLE I.
       - (b) CHARACTERISTIC B - CARRY 100 PERCENT OF RATED LOAD, AND WILL OPEN WITHIN 10 SECONDS AT 150 PERCENT OF RATED LOAD. SEE TABLE I.
   - B. CONSTRUCTION AND MECHANICAL:
     - (1) ENCLOSURE: GLASS BODY, METAL END CAPS, HERMETICALLY SEALED.
     - (2) LEAD MATERIAL SHALL BE IRON-NICKEL-COBALT ALLOY, GOLD PLATED PER NASA DOCUMENT PS 1015402. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
     - (3) LEAD BEND TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING LEAD BEND TEST. THE COMPONENT BODY SHALL BE HELD IN A VERTICAL POSITION WITH A TWO POUND WEIGHT SUSPENDED FROM THE LEAD UNDER TEST. 2 CYCLES OF BENDS SHALL BE ACCOMPLISHED, A CYCLE CONSISTING OF MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, THROUGH 90 DEGREES IN ONE DIRECTION, THEN 180 DEGREES IN THE OPPOSITE DIRECTION AND BACK 90 DEGREES TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE OR LACK OF PERFORMANCE SHALL BE EVIDENCED AFTER THE TEST.
     - (4) LEAD PULL TEST: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING AN AXIAL PULL OF 4 POUNDS MINIMUM.
   - C. PACKAGE MARKING: UNIT PACKAGES SHALL BE LEGIBLY MARKED WITH THE MANUFACTURER'S IDENTIFICATION, PART NUMBER AND CURRENT RATING.
   - D. ENVIRONMENTAL: UNITS SHALL BE CAPABLE OF WITHSTANDING THE ENVIRONMENTAL TESTS SPECIFIED IN NASA DOCUMENT ND 1000200.
   - E. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA DOCUMENT ND 1015404, CLASS II.
2. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

TABLE I

DASH NO	CURRENT RATING AMPERES	TEST SPEC.	COLOR CODE	
			ONE END	OTHER END
1	0.05	A	YELLOW	YELLOW
2	0.0625	A	BROWN	BROWN
3	0.1	A	RED	RED
4	0.125	A	ORANGE	ORANGE
5	0.15	B	RED	YELLOW
6	0.2	B	RED	BLUE
7	0.25	B	RED	PURPLE
8	0.3	A	GREEN	GREEN
9	0.4	A	BLUE	BLUE
10	0.5	B	ORANGE	GREEN
11	0.6	B	ORANGE	BLUE
12	0.75	B	ORANGE	PURPLE
13	1.0	B	YELLOW	GREEN

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

USAGE	DL1000201
MULTIPLE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

HEAT TREATMENT NONE

FINAL FINISH NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN D. [illegible] DATE 27 DEC 62
CHECKED [illegible] 3 Jan 63
APPROVAL [illegible] 6-19-63
APPROVAL

NASA APPROVAL W J [illegible] 6-26-63

MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

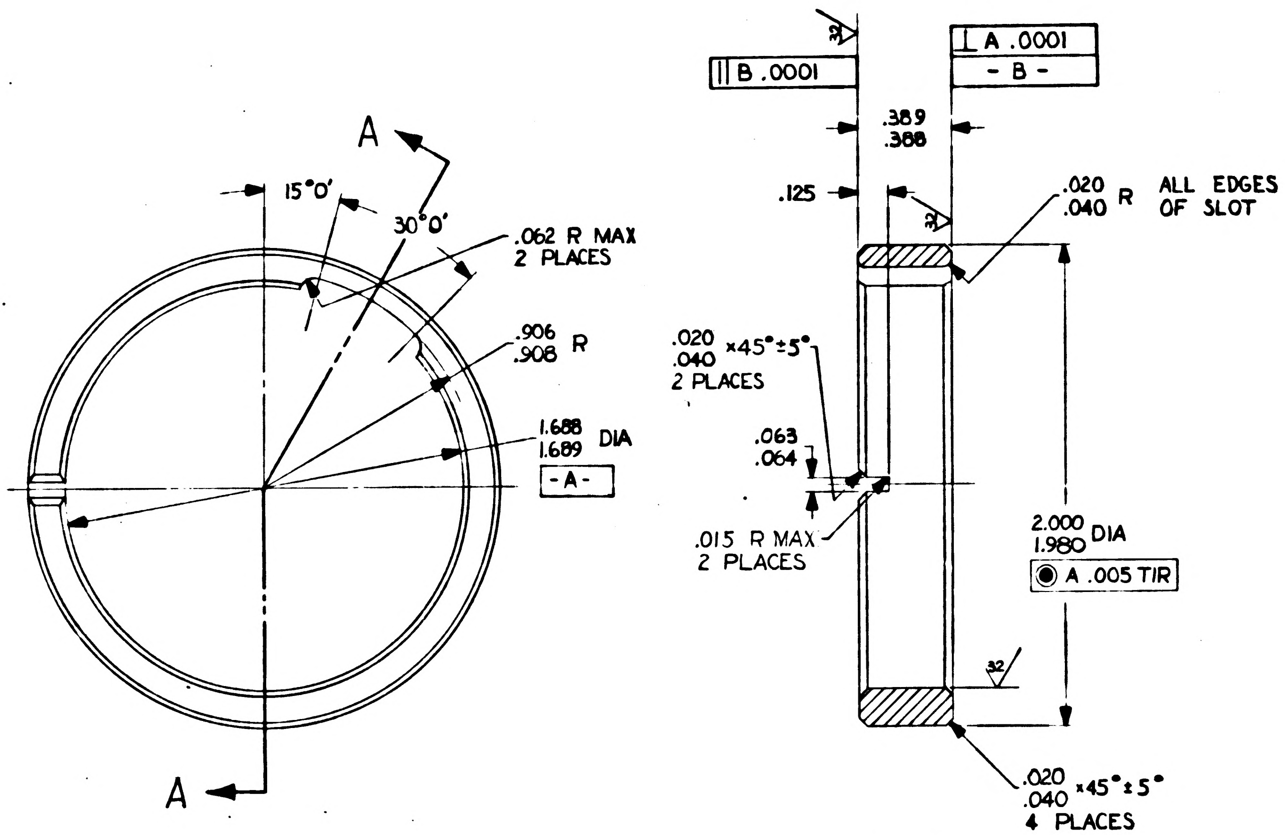
FUSE, PIGTAIL, SUB-MINIATURE

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000170
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00195				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	CHANGED MAT'L	12/27/62	ajB



A
15°0'
30°0'
.062 R MAX
2 PLACES
.906
.908 R
1.688
1.689 DIA
-A-
A
B .0001
A .0001
- B -
.389
.388
.125
32
.020
.040 R
ALL EDGES OF SLOT
.020
.040 ×45°±5°
2 PLACES
.063
.064
.015 R MAX
2 PLACES
2.000
1.980 DIA
A .005 TIR
32
.020
.040 ×45°±5°
4 PLACES

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63 ALL OVER UNLESS OTHERWISE SPECIFIED.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. MATERIAL: CRES CL 304 COND A FORM TUBE-ALT SPEC: MIL-T-8506
5. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130.
6. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000008	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	12/28/62
CHECKED		
DRAWN	PALERMO	12-19-62

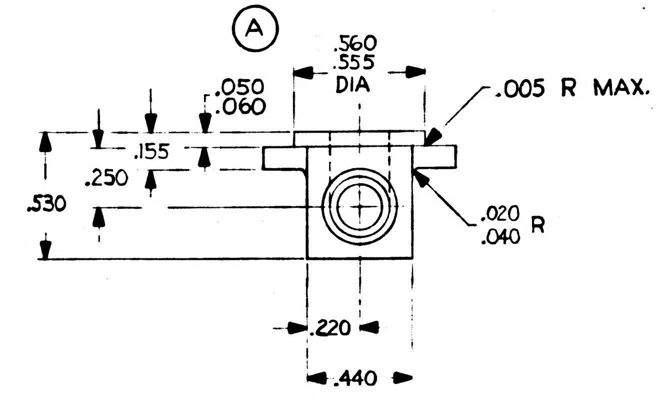
APPROVED FOR MSC
[illegible] 12/28/62
BY DIRECTION
MIT APPROVAL W A [illegible] 28 DEC 62

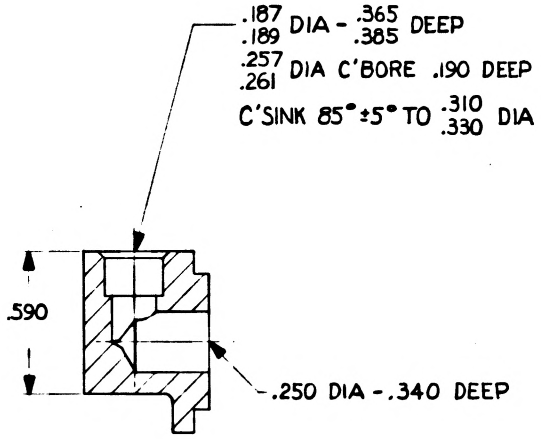
RING, SPACER
1X RESOLVER - MIDDLE AXIS

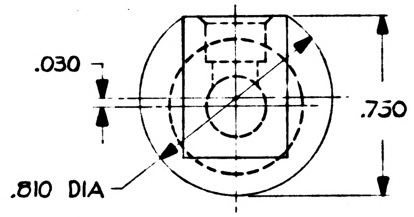
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000177
SHEET 1 OF 1

REVISIONS TDRR 00230				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00262	1-10-63	[illegible]


A
.560
.555
DIA
.005 R MAX.
.050
.060
.155
.250
.530
.020
.040 R
.220
.440


.187
.189 DIA - .365
.385 DEEP
.257
.261 DIA C'BORE .190 DEEP
C'SINK 85° ±5° TO .310
.330 DIA
.590
.250 DIA - .340 DEEP


.030
.750
.810 DIA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 63 MACHINE FINISH ALL OVER.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. MATERIAL: AL ALY 6061 TEMP T6. ALT SPEC: QQ-A-325 B TEMP-T6.
5. IDENTIFY USING DWG NO., REV LETTER, & MFR'S SYMBOL PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000083	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ——
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	J. B. Dugent	1-9-63
CHECKED		
DRAWN	PALERMO	12-31-62

APPROVED FOR MSC
W J Rhine 1-9-63

MIT/IL APPROVAL	DATE
W Kupfer	9 Jan 1963

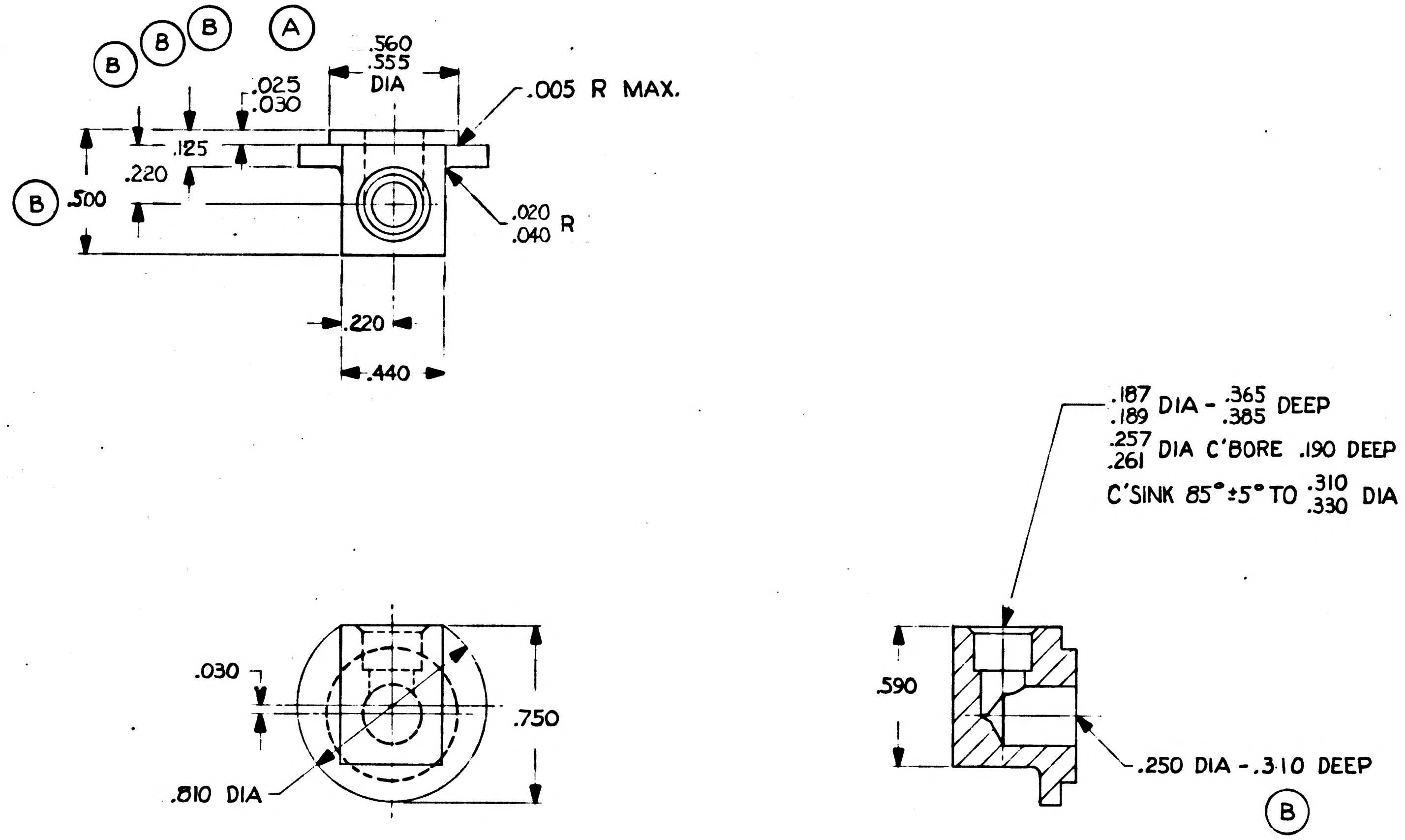
ADAPTER, ELBOW,
CROSS-OVER TUBE,
CASE CENTER

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000178
SHEET 1 OF 1

1000178

Ⓜ					
	REVISIONS TDRR 00230				
	ZONE	SYM	DESCRIPTION	DATE	APPROVAL
M		A	TDRR 00262	1-10-63	agB gm
		B	TDRR 01685	6-19-63	agB ws



B
B
B
A
.560
.555
DIA
.025
.030
.005 R MAX.
.125
.220
B .500
.020
.040 R
.220
.440
.187
.189 DIA - .365
.385 DEEP
.257
.261 DIA C'BORE .190 DEEP
C'SINK 85° ±5° TO .310
.330 DIA
.030
.750
.810 DIA
.590
.250 DIA - .310 DEEP
B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. $\sqrt{63}$ MACHINE FINISH ALL OVER.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. MATERIAL: AL ALY 6061 TEMP T6. ALT SPEC: QQ-A-325 B TEMP-T6.
5. IDENTIFY USING DWG NO., REV LETTER, & MFR'S SYMBOL PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	J. B. Angst	1-9-63
CHECKED		
DRAWN	PALERMO	12-31-62
APPROVED FOR MSC	W J Rhine	1-9-63
MIT/IL APPROVAL	W Koylen	9 Jan 1963

ADAPTER, ELBOW,
CROSS-OVER TUBE,
CASE CENTER

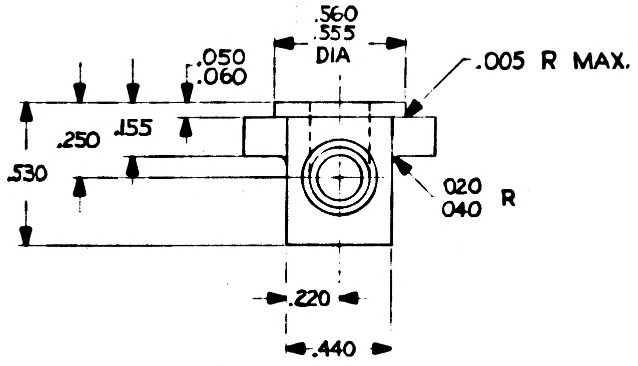
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000178
SHEET 1 OF 1

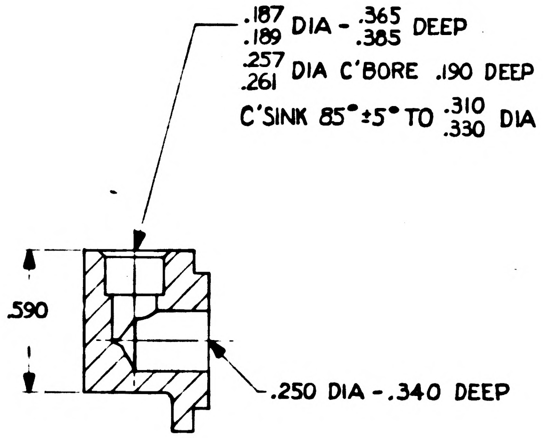
1000178 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

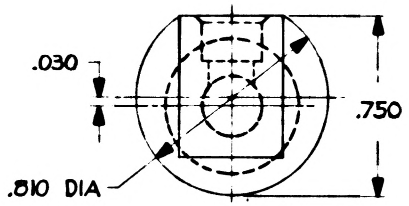
REVISIONS	TDRR 00230			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



.560
.555
DIA
.005 R MAX.
.050
.060
.250
.155
.530
.020
.040
R
.220
.440



.187
.189
DIA - .365
.385
DEEP
.257
.261
DIA C'BORE .190 DEEP
C'SINK 85°±5° TO .310
.330
DIA
.590
.250 DIA - .340 DEEP



.030
.750
.810 DIA

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. $\overset{63}{\nabla}$ MACHINE FINISH ALL OVER.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. MATERIAL: AL ALY 6061 TEMP T6. ALT SPEC: QQ-A-325 B TEMP-T6.
5. IDENTIFY USING DWG NO., REV LETTER, & MFR'S SYMBOL PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
—— ±.005 ——
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	J. B. Hesel	1-9-63
CHECKED		
DRAWN	PALERMO	12-31-62
APPROVED FOR MSC	W J Rhine	1-9-63
MIT/IL APPROVAL		DATE
W Kupfer		9 Jan 1963

ADAPTER, ELBOW,
CROSS-OVER TUBE,
CASE CENTER

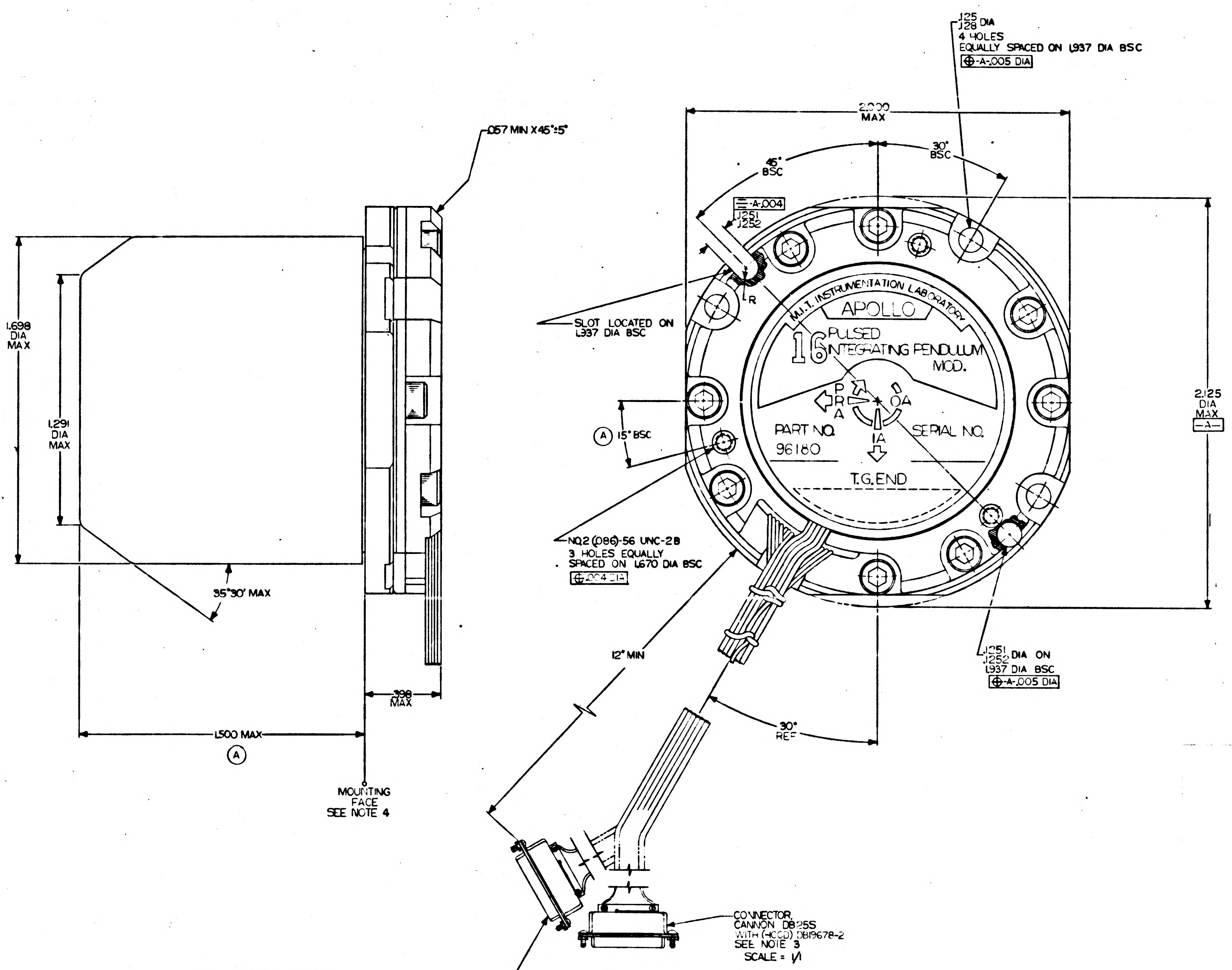
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000178
SHEET 1 OF 1

1000178

TERMINAL LEAD IDENTIFICATION TABLE			
TERM	WIRE COLOR	CONNECTOR	TERMINAL
TG-1	BLACK	DB25P	22
TG-2	BROWN		9
TG-3	RED		21
TG-4	ORANGE		8
TG-5	YELLOW		20
TG-6	GREEN		12
TG-9	GRAY		25
TG-10	WHITE		13
TG-11	WHT/BLK		13
TG-14	WHT/RED/GRN		10
TG-15	WHT/RED/BLUE	↓	11
SG-1	WHT/ORANGE	DB25S	22
SG-2	WHT/YELLOW		9
SG-3	WHT/GREEN		21
SG-4	WHT/BLUE		8
SG-5	WHT/VIOLET		20
SG-6	WHT/GRAY		25
SG-7	WHT/BLK/BRN		1
SG-10	WHT/BLK/YEL		15
SG-11	WHT/BLK/GRN		2
SG-12	WHT/BLK/BLUE		14
SG-15	WHT/BRN/RED		12
SG-16	WHT/BRN/ORN	↓	13
	WHT/BROWN	DB25P	4
	WHT/BROWN		16
	WHT/RED		5
	WHT/RED		17
	BLUE		1
	BLUE	↓	14

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 01686				
	A	TDRR 04446	11-15-63	


.057 MIN X45°±5°
1.698 DIA MAX
1.291 DIA MAX
35°30' MAX
.398 MAX
1.500 MAX
Ⓐ
MOUNTING FACE SEE NOTE 4
.125
.128 DIA
4 HOLES
EQUALLY SPACED ON 1.937 DIA BSC
⊕-A-.005 DIA
2.000 MAX
45° BSC
30° BSC
═-A-.004
.1251
.1252
R
SLOT LOCATED ON 1.937 DIA BSC
M.I.T. INSTRUMENTATION LABORATORY
APOLLO
16 PULSED INTEGRATING PENDULUM MOD.
PRA
OA
IA
PART NO. 96180
SERIAL NO.
T.G. END
Ⓐ 15° BSC
2.125 DIA MAX
-A-
NO.2 (.086)-56 UNC-2B
3 HOLES EQUALLY SPACED ON 1.670 DIA BSC
⊕.004 DIA
12" MIN
30° REF
.1251
.1252 DIA ON
1.937 DIA BSC
⊕-A-.005 DIA
CONNECTOR, CANNON DB25S WITH (HOOD) DB19678-2 SEE NOTE 3 SCALE = 1/1
CONNECTOR, CANNON DB25P WITH (HOOD) DB19678-2 SEE NOTE 3 SCALE = 1/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 70°F—150°F
3. CONNECTORS ARE FOR TEST PURPOSES ONLY AND MUST BE REMOVED PRIOR TO NEXT ASSEMBLY
4. CAUTION: USE EXTREME CARE TO PREVENT DAMAGE TO MOUNTING FACE DURING HANDLING, STORAGE, AND INSTALLATION
5. ASSEMBLY MUST MEET REQUIREMENTS OF THE APPLICABLE SECTIONS OF ATP 1000013

ORIGINAL SOURCE OF SUPPLY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
INSTRUMENTATION LABORATORY
MINIATURE COMPONENTS

PART NO.: 96180

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
	DL100020
1000013	DL100000
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN NORSE 9-6-63
APPROVED FOR MSC
MIT/IL APPROVAL
DATE 6/19/63

16 PULSED INTEGRATING PENDULUM

SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000179
SHEET 1 OF 1 SHEET

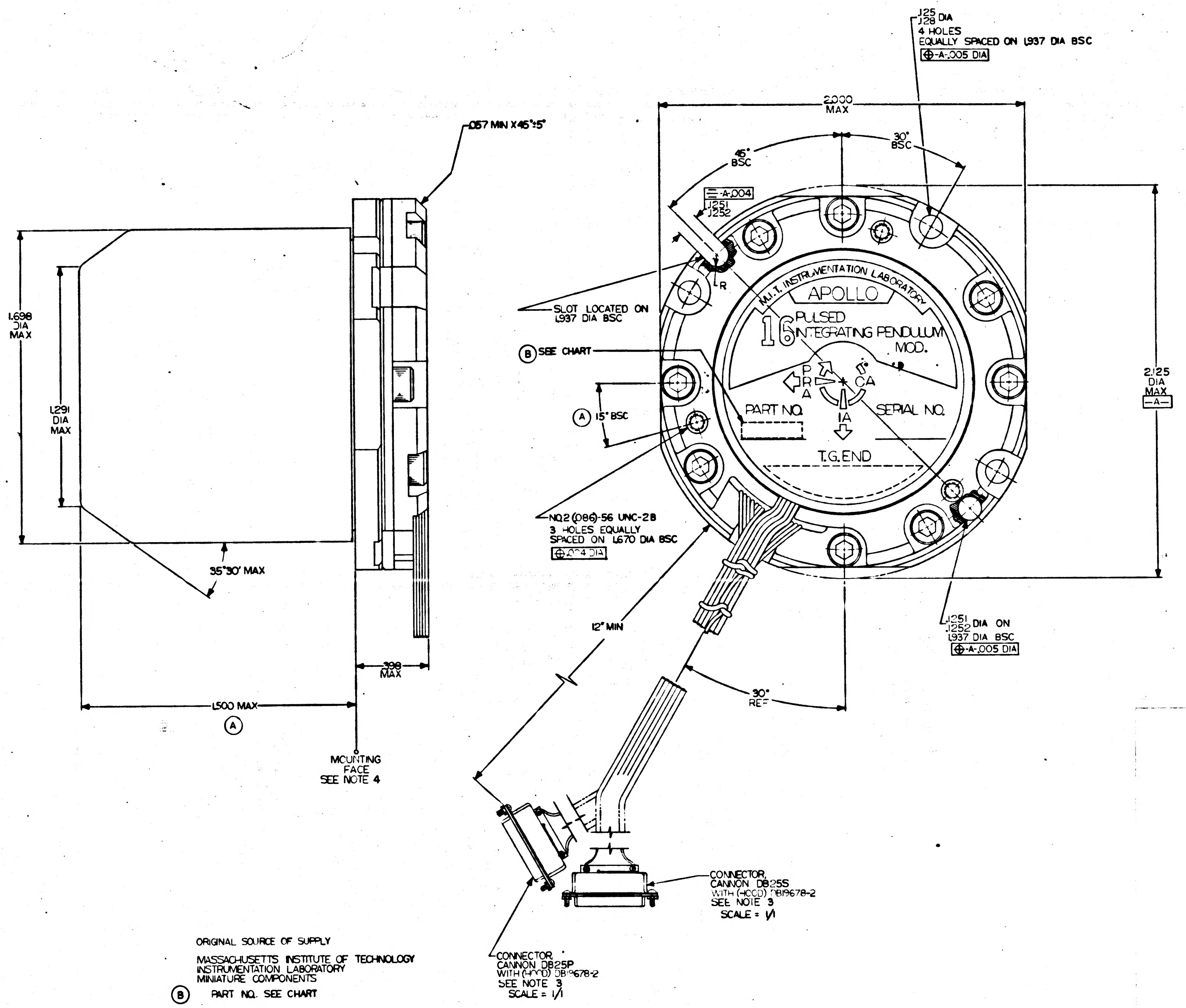
INCHES
PHOTOGRAPHIC SCALE ONLY

TERMINAL LEAD IDENTIFICATION TABLE			WIRING LIST 1	WIRING LIST 2
TERM	WIRE COLOR	CONNECTOR	TERMINAL	TERMINAL
TG-1	BLACK	DB25P	22	22
TG-2	BROWN		9	9
TG-3	RED		21	21
TG-4	ORANGE		8	8
TG-5	YELLOW		20	20
TG-6	GREEN		12	25
TG-9	GRAY		25	12
TG-10	WHITE		13	13
TG-11	WHT/BLK		13	13
TG-14	WHT/RED/GRN		10	10
TG-15	WHT/RED/BLUE		11	11
SG-1	WHT/ORANGE	DB25S	22	22
SG-2	WHT/YELLOW		9	9
SG-3	WHT/GREEN		21	21
SG-4	WHT/BLUE		8	8
SG-5	WHT/VIOLET		20	20
SG-6	WHT/GRAY		25	13
SG-7	WHT/BLK/BRN		1	1
SG-10	WHT/BLK/YEL		15	15
SG-11	WHT/BLK/GRN		2	2
SG-12	WHT/BLK/BLUE		14	14
SG-15	WHT/BRN/RED		12	12
SG-16	WHT/BRN/ORN		13	25
	WHT/BROWN	DB25P	4	4
	WHT/BROWN		16	16
	WHT/RED		5	5
	WHT/RED		17	17
	BLUE		1	1
	BLUE		14	14

Ⓑ

Ⓑ

PART NO.	WIRING LIST NO
96180	1
113600-1	2
113600-2	2



.057 MIN X45°±5°
1.698 DIA MAX
1.291 DIA MAX
35°30' MAX
.398 MAX
1.500 MAX
Ⓐ
MOUNTING FACE SEE NOTE 4
.125 .128 DIA
4 HOLES
EQUALLY SPACED ON 1.937 DIA BSC
⊕-A-.005 DIA
2.000 MAX
30° BSC
45° BSC
⌯-A-.004
.1251 .1252
R
SLOT LOCATED ON 1.937 DIA BSC
Ⓑ SEE CHART
Ⓐ 15° BSC
M.I.T. INSTRUMENTATION LABORATORY
APOLLO
16 PULSED INTEGRATING PENDULUM MOD.
P R A
CA
IA
PART NO.
SERIAL NO.
T.G. END
2.125 DIA MAX
-A-
NO.2 (.086)-56 UNC-2B
3 HOLES EQUALLY SPACED ON 1.670 DIA BSC
⊕.004 DIA
12" MIN
30° REF
.1251 .1252 DIA ON 1.937 DIA BSC
⊕-A-.005 DIA
CONNECTOR CANNON DB25S WITH (HOOD) DB19678-2 SEE NOTE 3 SCALE = 1/1
CONNECTOR CANNON DB25P WITH (HOOD) DB19678-2 SEE NOTE 3 SCALE = 1/1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 70°F—150°F
3. CONNECTORS ARE FOR TEST PURPOSES ONLY AND MUST BE REMOVED PRIOR TO NEXT ASSEMBLY
4. CAUTION: USE EXTREME CARE TO PREVENT DAMAGE TO MOUNTING FACE DURING HANDLING, STORAGE, AND INSTALLATION
5. ASSEMBLY MUST MEET REQUIREMENTS OF THE APPLICABLE SECTIONS OF ATP 1000013

ORIGINAL SOURCE OF SUPPLY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
INSTRUMENTATION LABORATORY
MINIATURE COMPONENTS

Ⓑ PART NO. SEE CHART

REVISIONS TLAR 01686

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 04446	11-15-63		
	B	TDRR 05301	12-23-63		

05301

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL100020
1000013	DL100000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED | DATE
CHECKED
DRAWN NORSE 4/16/63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE 4/17/63

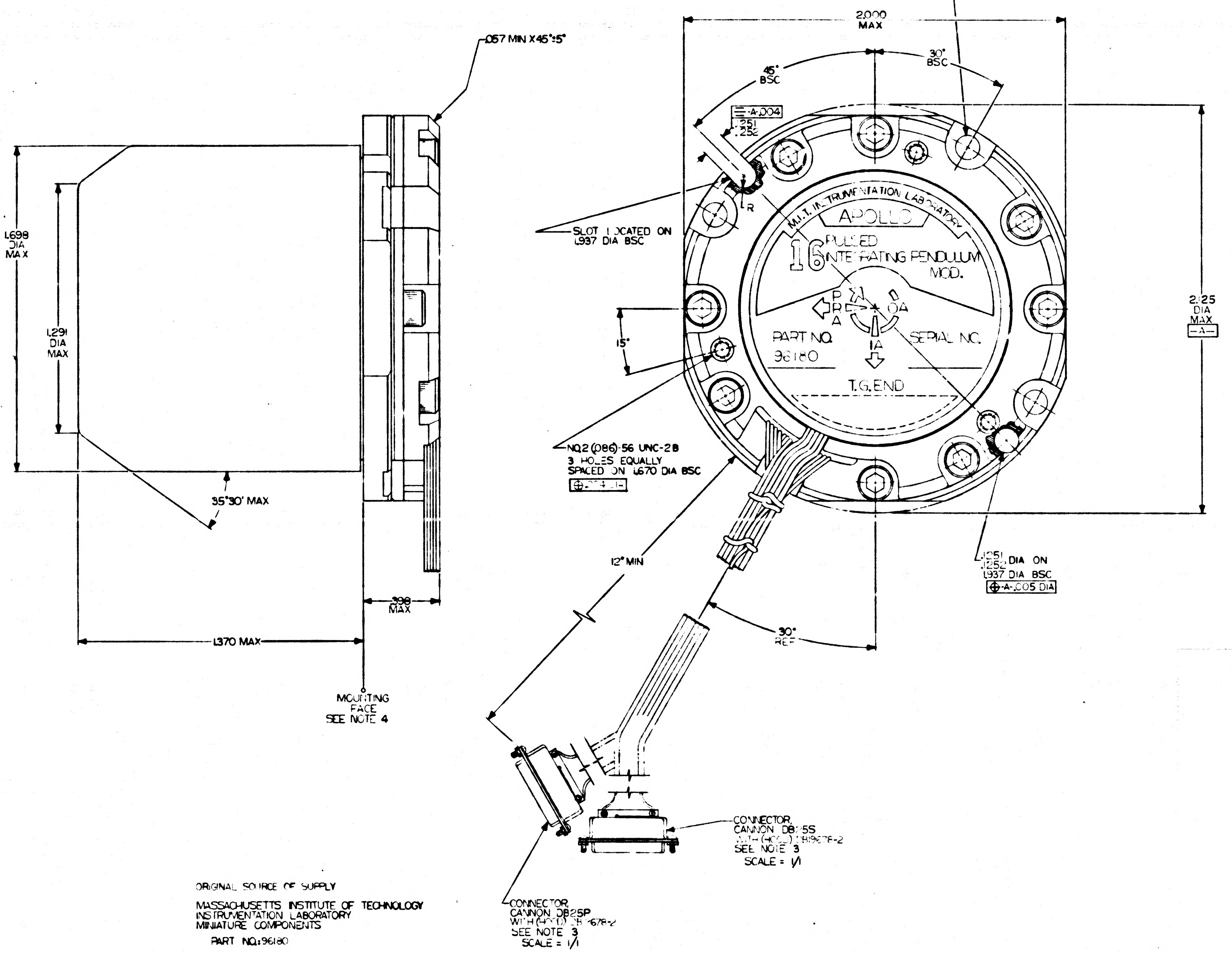
16 PULSED INTEGRATING PENDULUM
SPECIFICATION CONTROL DRAWING

SCALE 4/1 | UNIT WT. | CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000179
SHEET 1 OF 1 SHEET

TERMINAL LEAD IDENTIFICATION TABLE

TERM	WIRE COLOR	CONNECTOR	TERMINAL
TG-1	BLACK	DB25P	22
TG-2	BROWN		9
TG-3	RED		21
TG-4	ORANGE		8
TG-5	YELLOW		20
TG-6	GREEN		12
TG-9	GRAY		25
TG-10	WHITE		13
TG-11	WHT/BLK		3
TG-4	WHT/RED/GR		10
[illegible]	WHT/RED/BLUE	↓	[illegible]
SG-1	WHT/ORANGE	DB25S	22
SG-2	WHT/YELLOW		9
SG-3	WHT/GREEN		21
SG-4	WHT/BLUE		8
SG-5	WHT/VIOLET		20
SG-6	WHT/GRAY		25
SG-7	WHT/BLK/BR		1
SG-[illegible]	WHT/BLK/YEL		15
SG-	WHT/BLK/GR		2
SG-2	WHT/BLK/BLUE		14
SG-5	WHT/BRN/RED		12
SG-6	WHT/BLK/OR	↓	13
	WHT/BROWN	DB25P	4
	WHT/BROWN		16
	WHT/RED		5
	WHT/RED		17
	BLUE		1
	BLUE	↓	14


.057 MIN X45°±5°
1.698 DIA MAX
1.291 DIA MAX
35°30' MAX
.398 MAX
1.370 MAX
MOUNTING FACE SEE NOTE 4
.125 .128 DIA
4 HOLES
EQUALLY SPACED ON 1.937 DIA BSC
⊕-A-.005 DIA
2.000 MAX
45° BSC
30° BSC
-A-.004
.251 .252
R
SLOT LOCATED ON 1.937 DIA BSC
M.I.T. INSTRUMENTATION LABORATORY
APOLLO
16 PULSED INTEGRATING PENDULUM MOD.
PRA
OA
IA
PART NO. 96180
SERIAL NO.
T.G. END
2.25 DIA MAX
-A-
15°
NO.2 (.086)-56 UNC-2B
3 HOLES EQUALLY SPACED ON 1.670 DIA BSC
12" MIN
30° REF
.1251 .1252 DIA ON 1.937 DIA BSC
⊕-A-.005 DIA
CONNECTOR, CANNON DB25S WITH (HOOD) DB19678-2 SEE NOTE 3 SCALE = 1/1
CONNECTOR, CANNON DB25P WITH (HOOD) DB19678-2 SEE NOTE 3 SCALE = 1/1

ORIGINAL SOURCE OF SUPPLY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
INSTRUMENTATION LABORATORY
MINIATURE COMPONENTS

PART NO.: 96180

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 70°F—150°F
3. CONNECTORS ARE FOR TEST PURPOSES ONLY AND MUST BE REMOVED PRIOR TO NEXT ASSEMBLY
4. CAUTION: USE EXTREME CARE TO PREVENT DAMAGE TO MOUNTING FACE DURING HANDLING, STORAGE, AND INSTALLATION
5. ASSEMBLY MUST MEET REQUIREMENTS OF THE APPLICABLE SECTIONS OF ATP 1000013

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 01686

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
[illegible]	DL100[illegible]
[illegible]3	[illegible]

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED [illegible] DATE [illegible]
CHECKED
DRAWN
APPROVED FOR MSC
MIT/IL APPROVAL w Stameron DATE 6/19/63

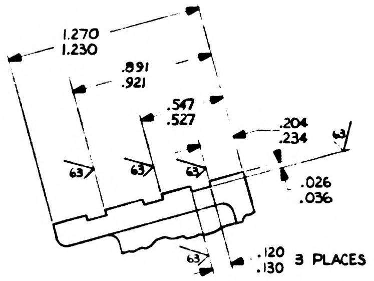
16 PULSED INTEGRATING PENDULUM
SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 100[illegible]9
SHEET 1 OF [illegible]

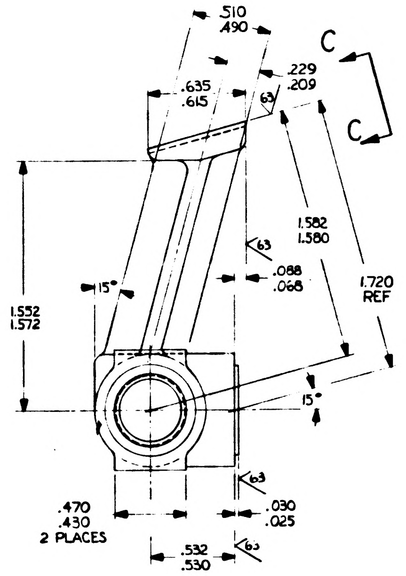
INCHES
PHOTOGRAPHIC SCALE ONLY

		REVISIONS TDRR 00256		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

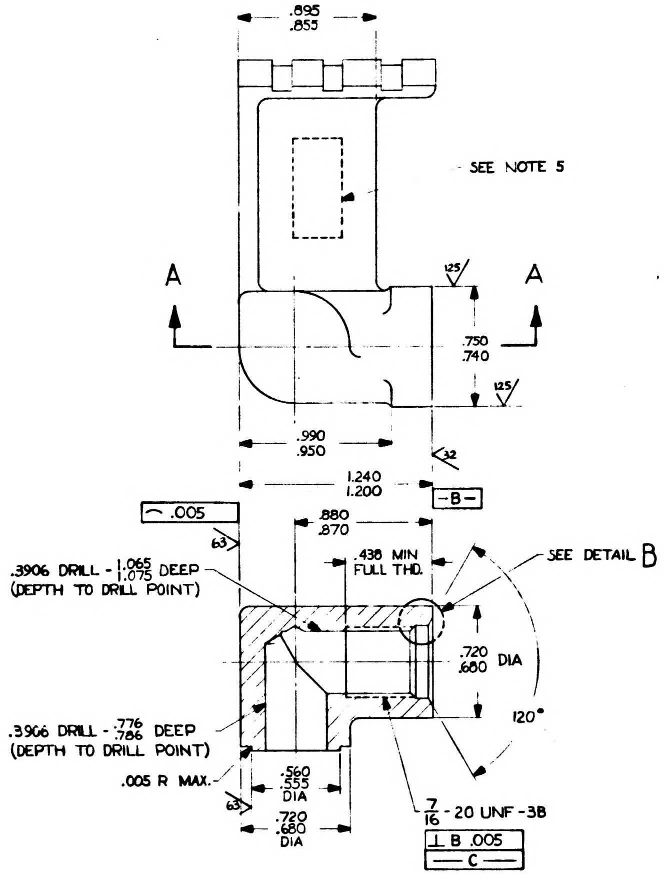


1.270
1.230
.891
.921
.547
.527
.204
.234
.026
.036
.120
.130 3 PLACES
63

VIEW C-C

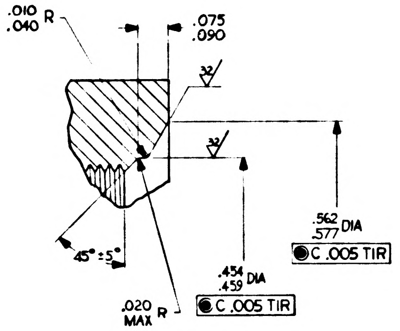


.510
.490
.635
.615
.229
.209
C
C
1.582
1.580
.088
.068
1.720
REF
15°
1.552
1.572
15°
.470
.430
2 PLACES
.532
.530
.030
.025
63



.895
.855
SEE NOTE 5
A
A
125
.750
.740
.990
.950
1.240
1.200
32
-B-
.005
63
.880
.870
.438 MIN
FULL THD.
SEE DETAIL B
.3906 DRILL - 1.065/1.075 DEEP
(DEPTH TO DRILL POINT)
.720
.680 DIA
120°
.3906 DRILL - .776/.786 DEEP
(DEPTH TO DRILL POINT)
.005 R MAX.
.560
.555
DIA
.720
.680
DIA
7/16 - 20 UNF - 3B
⊥ B .005
— C —

SECTION A-A



.010
.040 R
.075
.090
32
32
45° ± 5°
.562
.577 DIA
C .005 TIR
.454
.459 DIA
.020
MAX R
C .005 TIR

DETAIL B

SCALE 4/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ROUNDS & FILLETS TO BE $^{.040}_{.080}$ R.
3. $\sqrt{}^{250}$ ALL OVER UNLESS OTHERWISE SPECIFIED.
4. BREAK ALL SHARP EDGES $^{.005}_{.015}$ R.
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
6. HYDROSTATIC PROOF TEST AT 120 PSI.
7. CASTING REQUIREMENTS PER MIL-C-6021D, CLASS II B CASTING.
8. MIN. CAST WALL THICKNESS .125 UNLESS OTHERWISE SPECIFIED.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALLOY A 612-F HIGH PURITY

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		-16-63
CHECKED		
DRAWN	PALERMO	-8-63

APPROVED FOR MSC
11/16/63

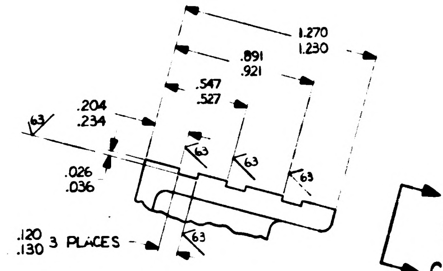
MIT/IL APPROVAL	DATE
EJ Hudson	1/16/63

BRACKET CONNECTOR
HEAT EXCHANGER
LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
2/1		

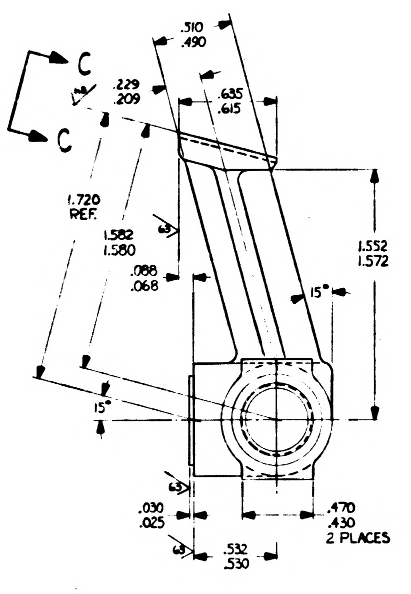
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000181
SHEET 1 OF 1

REVISIONS TDRR 00256				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

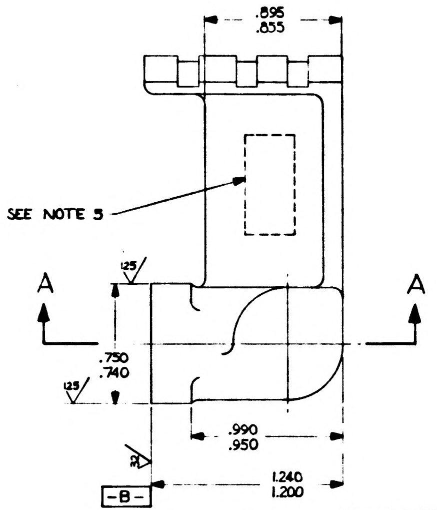


1.270
1.230
.891
.921
.547
.527
.204
.234
.026
.036
.120
.130 3 PLACES
63

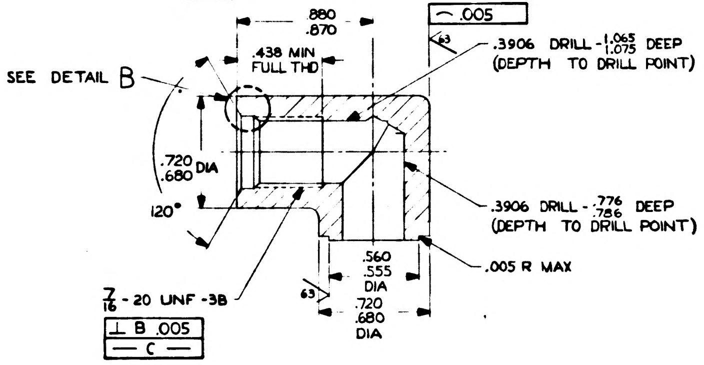
VIEW C-C



C
C
.510
.490
.229
.209
.635
.615
1.720 REF.
1.582
1.580
.088
.068
1.552
1.572
15°
15°
.030
.025
.532
.530
.470
.430
2 PLACES
63

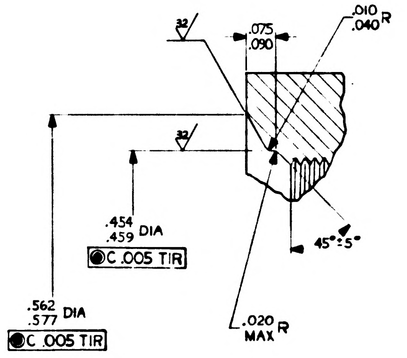


.895
.855
SEE NOTE 5
A
A
.750
.740
125
.990
.950
1.240
1.200
32
-B-



.880
.870
⌒ .005
.438 MIN FULL THD
.3906 DRILL - 1.065/1.075 DEEP (DEPTH TO DRILL POINT)
SEE DETAIL B
.720
.680 DIA
120°
.3906 DRILL - .776/.786 DEEP (DEPTH TO DRILL POINT)
.005 R MAX
.560
.555
DIA
.720
.680
DIA
63
7/16 - 20 UNF -3B
⊥ B .005
— C —

SECTION A-A



32
.075
.090
.010
.040 R
.454
.459 DIA
● C .005 TIR
.562
.577 DIA
● C .005 TIR
45° ± 5°
.020
MAX R

DETAIL B
SCALE 4/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ROUNDS & FILLETS TO BE $^{.040}_{.080}$ R.
3. $\overset{250}{\surd}$ ALL OVER UNLESS OTHERWISE SPECIFIED.
4. BREAK ALL SHARP EDGES $^{.005}_{.015}$ R.
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER MIL-STD-130.
6. HYDROSTATIC PROOF TEST AT 120 PSI.
7. CASTING REQUIREMENTS PER MIL-C-6021D, CLASS IIB CASTING.
8. MIN. CAST WALL THICKNESS .125 UNLESS OTHERWISE SPECIFIED.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000083	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0° 30′
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALLOY A 612-F
HIGH PURITY

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Rogers	1-16-63
CHECKED		
DRAWN	PALERMO	1-9-63
APPROVED FOR MSC	Jack Barnard	1-16-63
MIT/IL APPROVAL	G J Nelson	1-16-63

BRACKET CONNECTOR
HEAT EXCHANGER
RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
2/1		

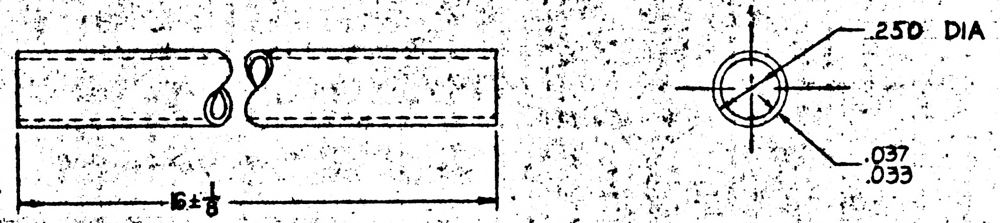
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000182
SHEET 1 OF 1

1000182

A 1000183

REVISIONS TDRR 00457

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REPLACED WITH CHANGE BY REV. B REVISED PER TDRR 11069	8 JUN 64	CJL



NOTES:
1. MAT'L : AL ALY TUBE 6061T6
ALT SPEC: AL ALY TUBE 6061T6 MIL-T-7081
2. PART TO BE CUT TO EXACT LENGTH, FORMED AND DEBURRED ON NEXT ASSY (1000083)
3. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

Ⓐ REPLACED WITH CHANGE BY REV B

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL1000201
1000083	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.003 — ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A J Boyce DATE 2-26-63
CHECKED
DRAWN
APPROVED FOR MSC W J Rhine 2-27-63
MIT/IL APPROVAL W Kupfer DATE 27 Feb 63

TUBE, CROSS-OVER HEAT EXCHANGER

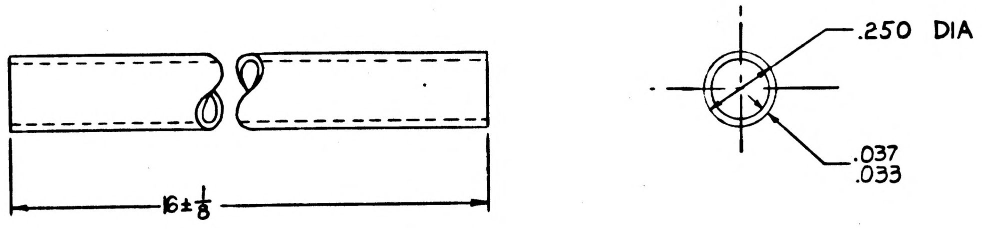
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000183
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REV	1000183

REVISIONS TDRR 00457				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. MAT'L: AL ALY TUBE 6061T6
   ALT SPEC: AL ALY TUBE 6061T6 MIL-T-7081
2. PART TO BE CUT TO EXACT LENGTH, FORMED AND DEBURRED ON NEXT ASSY (1000083)
3. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000083	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
±	±.003	±

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	2-26-63
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 2-27-63

MIT/IL APPROVAL	DATE
W Kupfer	27 Feb 63

TUBE, CROSS-OVER HEAT EXCHANGER

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

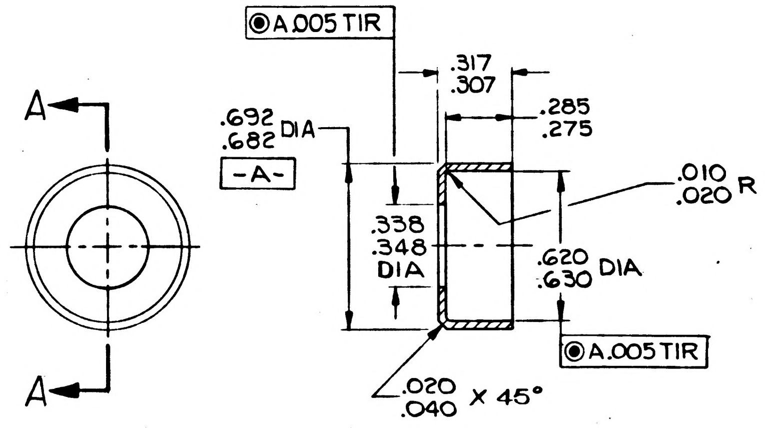
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000183

SHEET OF

1000185

REVISIONS TDRR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



SECTION A-A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300
3. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
4. 63√ ALL OVER
5. BREAK ALL SHARP EDGES $\begin{smallmatrix}.005\\.015\end{smallmatrix}$

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS —— DECIMALS —— ANGLES ± 5°
	DL1000201	DO NOT SCALE THIS DRAWING
1000109	DL1000001	MATERIAL: CRES. TYPE 303 COND A ALT SPEC QQ-S-763B
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	2/6/63
CHECKED		
DRAWN	R.G.S.	1-16-63
APPROVED FOR MSC	William S. Sunyh	6 Feb 63
MIT/IL APPROVAL		DATE
	W Kupfer	6Feb63

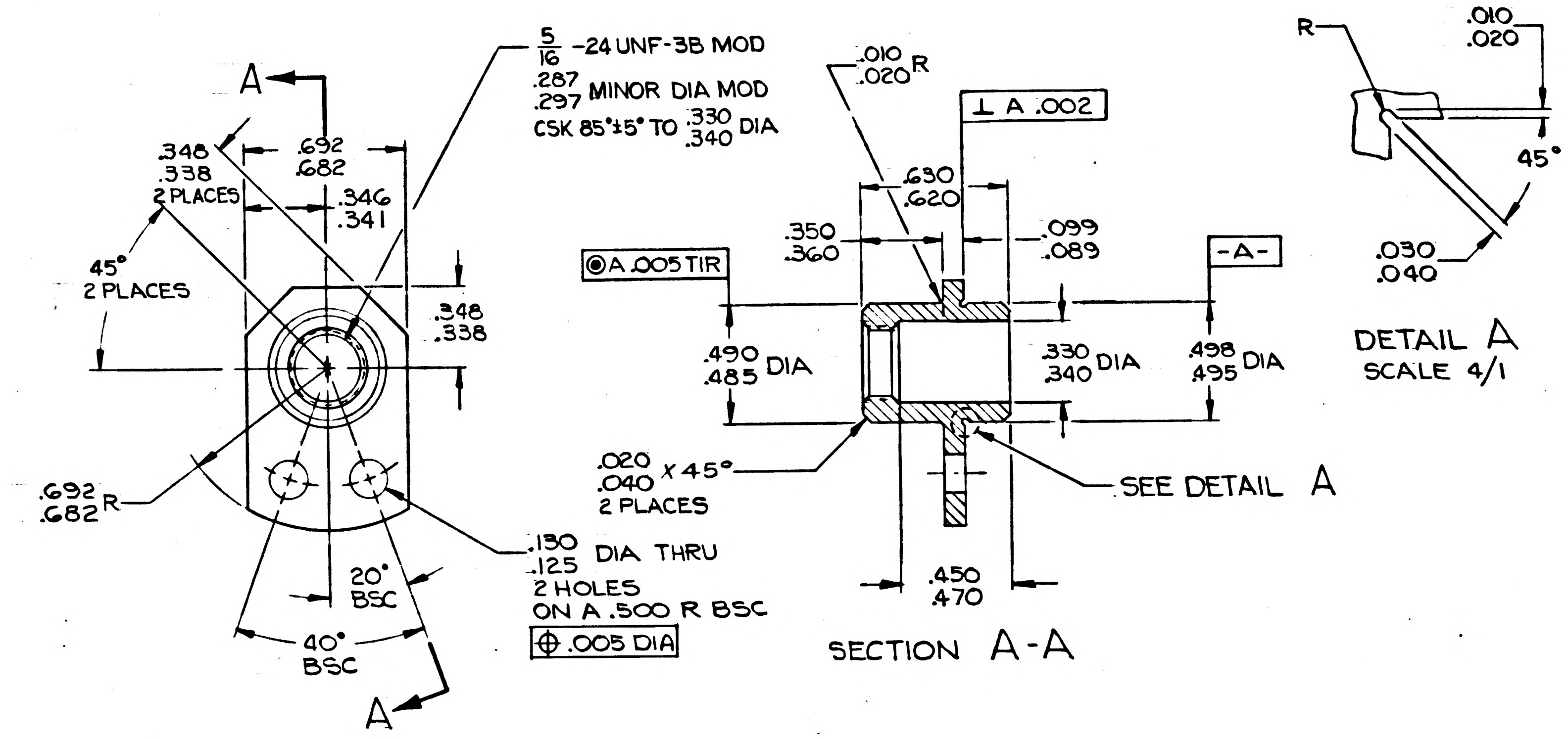
COVER, SPRING, FASTENER

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000185
SHEET 1 OF 1

REVISIONS TDRR 00331

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



A
A
5/16 -24 UNF-3B MOD
.287 .297 MINOR DIA MOD
CSK 85°±5° TO .330 .340 DIA
.348 .338 2 PLACES
.692 .682
.346 .341
45° 2 PLACES
.348 .338
.692 .682 R
.130 .125 DIA THRU
2 HOLES
ON A .500 R BSC
⊕ .005 DIA
20° BSC
40° BSC
.010 .020 R
⊥ A .002
.630 .620
.350 .360
.099 .089
◎A .005 TIR
-A-
.490 .485 DIA
.330 .340 DIA
.498 .495 DIA
.020 .040 X 45°
2 PLACES
SEE DETAIL A
.450 .470
SECTION A-A
R
.010 .020
45°
.030 .040
DETAIL A
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL : CRES CL 303 COND A. ALT SPEC QQ-S-763B
3. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN-E-300
4. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
5. 63√ ALL OVER
6. BREAK ALL SHARP EDGES .005 .015

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000109	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES ± 5°

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	C J Boyce	2/6/63
CHECKED		
DRAWN	R.G.S.	1-17-63
APPROVED FOR MSC	William L. Swing	6Feb63
MIT/IL APPROVAL	W Kupfer	6Feb63

RETAINER, FASTENER

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

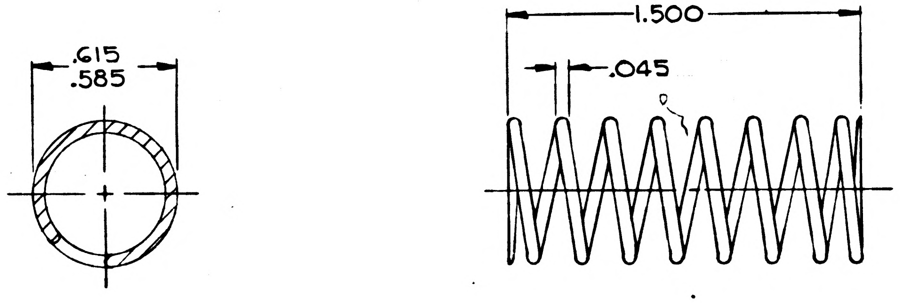
DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000186

SHEET 1 OF 1

REVISIONS TDRR 00331				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: STAINLESS STEEL, FED-SPEC QQ-W-423, COMP FS302 OR FS304, AMS 5688 SPRING TEMPER
3. GRIND AND SQUARE ENDS
4. DIRECTION OF HELIX, RIGHT HAND
5. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
6. SOLID HEIGHT .340 MAX
7. SPRING RATE 5.5 ± .5 LBS/IN

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000109	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		2/6/63
CHECKED		
DRAWN	R.G.S.	1-17-63
APPROVED FOR MSC		
MIT/IL APPROVAL		DATE
		6Fb63

SPRING,
FASTENER

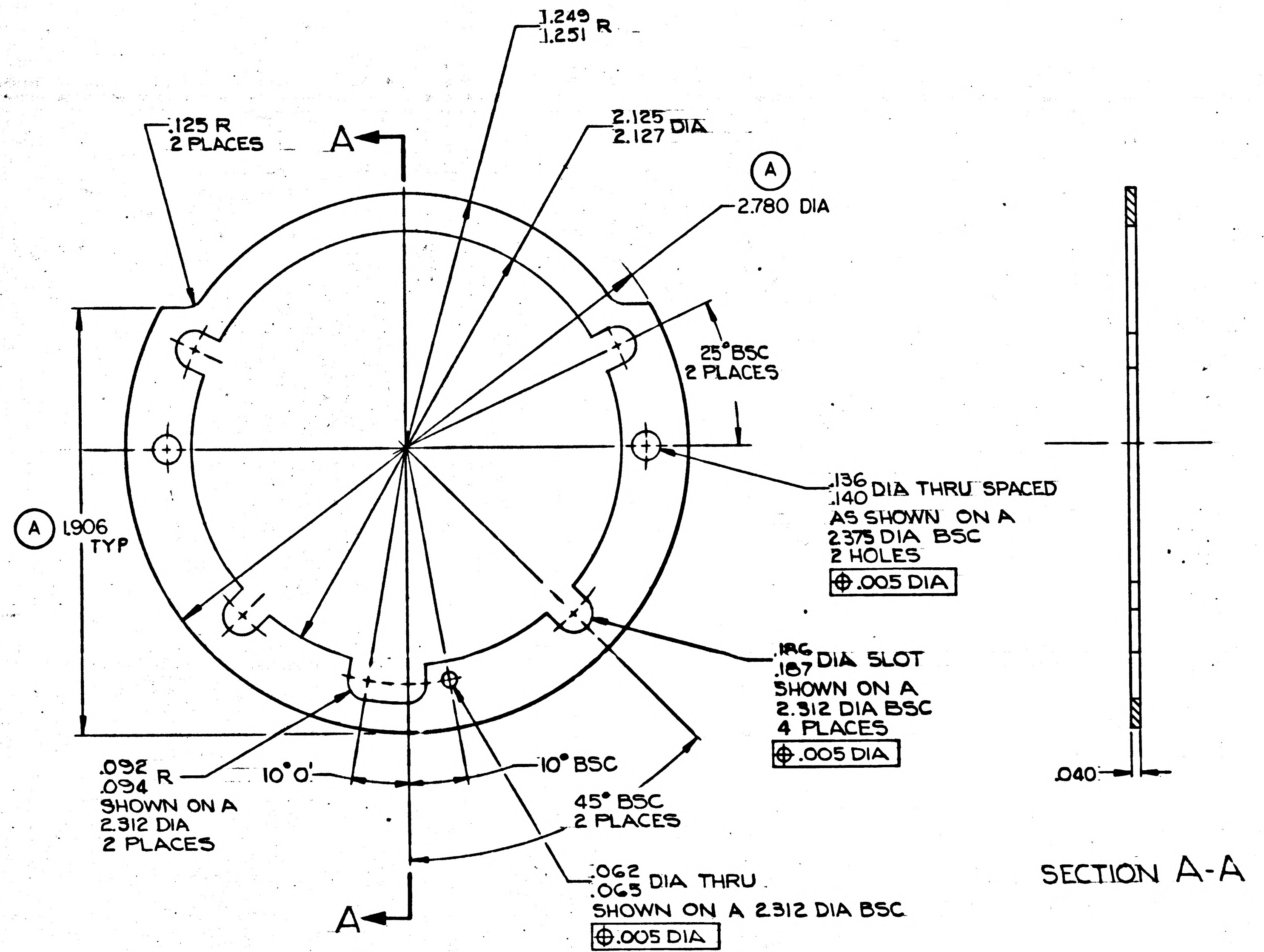
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000187
SHEET 1 OF 1

1000187

(17)

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00457		
	A	TDRR 05612	1-8-64	



1.249 / 1.251 R
.125 R 2 PLACES
A
2.125 / 2.127 DIA
Ⓐ 2.780 DIA
25° BSC 2 PLACES
.136 / .140 DIA THRU SPACED AS SHOWN ON A 2.375 DIA BSC 2 HOLES
⊕ .005 DIA
Ⓐ 1.906 TYP
.186 / .187 DIA SLOT SHOWN ON A 2.312 DIA BSC 4 PLACES
⊕ .005 DIA
.092 / .094 R SHOWN ON A 2.312 DIA 2 PLACES
10°0'
10° BSC
45° BSC 2 PLACES
.062 / .065 DIA THRU SHOWN ON A 2.312 DIA BSC
⊕ .005 DIA
A
.040
SECTION A-A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ ALL OVER
3. BREAK ALL SHARP EDGES $^{.005}_{.010}$
4. MATERIAL: COPPER-BERYLLIUM ALLOY STRIP COND $\frac{1}{4}$ H PER QQ-C-533-PRECIPITATION HARDEN
5. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
1000210	DL1000201
1000209	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-21-63
APPROVED FOR MSC	W J Rhine 2-27-63	
MIT/IL APPROVAL	W Kupfer	27 Feb 63

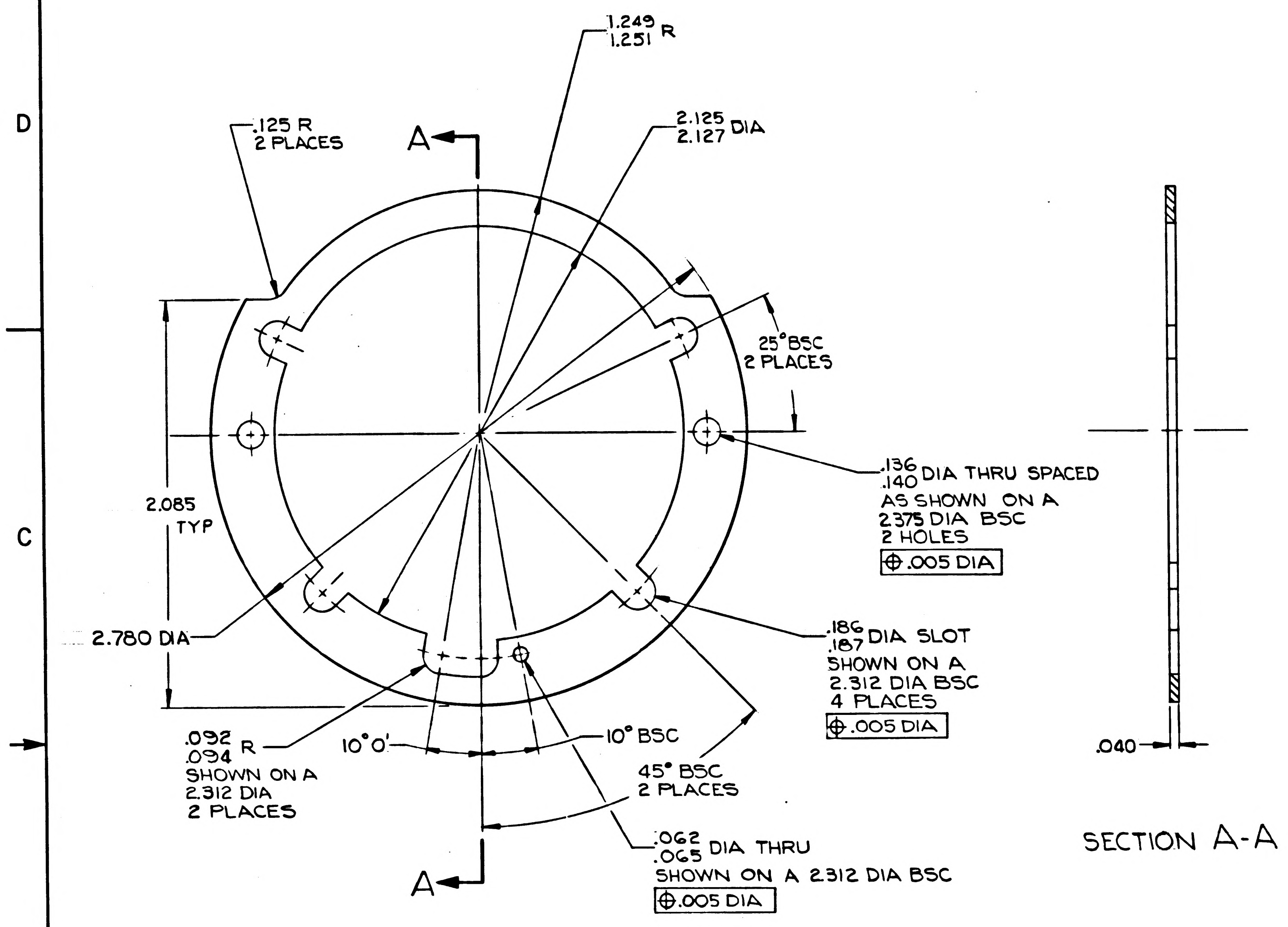
CONDUCTOR, LIMIT SWITCH

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000195
SHEET 1 OF 1

REVISIONS TDRR 00457

ZONE	SYM	DESCRIPTION	DATE	APPROVAL


1.249
1.251 R
.125 R
2 PLACES
A
2.125
2.127 DIA
25° BSC
2 PLACES
.136
.140 DIA THRU SPACED
AS SHOWN ON A
2.375 DIA BSC
2 HOLES
⊕ .005 DIA
2.085
TYP
2.780 DIA
.186
.187 DIA SLOT
SHOWN ON A
2.312 DIA BSC
4 PLACES
⊕ .005 DIA
.092
.094 R
SHOWN ON A
2.312 DIA
2 PLACES
10°0'
10° BSC
45° BSC
2 PLACES
.040
.062
.065 DIA THRU
SHOWN ON A 2.312 DIA BSC
⊕ .005 DIA
A
SECTION A-A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√ ALL OVER
3. BREAK ALL SHARP EDGES $^{.005}_{.010}$
4. MATERIAL: COPPER-BERYLLIUM ALLOY STRIP COND $\frac{1}{4}$H PER QQ-C-533-PRECIPITATION HARDEN
5. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000 210	DL1000201
1000 209	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-21-63

APPROVED FOR MSC
WJ Rhine 2-27-63
MIT/IL APPROVAL DATE
W Kupfer 27 Feb 63

CONDUCTOR,
LIMIT SWITCH

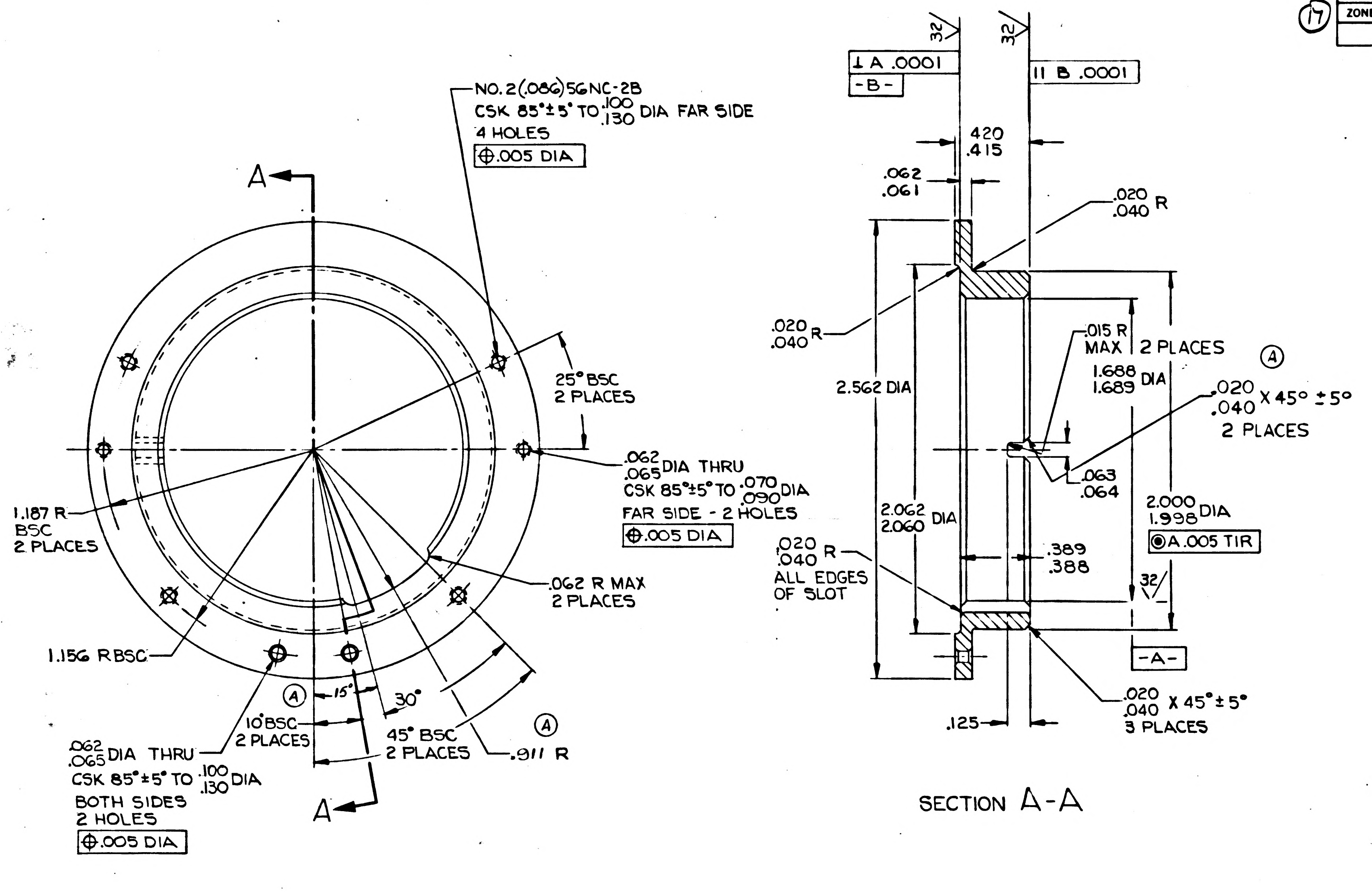
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000195
SHEET 1 OF 1

1000195

⑰

REVISIONS TDRR 00457				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01325	5-21-63	agB WK.


NO. 2 (.086) 56NC-2B
CSK 85°±5° TO .100/.130 DIA FAR SIDE
4 HOLES
⊕ .005 DIA
A
25° BSC
2 PLACES
.062/.065 DIA THRU
CSK 85°±5° TO .070/.090 DIA
FAR SIDE - 2 HOLES
⊕ .005 DIA
1.187 R BSC
2 PLACES
.062 R MAX
2 PLACES
1.156 R BSC
Ⓐ
15°
30°
10° BSC
2 PLACES
45° BSC
2 PLACES
Ⓐ
.911 R
.062/.065 DIA THRU
CSK 85°±5° TO .100/.130 DIA
BOTH SIDES
2 HOLES
⊕ .005 DIA
A
32
32
⊥ A .0001
-B-
∥ B .0001
.420/.415
.062/.061
.020/.040 R
.020/.040 R
.015 R MAX
2 PLACES
Ⓐ
2.562 DIA
1.688/1.689 DIA
.020/.040 X 45° ±5°
2 PLACES
.063/.064
2.062/2.060 DIA
2.000/1.998 DIA
◎ A .005 TIR
.020/.040 R
ALL EDGES
OF SLOT
.389/.388
32
-A-
.125
.020/.040 X 45°±5°
3 PLACES

SECTION A-A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
5. MATERIAL: CRES CL 303, COND A FORM BAR
   ALT. SPEC QQ-S-763B COND A
6. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ

	DL1000201
1000211	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-18-63

APPROVED FOR MSC
W J Rhine 2-27-63
MIT/IL APPROVAL DATE
W Kupfer 27 Feb 63

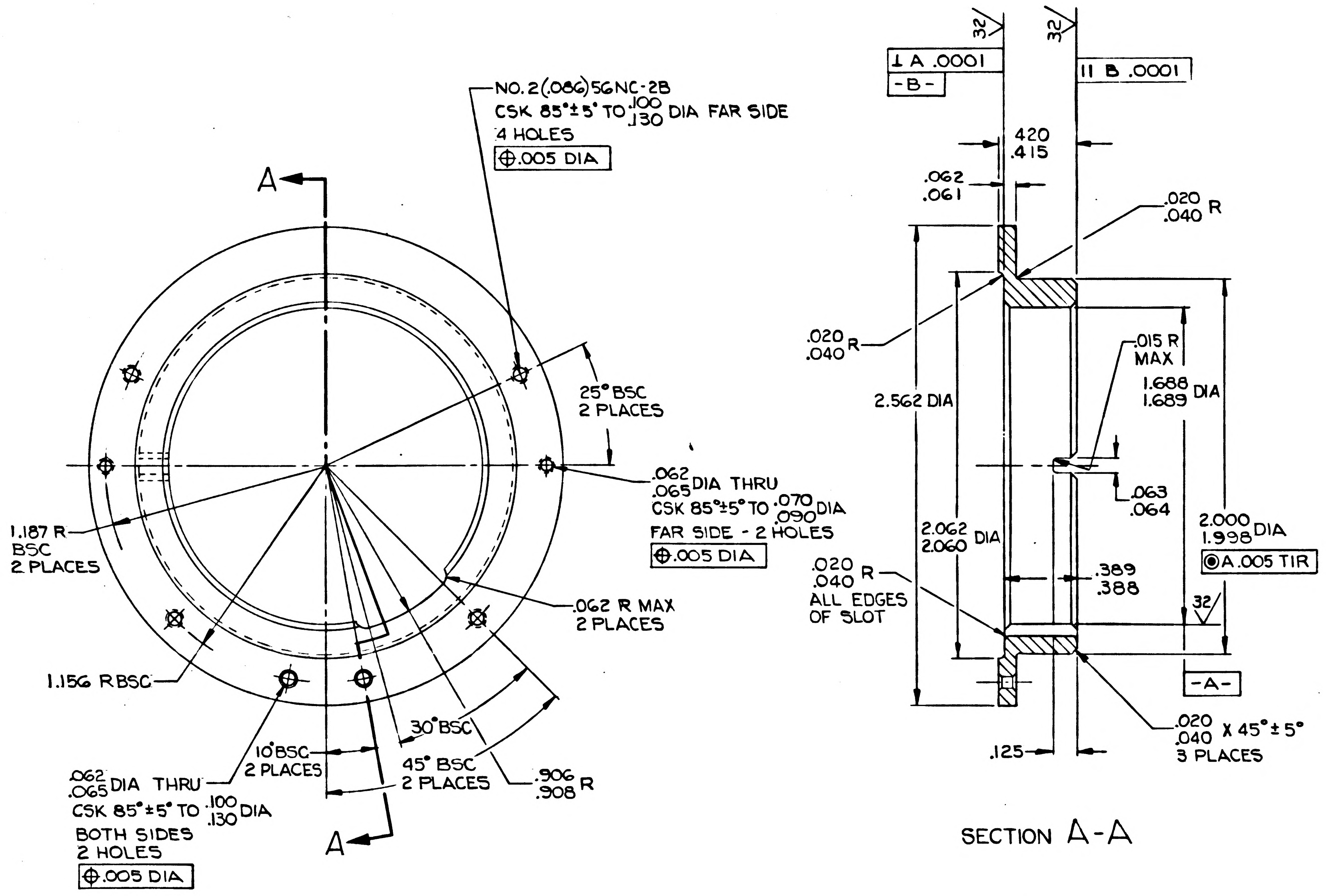
MOUNTING RING,
LIMIT SWITCH

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000197
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS	TDRR 00457			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



A
A
NO. 2(.086)56NC-2B
CSK 85°±5° TO .100/.130 DIA FAR SIDE
4 HOLES
⊕.005 DIA
25° BSC
2 PLACES
.062/.065 DIA THRU
CSK 85°±5° TO .070/.090 DIA
FAR SIDE - 2 HOLES
⊕.005 DIA
1.187 R
BSC
2 PLACES
.062 R MAX
2 PLACES
1.156 RBSC
30° BSC
10° BSC
2 PLACES
45° BSC
2 PLACES
.906/.908 R
.062/.065 DIA THRU
CSK 85°±5° TO .100/.130 DIA
BOTH SIDES
2 HOLES
⊕.005 DIA
32
32
⊥ A .0001
-B-
∥ B .0001
.420/.415
.062/.061
.020/.040 R
.020/.040 R
2.562 DIA
.015 R
MAX
1.688/1.689 DIA
.063/.064
2.062/2.060 DIA
.020/.040 R
ALL EDGES
OF SLOT
.389/.388
2.000/1.998 DIA
◎A .005 TIR
32
-A-
.125
.020/.040 X 45°±5°
3 PLACES

SECTION A-A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
5. MATERIAL: CRES CL 303, COND A FORM BAR
   ALT. SPEC QQ-S-763B COND A
6. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000211	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	2-26-63
CHECKED		
DRAWN	RGS.	1-18-63

APPROVED FOR MSC
W J Rhine 2-27-63

MIT/IL APPROVAL	DATE
[illegible]	27 Feb 63

MOUNTING RING,
LIMIT SWITCH

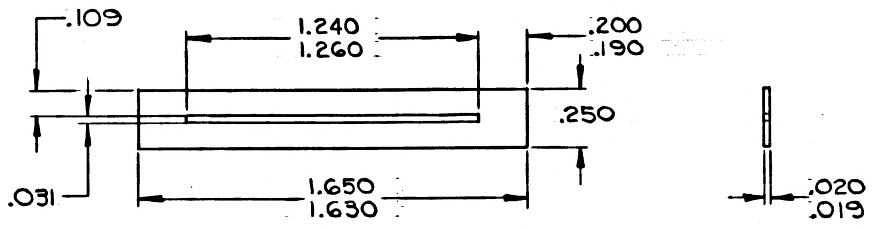
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000197
SHEET 1 OF 1

1000197

6610001

ZONE	SYM	REVISIONS TDRR 00457 DESCRIPTION	DATE	APPROVAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√ ALL OVER
3. ALL EDGES TO BE FULL ROUNDED
4. COPPER-BERYLLIUM ALLOY STRIP SPEC QQ-C-533 COND 1/4 H - PRECIPITATION HARDEN
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000208	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		2-26-63
CHECKED		
DRAWN	R.G.S.	1-25-63

APPROVED FOR MSC
W J Rhine 2-27-63
MIT/IL APPROVAL — DATE 27 Feb63

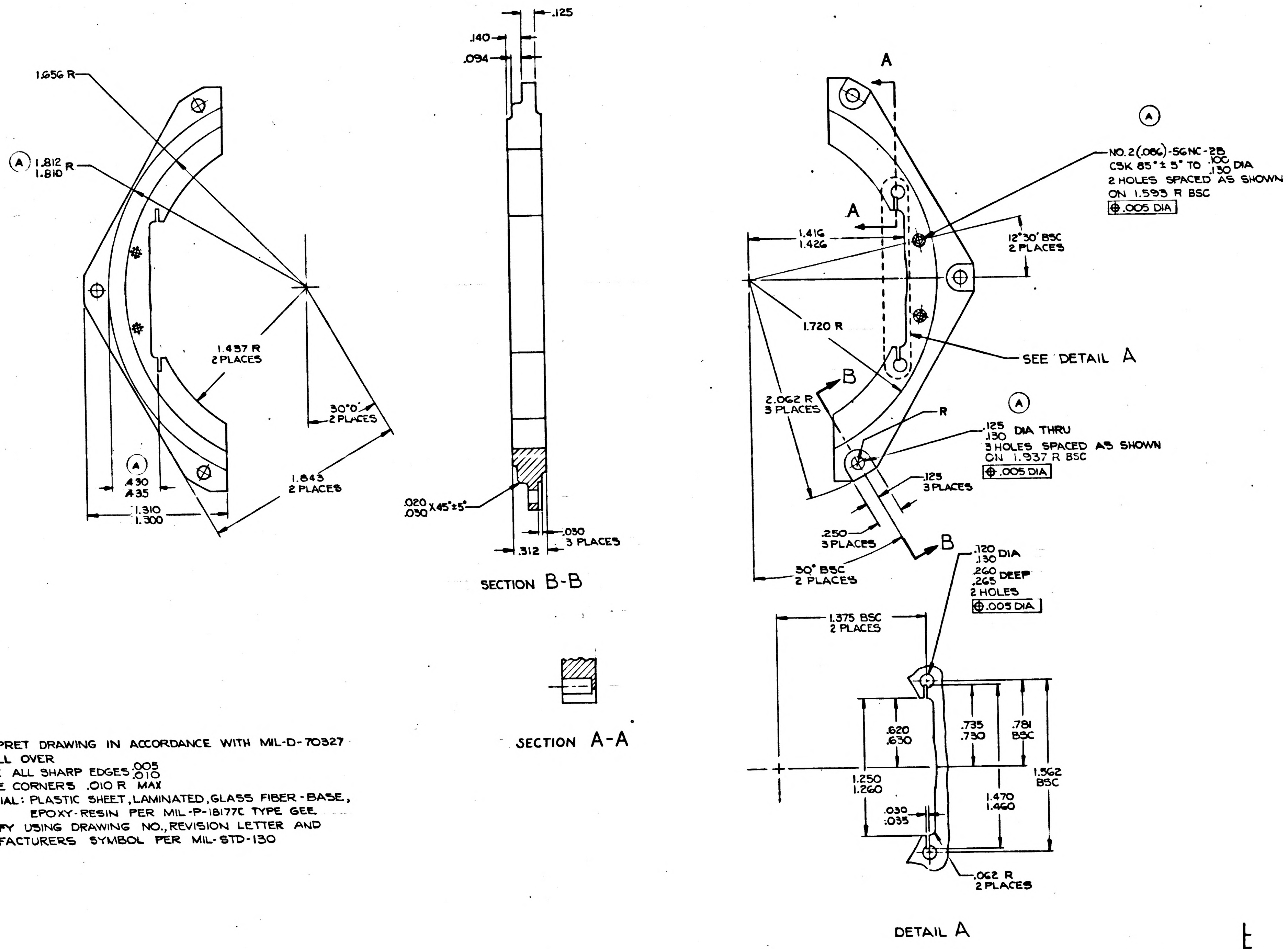
CONTACT
LIMIT SWITCH

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000199
SHEET 1 OF 1

1000199

Ⓜ ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00457				
	A	TDRR 00778	4-9-63	



.125
.140
.094
1.656 R
Ⓐ 1.812 / 1.810 R
1.437 R 2 PLACES
30°0′ 2 PLACES
1.843 2 PLACES
Ⓐ .430 / .435
1.310 / 1.300
.020 / .030 X45°±5°
.030 3 PLACES
.312
SECTION B-B
SECTION A-A
A
A
Ⓐ
NO. 2(.086)-56NC-2B CSK 85°± 5° TO .100 / .130 DIA 2 HOLES SPACED AS SHOWN ON 1.593 R BSC ⊕ .005 DIA
1.416 / 1.426
12°30′ BSC 2 PLACES
1.720 R
SEE DETAIL A
B
2.062 R 3 PLACES
R
Ⓐ
.125 / .130 DIA THRU 3 HOLES SPACED AS SHOWN ON 1.937 R BSC ⊕ .005 DIA
.125 3 PLACES
.250 3 PLACES
B
30° BSC 2 PLACES
.120 / .130 DIA .260 / .265 DEEP 2 HOLES ⊕ .005 DIA
1.375 BSC 2 PLACES
.620 / .630
.735 / .730
.781 BSC
1.562 BSC
1.250 / 1.260
1.470 / 1.460
.030 / .035
.062 R 2 PLACES
DETAIL A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√ ALL OVER
3. BREAK ALL SHARP EDGES $\frac{.005}{.010}$
4. INSIDE CORNERS .010 R MAX
5. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS FIBER-BASE, EPOXY-RESIN PER MIL-P-18177C TYPE GEE
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000208	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
—— ±.005 ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A. J. Boyce	2-26-63
CHECKED		
DRAWN	R G S	1-28-63

APPROVED FOR MSC
W. J. Rhine 2-27-63

MIT/IL APPROVAL	DATE
W. Ryffel	27 Feb 63

BRACKET, RETAINING
LIMIT SWITCH

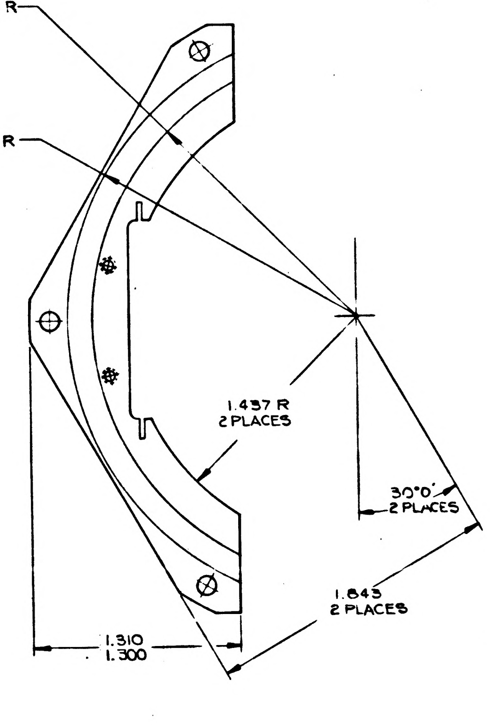
SCALE	UNIT WT.	CODE IDENT.
2/1		

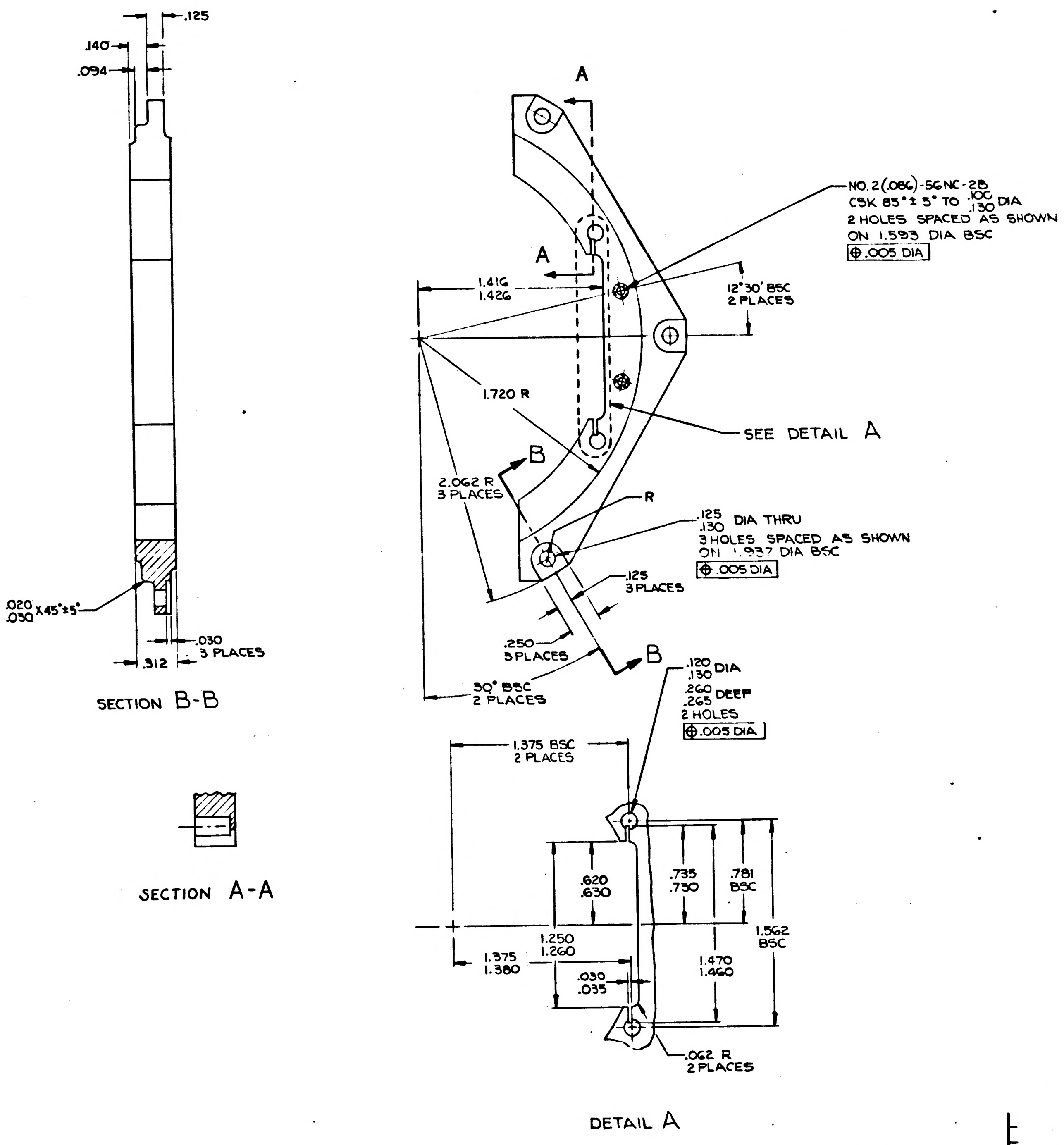
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000200
SHEET 1 OF 1

1000200 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS ~~T~~DRR 00459				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


1.656 R
1.812 R
1.437 R
2 PLACES
30°0'
2 PLACES
1.845
2 PLACES
1.310
1.300


.125
.140
.094
.020
.030 X45°±5°
.030
3 PLACES
.312
A
A
B
B
NO. 2 (.086)-56NC-2B
CSK 85° ± 5° TO .100 .130 DIA
2 HOLES SPACED AS SHOWN
ON 1.593 DIA BSC
⊕ .005 DIA
1.416
1.426
12°30' BSC
2 PLACES
1.720 R
SEE DETAIL A
2.062 R
3 PLACES
R
.125
.130 DIA THRU
3 HOLES SPACED AS SHOWN
ON 1.937 DIA BSC
⊕ .005 DIA
.125
3 PLACES
.250
3 PLACES
30° BSC
2 PLACES
.120
.130 DIA
.260
.265 DEEP
2 HOLES
⊕ .005 DIA
1.375 BSC
2 PLACES
.620
.630
.735
.730
.781
BSC
1.562
BSC
1.250
1.260
1.375
1.380
.030
.035
1.470
1.460
.062 R
2 PLACES

SECTION B-B

SECTION A-A

DETAIL A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√ ALL OVER
3. BREAK ALL SHARP EDGES $^{.005}_{.010}$
4. INSIDE CORNERS .010 R MAX
5. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS, FIBER-BASE, EPOXY-RESIN PER MIL-P-18177C TYPE GEE
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000208	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

M I T
INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a.g.Kagen	2-26-63
CHECKED		
DRAWN	R G S	1-28-63
APPROVED FOR MSC	W.G. Kline	2-27-63
MIT/IL APPROVAL	W. Kupfer	27 Feb 63

BRACKET, RETAINING
LIMIT SWITCH

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
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NASA DRAWING NO.
1000200
SHEET 1 OF 1

1000200

ATP 1000201

Class B Release
TDRR 00326

PRELIMINARY INERTIAL UNIT ASSEMBLY TEST PROCEDURE

FOR

GROUND SUPPORT EQUIPMENT DESIGN

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Record of Revisions

Revision Letter	TDRR Number	Date of TDRR
A (WAH)	01142-OBSOLETE	8 May 1963
		5/8/63

This document consists of page i to iii and 1 to 70 inclusive.

1000201

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00205	12/27/62		WK

PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
1000109	Fastener Assembly	4
1000082	Case Cover, Movable, Assembly	1
1000081	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2
1000163	Cover, Access, Rsvr Module	1
1000142	Connector Mount Assembly 16X	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
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MATERIAL:

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INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A J Boyce DATE 12/11/62
CHECKED
DRAWN
APPROVED FOR MSC 12-7-62
MIT/IL APPROVAL DATE 12/12/62

IMU ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
(M)	A	TDRR 00205	12/27/62	ajb	WK
	B	TDRR 00268	1/15/63	ajb	JM

PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
1000109	Fastener Assembly	4
1000082	Case Cover, Movable, Assembly	1
1000081	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2
1000163	Cover, Access, Rsvr Module	1
1000142	Connector Mount Assembly 16X	1
1000159-1	Packing, Preform, "0" Ring	2
1000159-2	Packing, Preform, "0" Ring	2
1000159-3	Packing, Preform "0" Ring	1
1000158	Packing, Preform	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201

APPLICATION

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NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
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APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

IMU ASSEMBLY

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REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
M	A	TDRR 00205	12/27/62	ajb WK
M	B	TDRR 00268	1/15/63	ajb JJM
	C	TDRR 00585	3/7/63	ajb WK

PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
1000109	Fastener Assembly	4
1000082	Case Cover, Movable, Assembly	1
1000081	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2
1000163	Cover, Access, Rsvr Module	1
1000142	Connector Mount Assembly 16X	1
1000159-1	Packing, Preform, "0" Ring	2
1000159-2	Packing, Preform, "0" Ring	2
1000159-3	Packing, Preform "0" Ring	1
1000158	Packing, Preform	2
1007004	Precision Rsvr. Alignment module Assembly	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201

APPLICATION

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NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
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APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

IMU ASSEMBLY

SCALE
UNIT WT.
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REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
M	A	TDRR 00205	12/27/62	ajB WK
M	B	TDRR 00268	1/15/63	ajB
M	C	TDRR 00585	3/7/63	ajB WK
	D	TDRR 00605	3/20/63	ajB WK

PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
1000109	Fastener Assembly	4
1000082	Case Cover, Movable, Assembly	1
1000081	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2
1000163	Cover, Access, Rsvr Module	1
1000142	Connector Mount Assembly 16X	1
1000159-1	Packing, Preform, "0" Ring	2
1000159-2	Packing, Preform, "0" Ring	2
1000159-3	Packing, Preform "0" Ring	1
1000158	Packing, Preform	2
1007004	Precision Rsvr. Alignment module Assembly	1
1000234	Pressure Valve Assembly	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

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		DATE
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APPROVED FOR MSC
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MIT/IL APPROVAL	DATE
	12/12/62

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00132			
(M)	A	TDRR 00205	12/27/62	ajB	WK
(M)	B	TDRR 00268	1/15/63	ajB	JJM
(M)	C	TDRR 00585	3/7/63	ajB	WK
(M)	D	TDRR 00605	3/20/63	ajB	WK
	E	TDRR 00766	4/10/63	ajB	WK

PART NO.	DESCRIPTION	REQ'D.	
1000202	Outer Axis Assy	1	
1000085	Case, Center, Machined Assembly	1	
1000099	Connector Mount Assembly One Speed	1	
1000109	Fastener Assembly	4	
1000082	Case Cover, Movable, Assembly	1	
1000081	Case, Cover, Fixed Assembly	1	SEE NOTE 1
1000135	Connector Water	2	
1000163	Cover, Access, Rsvr Module	1	
1000142	Connector Mount Assembly 16X	1	
1000159-1	Packing, Preform, "0" Ring	2	
1000159-2	Packing, Preform, "0" Ring	2	
1000159-3	Packing, Preform "0" Ring	1	
1000158	Packing, Preform	2	
1007004	Precision Rsvr. Alignment module Assembly	1	
1000234	Pressure Valve Assembly	1	

NOTE 1: CASE COVER FIXED NASA DWG. NUMBER 1000241 MAY BE USED AS AN ALTERNATE.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

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NEXT ASSY	USED ON
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APPROVED FOR MSC
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MIT/IL APPROVAL	DATE
	12/12/62

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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				REVISIONS TDRR 00132	
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDRR 00205	12/27/62	ajB	WK
M	B	TDRR 00268	1/15/63	ajB	JJM
M	C	TDRR 00585	3/7/63	ajB	WK
M	D	TDRR 00605	3/20/63	ajB	WK
M	E	TDRR 00766	4/10/63	ajB	WK
M	F	TDRR 00958	4/24/63	ajB	WK

PART NO.	DESCRIPTION	REQ'D.	
1000202	Outer Axis Assy	1	
1000085	Case, Center, Machined Assembly	1	
1000099	Connector Mount Assembly One Speed	1	
1000109	Fastener Assembly	4	
1000082	Case Cover, Movable, Assembly	1	
1000081	Case, Cover, Fixed Assembly	1	SEE NOTE 1
1000135	Connector Water	2	
1000163	Cover, Access, Rsvr Module	1	
1000142	Connector Mount Assembly 16X	1	
1000159-1	Packing, Preform, "0" Ring	2	
1000159-2	Packing, Preform, "0" Ring	2	
1000159-3	Packing, Preform "0" Ring	1	
~~1000158~~	~~Packing, Preform~~	~~2~~	
1007004	Precision Rsvr. Alignment module Assembly	1	
1000234	Pressure Valve Assembly	1	
1000159-6	Packing Preform "O" Ring	2	
1000159-5	Packing Preform "O" Ring	1	

NOTE 1: CASE COVER FIXED NASA DWG. NUMBER 1000241 MAY BE USED AS AN ALTERNATE.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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FRACTIONS DECIMALS ANGLES

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W Kupfer	12/12/62

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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1000201

SHEET OF

INCHES
0 1 2
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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDRR 00205	12/27/62	ajB	WK
M	B	TDRR 00268	1/15/63	ajB	JJM
M	C	TDRR 00585	3/7/63	ajB	WK
M	D	TDRR 00605	3/20/63	ajB	WK
M	E	TDRR 00766	4/10/63	ajB	WK
M	F	TDRR 00958	4/24/63	ajB	WK
M	G	TDRR 01063	4/30/63	ajB	WK

PART NO.	DESCRIPTION	REQ'D.	
1000202	Outer Axis Assy	1	
1000085	Case, Center, Machined Assembly	1	
1000099	Connector Mount Assembly One Speed	1	
1000109	Fastener Assembly	4	
1000082	Case Cover, Movable, Assembly	1	
1000081	Case, Cover, Fixed Assembly	1	SEE NOTE 1
1000135	Connector Water	2	
1000163	Cover, Access, Rsvr Module	1	
1000142	Connector Mount Assembly 16X	1	
1000159-1	Packing, Preform, "0" Ring	2	
1000159-2	Packing, Preform, "0" Ring	2	
1000159-3	Packing, Preform "0" Ring	1	
~~1000158~~	~~Packing, Preform~~	~~2~~	
1007004	Precision Rsvr. Alignment module Assembly	1	
1000234	Pressure Valve Assembly	1	
1000159-6	Packing Preform "O" Ring	2	
1000159-5	Packing Preform "O" Ring	1	
1000213	Weight, Balance S/M	A/R	
1000214	Weight, Balance S/M	A/R	
1000258	Weight, Balance S/M	A/R	
1000259	Weight, Balance S/M	A/R	
1000260	Weight, Balance S/M	A/R	
1000261	Weight, Balance M.G.	A/R.	
1000262	Weight, Balance M.G.	A/R	
1000263	Weight, Balance O.G. & M.G.	A/R	
1000268	Weight, Balance OG	A/R	
1000270	Weight, Balance OG	A/R	

NOTE 2: Balance weights to he selected on final assembly of IMU.

NOTE 1: CASE COVER FIXED NASA DWG. NUMBER 1000241 MAY BE USED AS AN ALTERNATE.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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FRACTIONS DECIMALS ANGLES
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MATERIAL:

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W Kupfer	12/12/62

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
~~[illegible]~~	~~Fastener Assembly~~	~~1~~
1000082	Case Cover, Movable, Assembly	1
1000081 See Note 1	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2
1000163	Cover, Access, Rsvr Module	1
1000142	Connector Mount Assembly 16X	1
1000159-1	Packing, Preform, "0" Ring	2
1000159-2	Packing, Preform, "0" Ring	2
1000159-3	Packing, Preform "0" Ring	1
~~1000158~~	~~Packing, Preform~~	~~2~~
~~1007004~~	~~Precision Rsvr. Alignment module Assembly~~	~~1~~
1000234	Pressure Valve Assembly	1
1000159-6	Packing Preform "O" Ring	2
1000159-5	Packing Preform "O" Ring	1
1000213	Weight, Balance S/M	A/R
1000214	Weight, Balance S/M	A/R
1000258	Weight, Balance S/M	A/R
1000259	Weight, Balance S/M	A/R
1000260	Weight, Balance S/M	A/R
1000261	Weight, Balance M.G.	A/R
1000262	Weight, Balance M.G.	A/R
1000263	Weight, Balance O.G. & M.G.	A/R
1000268	Weight, Balance OG	A/R
1000270	Weight, Balance OG	A/R

Part No	Description	REQ'd
1000185	Cover, Spring	4
1000187	Spring	4
1000188	Screw	4

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 00205	12/27/62	ajB	WK
Ⓜ	B	TDRR 00268	1/15/63	ajB	JJM
Ⓜ	C	TDRR 00585	3/7/63	ajB	WK
Ⓜ	D	TDRR 00605	3/20/63	ajB	WK
Ⓜ	E	TDRR 00766	4/10/63	ajB	WK
Ⓜ	F	TDRR 00958	4/24/63	ajB	WK
Ⓜ	G	TDRR 01063	4/30/63	ajB	WK
Ⓜ	H	TDRR 01151	5/8/63		WK
Ⓜ					

NOTE 2: Balance weights to be selected on final assembly of IMU.

NOTE 1: CASE COVER FIXED NASA DWG. NUMBER 1000241 MAY BE USED AS AN ALTERNATE.

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QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
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CONTRACT
NAS 9-153

		DATE
APPROVED	A. J. Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W. J. Kline 12-12-62

MIT IL APPROVAL	DATE
W. Kupfer	12/12/62

IMU ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

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ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00132			
M	A	TDRR 00205	12/27/62	AJB	WK
M	B	TDRR 00268	1/15/63	AJB	JJM
M	C	TDRR 00585	3/7/63	AJB	WK
M	D	TDRR 00605	3/20/63	AJB	WK
M	E	TDRR 00766	4/10/63	AJB	WK
M	F	TDRR 00958	4/24/63	AJB	WK
M	G	TDRR 01063	4/30/63	AJB	WK
M	H	TDRR 01151	5/8/63		WK

PART NO.	DESCRIPTION	REQ'D.	
1000202	Outer Axis Assy	1	
1000085	Case, Center, Machined Assembly	1	
1000099	Connector Mount Assembly One Speed	1	
1000109	Fastener Assembly	4	
1000082	Case Cover, Movable, Assembly	1	
1000081 See Note 1	Case, Cover, Fixed Assembly	1	SEE NOTE 1
1000135	Connector Water	2	
1000163	Cover, Access, Rsvr Module	1	
1000142	Connector Mount Assembly 16X	1	
1000159-1	Packing, Preform, "0" Ring	2	
1000159-2	Packing, Preform, "0" Ring	2	
1000159-3	Packing, Preform "0" Ring	1	
~~1000158~~	~~Packing, Preform~~	~~2~~	
1007004	Precision Rsvr. Alignment module Assembly	1	
1000234	Pressure Valve Assembly	1	
1000159-6	Packing Preform "O" Ring	2	
1000159-5	Packing Preform "O" Ring	1	
1000213	Weight, Balance S/M	A/R	
1000214	Weight, Balance S/M	A/R	
1000258	Weight, Balance S/M	A/R	
1000259	Weight, Balance S/M	A/R	
1000260	Weight, Balance S/M	A/R	
1000261	Weight, Balance M.G.	A/R	
1000262	Weight, Balance M.G.	A/R	
1000263	Weight, Balance O.G. & M.G.	A/R	
1000268	Weight, Balance OG	A/R	
1000270	Weight, Balance OG	A/R	

Part No	Description	REQ'd
1000185	Cover, Spring	4
1000187	Spring	4
1000188	Screw	4

NOTE 2: Balance weights to he selected on final assembly of IMU.

NOTE 1: CASE COVER FIXED NASA DWG. NUMBER 1000241 MAY BE USED AS AN ALTERNATE.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W Kupfer	12/12/62

IMU ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000201

SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000201 (M)

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
(M)	A	TDRR 00205	12/27/62	ajB WK
(M)	B	TDRR 00268	1/15/63	ajB JJM
(M)	C	TDRR 00585	3/7/63	ajB WK
(M)	D	TDRR 00605	3/20/63	ajB WK
(M)	E	TDRR 00766	4/10/63	ajB WK
(M)	F	TDRR 00958	4/24/63	ajB WK
(M)	G	TDRR 01063	4/30/63	ajB WK
(M)	H	TDRR 01151	5/8/63	WK
(M)	J	TDRR 02122	7/24/63	ajB WK

PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
~~1000100~~	~~Fastener Assembly~~	~~1~~
1000082	Case Cover, Movable, Assembly	1
1000081 See Note 1	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2
1000163	Cover, Access, Rsvr Module	1
1000142	Connector Mount Assembly 16X	1
1000159-1	Packing, Preform, "0" Ring	2
1000159-2	Packing, Preform, "0" Ring	2
1000159-3	Packing, Preform "0" Ring	1
~~1000158~~	~~Packing, Preform~~	~~2~~
~~1007804~~	~~Precision Rsvr. Alignment module Assembly~~	~~1~~
1000234	Pressure Valve Assembly	1
1000159-6	Packing Preform "O" Ring	2
1000159-5	Packing Preform "O" Ring	1
1000213	Weight, Balance S/M	A/R
1000214	Weight, Balance S/M	A/R
1000258	Weight, Balance S/M	A/R
1000259	Weight, Balance S/M	A/R
1000260	Weight, Balance S/M	A/R
1000261	Weight, Balance M.G.	A/R.
1000262	Weight, Balance M.G.	A/R
1000263	Weight, Balance O.G. & M.G.	A/R
1000268	Weight, Balance OG	A/R
1000270	Weight, Balance OG	A/R

Part No	Description	REQ'd
1000185	Cover, Spring	4
1000187	Spring	4
1000188	Screw	4
1000110-306	SCREW, SOC HD	12
1000110-305	SCREW, SOC HD	6
1000296	NAMEPLATE	1

REPLACED BY REV K WITH CHANGES

NOTE 2: Balance weights to he selected on final assembly of IMU.

NOTE 1: CASE COVER FIXED NASA DWG. NUMBER 1000241
MAY BE USED AS AN ALTERNATE.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-63

MIT/IL APPROVAL	DATE
	12/12/63

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
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SPACECRAFT CENTER
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NASA DRAWING NO.
1000201

SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000201

PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
~~[illegible]~~	~~Fastener Assembly~~	~~[illegible]~~
1000082	Case Cover, Movable, Assembly	1
1000081 See Note 1	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2
1000163	Cover, Access, Rsvr Module	1
1000142	Connector Mount Assembly 16X	1
1000159-1	Packing, Preform, "0" Ring	2
1000159-2	Packing, Preform, "0" Ring	2
1000159-3	Packing, Preform "0" Ring	1
~~1000158~~	~~Packing, Preform~~	~~2~~
~~1007004~~	~~Precision Rsvr, Alignment module Assembly~~	~~1~~
1000234	Pressure Valve Assembly	1
1000159-6	Packing Preform "O" Ring	2
1000159-5	Packing Preform "O" Ring	1
1000213	Weight, Balance S/M	A/R
1000214	Weight, Balance S/M	A/R
1000258	Weight, Balance S/M	A/R
1000259	Weight, Balance S/M	A/R
1000260	Weight, Balance S/M	A/R
1000261	Weight, Balance M.G.	A/R
1000262	Weight, Balance M.G.	A/R
1000263	Weight, Balance O.G. & M.G.	A/R
1000268	Weight, Balance OG	A/R
1000270	Weight, Balance OG	A/R

Part No	Description	REQ'd
1000185	Cover, Spring	4
1000187	Spring	4
1000188	Screw	4
1000110-306	SCREW, SOC HD	12
1000110-305	SCREW, SOC HD	6
1000296	NAMEPLATE	1

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDRR 00205	12/27/62	ajB	WK
M	B	TDRR 00268	1/15/63	ajB	JJM
M	C	TDRR 00585	3/7/63	ajB	WK
M	D	TDRR 00605	3/20/63	ajB	WK
M	E	TDRR 00766	4/10/63	ajB	WK
M	F	TDRR 00958	4/24/63	ajB	WK
M	G	TDRR 01063	4/30/63	ajB	WK
M	H	TDRR 01151	5/8/63	[illegible]	WK
M	J	TDRR 02122	7/24/63	ajB	WK
M	K	REPLACED BY REV L WITH CHANGES TDRR 02506	8-14-63	ajB	WK

REPLACED BY REV L WITH CHANGES

NOTE 2: Balance weights to he selected on final assembly of IMU.

NOTE 1: CASE COVER FIXED NASA DWG. NUMBER 1000241 MAY BE USED AS AN ALTERNATE.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT IL APPROVAL	DATE
W Kupfer	12/12/62

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

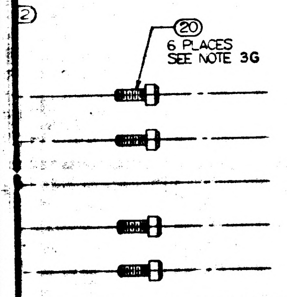
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

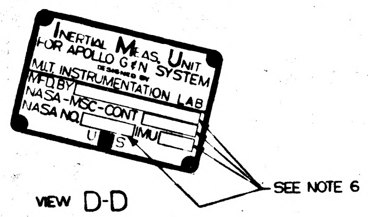
NASA DRAWING NO.
1000201

SHEET OF

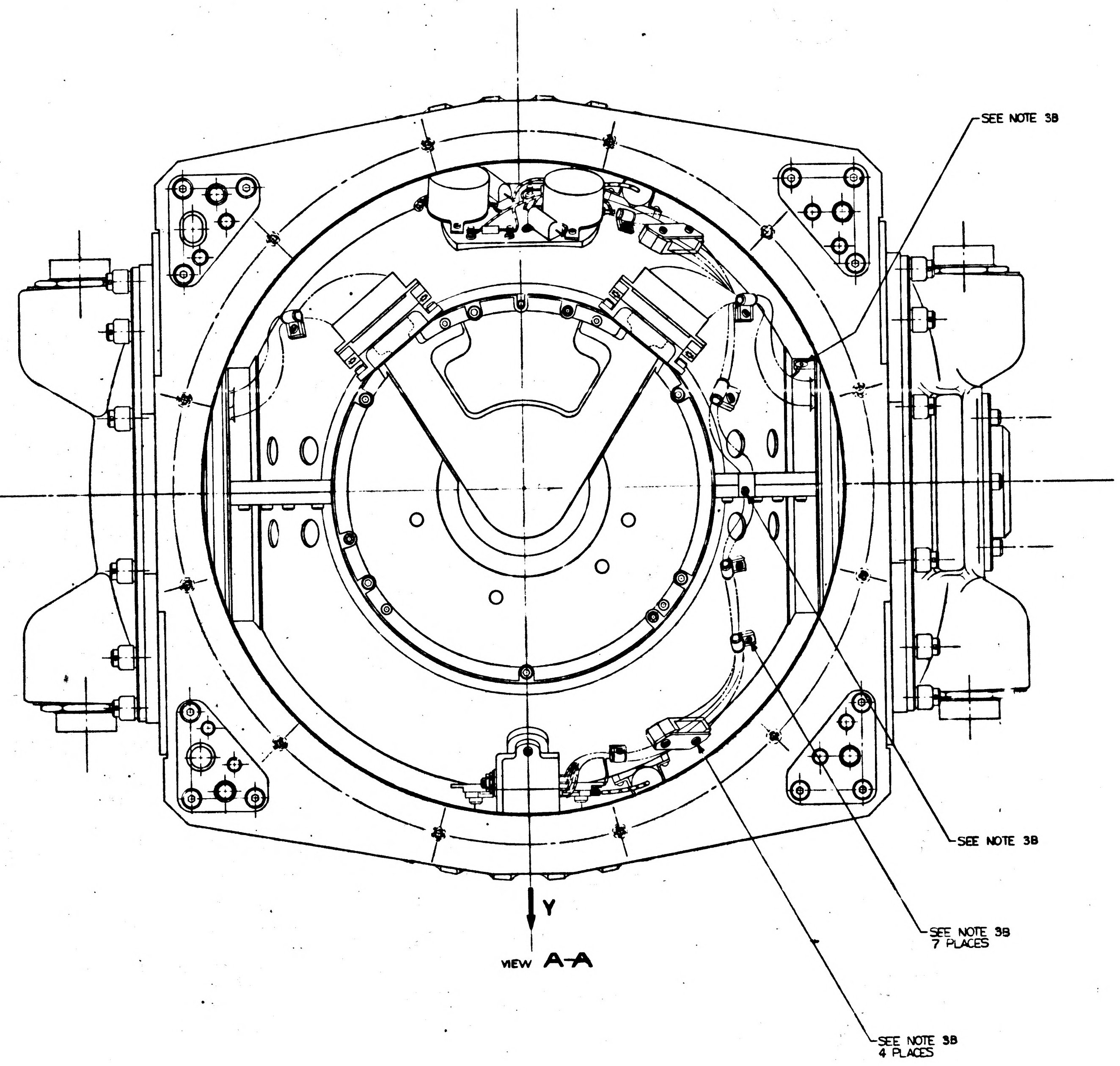
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	L	REPLACES REV K WITH CHANGES TDRR 02506	8-12-63	gjB WH





VIEW D-D



VIEW A-A

REPLACES REV K WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
A/R	SCREW, CAP, SLF-LKG, SOC HD, HEX	NAS608C440LL		SEE NOTE 8	41
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
A/R	WEIGHT, BALANCE OUT. & MID. GMBL.	1000263		SEE NOTE 8	38
A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
4	COVER, ELECTRICAL CONNECTOR	1001495		SEE NOTE 7	30
1	COVER, WATER CONNECTOR	1001494		SEE NOTE 7	29
2	COVER, MTG. PAD, LEFT HAND	1001461		SEE NOTE 7	28
2	COVER, MTG. PAD, RIGHT HAND	1001460		SEE NOTE 7	27
1	VALVE, EXPANSION	1001458		SEE NOTE 7	26
A/R	LUBRICANT, DOW CORNING NO. 55		MIL-L-4343A		25
1	PLATE, IDENTIFICATION	1000296			24
4	SCREW, BUT HD, SELF LKG SPL, SOC	1000250-13			23
12	SCREW, BUT HD, HEX, SOC	1001496-26			22
12	SCREW, CAP, SOC, HD, HEX	1000110-306			21
6	SCREW, CAP, SOC, HD, HEX	1000110-305			20
2	PACKING, PREFORMED, "O" RING	1000159-6			19
1	PACKING, PREFORMED, "O" RING	1000159-5			18
1	VALVE, PRESSURE, ASSY.	1000234			17
2	COUPLING-HALF, QUICK, DISCONNECT	1000135			16
4	SPRING, FASTENER	1000187			15
4	COVER, SPRING FASTENER	1000185			14
4	SCREW, FASTENER	1000188			13
1	COVER ACCESS RESOLVER MODULE	1000163			12
1	PACKING, PREFORMED, "O" RING	1000159-3			11
2	PACKING, PREFORMED, "O" RING	1000159-1			10
2	PACKING, PREFORMED, "O" RING	1000159-2			9
1	MT., CONN ASS'Y 16-X OUTER AXIS	1000142			8
1	MT., CONN ASS'Y I-X OUTER AXIS	1000099			7
1	INTERGIMBAL SUB-ASSEMBLY 16 X OUTER AXIS	1000205			6
1	INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS	1000006			5
1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
1	CASE, COVER, MOVABLE ASSY.	1000082			3
1	OUTER AXIS, ASSEMBLY	1000202			2
1	MACHINE ASS'Y, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153

		DATE
APPROVED	G J Bogan	8-12-63
CHECKED		
DRAWN	R W C	5-20-63

APPROVED FOR MSC
MIT I.L. APPROVAL DATE
W Kupfer 14 Aug 63

INERTIAL MEASURING UNIT ASSEMBLY

SCALE	UNIT WT	CODE IDENT
1/1		

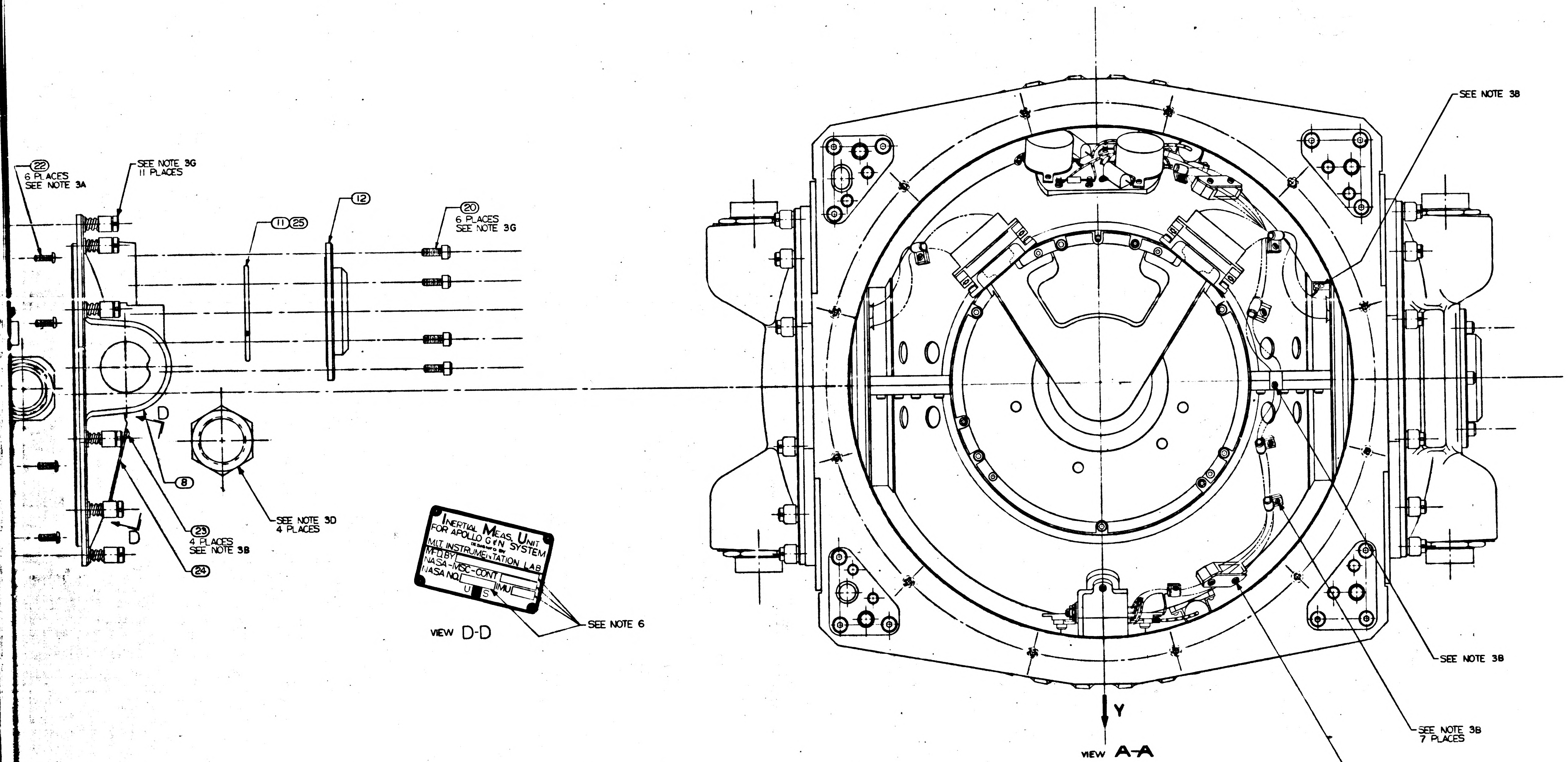
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000201
SHEET 1 OF 1

1000201 L

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

E-4


22
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
12
20
6 PLACES
SEE NOTE 3G
D
D
8
23
4 PLACES
SEE NOTE 3B
24
SEE NOTE 3D
4 PLACES
INERTIAL MEAS. UNIT
FOR APOLLO G&N SYSTEM
DESIGNED BY
M.I.T. INSTRUMENTATION LAB
MFD. BY
NASA-MSC-CONT
NASA NO.
U S
IMU
SEE NOTE 6
SEE NOTE 3B
SEE NOTE 3B
SEE NOTE 3B
7 PLACES
SEE NOTE 3B
4 PLACES
Y

VIEW D-D

VIEW A-A

REPLACES REV K WITH CHANGES

QT REQ'D	NOMENCLATURE OR DESCRIPTION
8	NUT, CLINCH, FLUSH-M
A/R	SCREW, CAP, SOC HD,
A/R	SCREW, CAP SLF-LKG,
A/R	WEIGHT, BALANCE, OUT
A/R	WEIGHT BALANCE, OUT
A/R	WEIGHT, BALANCE OUT
A/R	WEIGHT, BALANCE M
A/R	WEIGHT, BALANCE M
A/R	WEIGHT, BALANCE
A/R	WEIGHT, BALANCE
A/R	WEIGHT, BALANCE
A/R	WEIGHT BALANCE
A/R	WEIGHT, BALANCE
4	COVER, ELECTRICAL C
1	COVER, WATER CONN
2	COVER, MTG. PAD, LEF
2	COVER, MTG. PAD, RIG
1	VALVE, EXPANSION
A/R	LUBRICANT, DOW CO
1	PLATE, IDENTIFICATIO
4	SCREW, BUT HD, SELF
12	SCREW, BUT HD HEX
12	SCREW, CAP SOC HD
6	SCREW, CAP SOC HD
2	PACKING, PREFORMED
1	PACKING, PREFORMED
1	VALVE PRESSURE AS
2	COUPLING-HALF QUICK
4	SPRING, FASTENER
4	COVER SPRING FA
4	SCREW FASTENER
1	COVER ACCESS RESOLVER MODU
1	PACKING PREFORMED
2	PACKING PREFORMED
2	PACKING PREFORMED
1	M.T. COMM ASSY
1	M.T. COMM ASSY
1	INTERGIMBAL 3-8 16X OUTER AX
1	INTERGIMBAL 6-8 OUTER AXIS
1	CASE, COVER FIXED
1	CASE COVER MOVAB
1	OUTER AXIS AS
1	MACHINE ASSY CAS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

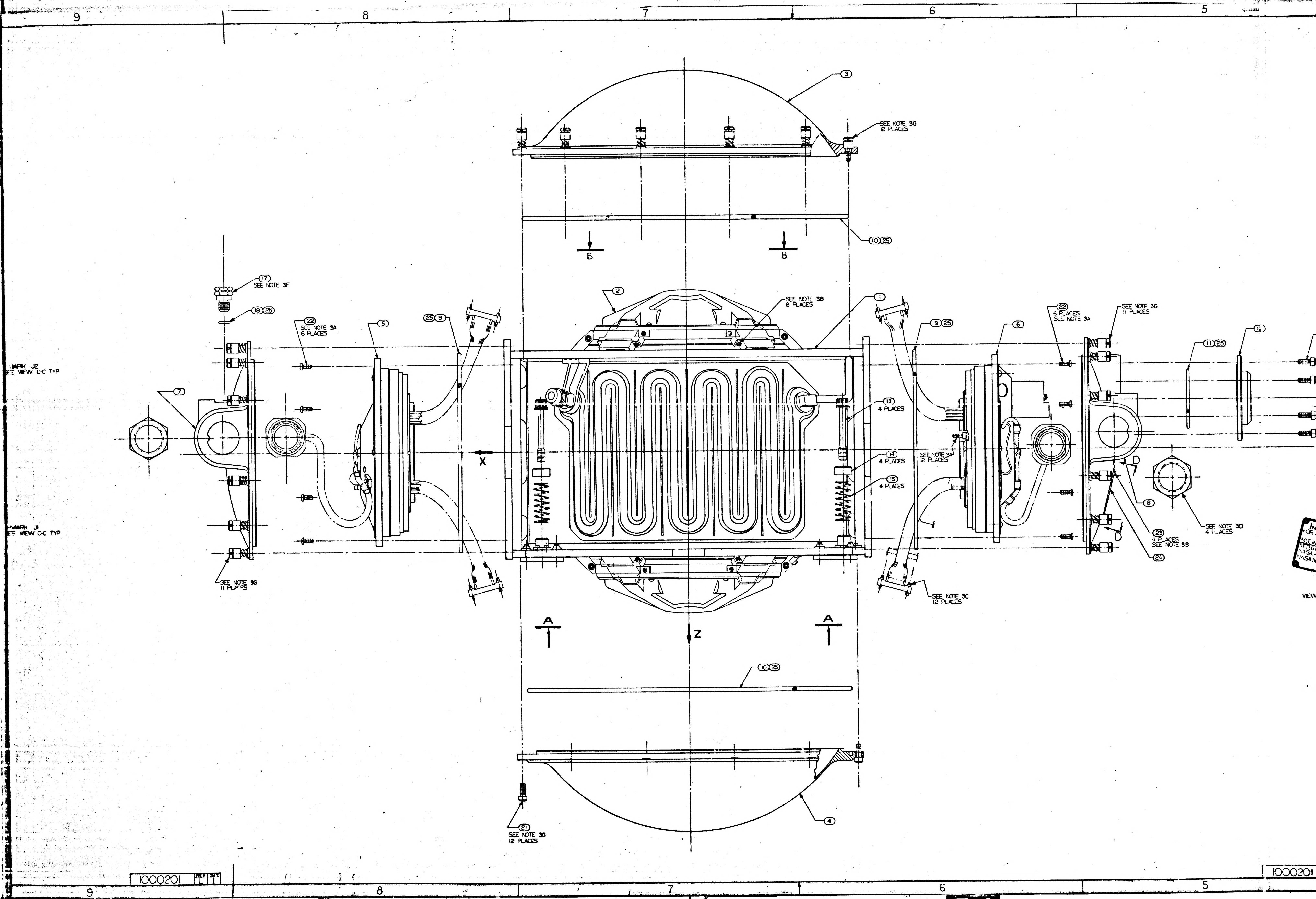
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHK'D
DRAWN R.A.C.
APPROVED FOR MSC
T.R. APPROVAL DATE

MASTER

1000201 REV SHEET

INCHES
PHOTOGRAPHIC SCALE ONLY

F3


9
8
7
6
5
3
SEE NOTE 3G
12 PLACES
10 25
B
B
17
SEE NOTE 3F
18 25
22
SEE NOTE 3A
6 PLACES
5
25 9
2
SEE NOTE 3B
8 PLACES
1
9 25
6
22
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
12
MARK J2
SEE VIEW C-C TYP
7
X
13
4 PLACES
14
4 PLACES
15
4 PLACES
SEE NOTE 3A
12 PLACES
D
8
23
4 PLACES
SEE NOTE 3B
24
D
SEE NOTE 3D
4 PLACES
MARK J1
SEE VIEW C-C TYP
SEE NOTE 3G
11 PLACES
SEE NOTE 3C
12 PLACES
VIEW
A
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10 25
21
SEE NOTE 3G
12 PLACES
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1000201
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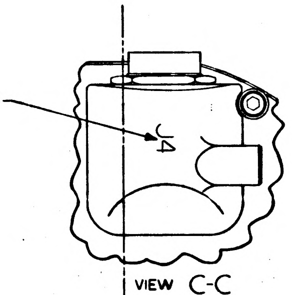
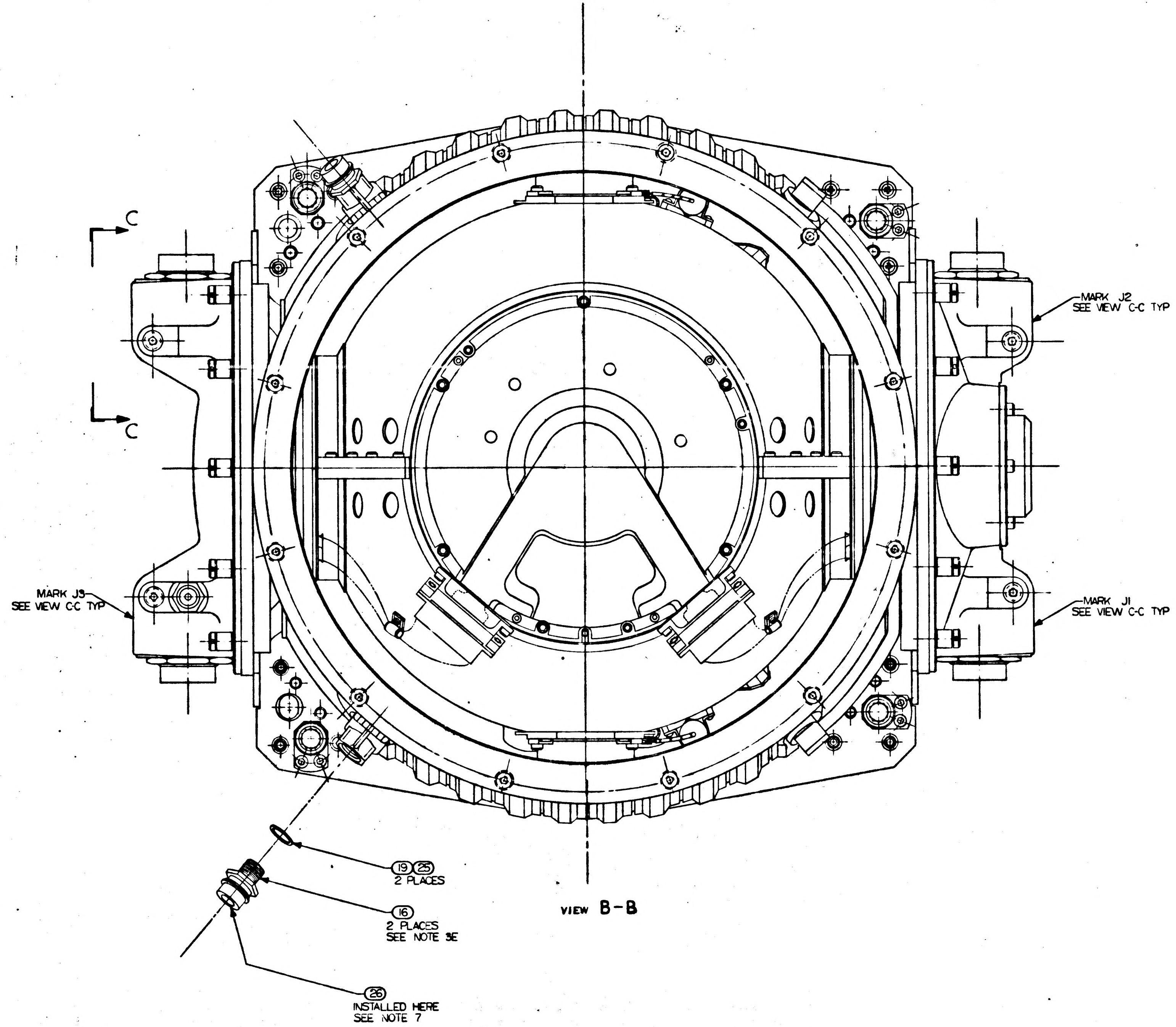
INCHES
PHOTOGRAPHIC SCALE ONLY

F-2

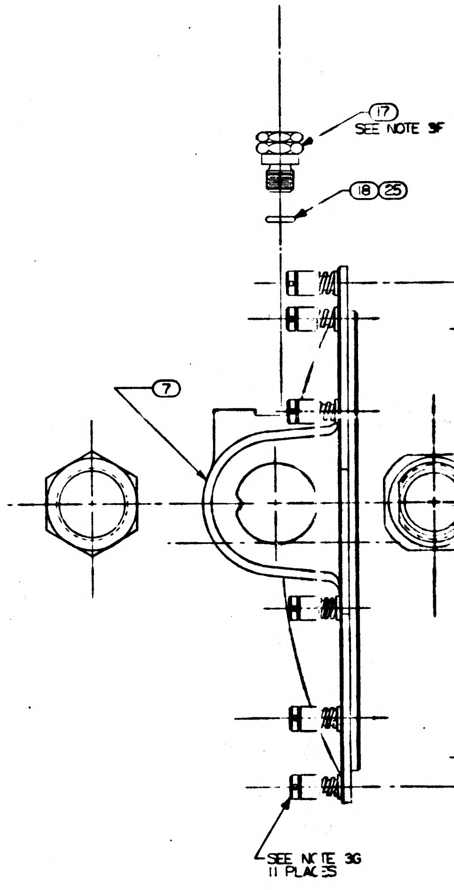
1000503


SEE NOTE 4
J4

VIEW C-C


C
C
MARK J2
SEE VIEW C-C TYP
MARK J3
SEE VIEW C-C TYP
MARK J1
SEE VIEW C-C TYP
19 25
2 PLACES
16
2 PLACES
SEE NOTE 3E
26
INSTALLED HERE
SEE NOTE 7

VIEW B-B

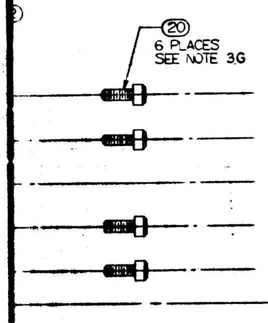

17
SEE NOTE 3F
18 25
7
SEE NOTE 3G
11 PLACES

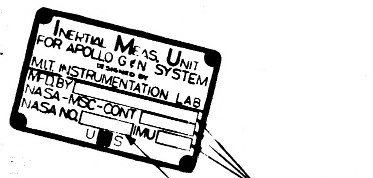
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 2.0 IN. LB. AT FINAL SEATING, NOTE TO EXCEED 1.0 IN. LB. WHILE ENGAGING PINS
   - D. 85.0 IN. LB.
   - E. 70.0 IN. LB.
   - F. 65.0 IN. LB.
   - G. 30.0 IN. LB.
4. MARK CHARACTERS $\frac{.23}{.27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. CASE COVER FIXED NASA DRAWING 1000241 MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{.10}{.14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019
7. (26)(27)(28)(29) & (30) INSTALLED DURING STORING & SHIPPING
8. BALANCE WEIGHTS SCREWS AND NUTS TO BE SELECTED FROM DRAWINGS AND INSTALLED PER ATP 1000201
9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

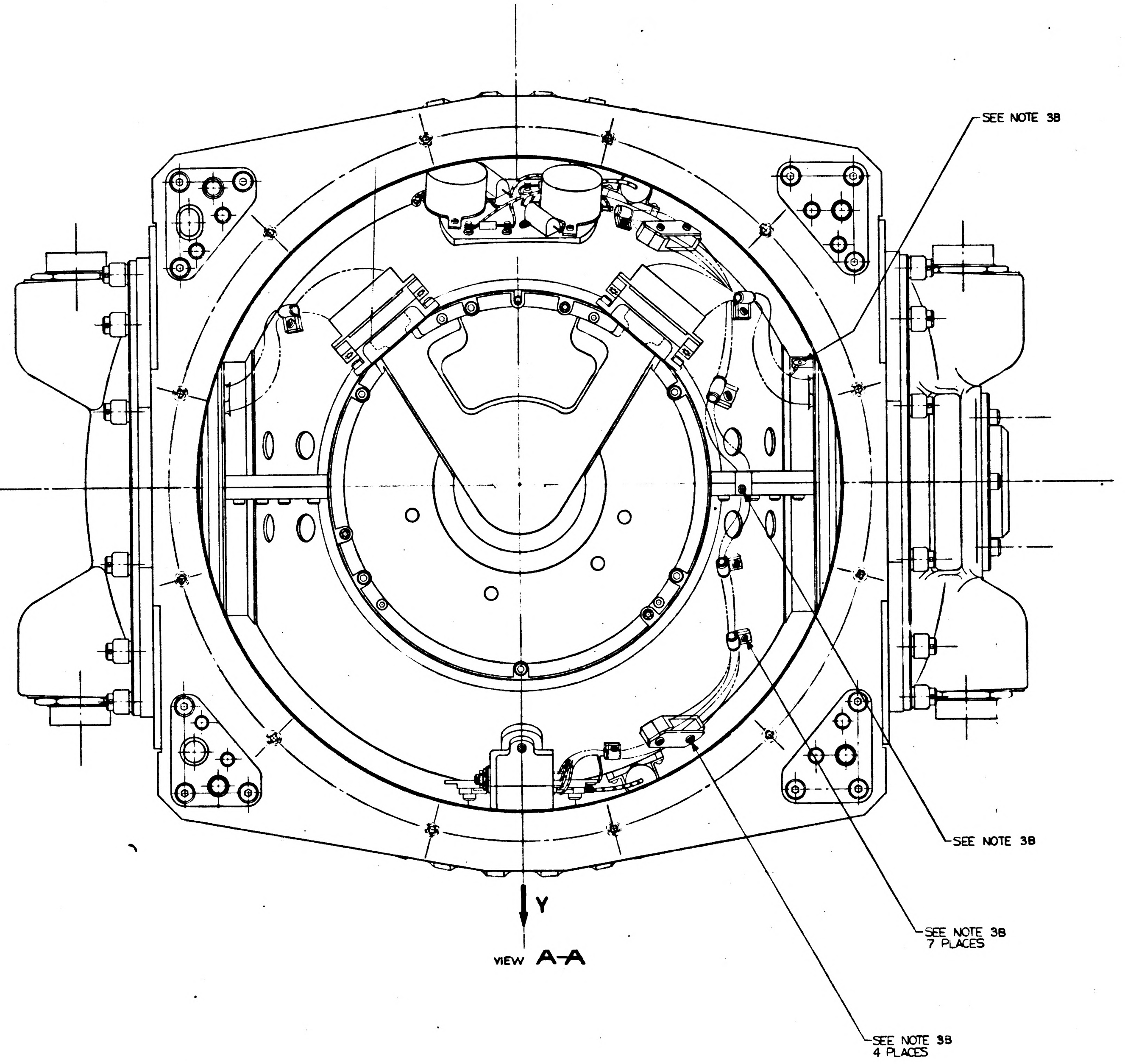
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						
ZONE	SYM	DESCRIPTION	DATE	APPROVAL		
Ⓜ	·	L	REPLACES REV K WITH CHANGES TDRR 02506	8-12-63	gjb	WK
		M	TDRR 02896	9-4-63	gjb	WK





VIEW D-D



VIEW A-A

REPLACES REV K WITH CHANGES

MASTER

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
A/R	SCREW, CAP, SLF-LKG, SOC HD HEX	NAS608C440LL		SEE NOTE 8	41
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
A/R	WEIGHT, BALANCE OUT & MID. GMBL.	1000263		SEE NOTE 8	38
A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
4	COVER, ELECTRICAL CONNECTOR	1001495		SEE NOTE 7	30
1	COVER, WATER CONNECTOR	1001494		SEE NOTE 7	29
2	COVER, MTG. PAD, LEFT HAND	1001461		SEE NOTE 7	28
2	COVER, MTG. PAD, RIGHT HAND	1001460		SEE NOTE 7	27
1	VALVE, EXPANSION	1001456		SEE NOTE 7	26
A/R	LUBRICANT, DOW CORNING NO.55		MIL-L-4343A		25
1	PLATE, IDENTIFICATION	1000296			24
4	SCREW, BUT HD, SELF LKG SPL SOC	1000250-13			23
12	SCREW, CAP, SOC, HD, HEX	1000110-7			22
12	SCREW, CAP, SOC, HD, HEX	1000110-306			21
6	SCREW, CAP, SOC, HD, HEX	1000110-305			20
2	PACKING, PREFORMED, "O" RING	1000159-6			19
1	PACKING, PREFORMED, "O" RING	1000159-5			18
1	VALVE, PRESSURE, ASSY.	1000234			17
2	COUPLING-HALF, QUICK DISCONNECT	1000135			16
4	SPRING, FASTENER	1000187			15
4	COVER, SPRING FASTENER	1000185			14
4	SCREW, FASTENER	1000188			13
1	COVER ACCESS RESOLVER MODULE	1000163			12
1	PACKING, PREFORMED, "O" RING	1000159-3			11
2	PACKING, PREFORMED, "O" RING	1000159-1			10
2	PACKING, PREFORMED, "O" RING	1000[illegible]-2			9
1	MT., CONN ASS'Y 16-X OUTER AXIS	1000142			8
1	MT., CONN ASS'Y 1-X OUTER AXIS	1000099			7
1	INTERGIMBAL SUB-ASSEMBLY 16X OUTER AXIS	1000205			6
1	INTERGIMBAL SUB-ASSEMBLY 1-X OUTER AXIS	1000006			5
1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
1	CASE, COVER, MOVABLE ASS'Y.	1000082			3
1	OUTER AXIS, ASSEMBLY	1000202			2
1	MACHINE ASS'Y, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

Ⓜ 1000201

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED G J Boyce DATE 8-12-63
CHECKED
DRAWN R W C 5-20-63
APPROVED FOR MSC Jack Bonnel
MIT I.L. APPROVAL W Kupfer DATE 14 Aug 63

INERTIAL MEASURING UNIT ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT

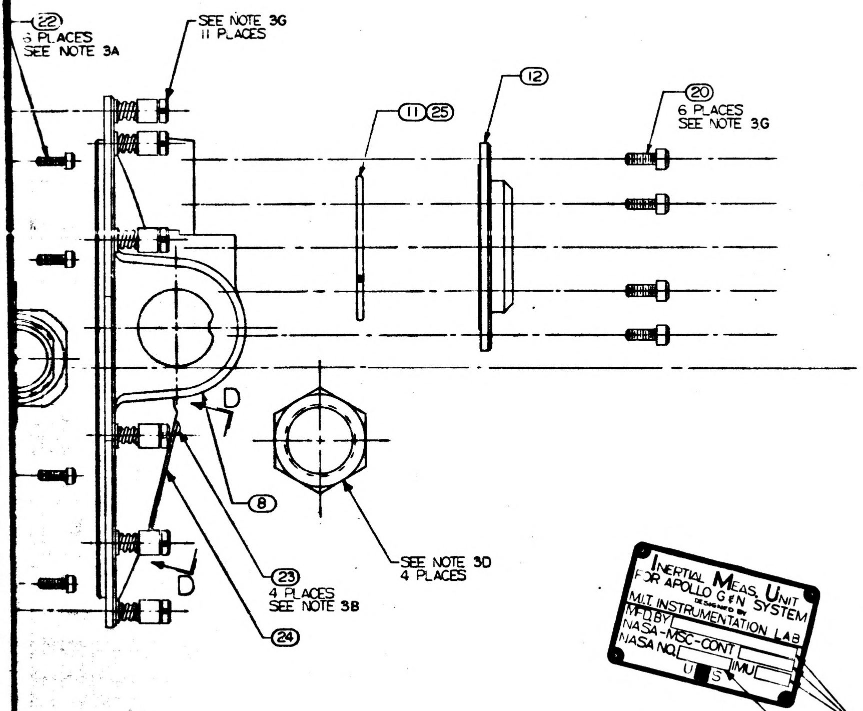
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000201
SHEET 1 OF 1

1000201 REV M SHEET 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

F-4

5 4 3 2



22
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
12
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6 PLACES
SEE NOTE 3G
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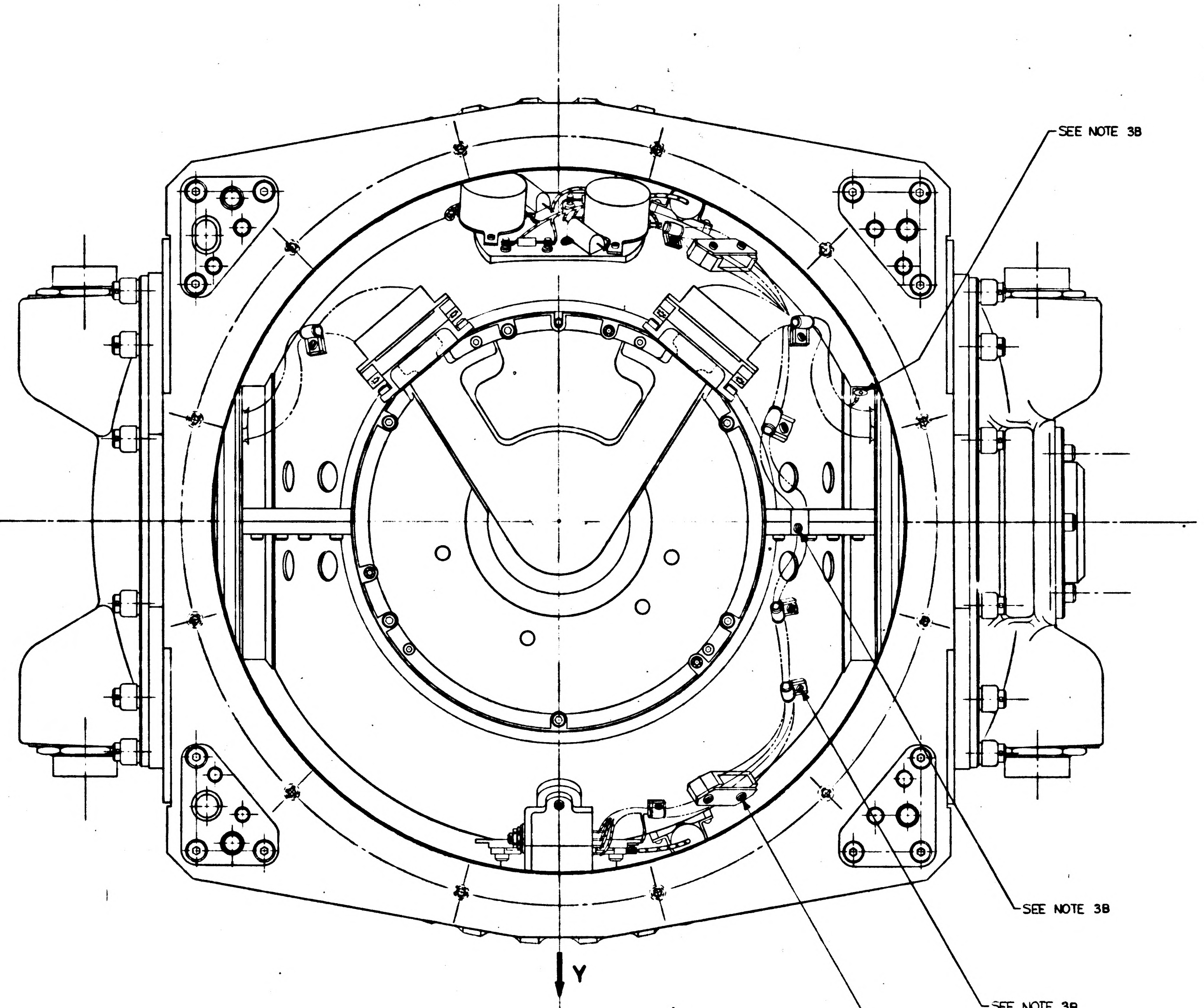
D
8
23
4 PLACES
SEE NOTE 3B
24
SEE NOTE 3D
4 PLACES

INERTIAL MEAS. UNIT
FOR APOLLO G&N SYSTEM
DESIGNED BY
M.I.T. INSTRUMENTATION LAB
MFD. BY
NASA-MSC-CONT
NASA NO.
IMU
U S
SEE NOTE 6

VIEW D-D



SEE NOTE 3B
SEE NOTE 3B
SEE NOTE 3B
7 PLACES
SEE NOTE 3B
4 PLACES
Y

VIEW A-A

REPLACES REV K WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION
8	NUT, CLINCH, FLUSH-M
A/R	SCREW, CAP, SOC HD, H
A/R	SCREW, CAP, SLF-LKG, S
A/R	WEIGHT, BALANCE, OUTE
A/R	WEIGHT, BALANCE, OUTE
A/R	WEIGHT, BALANCE OUT,
A/R	WEIGHT, BALANCE MI
A/R	WEIGHT, BALANCE MI
A/R	WEIGHT, BALANCE S
A/R	WEIGHT, BALANCE S
A/R	WEIGHT, BALANCE S
A/R	WEIGHT, BALANCE S
A/R	WEIGHT, BALANCE S
4	COVER, ELECTRICAL CO
1	COVER, WATER CONNE
2	COVER, MTG. PAD, LEFT
2	COVER, MTG. PAD, RIGH
1	VALVE, EXPANSION
A/R	LUBRICANT, DOW CORI
1	PLATE, IDENTIFICATION
4	SCREW, BUTT HD, SELF-L
ⓜ 12	SCREW, CAP SOC HD, H
12	SCREW, CAP SOC HD H
6	SCREW, CAP SOC HD H
2	PACKING, PREFORMED,
1	PACKING, PREFORMED,
1	VALVE PRESSURE, ASS
2	COUPLING-HALF QUICK, D
4	SPRING, FASTENER
4	COVER, SPRING FAS
4	SCREW, FASTENER
1	COVER ACCESS RESOLVER MODULE
1	PACKING PREFORMED, "O"
2	PACKING PREFORMED "O
2	PACKING PREFORMED "O"
1	MT., CONN ASS'Y 16
1	MT., CONN ASS'Y HOU
1	INTERGIMBAL SUB-ASS 16X OUTER AXIS
1	INTERGIMBAL SUB-ASS OUTER AXIS
1	CASE, COVER FIXED
1	CASE COVER MOVABLE
1	OUTER AXIS, ASSE
1	MACHINE ASS'Y CASE

MASTER

MASTER

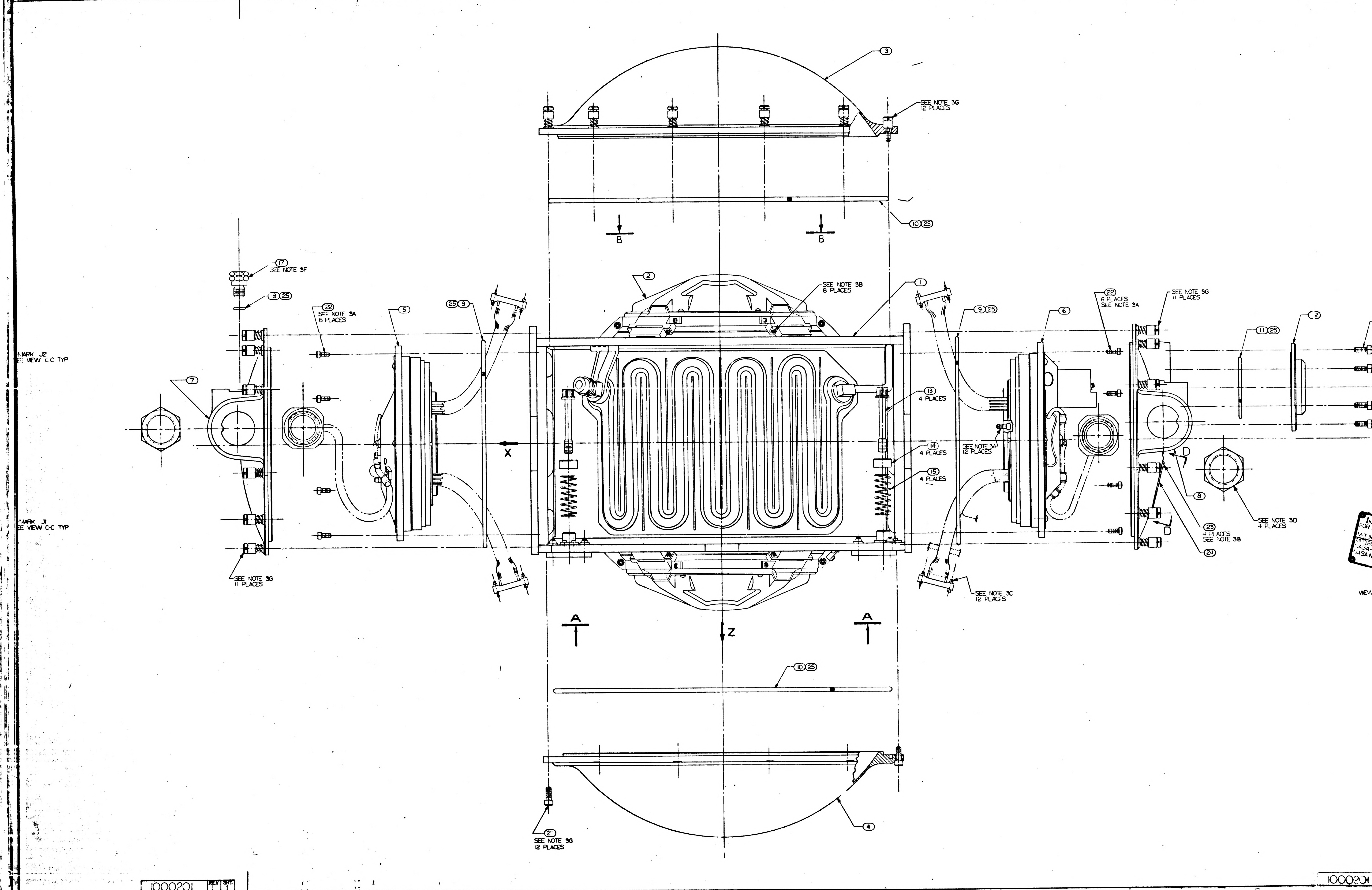
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN R.W.C. 5-20-63
APPROVED MSC
MIT IL APPROVAL DATE
14 May 63

1000201 REV M SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY


9
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SEE NOTE 3G
12 PLACES
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17
SEE NOTE 3F
8 25
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SEE NOTE 3A
6 PLACES
5
25 9
2
SEE NOTE 3B
8 PLACES
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9 25
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22
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
2
MARK J2
SEE VIEW C-C TYP
7
X
13
4 PLACES
14
4 PLACES
15
4 PLACES
SEE NOTE 3A
12 PLACES
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4 PLACES
SEE NOTE 3B
24
SEE NOTE 3D
4 PLACES
MARK J1
SEE VIEW C-C TYP
SEE NOTE 3G
11 PLACES
SEE NOTE 3C
12 PLACES
VIEW
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10 25
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SEE NOTE 3G
12 PLACES

1000201	REV	SHT

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1000201

INCHES
PHOTOGRAPHIC SCALE ONLY

F-2

1000502

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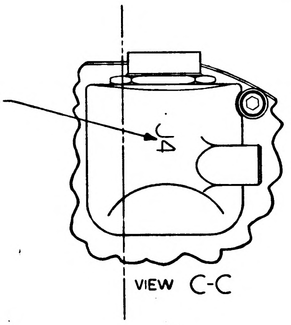
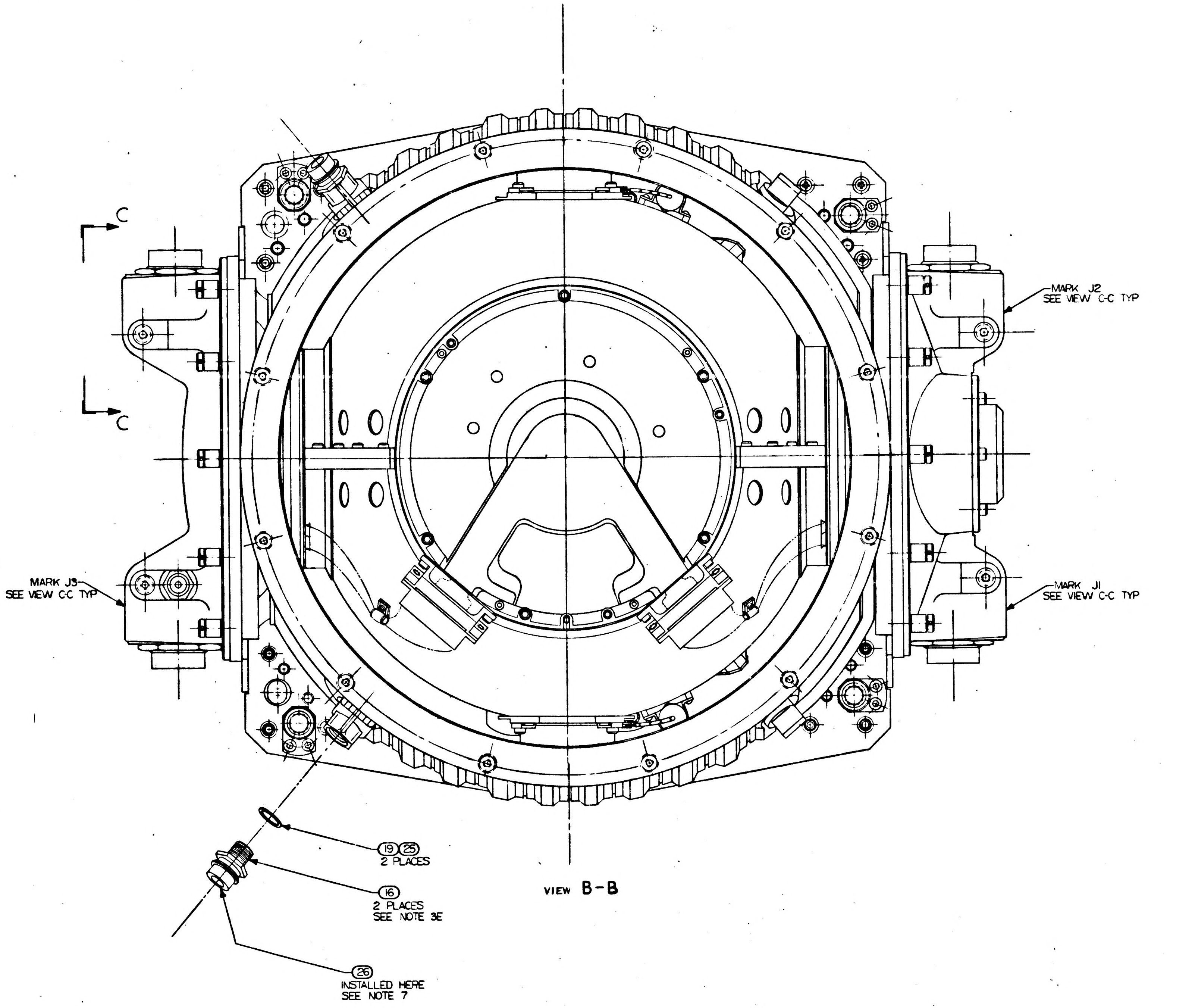

SEE NOTE 4
J4
VIEW C-C


C
C
MARK J2
SEE VIEW C-C TYP
MARK J3
SEE VIEW C-C TYP
MARK J1
SEE VIEW C-C TYP
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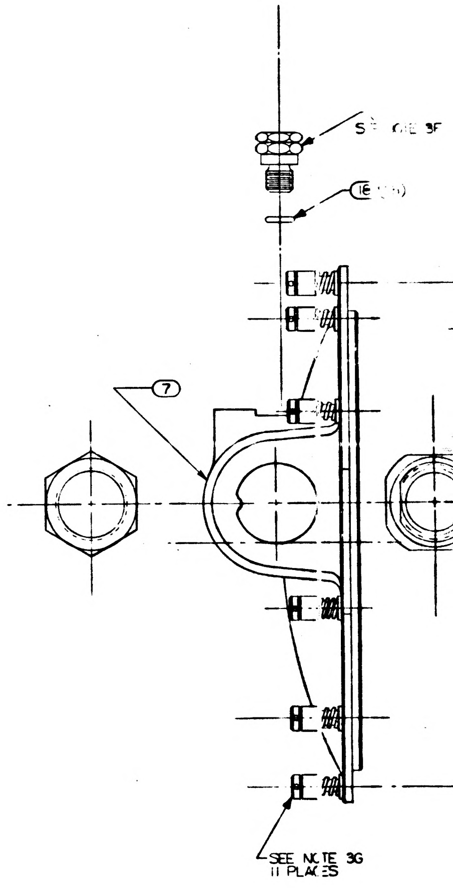
2 PLACES
SEE NOTE 3E
26
INSTALLED HERE
SEE NOTE 7
VIEW B-B


SEE NOTE 3F
16
7
SEE NOTE 3G
11 PLACES

B

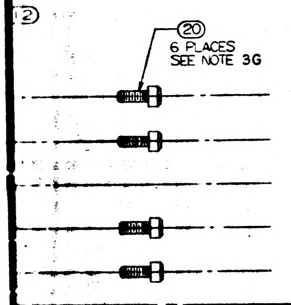
NOTES

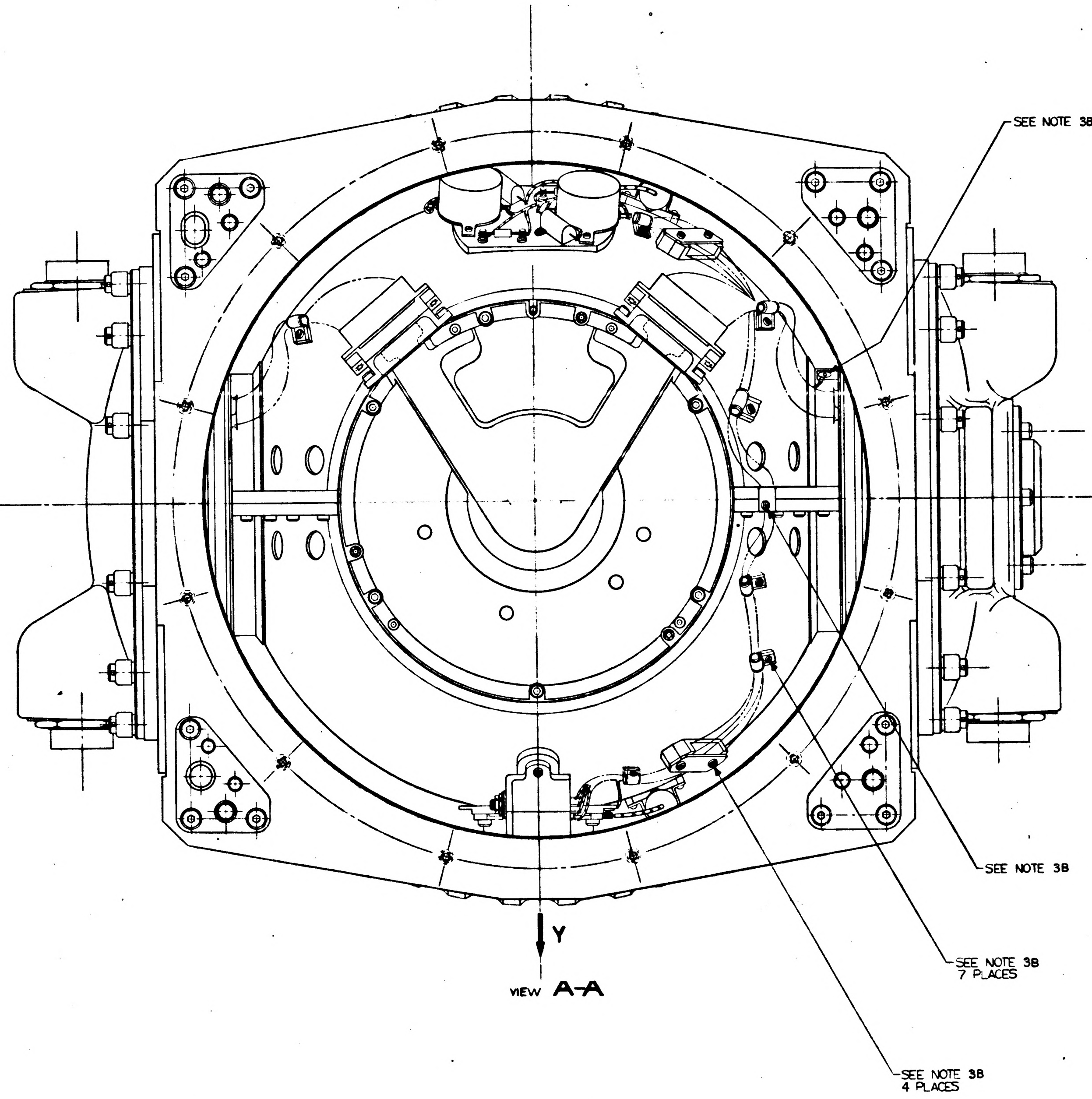
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
    - A. 10.0 IN. LB.
    - B. 5.0 IN. LB.
    - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB. WHILE ENGAGING PINS
    - D. 85.0 IN. LB.
    - E. 70.0 IN. LB.
    - F. 65.0 IN. LB.
    - G. 30.0 IN. LB.
4. MARK CHARACTERS $\frac{.23}{.27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. CASE COVER FIXED NASA DRAWING 1000241 MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{.10}{.14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019
7. (26) (27) (28) (29) & (30) INSTALLED DURING STORING & SHIPPING
8. BALANCE WEIGHTS SCREWS AND NUTS TO BE SELECTED FROM DRAWINGS AND INSTALLED PER ATP 1000201
9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

A

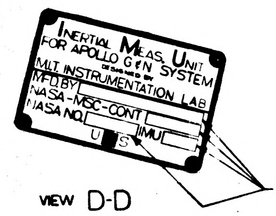
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	L	REPLACES REV K WITH CHANGES TDRR 02506	9-12-63	ajB	WK.
Ⓜ	M	TDRR 02896	9-4-63	ajB	WK
	N	TDRR 03233	9-20-63	AOH	W/K





VIEW A-A



VIEW D-D

REPLACES REV K WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
A/R	SCREW, CAP, SLF-LKG, SOC HD, HEX	NAS1352C04LL		SEE NOTE 8	41
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
A/R	WEIGHT, BALANCE OUT & MID. GMBL.	1000263		SEE NOTE 8	38
A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
Ⓝ					30
Ⓝ					29
Ⓝ					28
Ⓝ					27
Ⓝ					26
A/R	LUBRICANT, DOW CORNING NO.55		MIL-L-4343A		25
1	PLATE, IDENTIFICATION	1000296			24
4	SCREW, BUT HD, SELF LKG SPL SOC	1000250-13			23
Ⓜ 12	SCREW, CAP, SOC, HD, HEX	1000110-7			22
12	SCREW, CAP, SOC, HD HEX	1000110-306			21
6	SCREW, CAP, SOC, HD, HEX	1000110-305			20
2	PACKING, PREFORMED, "O" RING	1000159-6			19
1	PACKING, PREFORMED, "O" RING	1000159-5			18
1	VALVE, PRESSURE, ASSY.	1000234			17
2	COUPLING-HALF, QUICK, DISCONNECT	1000135			16
4	SPRING, FASTENER	1000187			15
4	COVER, SPRING FASTENER	1000185			14
4	SCREW, FASTENER	1000188			13
1	COVER ACCESS RESOLVER MODULE	1000163			12
1	PACKING, PREFORMED, "O" RING	1000159-3			11
2	PACKING, PREFORMED, "O" RING	1000159-1			10
2	PACKING, PREFORMED, "O" RING	1000159-2			9
1	MT., CONN ASS'Y 16-X OUTER AXIS	1000142			8
1	MT., CONN ASS'Y I-X OUTER AXIS	1000099			7
1	INTERGIMBAL SUB-ASSEMBLY 16 X OUTER AXIS	1000205			6
1	INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS	1000006			5
1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
1	CASE, COVER, MOVABLE ASSY.	1000082			3
1	OUTER AXIS, ASSEMBLY	1000202			2
1	MACHINE ASS'Y, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

1000201 N

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED C.J. Bagne 9-12-63
CHECKED
DRAWN R W C 5-20-63
APPROVED FOR MSC
Jack Barnard
MIT IL APPROVAL DATE
W Kupfer 14 Aug 63

INERTIAL MEASURING UNIT ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
Cambridge, Mass.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000201
SHEET 1 OF 1

MASTER

MASTER

1000201 N

INCHES
PHOTOGRAPHIC SCALE ONLY

F-4

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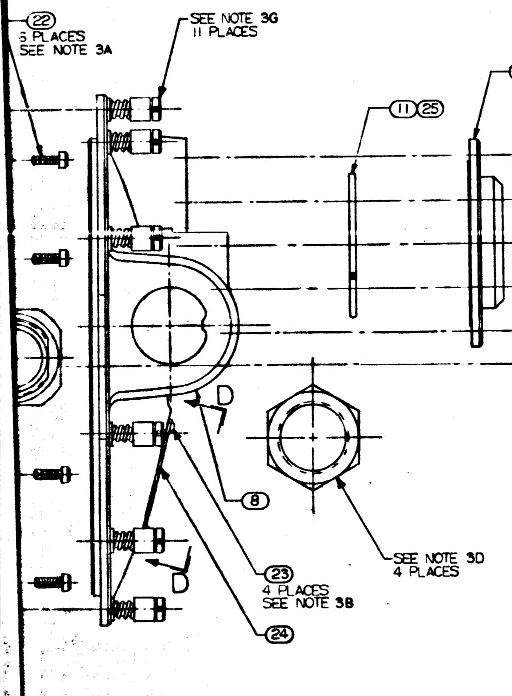

(22)
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
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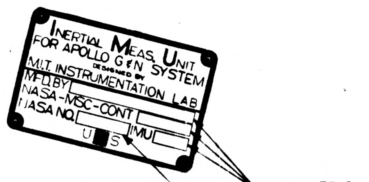
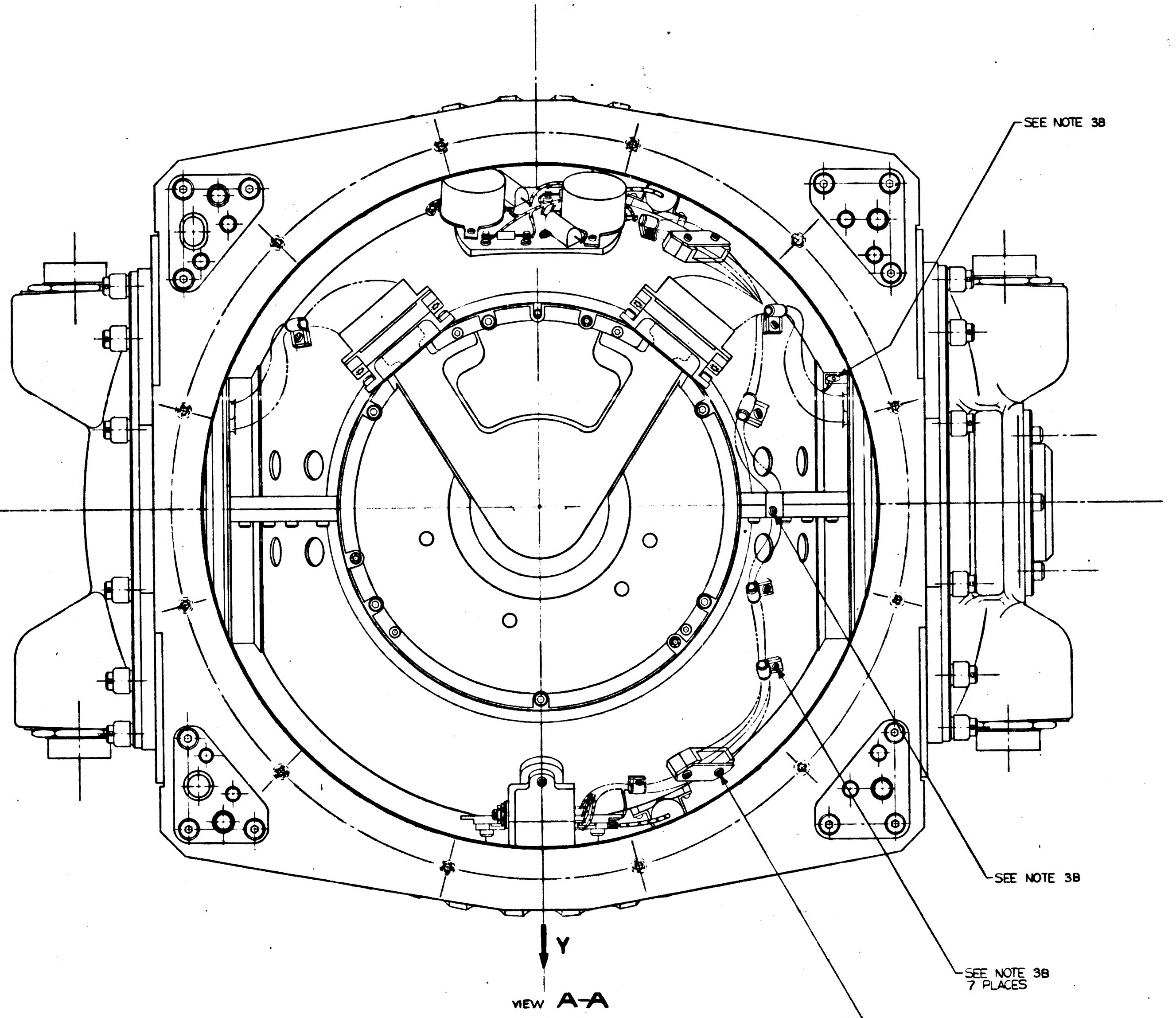
SEE NOTE 3D
4 PLACES



INERTIAL MEAS. UNIT
FOR APOLLO G&N SYSTEM
DESIGNED BY
M.I.T. INSTRUMENTATION LAB
MFD. BY
NASA-MSC-CONT
NASA NO.
IMU
U S
SEE NOTE 6

VIEW D-D



SEE NOTE 3B
SEE NOTE 3B
Y
SEE NOTE 3B
7 PLACES
SEE NOTE 3B
4 PLACES

VIEW A-A

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION
	8	NUT CLINCH, FLUSH-MOUN
	A/R	SCREW CAP, SOC HD, HEX
	A/R	SCREW CAP SLF-LKG, SOC
	A/R	WEIGHT, BALANCE, OUTER
	A/R	WEIGHT, BALANCE, OUTER
	A/R	WEIGHT, BALANCE OUTE
	A/R	WEIGHT, BALANCE MID.
	A/R	WEIGHT, BALANCE MID.
	A/R	WEIGHT, BALANCE S/
	A/R	WEIGHT, BALANCE S/
	A/R	WEIGHT, BALANCE S/
	A/R	WEIGHT, BALANCE S/
	A/R	WEIGHT, BALANCE S/
Ⓝ		
Ⓝ		
Ⓝ		
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Ⓝ		
	A/R	LUBRICANT, DOW CORN
	1	PLATE, IDENTIFICATION
	4	SCREW, BUT HD, SELF LK
Ⓜ	12	SCREW, CAP, SOC, HD, HE
	12	SCREW, CAP, SOC HD HE
	6	SCREW, CAP, SOC HD HE
	2	PACKING, PREFORMED "O"
	1	PACKING, PREFORMED, "O"
	1	VALVE, PRESSURE, ASSY.
	2	COUPLING-HALF QUICK DIS
	4	SPRING, FASTENER
	4	COVER, SPRING FAST
	4	SCREW, FASTENER
	1	COVER ACCESS RESOLVER MODULE
	1	PACKING PREFORMED "O" R
	2	PACKING PREFORMED "O"
	2	PACKING, PREFORMED, "O" R
	1	MT. CONN ASSY 16A0
	1	MT. CONN ASSY
	1	INTERGIMBAL SUB-ASSY MX OUTER AXIS
	1	INTERGIMBAL SUB-ASSY OUTER AXIS
	1	CASE, COVER, FIXED
	1	CASE, COVER, MOVABLE
	1	OUTER AXIS, ASSEM
	1	MACHINE ASSY CASE

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
		DO NOT SCALE THIS DRAWING
		MATERIAL
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		
CHECKED		
DRAWN	R.V.C.	5-20
APPROVED FOR NASC		
MIT APPROVAL		DATE
		14 May 63

MASTER

MASTER

1000201 REV N SHEET

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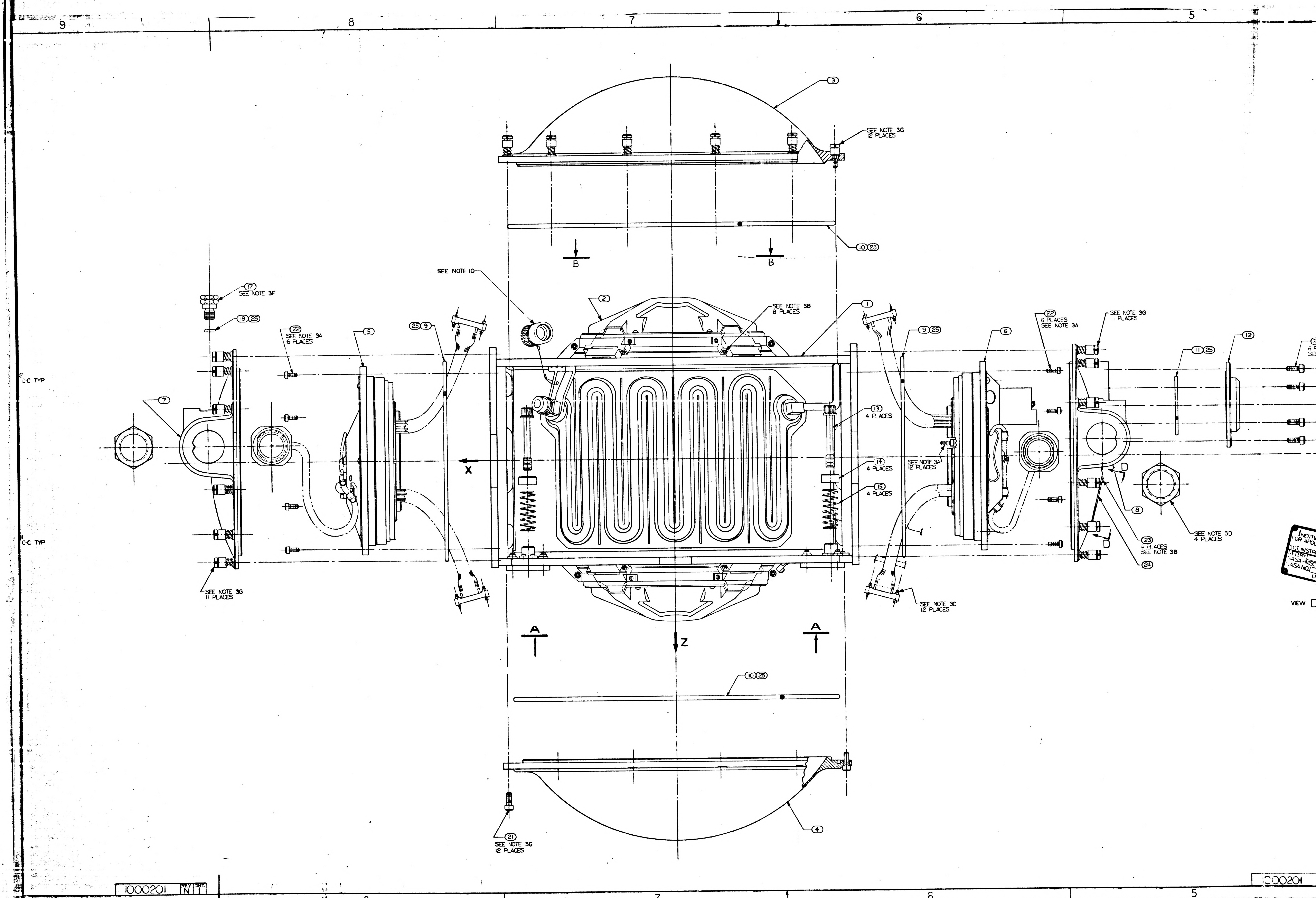
INCHES
PHOTOGRAPHIC SCALE ONLY

F-3



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INCHES
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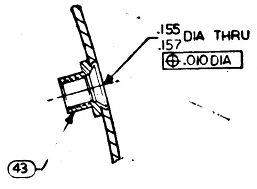
PHOTOGRAPHIC SCALE ONLY

E-2

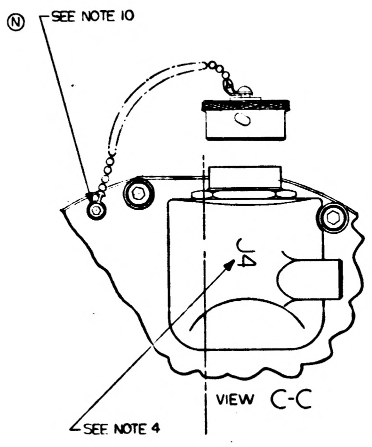
1000201

Ⓝ

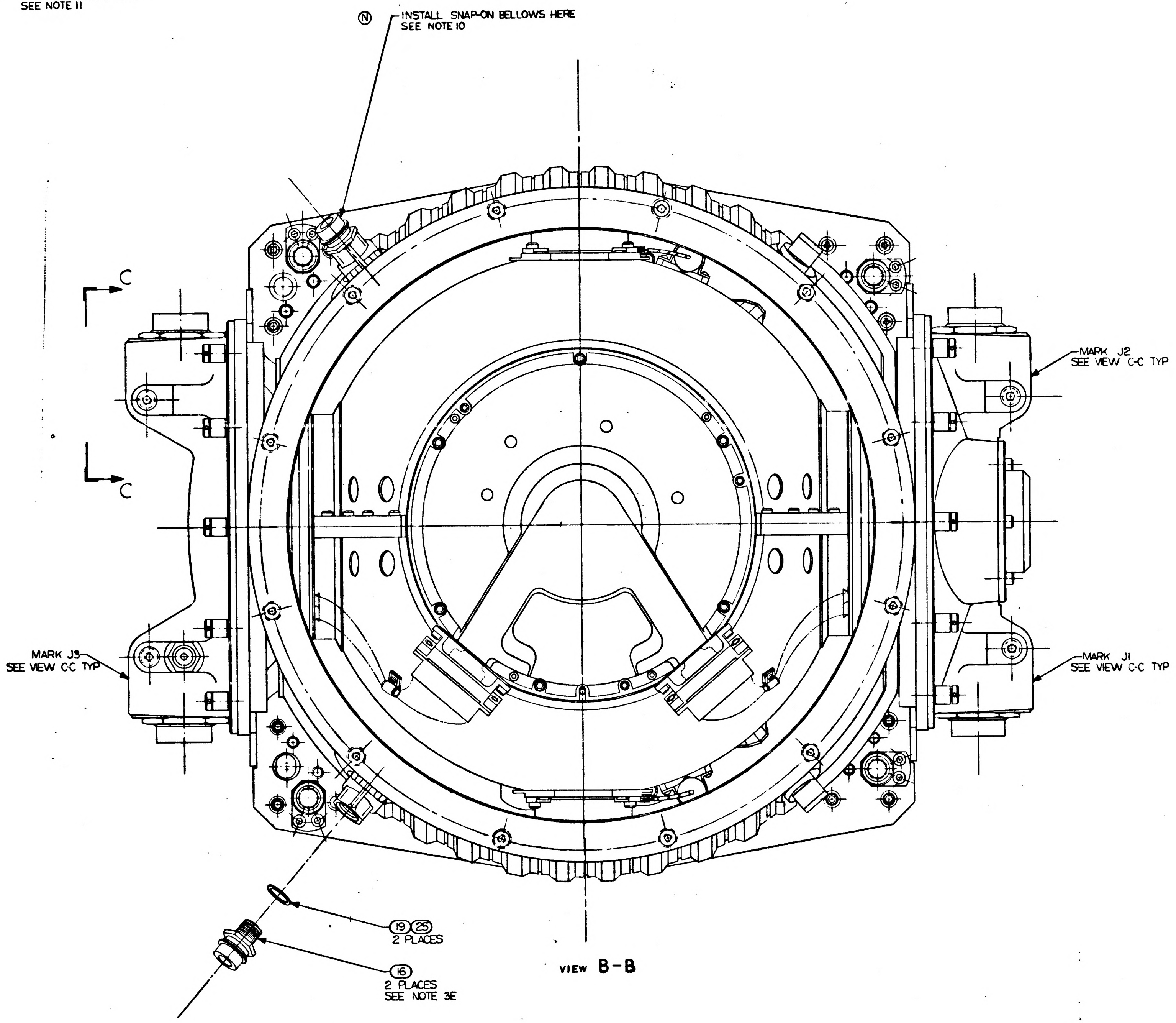
SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4	STABLE MEMBER
NAS1352C04LL6	
NAS1352C04LL8	
1000110-1	MIDDLE AND OUTER AXIS
1000110-2	
1000110-3	
1000110-302	



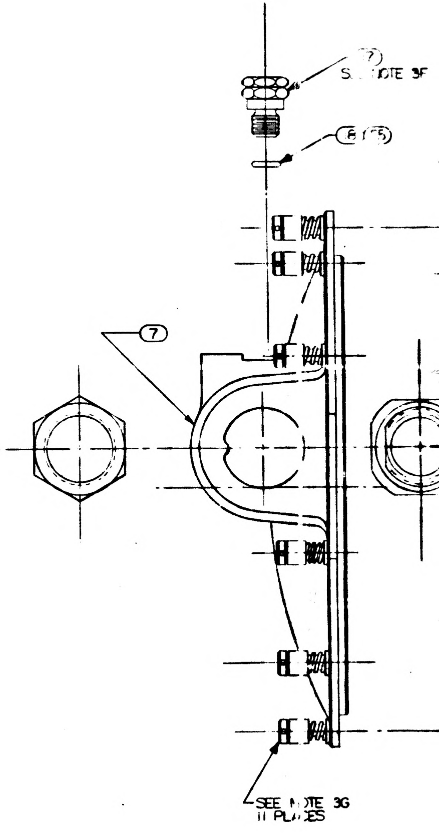
Ⓝ VIEW E
TYPICAL INSTALLATION
SEE NOTE 11



VIEW C-C



VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB. WHILE ENGAGING PINS
   - D. 85.0 IN. LB.
   - E. 70.0 IN. LB.
   - F. 65.0 IN. LB.
   - G. 30.0 IN. LB.
4. MARK CHARACTERS $\frac{.23}{.27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{.10}{.14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

Ⓝ 7. ~~(26)(27)(28)(29)&(30) INSTALLED DURING STORING & SHIPPING~~

Ⓝ 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000201. SELECT SCREWS FROM CHART

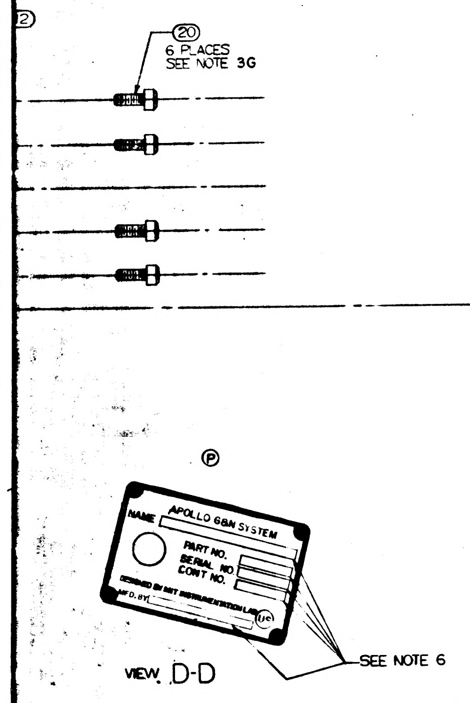
9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓝ 10. PROTECTIVE COVER, ELECT, NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 1001494, MOUNTING PAD COVERS, NASA DRAWING NO.'S 1001460 AND 1001461, AND IMU SNAP-ON BELLOWS, NASA DRAWING NO. 1900802, TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS 35C04LL4, OR EQUIV, TO SECURE 1001495 TO CONNECTOR MOUNT. ASSY'S (7) AND (8) SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE ON (7) & (8). REMOVE PROTECTIVE COVER MOUNTING SCREWS AND CABLE IMMEDIATELY PRIOR TO INSTALLATION

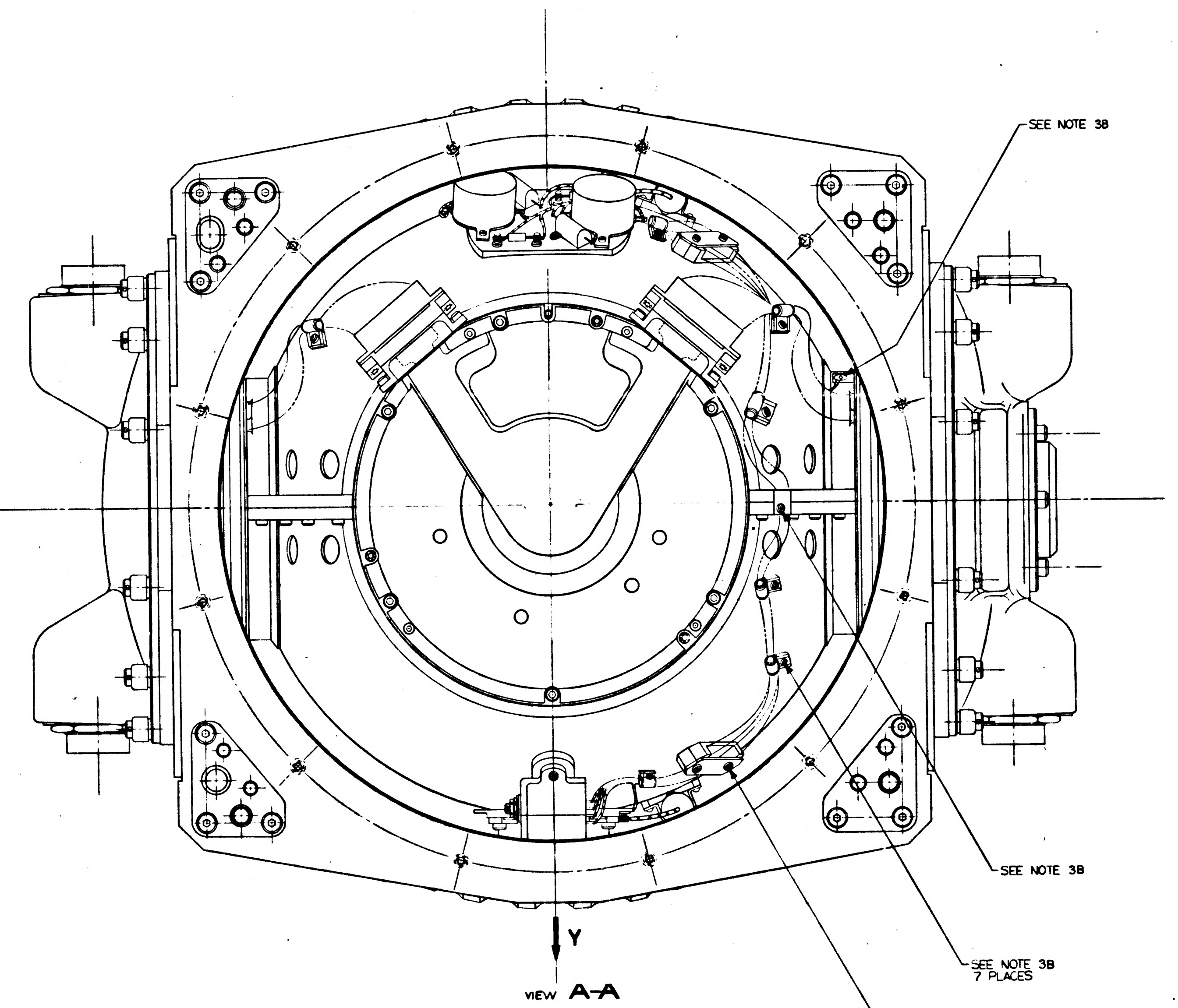
Ⓝ 11. SECURE BALANCE WEIGHTS, ITEMS (36) THRU (40) TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM (43) AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM (43) IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

Ⓝ 12. TEMPERATURE OF ASSEMBLY - MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTERGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F° TO 160°F RANGE.

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ		L	REPLACES REV K WITH CHANGES TDRR 02506	8-12-63	ajB	WK
Ⓜ		M	TDRR 02896	9-4-63	ajB	WK
Ⓝ		N	TDRR 03233	9-20-63	AAH	WK
		P	TDRR 03488	10-4-63	AAH	
		R	TDRR 03658	10-8-63	AAH	WK



VIEW D-D



VIEW A-A

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
	A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
	A/R	SCREW, CAP, SLF-LKG, SOC HD, HEX	NAS1352C04LL		SEE NOTE 8	41
	A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
	A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
	A/R	WEIGHT, BALANCE OUT & MID. GMBL.	1000263		SEE NOTE 8	38
	A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
	A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
	A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
	A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
	A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
	A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
	A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
Ⓝ						30
Ⓝ						29
Ⓝ						28
Ⓝ						27
Ⓝ						26
	A/R	LUBRICANT, DOW CORNING NO. 55		MIL-L-4343A		25
Ⓟ	1	PLATE, IDENTIFICATION	1000024			24
	4	SCREW, BUT HD, SELF LKG SPL.	1000250-13			23
Ⓜ	12	SCREW, CAP, SOC, HD, HEX	1000110-7			22
Ⓡ	12	SCREW, CAP, SOC, HD, HEX	1000110-307			21
	6	SCREW, CAP, SOC, HD, HEX	1000110-305			20
	2	PACKING, PREFORMED, "O" RING	1000159-6			19
	1	PACKING, PREFORMED, "O" RING	1000159-5			18
	1	VALVE, PRESSURE, ASSY.	1000234			17
	2	COUPLING-HALF, QUICK, DISCONNECT	1000135			16
	4	SPRING, FASTENER	1000187			15
	4	COVER, SPRING FASTENER	1000185			14
	4	SCREW, FASTENER	1000188			13
	1	COVER ACCESS RESOLVER MODULE	1000163			12
	1	PACKING, PREFORMED, "O" RING	1000159-3			11
	2	PACKING, PREFORMED, "O" RING	1000159-1			10
	2	PACKING, PREFORMED, "O" RING	1000159-2			9
	1	MT., CONN ASS'Y 16-X OUTER AXIS	1000142			8
	1	MT., CONN ASS'Y I-X OUTER AXIS	1000099			7
	1	INTERGIMBAL SUB-ASSEMBLY 16-X OUTER AXIS	1000205			6
	1	INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS	1000006			5
	1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
	1	CASE, COVER, MOVABLE ASSY.	1000082			3
	1	OUTER AXIS, ASSEMBLY	1000202			2
	1	MACHINE ASSY, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

1000201 R

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED C J Boyce DATE 8-12-63
CHECKED
DRAWN R W C 5-20-63
APPROVED FOR MSC Jack Barnard
MIT IL APPROVAL W Kupfer DATE 14 Aug 63

INERTIAL MEASURING UNIT ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT

MIT INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000201
SHEET 1 OF 1

MASTER

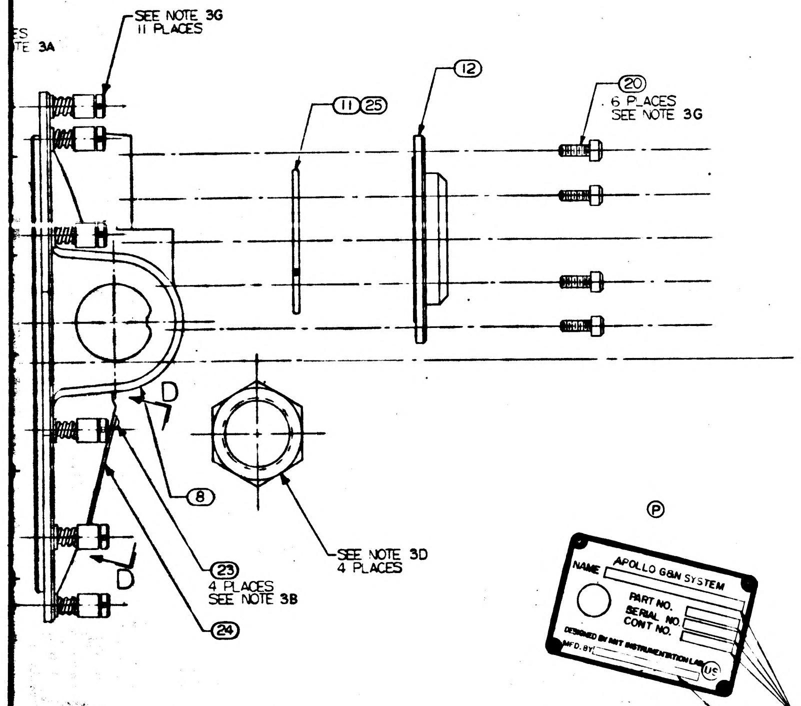
MASTER

1000201 REV R SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

E4

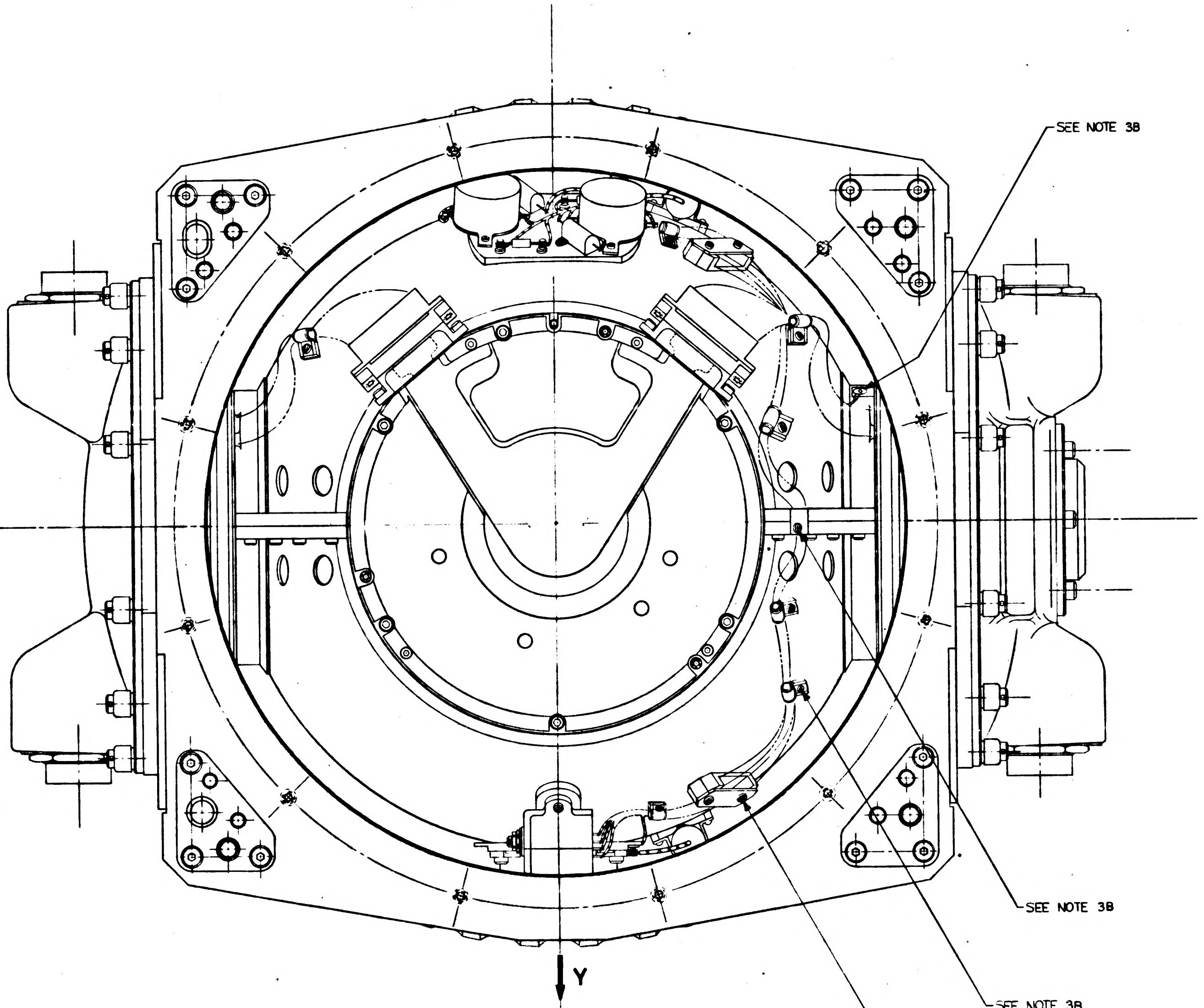
	SYM	
Ⓜ	L	REPLACES CHANGES
Ⓜ	M	TDRR 02
	N	TDRR 0383
	P	TDRR 0346
	R	TDRR 03



ES
TE 3A
SEE NOTE 3G
11 PLACES
⑪ ㉕
⑫
⑳
6 PLACES
SEE NOTE 3G
D
D
⑧
㉓
4 PLACES
SEE NOTE 3B
㉔
SEE NOTE 3D
4 PLACES

Ⓟ
NAME
APOLLO G&N SYSTEM
PART NO.
SERIAL NO.
CONT NO.
DESIGNED BY MIT INSTRUMENTATION LAB
MFD. BY
US
SEE NOTE 6

VIEW D-D



SEE NOTE 3B
SEE NOTE 3B
SEE NOTE 3B
7 PLACES
SEE NOTE 3B
4 PLACES
Y

VIEW A-A

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION
	8	NUT, CLINCH, FLUSH-MOUNTED
	A/R	SCREW, CAP, SOC. HD, HEX
	A/R	SCREW, CAP SLF LKG, SOC HD HEX
	A/R	WEIGHT, BALANCE, OUTER GIMBAL
	A/R	WEIGHT, BALANCE, OUTER GIMBAL
	A/R	WEIGHT, BALANCE OUT & MID. GMBL.
	A/R	WEIGHT, BALANCE MID. GIMBAL
	A/R	WEIGHT, BALANCE MID. GIMBAL
	A/R	WEIGHT, BALANCE S/M
	A/R	WEIGHT, BALANCE S/M
	A/R	WEIGHT, BALANCE S/M
	A/R	WEIGHT, BALANCE S/M
	A/R	WEIGHT, BALANCE S/M
Ⓝ		
Ⓝ		
Ⓝ		
Ⓝ		
Ⓝ		
	A/R	LUBRICANT, DOW CORNING, NO.55
Ⓟ	1	PLATE, IDENTIFICATION
	4	SCREW, BUT HD SELF LKG SPL
Ⓜ	12	SCREW, CAP, SOC, HD, HEX
Ⓡ	12	SCREW, CAP SOC HD HEX
	6	SCREW, CAP SOC HD HEX
	[illegible]	PACKING, PREFORMED, "O" RING
	1	PACKING, PREFORMED, "O" RING
	1	VALVE PRESSURE ASSY.
	2	COUPLING-HALF QUICK DISCONNECT
	4	SPRING, FASTENER
	4	COVER, SPRING FASTENER
	4	SCREW, FASTENER
	1	COVER ACCESS RESOLVER MODULE
	1	PACKING PREFORMED "O" RING
	2	PACKING, PREFORMED, "O" RING
	2	PACKING, PREFORMED, "O" RING
	1	MT., CONN ASSY 16-X OUTER AXIS
	1	MT., CONN ASSY 1-X OUTER AXIS
	1	INTERGIMBAL SUB-ASSEMBLY 16 X OUTER AXIS
	1	INTERGIMBAL SUB-ASSEMBLY 1-X OUTER AXIS
	1	CASE, COVER, FIXED
	1	CASE, COVER, MOVABLE ASSY.
	1	OUTER AXIS ASSEMBLY
	1	MACHINE ASSY CASE CENTER

LIST OF PARTS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN R.W.C. 5/20
APPROVED FOR MSC
MIT/IL APPROVAL
DATE

INERT
MEASURIN
ASSE

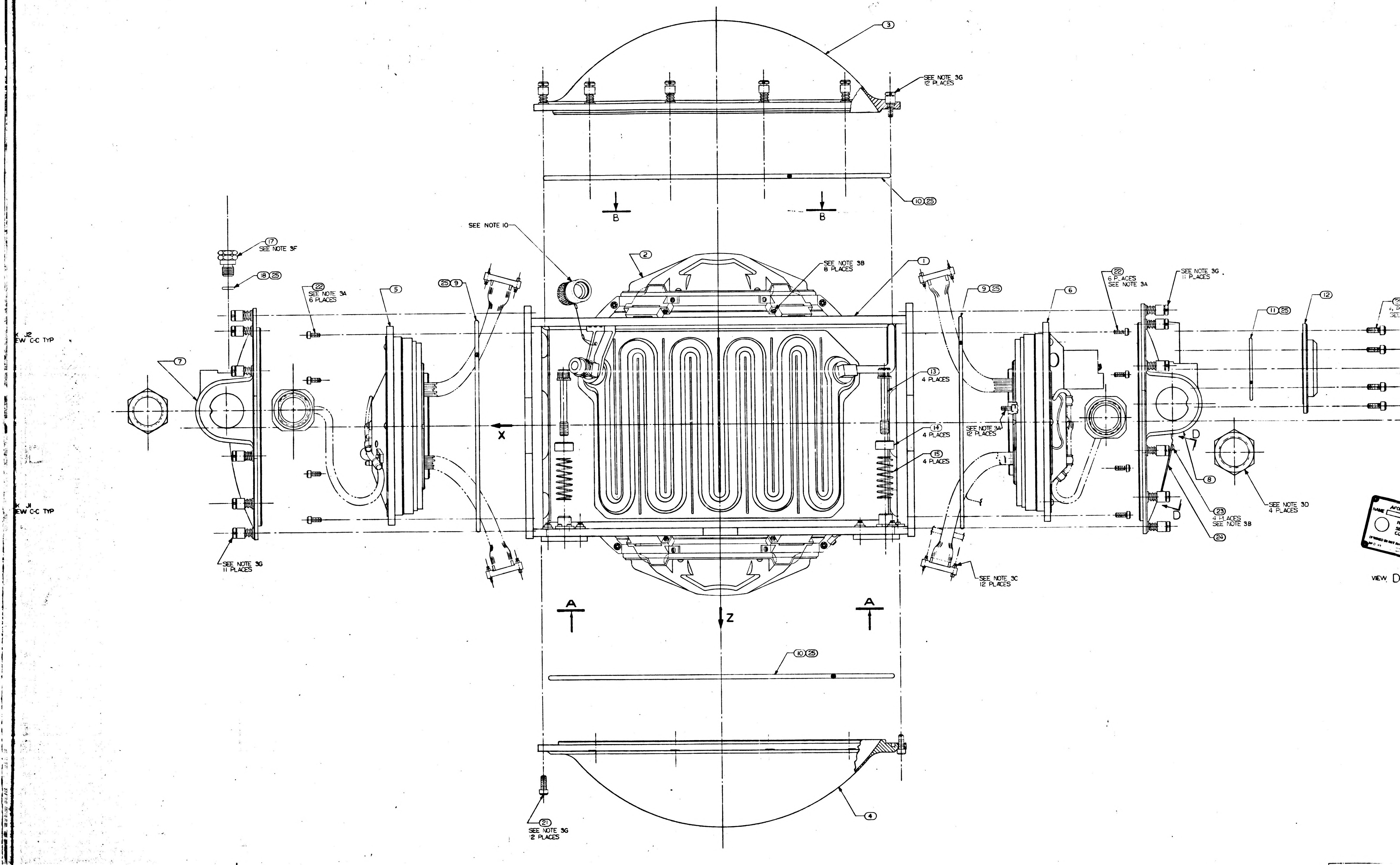
SCALE
1/1

MASTER

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

F-3



9
8
7
6
5
③
SEE NOTE 3G
12 PLACES
⑩㉕
B
B
SEE NOTE 10
⑰
SEE NOTE 3F
⑱㉕
㉒
SEE NOTE 3A
6 PLACES
⑤
㉕⑨
②
SEE NOTE 3B
8 PLACES
①
⑨㉕
⑥
㉒
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
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⑫
X J2
EW C-C TYP
⑦
X
⑬
4 PLACES
⑭
4 PLACES
⑮
4 PLACES
SEE NOTE 3A
12 PLACES
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4 PLACES
SEE NOTE 3B
㉔
SEE NOTE 3D
4 PLACES
X J1
EW C-C TYP
SEE NOTE 3G
11 PLACES
SEE NOTE 3C
12 PLACES
VIEW D
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Z
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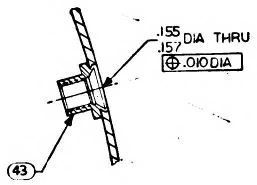
㉑
SEE NOTE 3G
2 PLACES
④

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

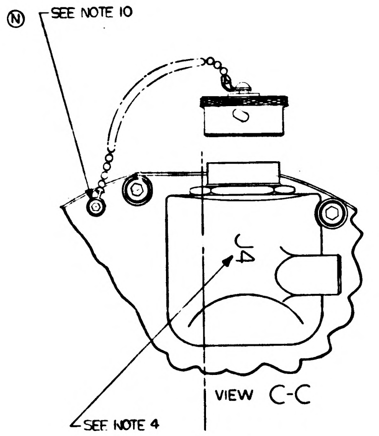
1000201

Ⓝ

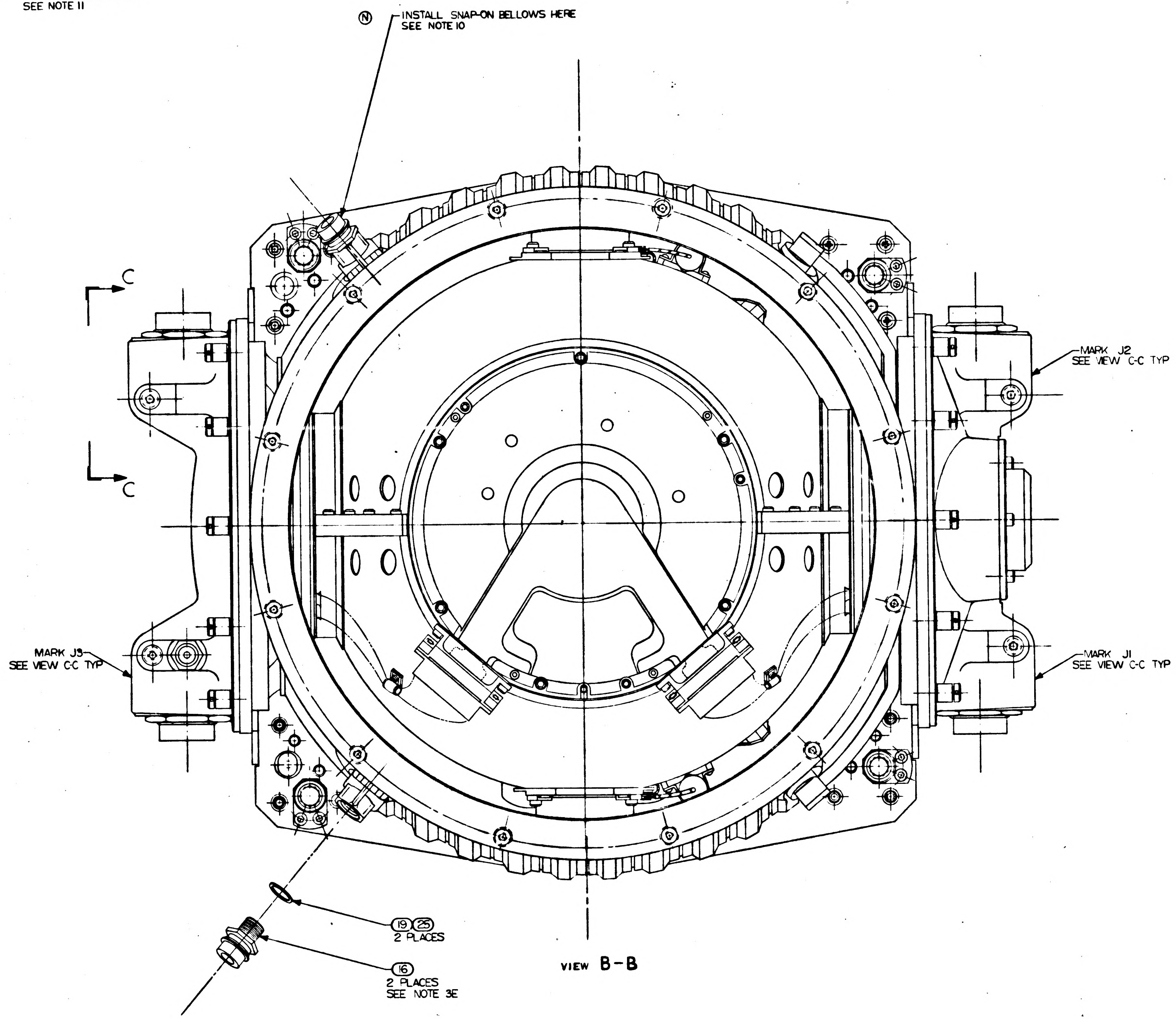
SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4	STABLE MEMBER
NAS1352C04LL6	
NAS1352C04LL8	
1000110-1	MIDDLE AND OUTER AXIS
1000110-2	
1000110-3	
1000110-302	



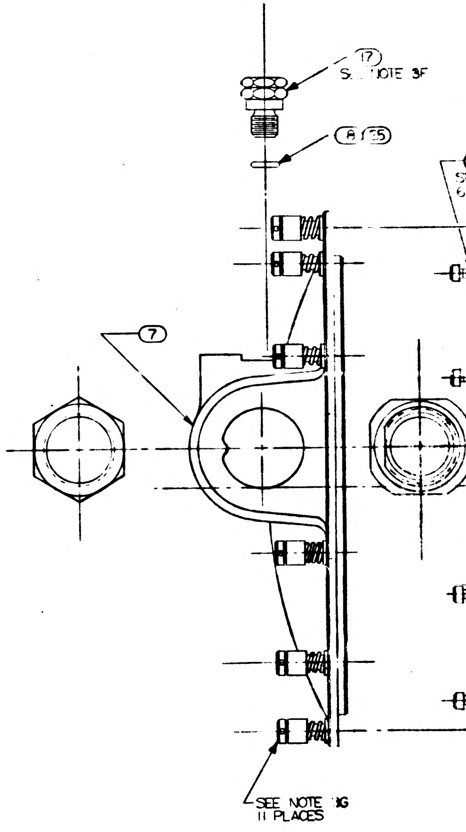
Ⓝ VIEW E
TYPICAL INSTALLATION
SEE NOTE 11



VIEW C-C



VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB. WHILE ENGAGING PINS
   - D. 85.0 IN. LB.
   - E. 70.0 IN. LB.
   - F. 65.0 IN. LB.
   - G. 30.0 IN. LB.
4. MARK CHARACTERS $\frac{.23}{.27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{.10}{.14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

Ⓝ 7. ~~(26)(27)(28)(29) & (30) INSTALLED DURING STORING & SHIPPING~~

Ⓝ 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000201. SELECT SCREWS FROM CHART

9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓝ 10. PROTECTIVE COVER, ELECT, NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 1001494, MOUNTING PAD COVERS, NASA DRAWING NO.'S 1001460 AND 1001461, AND IMU SNAP-ON BELLOWS, NASA DRAWING NO. 1900802, TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS1352C04LL4, OR EQUIV, TO SECURE 1001495 TO CONNECTOR MOUNT. ASSY'S (7) AND (8) SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE ON (7) & (8). REMOVE PROTECTIVE COVER MOUNTING SCREWS AND CABLE IMMEDIATELY PRIOR TO INSTALLATION

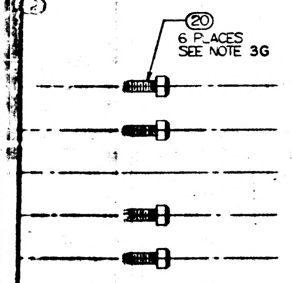
Ⓝ 11. SECURE BALANCE WEIGHTS, ITEMS (36) THRU (40) TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM (43) AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM (43) IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

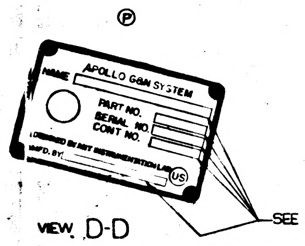
Ⓝ 12. TEMPERATURE OF ASSEMBLY - MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTERGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F TO 160°F RANGE.

INCHES
PHOTOGRAPHIC SCALE ONLY

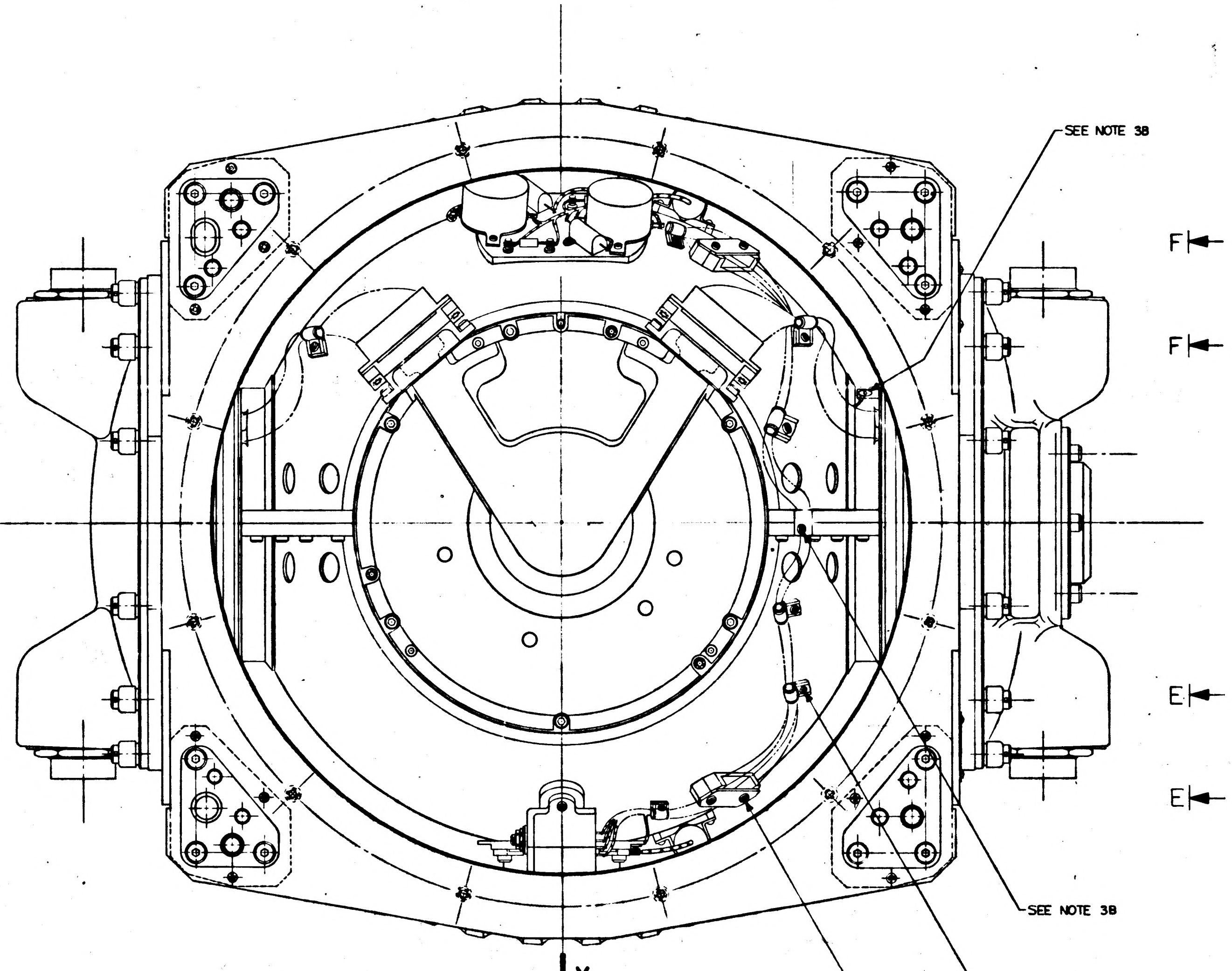
F-1

	REVISIONS					
	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ		L	REPLACES REV K WITH CHANGES TDRR 02506	8-12-63		WK
Ⓜ		M	TDRR 02896	9-4-63		WK
		N	TDRR 03233	9-20-63		WK
		P	TDRR 03488	10-4-63		
		R	TDRR 03658	10-8-63		WK
		S	TDRR 04555	12-10-63		WK

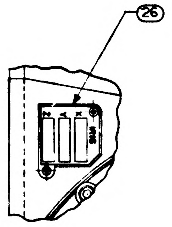




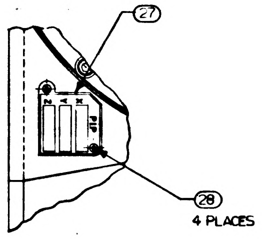
VIEW D-D



VIEW A-A



VIEW F-F.
Ⓢ



VIEW E-E
Ⓢ

REPLACES REV K WITH CHANGES

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
	A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
	A/R	SCREW, CAP, SLF-LKG, SOC HD, HEX	NAS1352C04LL		SEE NOTE 8	41
	A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
	A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
	A/R	WEIGHT, BALANCE OUT. & MID. GMBL.	1000263		SEE NOTE 8	38
	A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
	A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
	A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
	A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
	A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
	A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
	A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
Ⓝ						30
Ⓝ						29
Ⓢ Ⓝ	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-1			28
Ⓢ Ⓝ	1	PLATE INFORMATION	1000022			27
Ⓢ Ⓝ	1	PLATE, INFORMATION	1000023			26
	A/R	LUBRICANT, DOW CORNING NO.55		MIL-L-4343A		25
Ⓟ	1	PLATE, IDENTIFICATION	1000024			24
	4	SCREW, BUT HD, SELF-LKG SPL SOC	1000250-13			23
Ⓜ	12	SCREW, CAP, SOC, HD, HEX	1000110-7			22
Ⓡ	12	SCREW, CAP, SOC, HD, HEX	1000 0-307			21
	6	SCREW, CAP, SOC, HD, HEX	100 0-305			20
	2	PACKING, PREFORMED, "O" RING	1000 59-6			19
	1	PACKING, PREFORMED, "O" RING	1000 59-5			18
	1	VALVE, PRESSURE, ASSY.	1000234			17
	2	COUPLING HALF, QUICK DISCONNECT	1000135			16
	4	SPRING, FASTENER	1000187			15
	4	COVER, SPRING FASTENER	1000185			14
	4	SCREW, FASTENER	1000188			13
	1	COVER ACCESS RESOLVER MODULE	1000163			12
	1	PACKING, PREFORMED, "O" RING	1000159-3			11
	2	PACKING, PREFORMED, "O" RING	1000159-1			10
	2	PACKING, PREFORMED, "O" RING	1000159-2			9
	1	MT., CONN ASS'Y 16-X OUTER AXIS	1000142			8
	1	MT, CONN ASS'Y I-X OUTER AXIS	1000099			7
	1	INTERGIMBAL SUB-ASSEMBLY 16X OUTER AXIS	1000205			6
	1	INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS	1000006			5
	1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
	1	CASE, COVER, MOVABLE ASSY.	1000082			3
	1	OUTER AXIS, ASSEMBLY	1000202			2
	1	MACHINE ASSY, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED 8-12-63
CHECKED
DRAWN RWC 5-20-63
APPROVED FOR MSC
MIT IL APPROVAL DATE 14 Aug 63

INERTIAL MEASURING UNIT ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO 1000201
SHEET 1 OF 1

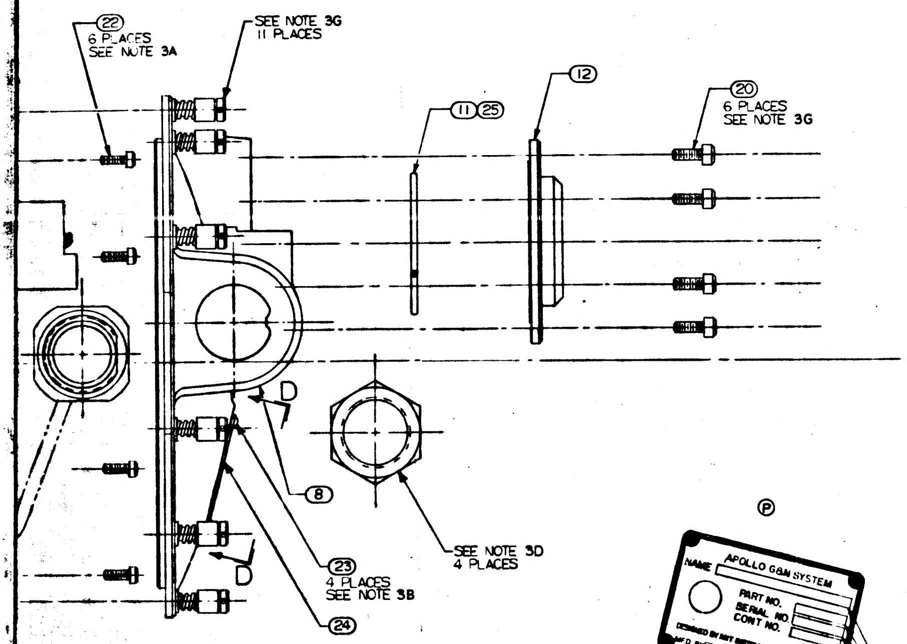
S 1000201

MASTER

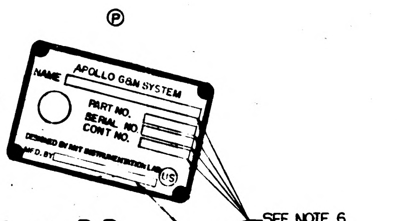
MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

F-4

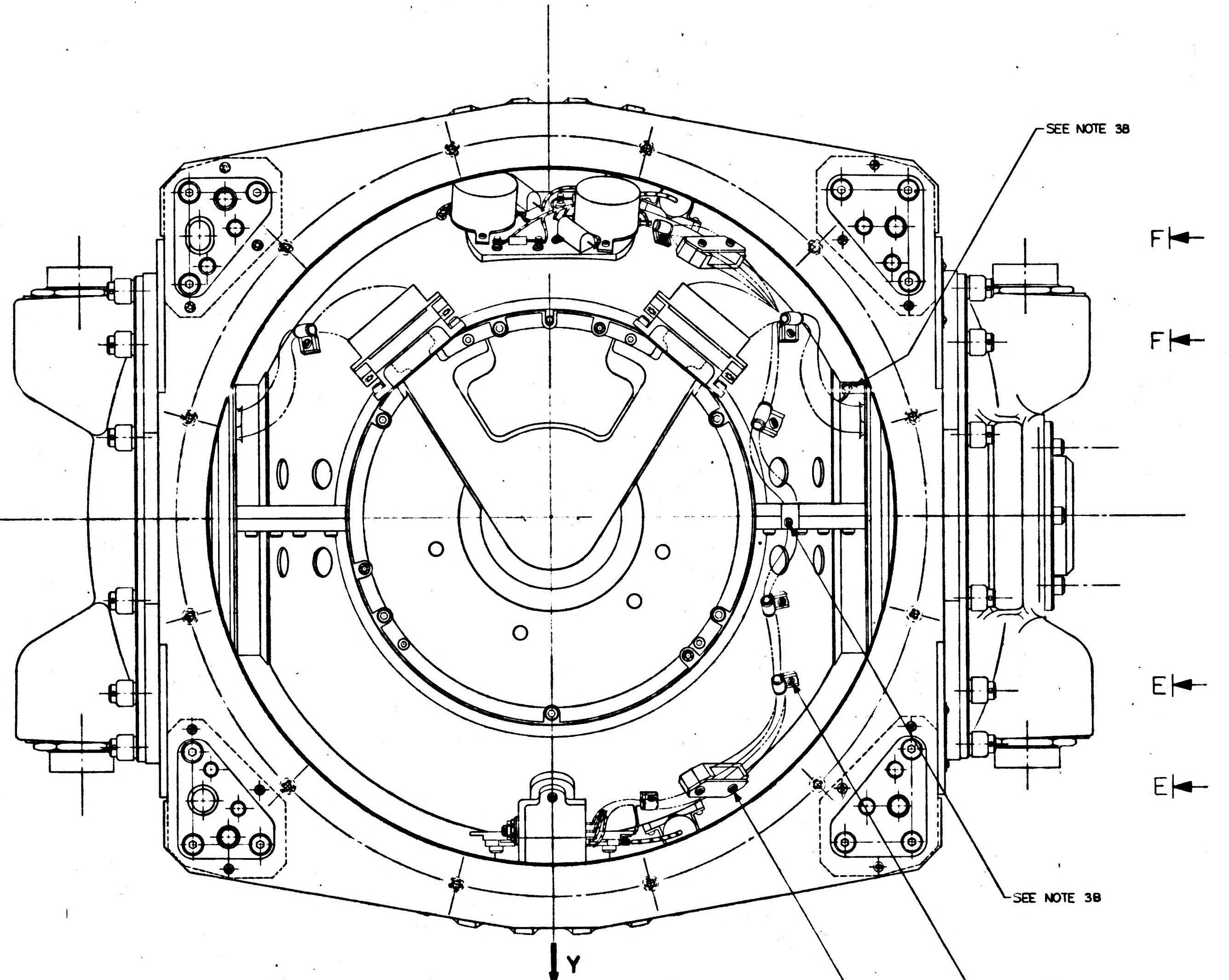


22
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
12
20
6 PLACES
SEE NOTE 3G
D
8
D
23
4 PLACES
SEE NOTE 3B
24
SEE NOTE 3D
4 PLACES



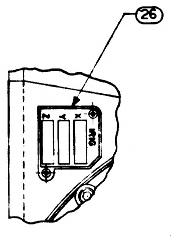
P
APOLLO G&N SYSTEM
NAME
PART NO.
SERIAL NO.
CONT NO.
DESIGNED BY MIT INSTRUMENTATION LAB
MFD. BY
SEE NOTE 6

VIEW D-D

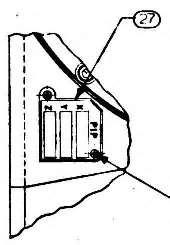


SEE NOTE 3B
F
F
E
E
Y
SEE NOTE 3B
SEE NOTE 3B
7 PLACES
SEE NOTE 3B
4 PLACES

VIEW A-A



VIEW F-F
Ⓢ



27
28
4 PLACES

VIEW E-E
Ⓢ

REPLACES REV K WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION
	8	UT. CLINCH, FLUSH-M
	A/R	SCREW, CAP. SOC HD,
	A/R	SCREW, CAP. SLF-LKG, S
	A/R	WEIGHT, BALANCE, OUT
	A/R	WEIGHT, BALANCE, OUT
	A/R	WEIGHT, BALANCE OUT
	A/R	WEIGHT, BALANCE MI
	A/R	WEIGHT, BALANCE MI
	A/R	WEIGHT, BALANCE
	A/R	WEIGHT, BALANCE
	A/R	WEIGHT, BALANCE
	A/R	WEIGHT, BALANCE
	A/R	WEIGHT, BALANCE
Ⓝ		
Ⓝ		
ⓈⓃ	4	SCREW, BUT HD SELF
ⓈⓃ	1	PLATE INFORMATION
ⓈⓃ	1	PLATE, INFORMATION
	A/R	LUBRICANT, DOW CO
Ⓟ	1	PLATE, IDENTIFICATION
	4	SCREW, BUT HD, SELF-
Ⓜ	12	SCREW, CAP, SOC, HD,
Ⓡ	12	SCREW, CAP, SOC HD
	6	SCREW, CAP, SOC, HD,
	2	PACKING, PREFORMED,
	1	PACKING, PREFORMED,
	1	VALVE PRESSURE, ASS
	2	COUPLING-HALF QUICK,
	4	SPRING, FASTENER
	4	COVER, SPRING FA
	4	SCREW, FASTENER
	1	COVER ACCESS RESOLVER MODUL
	1	PACKING PREFORMED, "O
	2	PACKING, PREFORMED, "O
	2	PACKING, PREFORMED, "O
	1	MT., CONN ASSY 16
	1	MT., CONN ASSY XO
	1	INTERGIMBAL SUB-AS 16 X OUTER AXIS
	1	INTERGIMBAL SUB AS XOA OUTER AXIS
	1	CASE COVER, FIXED
	1	CASE COVER, MOVABL
	1	OUTER AXIS, A S
	1	MACHINE ASSY CASE

MASTER

MASTER

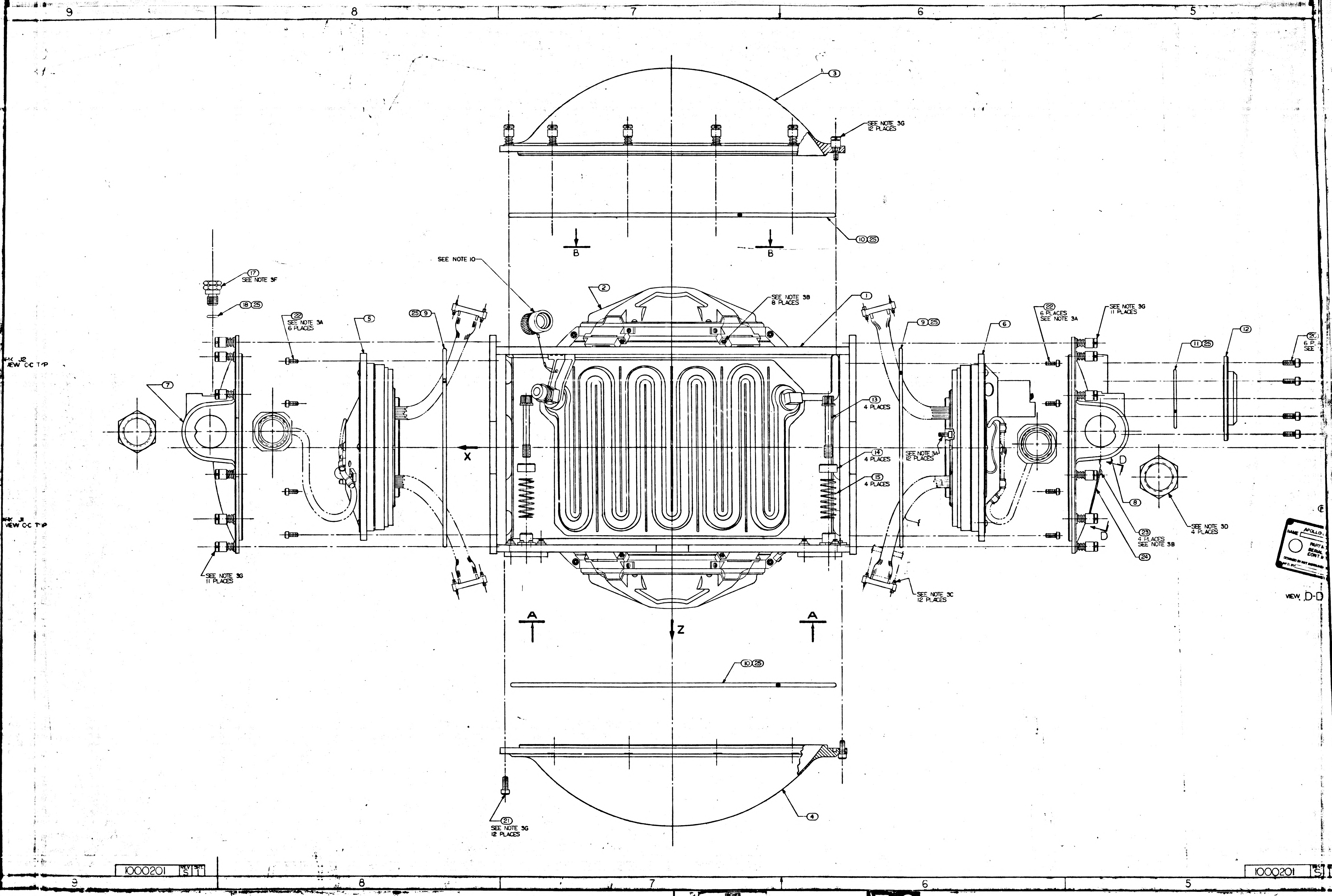
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED DATE
CHECKED
DRAWN R N C
APPROVED FOR MSC
MIT APPROVAL DATE

INCHES
PHOTOGRAPHIC SCALE ONLY

F3


9
8
7
6
5
3
SEE NOTE 3G
12 PLACES
10 25
B
B
SEE NOTE 10
2
SEE NOTE 3B
8 PLACES
1
17
SEE NOTE 3F
18 25
22
SEE NOTE 3A
6 PLACES
5
25 9
9 25
6
22
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
12
20
6 P
SEE
HK J2
IEW C-C TYP
7
X
13
4 PLACES
14
4 PLACES
15
4 PLACES
SEE NOTE 3A
12 PLACES
D
D
8
23
4 PLACES
SEE NOTE 3B
24
SEE NOTE 3D
4 PLACES
HK J1
VIEW C-C TYP
SEE NOTE 3G
11 PLACES
SEE NOTE 3C
12 PLACES
APOLLO
NAME
PART
SERIAL
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DESIGNED BY MIT INSTRUMENTATION
MFD. BY
VIEW D-D
A
A
Z
10 25
21
SEE NOTE 3G
12 PLACES
4
1000201
REV
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SHT.
1
1000201
REV
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SHT
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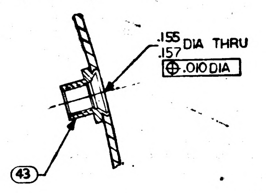
6
5

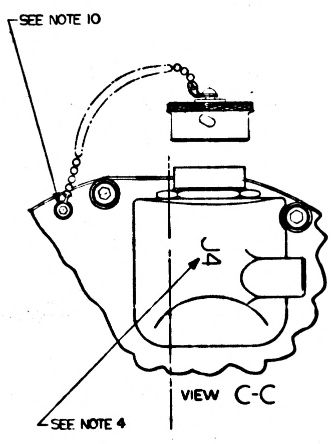
INCHES
PHOTOGRAPHIC SCALE ONLY

Ⓝ

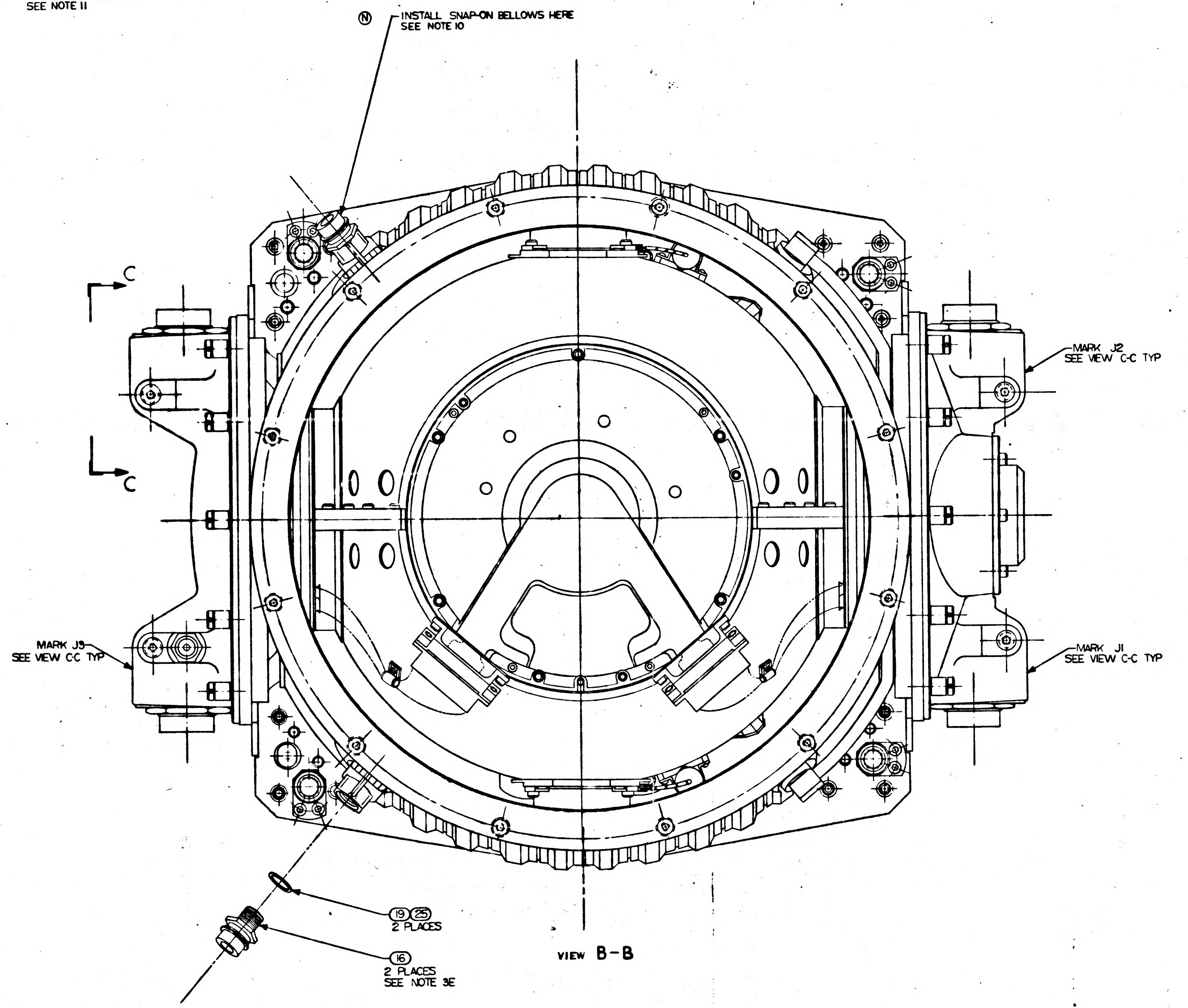
SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4	STABLE MEMBER
NAS1352C04LL6	
NAS1352C04LL8	
1000110-1	MIDDLE AND OUTER AXIS
1000110-2	
1000110-3	
1000110-302	



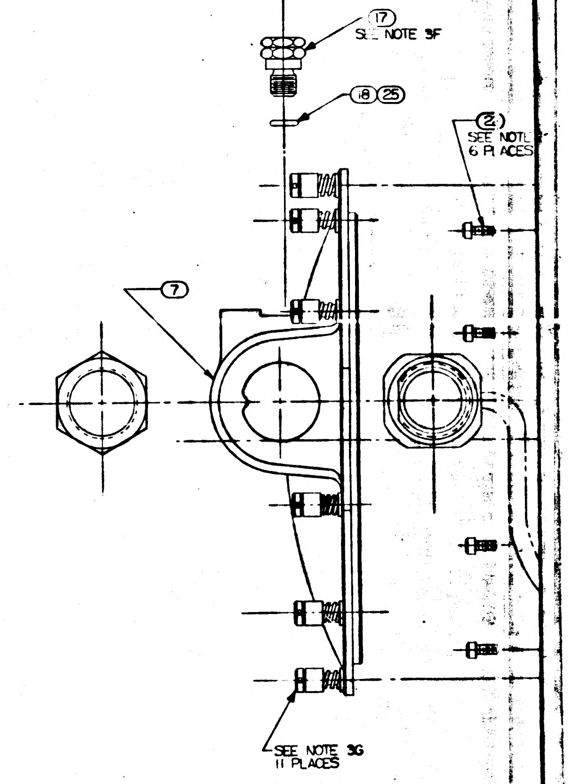
Ⓝ VIEW E
TYPICAL INSTALLATION
SEE NOTE 11



VIEW C-C



VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 10 IN. LB. WHILE ENGAGING PINS
   - D. 85.0 IN. LB.
   - E. 70.0 IN. LB.
   - F. 65.0 IN. LB.
   - G. 30.0 IN. LB.
   - Ⓢ H. 3.5 IN. LB.
4. MARK CHARACTERS $\frac{.23}{.27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN.
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{.10}{.14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

Ⓝ 7. ~~(26)(27)(28)(29)& (30) INSTALLED DURING STORING & SHIPPING~~

Ⓝ 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000201. SELECT SCREWS FROM CHART

9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓢ Ⓝ 10. PROTECTIVE COVER, ELECT, NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 1001494, MOUNTING PAD COVERS, NASA DRAWING NO.'S 1001460, 1001464 & 1001461 1001465, AND IMU SNAP-ON BELLOWS, NASA DRAWING NO. 1900802, TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS 35C04LL4, OR EQUIV, TO SECURE 1001495 TO CONNECTOR MOUNT: ASSY'S (7) AND (8) SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE ON (7) & (8). REMOVE PROTECTIVE COVER MOUNTING SCREWS AND CABLE IMMEDIATELY PRIOR TO INSTALLATION

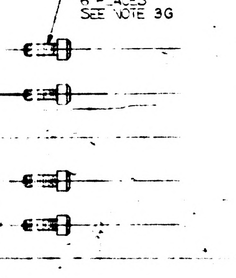
Ⓝ 11. SECURE BALANCE WEIGHTS, ITEMS (36) THRU (40) TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM (43) AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM (43) IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

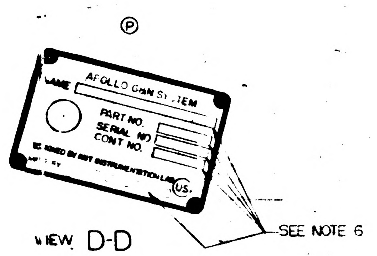
Ⓝ 12. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTERGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F TO 160°F RANGE.

Ⓢ 13. STAMP OR ENGRAVE SERIAL NUMBERS OF IRIGS, NASA DWG. NO. 1000012, AND PIPS NASA NO. 1000013 IN APPROPRIATE BLOCKS PER ND 1002019

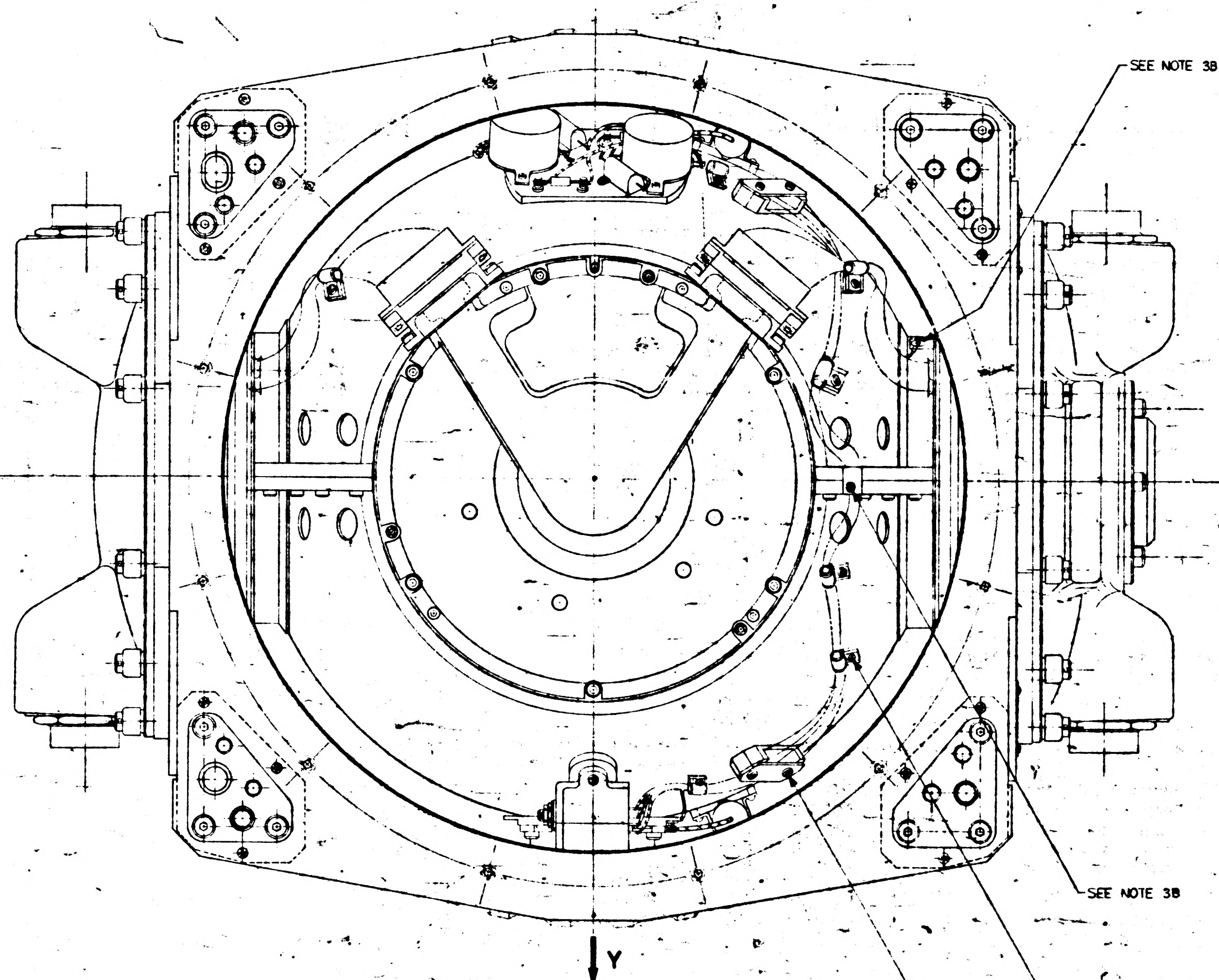
	REV	SHT.
1000201	S	1

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	L	REPLACES REV [illegible] W [illegible] CHANGES TDRR 02506	8-12-63	ajB	WK
	M	TDRR 02896	9-4-63	ajB	WK
	N	TDRR 03233	9-20-63	[illegible]	WK
	P	TDRR 03488	10-4-63	[illegible]	
	R	TDRR 03658	10-8-63	[illegible]	WK
	S	TDRR 04555	12-10-63	[illegible]	WK
	T	REVISED PER TDRR 07576	17 APR 64	JHR	BS

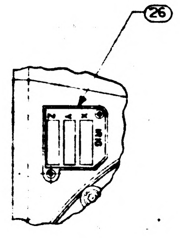




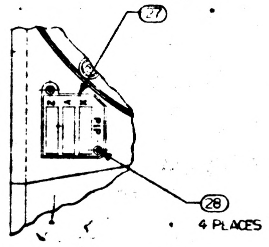
VIEW D-D



VIEW A-A



VIEW F-F
Ⓢ



VIEW E-E
Ⓢ

REPLACES REV K WITH CHANGES

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
	A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
	A/R	SCREW, CAP, SLF LKG, SOC HD HEX	NAS1352C04LL		SEE NOTE 8	41
	A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
	A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
	A/R	WEIGHT, BALANCE OUT & MID GMBL	1000263		SEE NOTE 8	38
	A/R	WEIGHT, BALANCE MID GIMBAL	1000262		SEE NOTE 8	37
	A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
	A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
	A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
	A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
	A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
	A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
Ⓝ						30
Ⓝ						29
Ⓢ Ⓝ	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-1			28
Ⓢ Ⓝ	1	PLATE INFORMATION	1000022			27
Ⓢ Ⓝ	1	PLATE, INFORMATION	1000023			26
	A/R	LUBRICANT, DOW CORNING NO55		MIL-L-4343A		25
Ⓟ	1	PLATE, IDENTIFICATION	1000024			24
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			23
Ⓜ	12	SCREW, CAP SOC, HD, HEX	1000110-7			22
Ⓡ	12	SCREW, CAP SOC, HD HEX	1000110-307			21
	6	SCREW, CAP SOC HD HEX	1000110-305			20
	2	PACKING, PREFORMED, "O" RING	1000159-6			19
	1	PACKING, PREFORMED, "O" RING	1000159-5			18
	1	VALVE, PRESSURE, ASSY.	1000234			17
	2	COUPLING-HALF QUICK DISCONNECT	1000135			16
	4	SPRING, FASTENER	1000187			15
	4	COVER, SPRING FASTENER	1000185			14
	4	SCREW, FASTENER	1000188			13
	1	COVER ACCESS RESOLVER MODULE	1000163			12
	1	PACKING, PREFORMED, "O" RING	1000159-3			11
	2	PACKING, PREFORMED, "O" RING	1000159-1			10
	2	PACKING, PREFORMED, "O" RING	1000159-2			9
	1	MT., CONN ASSY 16A OUTER AXIS	1000142			8
	1	MT., CONN ASSY [illegible] OUTER AXIS	1000099			7
	1	INTERGIMBAL SUB ASSEMBLY 16X OUTER AXIS	1000205			6
	1	INTERGIMBAL SUB ASSEMBLY II-A OUTER AXIS	1000006			5
	1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
	1	CASE COVER, MOVABLE ASSY.	1000082			3
	1	OUTER AXIS, ASSEMBLY	1000202			2
	1	MACHINE ASSY, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

3

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED [illegible] DATE [illegible]
CHECKED
DRAWN R W C 5-20-63
APPROVED FOR MSC
MIT/IL APPROVAL DATE
W Kupfer 14 May 63

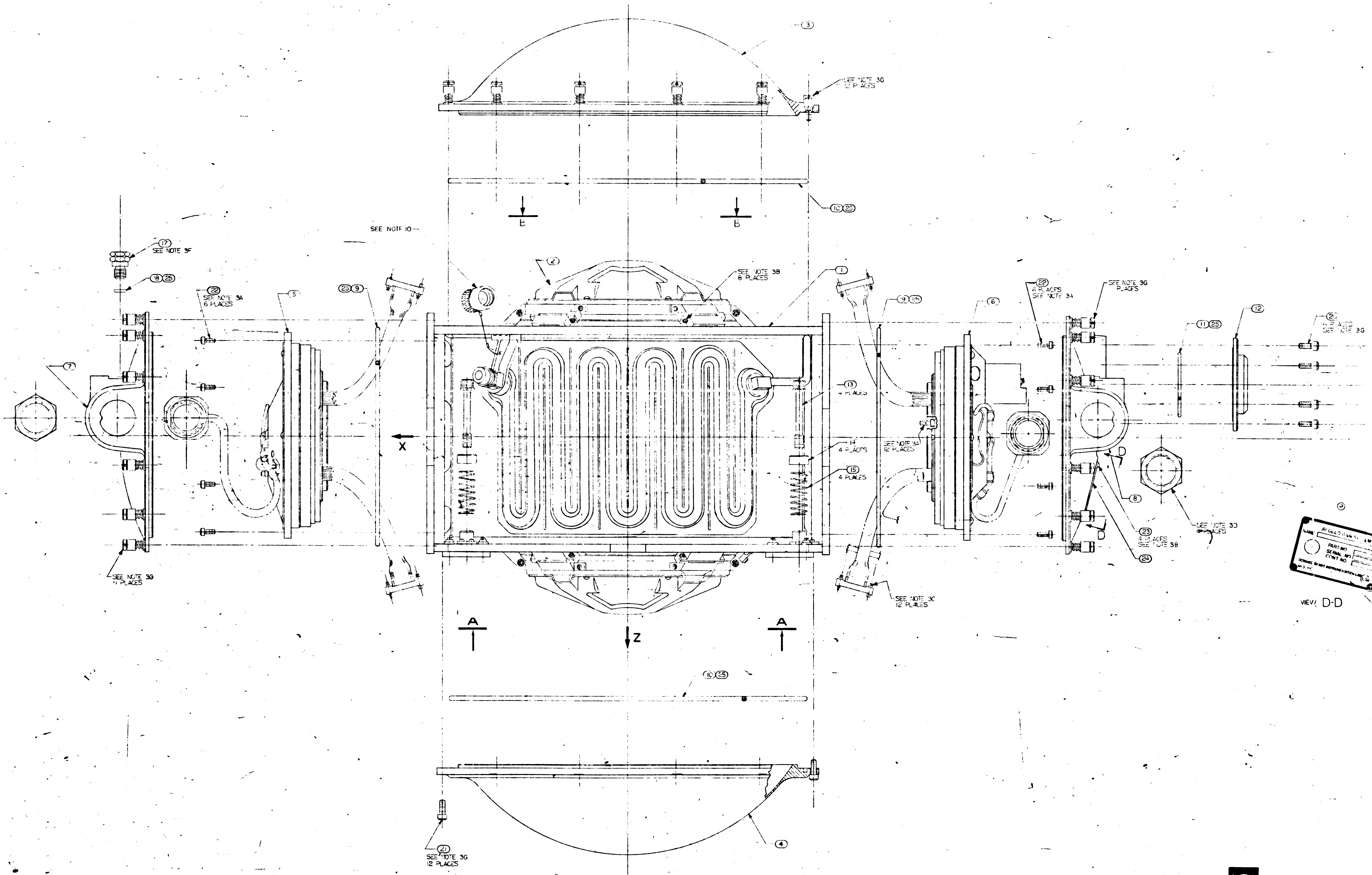
INERTIAL
MEASURING UNIT
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000201
SHEET 1 OF 1

1000201

1000201 REV T SHEET 1


③
SEE NOTE 3G
12 PLACES
⑩㉕
B
B
SEE NOTE 10
②
SEE NOTE 3B
8 PLACES
①
⑰
SEE NOTE 3F
⑱㉕
㉒
SEE NOTE 3A
6 PLACES
⑤
㉕⑨
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X
SEE NOTE 3G
11 PLACES
⑬
4 PLACES
14
4 PLACES
⑮
4 PLACES
⑨㉕
SEE NOTE 3A
12 PLACES
SEE NOTE 3C
12 PLACES
⑥
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6 PLACES
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SEE NOTE 3G
11 PLACES
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5 PLACES
SEE NOTE 3G
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D
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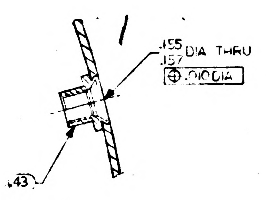
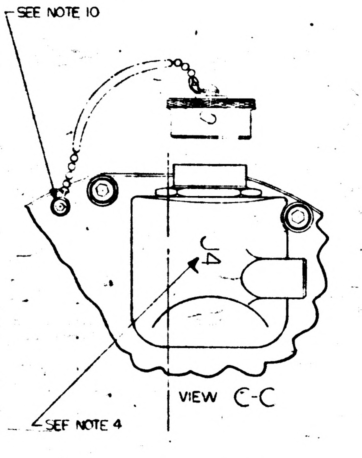
㉓
4 PLACES
SEE NOTE 3B
㉔
SEE NOTE 3D
4 PLACES
APOLLO G&N S
NAME
PART NO.
SERIAL NO.
CONT NO.
DESIGNED BY MIT INSTRUMENTATION LAB
VIEW D-D
A
A
Z
⑩㉕
④
㉑
SEE NOTE 3G
12 PLACES

Ⓝ

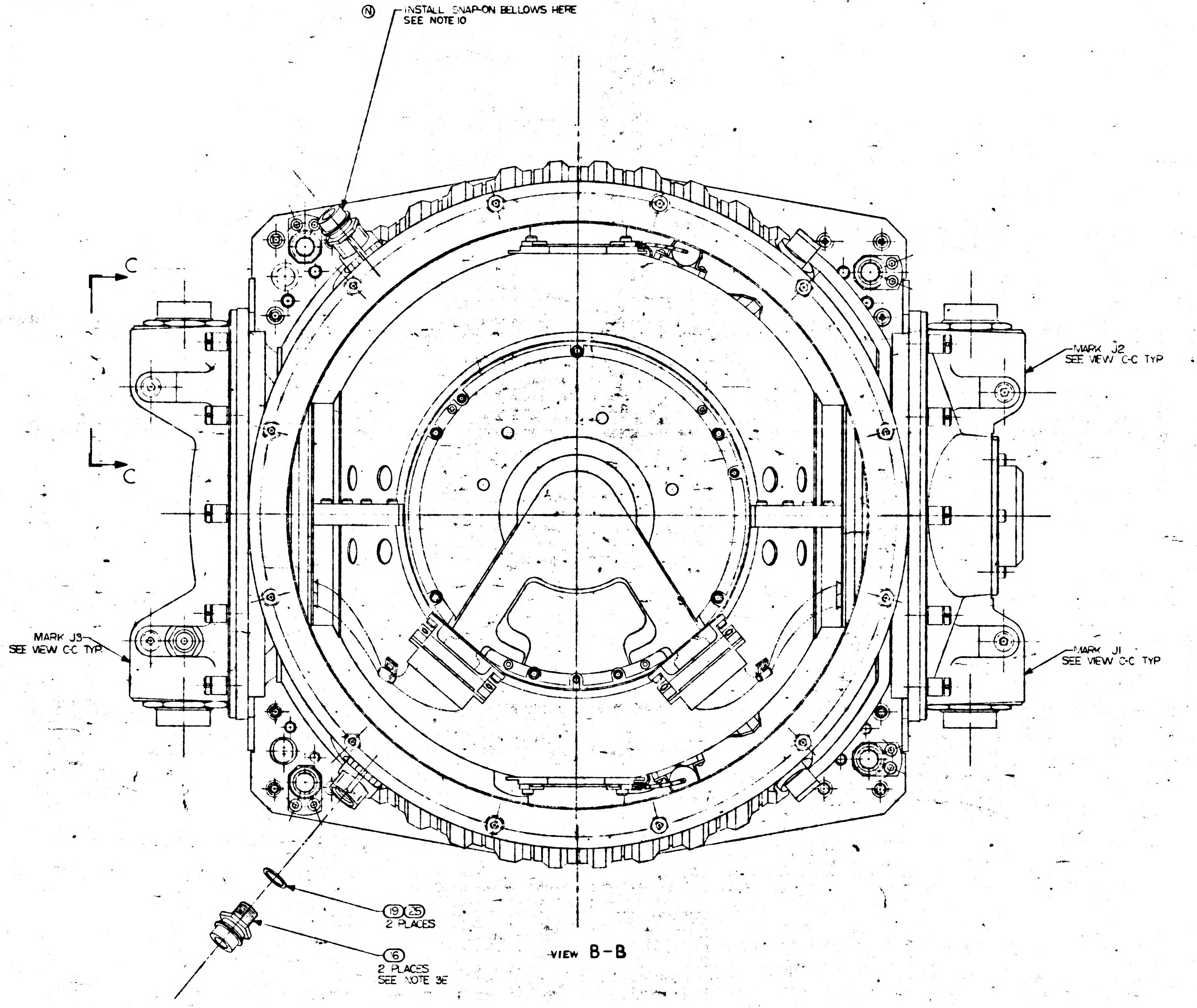
SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4	STABLE MEMBER
NAS1352C04LL6	
NAS1352C04LL8	
1000110-1	MIDDLE AND OUTER AXIS
1000110-2	
1000110-3	
1000110-302	



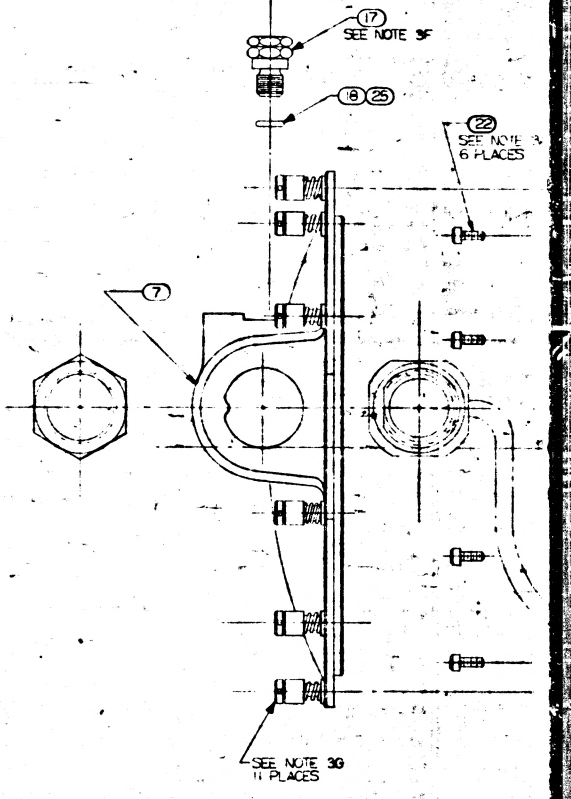
Ⓝ VIEW E
TYPICAL INSTALLATION
SEE NOTE 11



VIEW C-C



VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
    - A. 10.0 IN. LB.
    - B. 5.0 IN. LB.
    - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 10 IN. LB. WHILE ENGAGING PINS
    - D. 85.0 IN. LB.
    - E. 70.0 IN. LB.
    - F. 65.0 IN. LB.
    - G. 30.0 IN. LB.
    - Ⓢ H. 3.5 IN. LB.
4. MARK CHARACTERS $\frac{23}{27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN.
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{10}{14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

Ⓝ 7. ㉖ ㉗ ㉘ ㉙ & ㉚ ~~INSTALLED DURING STORING & SHIPPING~~

Ⓝ 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000201. SELECT SCREWS FROM CHART

9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓢ Ⓝ 10. PROTECTIVE COVER, ELECT, NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 1001494, MOUNTING PAD COVERS, NASA DRAWING NO'S 1001460, 1001464 & 1001461 1001465, AND IMU SNAP-ON BELLOWS, NASA DRAWING NO. 1900802, TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS1352C04LL4, OR EQUIV, TO SECURE 1001495 TO CONNECTOR MOUNT. ASSY'S ⑦ AND ⑧ SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE ON ⑦ & ⑧. REMOVE PROTECTIVE COVER MOUNTING SCREWS AND CABLE IMMEDIATELY PRIOR TO INSTALLATION

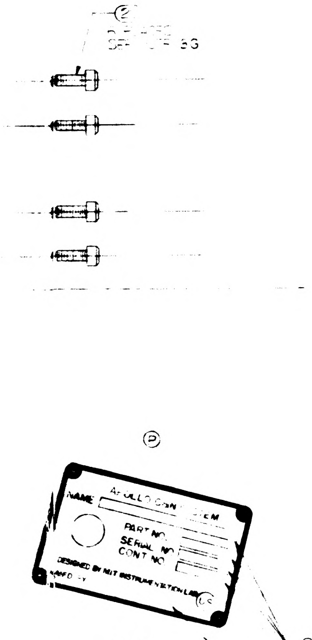
Ⓝ 11. SECURE BALANCE WEIGHTS, ITEMS ㊱ THRU ㊵ TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM ㊸ AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM ㊸ IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

Ⓝ 12. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTERGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F TO 160°F RANGE.

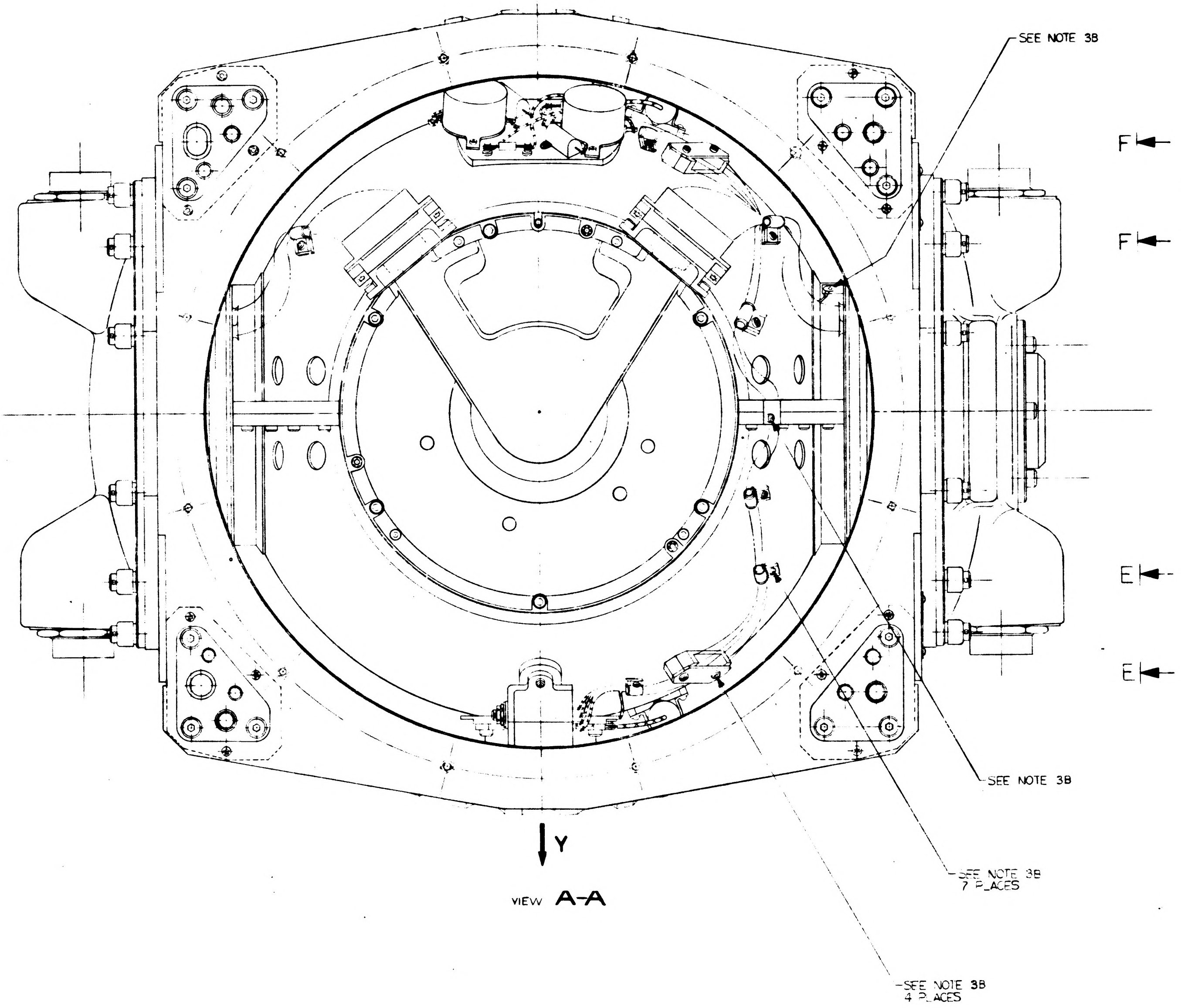
Ⓢ 13. STAMP OR ENGRAVE SERIAL NUMBERS OF IRIGS, NASA DWG. NO. 1000012, AND PIPS NASA NO. 1000013 IN APPROPRIATE BLOCKS PER ND 1002019

1	1000201	REV S	SH. 1

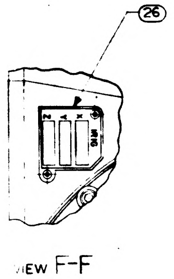
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	L	REPLACES REV K WITH CHANGES TDRR 02506	9-12-63	ajB	WR
	M	TDRR 02896	9-4-63	ajB	WR
	N	TDRR 03233	9-20-63	GOM	WR
	P	TDRR 03488	10-4-63	[illegible]	
	R	TDRR 03658	10-8-63	[illegible]	WR
	S	TDRR 04555	12-10-63	[illegible]	WR
	T	REVISED PER TDRR 07576	17 APR 64	JHR	BS
	U	REVISED PER TDRR 07964	8 MAY 64	JG	[illegible]



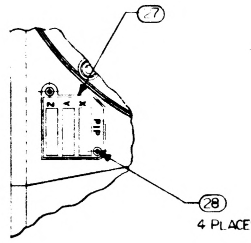
VIEW D-D



VIEW A-A



VIEW F-F
Ⓢ



VIEW E-E
Ⓢ

REPLACES REV K WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
A/R	SCREW, CAP SOC HD, HEX	100[illegible]		SEE NOTE 8	42
A/R	SCREW, CAP SLF-LKG, SOC HD HEX	NAS1352C04LL		SEE NOTE 8	41
A/R	WEIGHT, BALANCE, OUTER GIMBAL	[illegible]270		SEE NOTE 8	40
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
A/R	WEIGHT, BALANCE OUT & MID. GMBL.	[illegible]263		SEE NOTE 8	38
A/R	WEIGHT, BALANCE MID. GIMBAL	[illegible]262		SEE NOTE 8	37
A/R	WEIGHT, BALANCE MID. GIMBAL	[illegible]261		SEE NOTE 8	36
A/R	WEIGHT, BALANCE S/M	10[illegible]260		SEE NOTE 8	35
A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
A/R	WEIGHT, BALANCE S/M	[illegible]258		SEE NOTE 8	33
A/R	WEIGHT, BALANCE S/M	[illegible]214		SEE NOTE 8	32
A/R	WEIGHT, BALANCE S/M	[illegible]213		SEE NOTE 8	31
					30
1	IMU-CDU LOAD COMP MOD ASSY	1007050		SEE NOTE 14	29
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-1			28
[illegible]	PLATE INFORMATION	1000022			27
[illegible]	PLATE, INFORMATION	[illegible]00023			26
A/R	LUBRICANT, [illegible]		MIL-L-4343A		25
1	PLATE, IDENTIFICATION	[illegible]024			24
4	SCREW, BUT HD SELF LKG SPL SOC	[illegible]250-13			23
12	SCREW, CAP SOC HD, HEX	[illegible]-7			22
12	SCREW, CAP SOC HD HEX	[illegible]-307			21
6	SCREW, CAP SOC HD HEX	[illegible]-305			20
2	PACKING PREFORMED "O" RING	[illegible]159-6			19
1	PACKING, PREFORMED, "O" RING	1000159-5			18
1	VALVE PRESSURE ASSY.	1000234			17
2	COUPLING-HALF, QUICK DISCONNECT	1000135			16
4	SPRING, FASTENER	1000187			15
4	COVER, SPRING FASTENER	1000185			14
4	SCREW, FASTENER	1000188			13
1	COVER ACCESS RESOLVER MODULE	1000163			12
1	PACKING, PREFORMED, "O" RING	1000159-3			11
2	PACKING, PREFORMED "O" RING	1000159-1			10
2	PACKING, PREFORMED "O" RING	1000159-2			9
1	MT., CONN ASSY 16-X OUTER AXIS	1000142			8
1	MT., CONN ASSY [illegible]	[illegible]099			7
1	INTERGIMBAL SUB ASSEMBLY 16X OUTER AXIS	1000005			6
1	INTERGIMBAL SUB-ASSEMBLY 1[illegible] OUTER AXIS	1000006			5
1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
1	CASE, COVER, MOVABLE ASSY.	1000082			3
1	OUTER AXIS ASSEMBLY	1000202			2
1	MACHINE ASSY, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED [illegible] DATE 5-12-63
CHECKED
DRAWN R.W.C. 5-20-63
APPROVED FOR MSC
MIT IL APPROVAL DATE 14 May 63

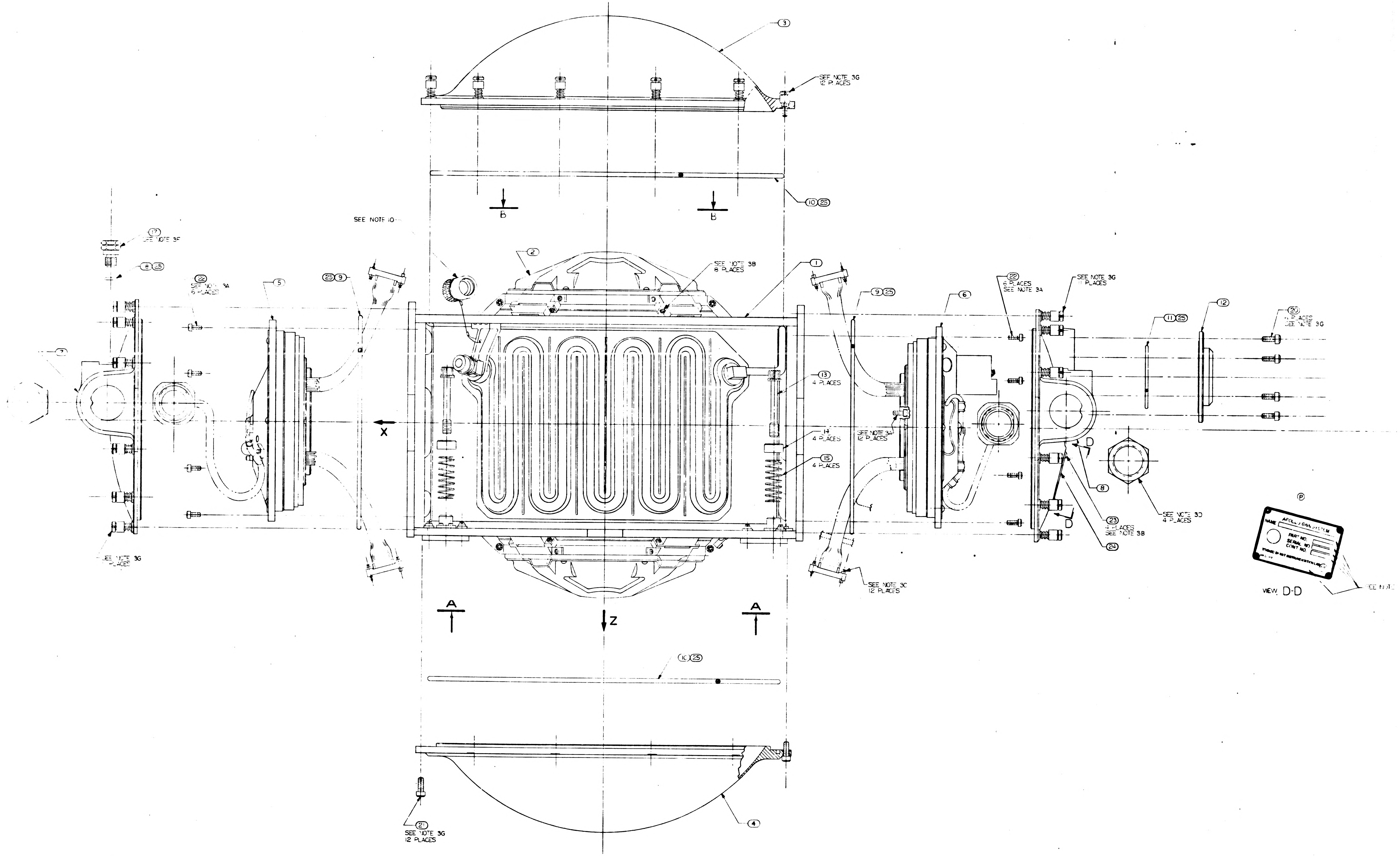
INERTIAL MEASURING UNIT ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000201
SHEET 1 OF 1

1000201 U

3/1000201


3
SEE NOTE 3G
12 PLACES
10 25
B
B
SEE NOTE 10
2
SEE NOTE 3B
8 PLACES
1
17
SEE NOTE 3F
8 25
22
SEE NOTE 3A
6 PLACES
5
25 9
9 25
6
22
8 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
12
20
11 PLACES
SEE NOTE 3G
7
X
13
4 PLACES
14
4 PLACES
15
4 PLACES
SEE NOTE 3A
12 PLACES
D
D
8
23
4 PLACES
SEE NOTE 3B
24
SEE NOTE 3D
4 PLACES
SEE NOTE 3G
4 PLACES
SEE NOTE 3C
12 PLACES
A
A
Z
10 25
21
SEE NOTE 3G
12 PLACES
4
P
APOLLO GN&C SYSTEM
NAME
PART NO.
SERIAL NO.
CONT NO.
DESIGNED BY MIT INSTRUMENTATION LAB
SEE NOTE
VIEW D-D

1000201 REV U SHEET 1

2X1000201

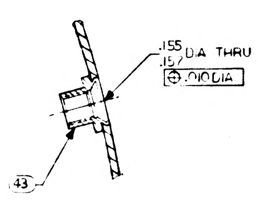
Ⓥ

SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4	STABLE MEMBER
NAS1352C04LL6	
NAS1352C04LL8	
1000110-1	MIDDLE AND OUTER AXIS
1000110-2	
1000110-3	
1000110-302	

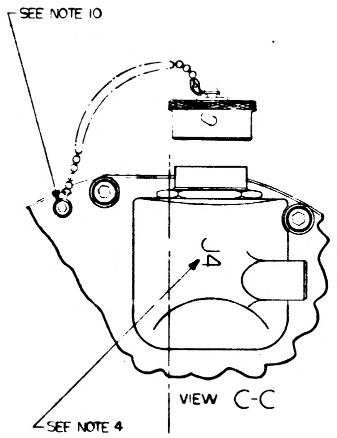
Ⓤ

TABLE 1

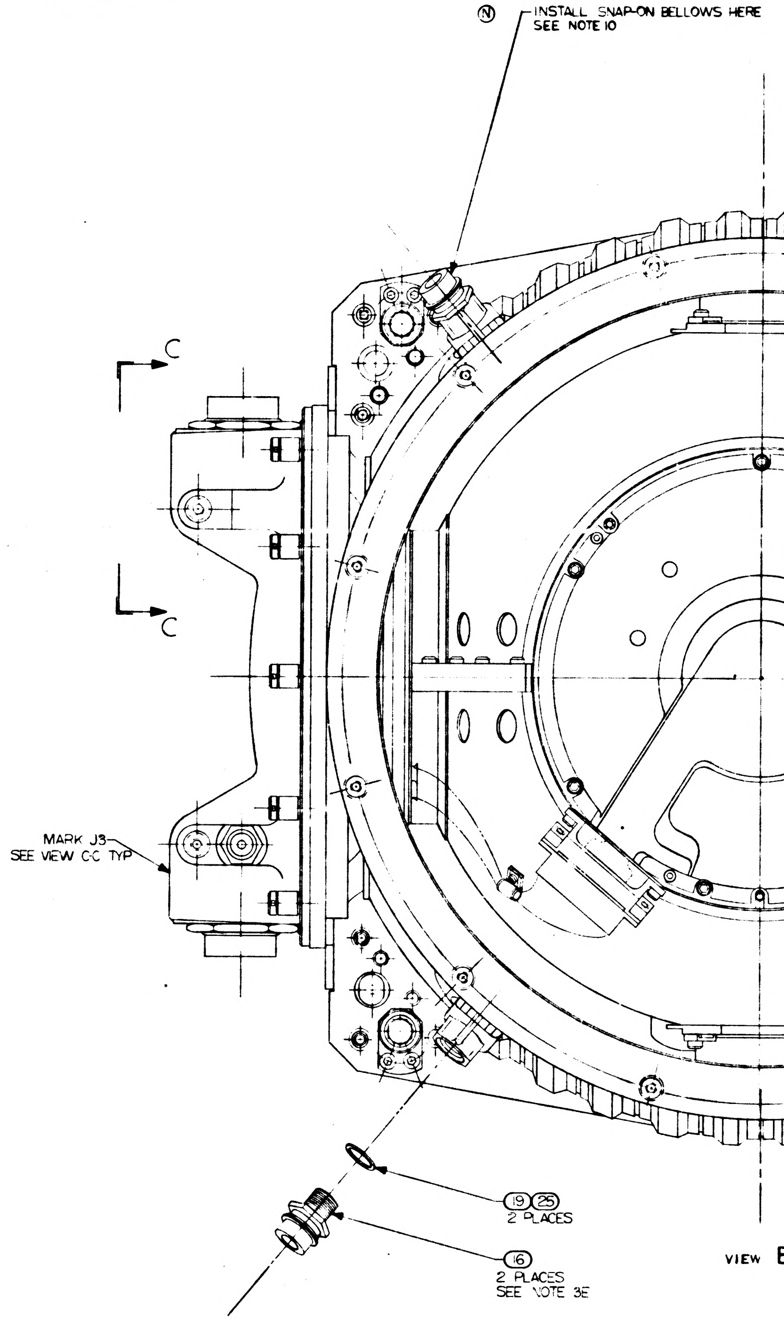
GYRO WHEEL TYPES	PART NO.
3 SIMONDS	1007050-1
2 SIMONDS 1 GRAPHMO	1007050-2
1 SIMONDS 2 GRAPHMO	1007050-3
3 GRAPHMO	1007050-4



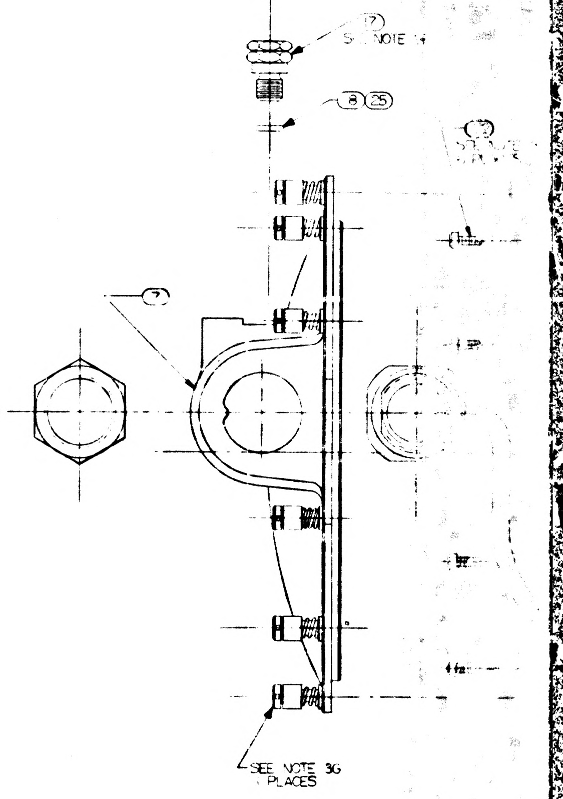
Ⓝ VIEW F
TYPICAL INSTALLATION
SEE NOTE 11



VIEW C-C



VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 10 IN. LB. WHILE ENGAGING PINS
   - D. 25.0 IN. LB.
   - E. 70.0 IN. LB.
   - F. 65.0 IN. LB.
   - G. 30.0 IN. LB.
   - Ⓢ H. 3.5 IN. LB.
4. MARK CHARACTERS $\frac{.23}{.27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN.
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{.10}{.14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

Ⓝ 7. (26)(27)(28)(29) & (30) ~~INSTALLED DURING STORING & SHIPPING~~

Ⓝ 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000201. SELECT SCREWS FROM CHART

9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓢ Ⓝ 10. PROTECTIVE COVER, ELECT, NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 001494, MOUNTING PAD COVERS, NASA DRAWING NO'S 1001460, 1001464 & 1001461 1001465, AND IMU SNAP-ON BELLOWS, NASA DRAWING NO. P00802, TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS 35C04LL4, OR EQUIV, TO SECURE 1001495 TO CONNECTOR MOUNT. ASSY'S (7) AND (8) SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE ON (7) & (8). REMOVE PROTECTIVE COVER MOUNTING SCREWS AND CABLE IMMEDIATELY PRIOR TO INSTALLATION

Ⓝ 11. SECURE BALANCE WEIGHTS, ITEMS (36) THRU (40) TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM (43) AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM (43) IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

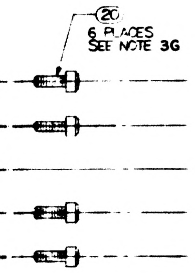
Ⓝ 12. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTERGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F TO 160°F RANGE.

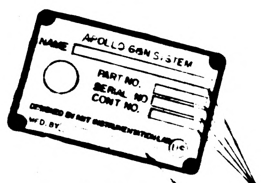
Ⓢ 13. STAMP OR ENGRAVE SERIAL NUMBERS OF IRIGS, NASA DWG. NO. 1000012, AND PIPS NASA NO. 1000013 IN APPROPRIATE BLOCKS PER ND 1002019

Ⓤ 14. ITEM (29) TO BE SELECTED AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY. ITEM (29) TO BE ASSEMBLED ON 1007152 WITH 15 TO 17 IN-LB OF TORQUE AT I.S.S. LEVEL. SELECT ITEM (29) FROM TABLE 1.

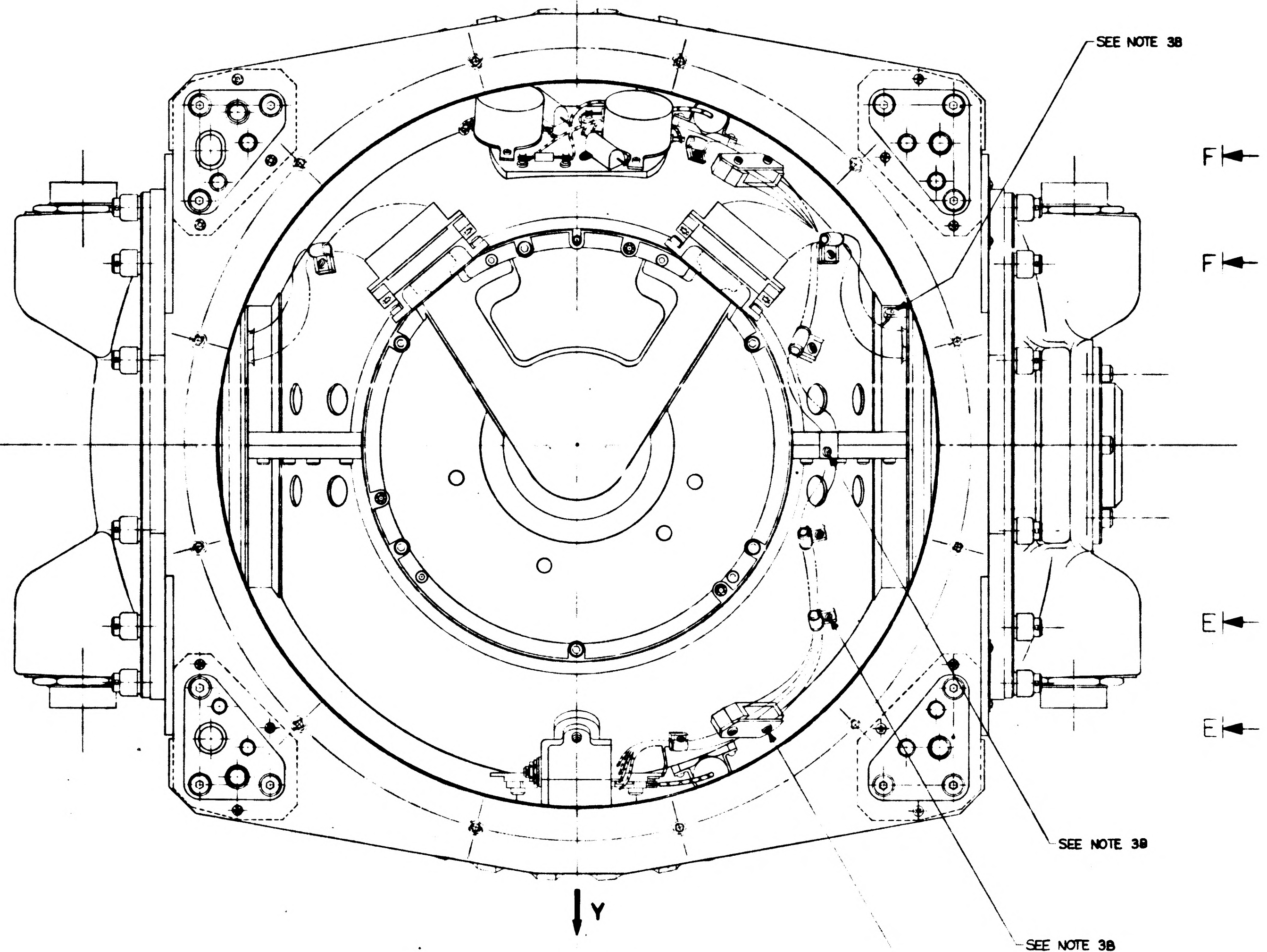
1000201	REV J	SH 1

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	L	REPLACES REV K WITH CHANGES TDRR 02506	8-12-63	ajb	WR
	M	TDRR 02896	9-4-63	ajb	WR
	N	TDRR 03233	9-20-63		WR
	P	TDRR 03488	10-4-63		
	R	TDRR 03658	10-8-63		WR
	S	TDRR 04555	12-10-63		WR
	T	REVISED PER TDRR 07576	17 APR 64	JHR	BS
	U	REVISED PER TDRR 07964	8 MAY 64	JG	
	V	REVISED PER TDRR 12685	29 SEP 64	JHH	

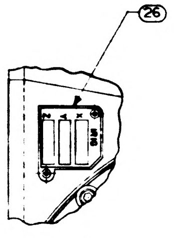




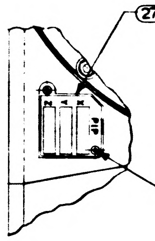
VIEW D-D



VIEW A-A



VIEW F-F
(S)



VIEW E-E
(S)

REPLACES REV K WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	INSULATION CASE HEAT EXCH. (LH)	1001478			45
1	INSULATION CASE HEAT EXCH. (RH)	1001477			44
8	NUT, CLINCH, FLUSH-MOUNTED	1000078-1		SEE NOTE 8	43
A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
A/R	SCREW, CAP, SLF-LKG, SOC HD HEX	NAS1352C04LL		SEE NOTE 8	41
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
A/R	WEIGHT, BALANCE OUT & MID. GIMBAL	1000263		SEE NOTE 8	38
A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
					30
1	IMU-CDU LOAD COMP MOD ASSY	1007050		SEE NOTE 14	29
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-1			28
1	PLATE INFORMATION	1000022			27
1	PLATE, INFORMATION	1000023			26
A/R	LUBRICANT, DOW CORNING NO.55		MIL-L-4343A		25
1	PLATE, IDENTIFICATION	1000024			24
4	SCREW, BUT HD, SELF-LKG SPL SOC	1000250-13			23
12	SCREW, CAP, SOC, HD, HEX	1000110-7			22
12	SCREW, CAP, SOC, HD HEX	1000110-307			21
6	SCREW, CAP, SOC, HD, HEX	1000110-305			20
2	PACKING, PREFORMED, "O" RING	1000159-6			19
1	PACKING, PREFORMED "O" RING	1000159-5			18
1	VALVE, PRESSURE, ASSY.	1000234			17
2	COUPLING, HALF, QUICK, DISCONNECT	1000185			16
4	SPRING FASTENER	1000187			15
4	COVER, SPRING FASTENER	1000185			14
4	SCREW, FASTENER	1000188			13
1	COVER ACCESS RESOLVER MODULE	1000183			12
1	PACKING, PREFORMED, "O" RING	1000159-3			11
2	PACKING, PREFORMED "O" RING	1000159-1			10
2	PACKING, PREFORMED, "O" RING	1000188-2			9
1	MT., CONN ASS'Y 16-K OUTER AXIS	1000142			8
1	MT., CONN ASS'Y 1-X OUTER AXIS	1000099			7
1	INTERGIMBAL SUB-ASSEMBLY 16X OUTER AXIS	1000205			6
1	INTERGIMBAL SUB-ASSEMBLY 1-X OUTER AXIS	1000006			5
1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
1	CASE, COVER, MOVABLE ASSY	1000082			3
1	OUTER AXIS, ASSEMBLY	1000202			2
1	MACHINE ASSY, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED C J Bryan 8-12-63
CHECKED
DRAWN R W C 5-20-63
APPROVED FOR MSC
John Bernard
MIT I.L. APPROVAL DATE
W Kupfer 14 Aug 63

INERTIAL MEASURING UNIT ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

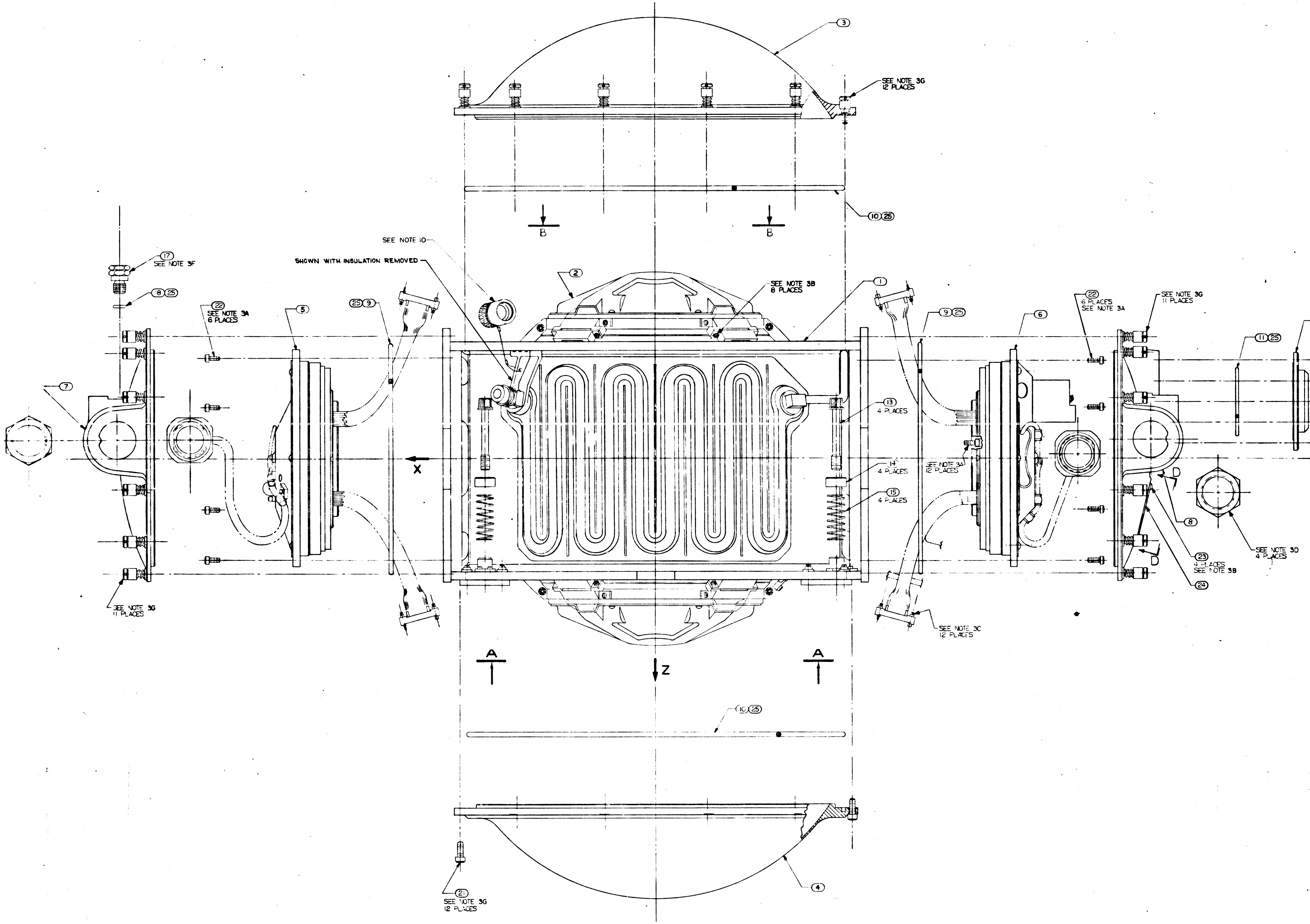
MIT
INSTRUMENTATION
LABORATORY
Cambridge Mass
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000201
SHEET 1 OF 1

1000201

1000201 REV U SHEET 1

3-/1000201

8 7 6 5


3
SEE NOTE 3G
12 PLACES
10 25
B
B
SEE NOTE 10
SHOWN WITH INSULATION REMOVED
2
SEE NOTE 3B
8 PLACES
1
17
SEE NOTE 3F
8 25
22
SEE NOTE 3A
6 PLACES
5
25 9
9 25
6
22
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
11 PLACES
11 25
12
20
6 PLACES
SEE NOTE 3G
7
X
13
4 PLACES
14
4 PLACES
SEE NOTE 3A
12 PLACES
15
4 PLACES
D
D
8
23
4 PLACES
SEE NOTE 3B
24
SEE NOTE 3D
4 PLACES
SEE NOTE 3G
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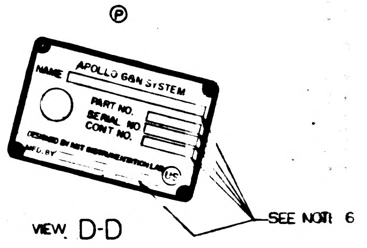
21
SEE NOTE 3G
12 PLACES
4


P
APOLLO G&N SYSTEM
NAME
PART NO.
SERIAL NO.
CONT NO.
DESIGNED BY MIT INSTRUMENTATION LAB
MFD. BY
US
SEE NOTE 6

VIEW D-D

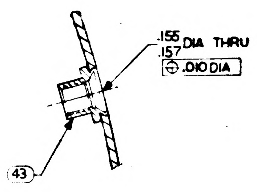
1000201

Ⓝ

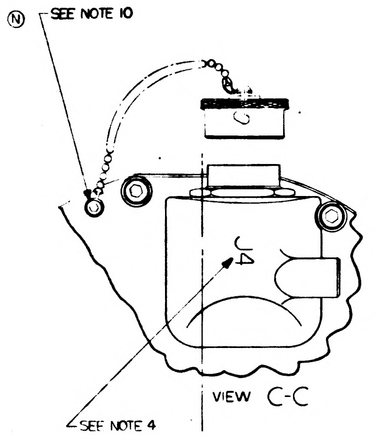
SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4	STABLE MEMBER
NAS1352C04LL6	
NAS1352C04LL8	
1000110-1	MIDDLE AND OUTER AXIS
1000110-2	
1000110-3	
1000110-302	

Ⓤ TABLE 1

GYRO WHEEL TYPES	PART NO.
3 SIMONDS	1007050-1
2 SIMONDS 1 GRAPHMO	1007050-2
1 SIMONDS 2 GRAPHMO	1007050-3
3 GRAPHMO	1007050-4



Ⓝ VIEW E
TYPICAL INSTALLATION
SEE NOTE 11



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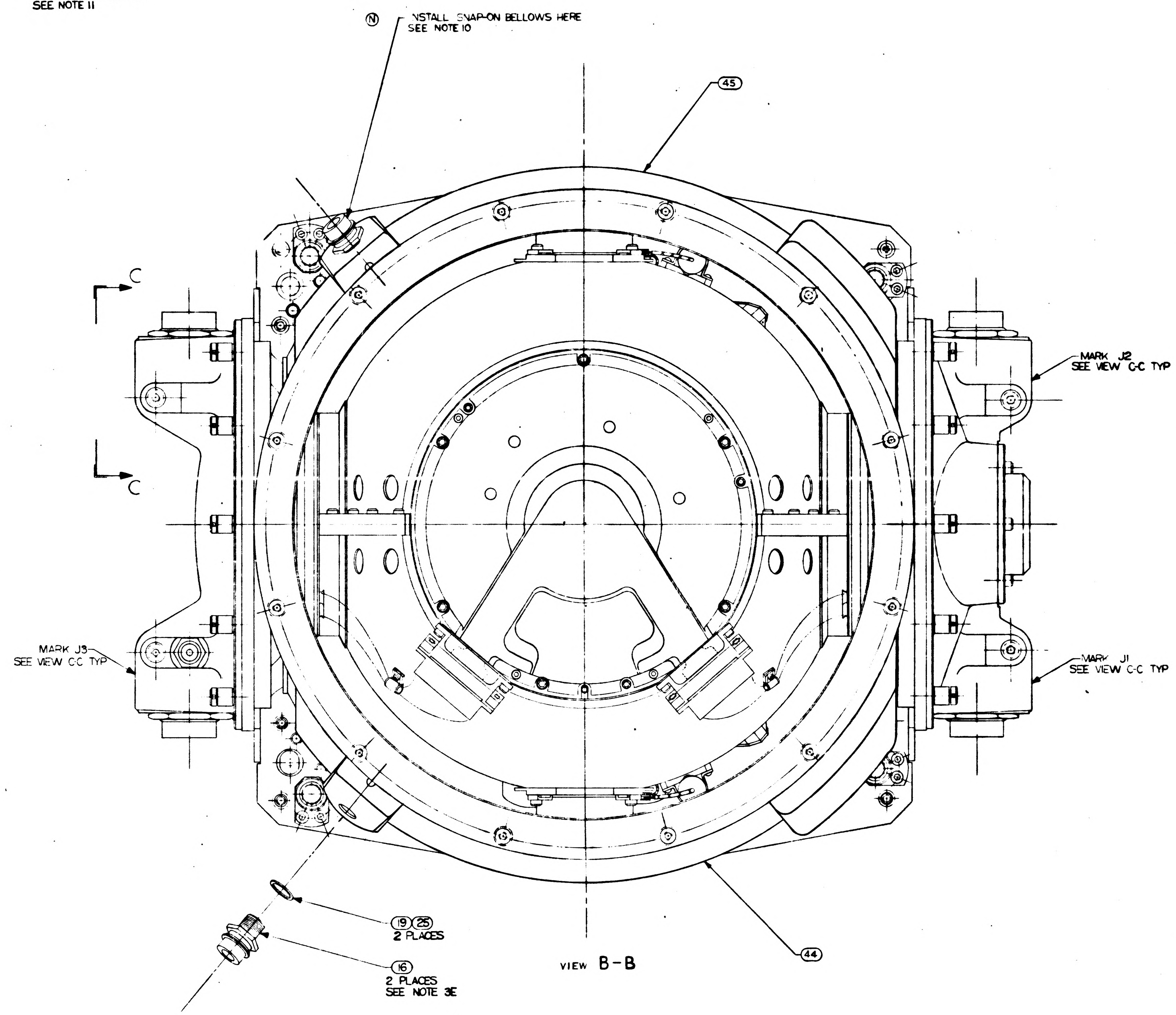
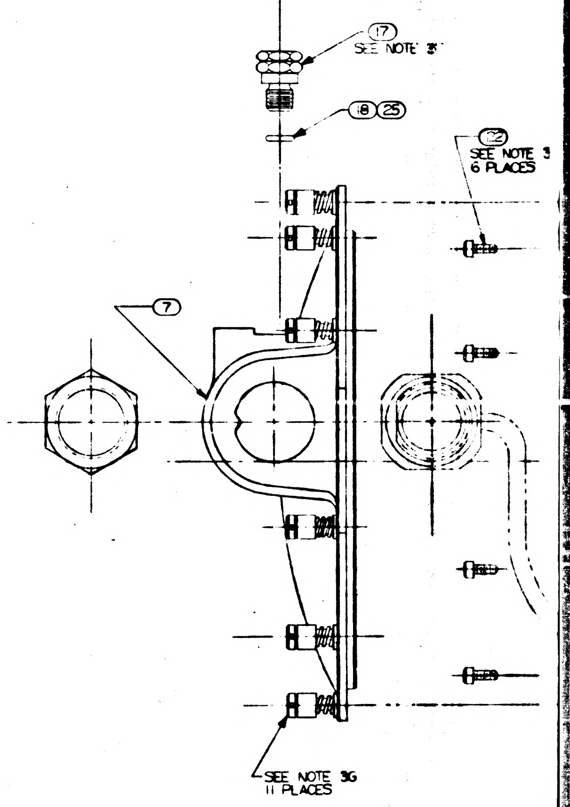


VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB. WHILE ENGAGING PINS
   - D. 85.0 IN. LB.
   - E. 70.0 IN. LB.
   - F. 65.0 IN. LB.
   - G. 30.0 IN. LB.
   - Ⓢ H. 3.5 IN. LB.
4. MARK CHARACTERS $\frac{23}{27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN.
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{19}{21}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

Ⓝ 7. ㉖㉗㉘㉙ & ㉚ ~~INSTALLED DURING STORING & SHIPPING~~

Ⓝ 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000001. SELECT SCREWS FROM CHART

9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓢ Ⓝ 10. PROTECTIVE COVER, ELECT. NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 1001494, MOUNTING PAD COVERS, NASA DRAWING NO.'S 1001460, 1001464 & 1001461 1001465, AND IMU SNAP-ON BELLOWS, NASA DRAWING NO. 1900802, TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS 35C04LL4, OR EQUIV, TO SECURE 1001495 TO CONNECTOR MOUNT. ASSY'S ⑦ AND ⑧ SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE ON ⑦ & ⑧. REMOVE PROTECTIVE COVER MOUNTING SCREWS AND CABLE IMMEDIATELY PRIOR TO INSTALLATION

Ⓝ 11. SECURE BALANCE WEIGHTS, ITEMS ㊱ THRU ㊵ TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM ㊸ AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM ㊸ IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

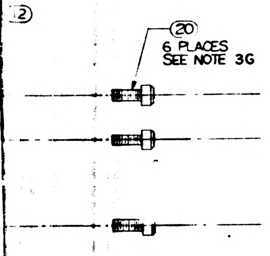
Ⓝ 12. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTEGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F TO 160°F RANGE.

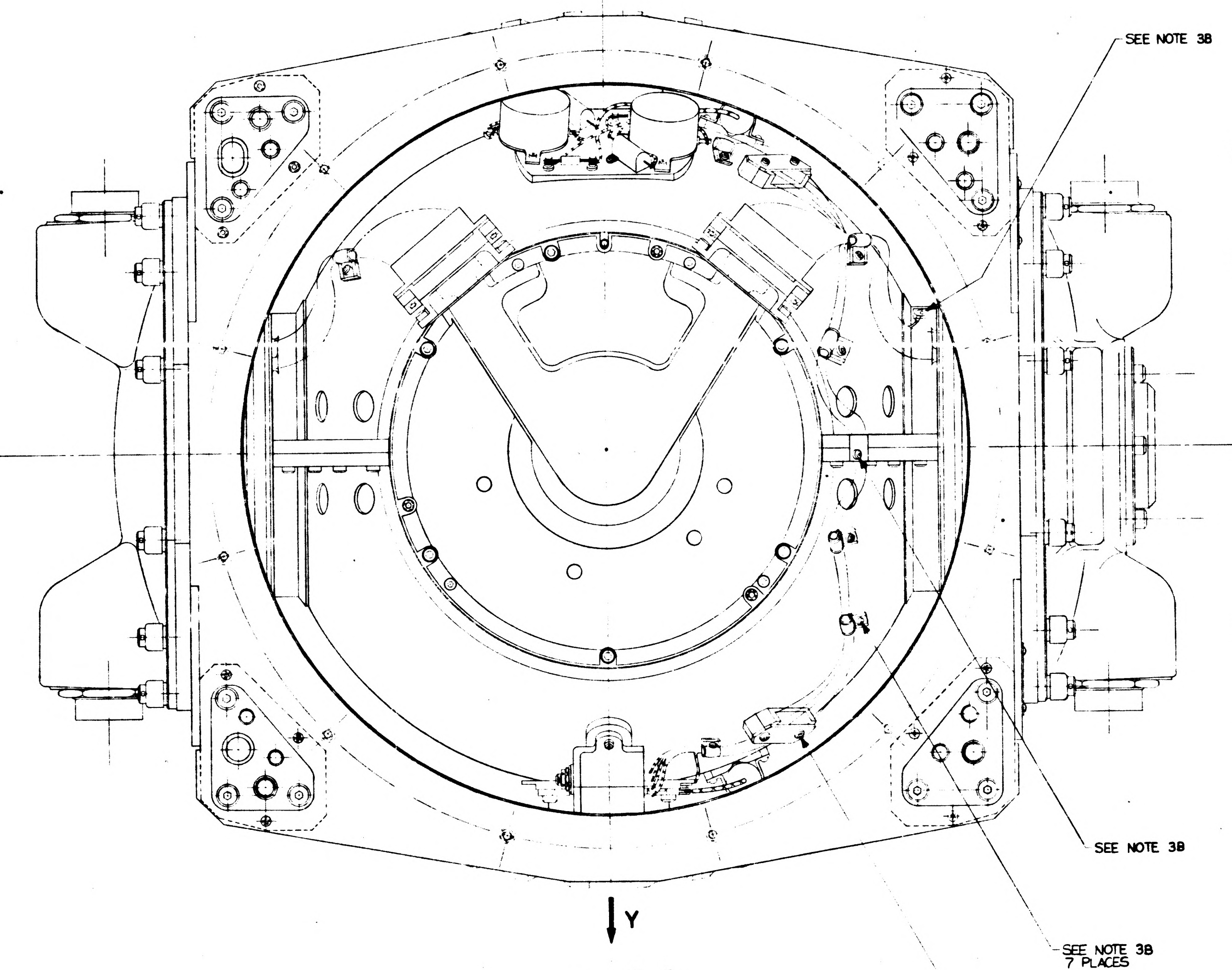
Ⓢ 13. STAMP OR ENGRAVE SERIAL NUMBERS OF IRIGS, NASA DWG. NO. 1000012, AND PIPS NASA NO. 1000013 IN APPROPRIATE BLOCKS PER ND 1002019

Ⓤ 14. ITEM ㉙ TO BE SELECTED AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY. ITEM ㉙ TO BE ASSEMBLED ON 1007152 WITH 13 TO 17 IN-LB OF TORQUE AT I.S.S. LEVEL. SELECT ITEM ㉙ FROM TABLE 1.

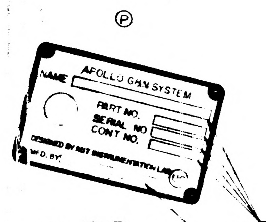
1000201	REV	SH
	V	1

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	L	REPLACES REV K WITH CHANGES TDRR 02506	8-12-63	ajB	WK
	M	TDRR 02896	9-4-63	ajB	wk
	N	TDRR 03233	9-20-63		WK
	P	TDRR 03488	10-4-63		
	R	TDRR 03658	10-8-63		wk
	S	TDRR 04555	12-10-63		wk
	T	REVISED PER TDRR 07576	17 APR 64	JHR	
	U	REVISED PER TDRR 07964	8 MAY 64	JG	
	V	REVISED PER TDRR 12685	29 SEP 64	JHH	
	W	REVISED PER TDRR 13369	20 OCT 64		

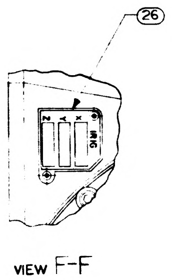




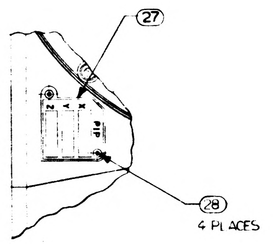
VIEW A-A



VIEW D-D



VIEW F-F
(S)



VIEW E-E
(S)

REPLACES REV K WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	INSULATION CASE HEAT EXCH. (LH)	1001478			45
1	INSULATION CASE HEAT EXCH. (RH)	1001477			44
8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
A/R	SCREW, CAP, SLF-LKG, SOC HD HEX	NAS1352C04LL		SEE NOTE 8	41
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
A/R	WEIGHT, BALANCE OUT. & MID. GMBL	1000263		SEE NOTE 8	38
A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
					30
1	IMU-CDU LOAD COMP MOD ASSY	1007050		SEE NOTE 14	29
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-1			28
1	PLATE INFORMATION	1000022			27
1	PLATE, INFORMATION	1000023			26
A/R	LUBRICANT, DOW CORNING NO.55		MIL-L-4343A		25
1	PLATE, IDENTIFICATION	1000024			24
4	SCREW, BUT HD, SELF-LKG SPL SOC	1000250-13			23
12	SCREW, CAP, SOC, HD, HEX	1000110-7			22
12	SCREW, CAP, SOC, HD HEX	1000110-307			21
6	SCREW, CAP, SOC, HD, HEX	1000110-305			20
2	PACKING, PREFORMED, "O" RING	1000159-6			19
1	PACKING, PREFORMED "O" RING	1000159-5			18
1	VALVE, PRESSURE, ASSY.	1000234			17
2	COUPLING, HALF, QUICK, DISCONNECT	1000155			16
4	SPRING FASTENER	1000187			15
4	COVER, SPRING FASTENER	1000185			14
4	SCREW, FASTENER	1000188			13
1	COVER ACCESS RESOLVER MODULE	1000163			12
1	PACKING, PREFORMED, "O" RING	1000159-3			11
2	PACKING, PREFORMED "O" RING	1000159-1			10
2	PACKING, PREFORMED, "O" RING	1000159-2			9
1	MT., CONN ASSY 16-X OUTER AXIS	1000142			8
1	MT. CONN ASSY 1-X OUTER AXIS	1000099			7
1	INTERGIMBAL SUB-ASSEMBLY 16X OUTER AXIS	1000205			6
1	INTERGIMBAL SUB-ASSEMBLY 1-X OUTER AXIS	1000006			5
1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
1	CASE, COVER, MOVABLE ASSY.	1000082			3
1	OUTER AXIS, ASSEMBLY	1000202			2
1	MACHINE ASSY, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED E. J. Boyce DATE 8-12-63
CHECKED
DRAWN R.W.C. 5-20-63
APPROVED FOR MSC
MIT APPROVAL DATE
W. Kupfer 14 Aug 63

INERTIAL
MEASURING UNIT
ASSEMBLY

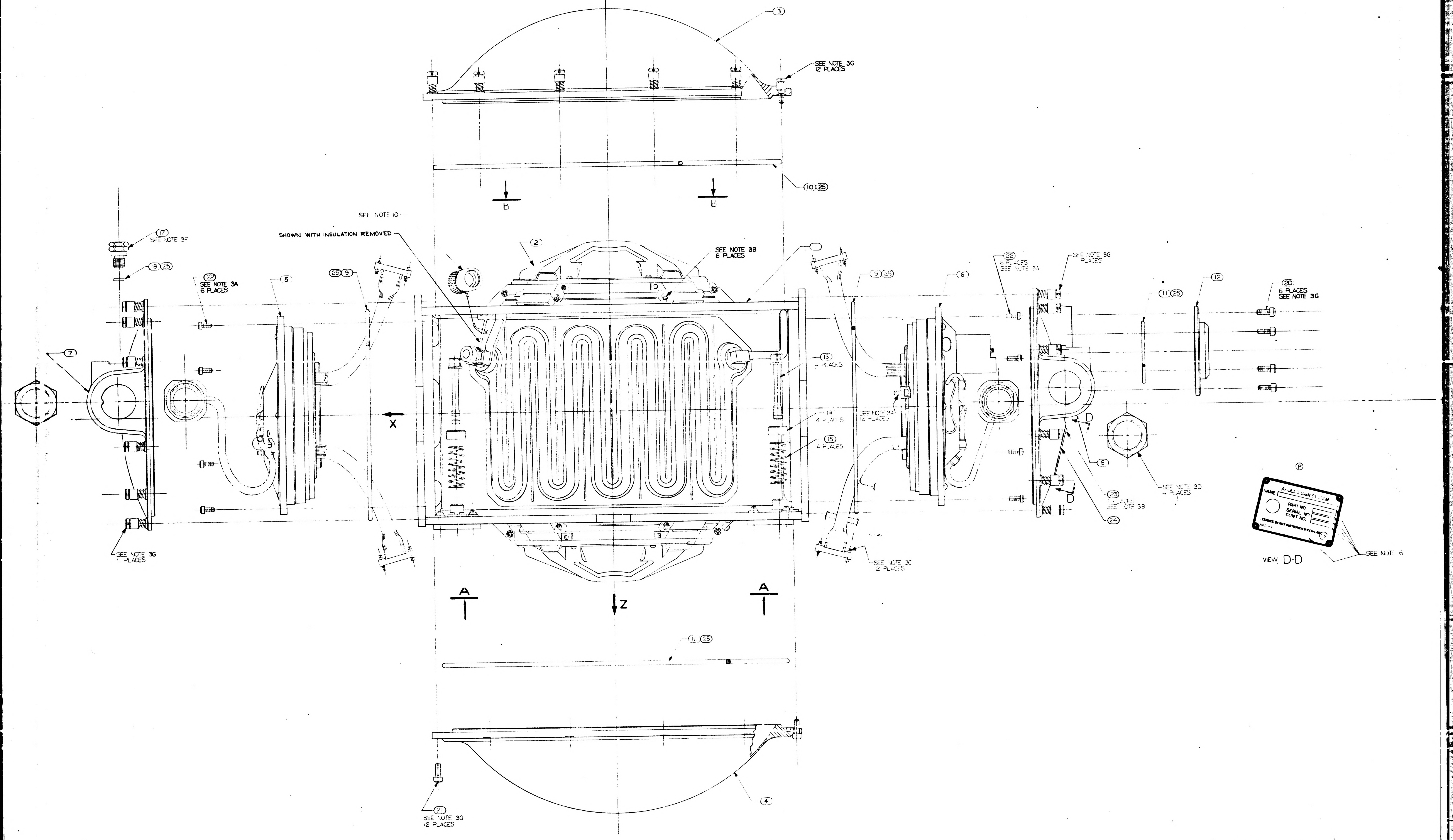
SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000201
SHEET 1 OF 1

W
1000201

1000201 REV W SHEET 1

37 1000201


③
SEE NOTE 3G
12 PLACES
(10)㉕
B
B
SEE NOTE 10
SHOWN WITH INSULATION REMOVED
②
SEE NOTE 3B
8 PLACES
①
⑰
SEE NOTE 3F
⑧㉕
㉒
SEE NOTE 3A
6 PLACES
⑤
㉕⑨
⑦
X
SEE NOTE 3G
11 PLACES
⑬
4 PLACES
14
4 PLACES
⑮
4 PLACES
⑨㉕
⑥
SEE NOTE 3A
12 PLACES
㉒
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
PLACES
⑪㉕
⑫
⑳
6 PLACES
SEE NOTE 3G
D
D
⑧
㉓
PLACES
SEE NOTE 3B
㉔
SEE NOTE 3D
4 PLACES
SEE NOTE 3C
12 PLACES
Ⓟ
APOLLO G&N SYSTEM
NAME
PART NO.
SERIAL NO.
CONT NO.
DESIGNED BY MIT INSTRUMENTATION LAB
MFD. BY
SEE NOTE 6
VIEW D-D
A
A
Z
(10)㉕
④
㉑
SEE NOTE 3G
12 PLACES

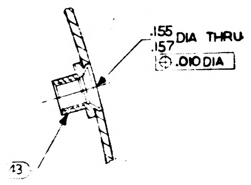
1000201

(N)

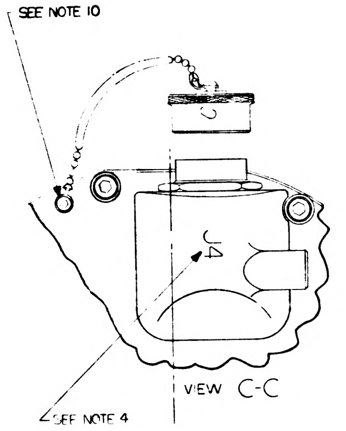
SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4	STABLE MEMBER
NAS1352C04LL6	
NAS1352C04LL8	
1000110-1	MIDDLE AND OUTER AXIS
1000110-2	
1000110-3	
1000110-302	

(U) TABLE 1

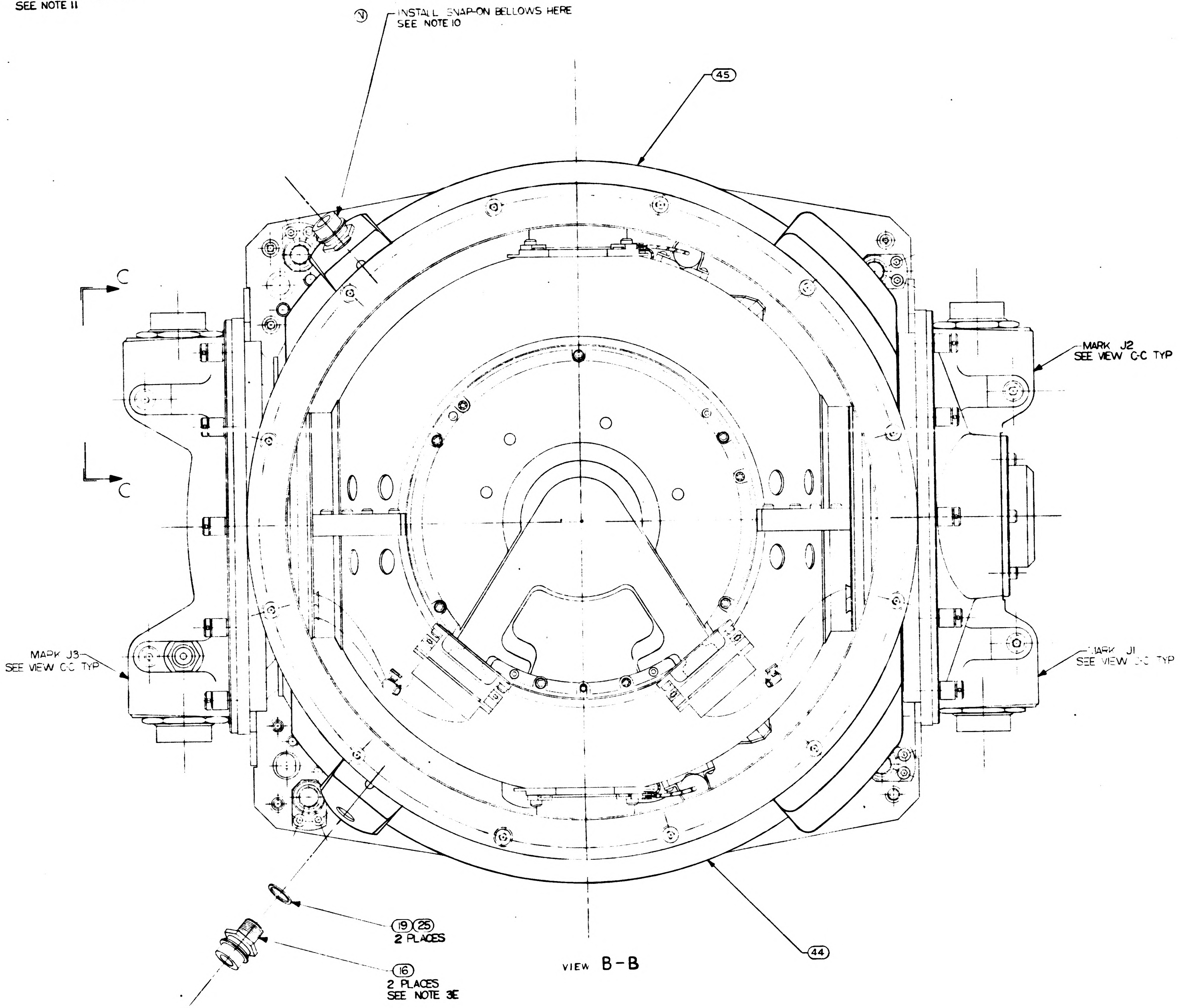
GYRO WHEEL TYPES	PART NO.
3 SIMONDS	1007050-1
2 SIMONDS 1 GRAPHMO	1007050-2
1 SIMONDS 2 GRAPHMO	1007050-3
3 GRAPHMO	1007050-4



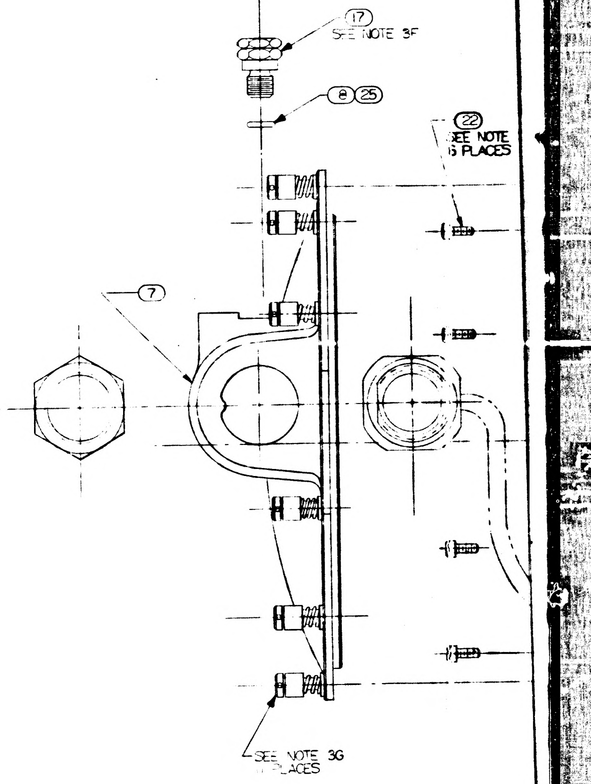
(N) VIEW E
TYPICAL INSTALLATION
SEE NOTE 11



VIEW C-C



VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
    - A. 10.0 IN.LB.
    - B. 5.0 IN.LB.
    - C. 2.0 IN.LB. AT FINAL SEATING, NOT TO EXCEED 10 IN.LB. WHILE ENGAGING PINS
    - D. 35.0 IN.LB.
    - E. 70.0 IN.LB.
    - F. 65.0 IN.LB.
    - G. 30.0 IN.LB.
    - (S) H. 3.5 IN.LB.
4. MARK CHARACTERS $\frac{.23}{.27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN.
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{.10}{.14}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

(N) 7. (26) (27) (28) (29) & (30) INSTALLED ~~DURING STORING & SHIPPING~~

(N) 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000001. SELECT SCREWS FROM CHART

9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

(S) (N) 10. PROTECTIVE COVER, ELECT. NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 1001494, MOUNTING PAD COVERS, NASA DRAWING NO'S 1001460, 1001464 & 1001461 1001465, ~~AND MH SNAP-ON BELLOWS, NASA DRAWING NO. 1000402~~. TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS 35C04LL4, OR EQUIV. TO SECURE 1001495 TO CONNECTOR MOUNT. ASSY'S (7) AND (8) SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE OF (7) & (8). REMOVE PROTECTIVE COVER MOUNTING SCREWS AND CABLE IMMEDIATELY PRIOR TO INSTALLATION

(N) 11. SECURE BALANCE WEIGHTS, ITEMS (36) THRU (40) TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM (43) AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM (43) IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

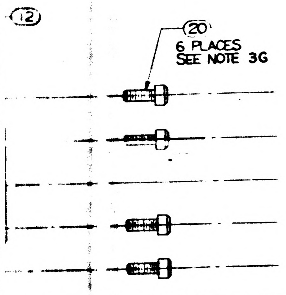
(N) 12. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTEGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F TO 160°F RANGE.

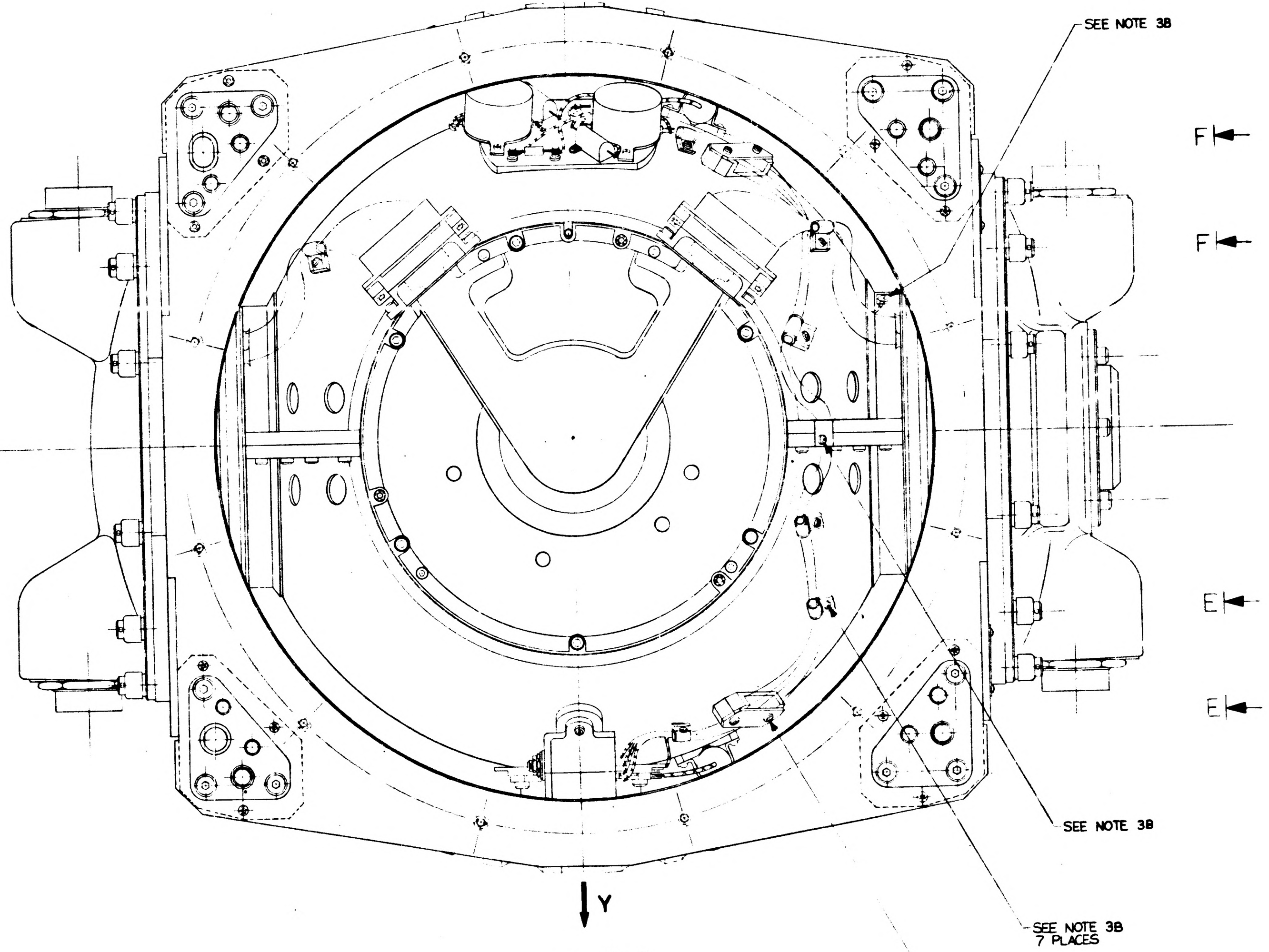
(S) 13. STAMP OR ENGRAVE SERIAL NUMBERS OF IRIGS, NASA DWG. NO. 1000012, AND PIPS NASA NO. 1000013 IN APPROPRIATE BLOCKS PER ND 1002019

(U) 14. ITEM (29) TO BE SELECTED AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY. ITEM (29) TO BE ASSEMBLED ON 1007152 WITH 13 TO 17 IN-LB OF TORQUE AT I.S.S. LEVEL. SELECT ITEM (29) FROM TABLE 1.

1000201	REV	SHT.
	W	1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	L	REPLACES REV K WITH CHANGES TDRR 02506	8-12-63	ajB	WR
	M	TDRR 02896	9-4-63	ajB	WR
	N	TDRR 03233	9-20-63		WR
	P	TDRR 03488	10-4-63		
	R	TDRR 03658	10-8-63		WR
	S	TDRR 04555	12-10-63		WR
	T	REVISED PER TDRR 07576	17 APR 64	JHR	
	U	REVISED PER TDRR 07964	8 MAY 64	JG	
	V	REVISED PER TDRR 12685	29 SEP 64	JHH	
	W	REVISED PER TDRR 13369	20 OCT 64	JWP	
	Y	REVISED PER TDRR 14542	7 DEC 64	JJJ	

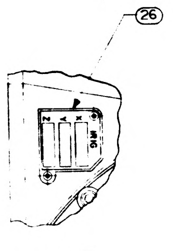




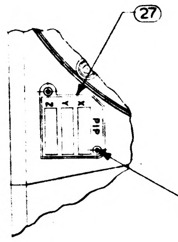
VIEW A-A

SEE NOTE 3B
7 PLACES

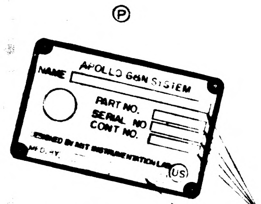
SEE NOTE 3B
4 PLACES



VIEW F-F
(S)



VIEW E-E
(S)



VIEW D-D

REPLACES REV K WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	INSULATION CASE HEAT EXCH. (LH)	1001478			45
1	INSULATION CASE HEAT EXCH. (RH)	1001477			44
8	NUT, CLINCH, FLUSH-MOUNTED	1000076-1		SEE NOTE 8	43
A/R	SCREW, CAP, SOC HD, HEX	1000110		SEE NOTE 8	42
A/R	SCREW, CAP, SLF-LKG, SOC HD, HEX	NAS1352C04LL		SEE NOTE 8	41
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000270		SEE NOTE 8	40
A/R	WEIGHT, BALANCE, OUTER GIMBAL	1000268		SEE NOTE 8	39
A/R	WEIGHT, BALANCE OUT. & MID. GMBL.	1000263		SEE NOTE 8	38
A/R	WEIGHT, BALANCE MID. GIMBAL	1000262		SEE NOTE 8	37
A/R	WEIGHT, BALANCE MID. GIMBAL	1000261		SEE NOTE 8	36
A/R	WEIGHT, BALANCE S/M	1000260		SEE NOTE 8	35
A/R	WEIGHT, BALANCE S/M	1000259		SEE NOTE 8	34
A/R	WEIGHT, BALANCE S/M	1000258		SEE NOTE 8	33
A/R	WEIGHT, BALANCE S/M	1000214		SEE NOTE 8	32
A/R	WEIGHT, BALANCE S/M	1000213		SEE NOTE 8	31
					30
1	IMU-CDU LOAD COMP MOD ASSY	1007050		SEE NOTE 14	29
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-1			28
1	PLATE INFORMATION	1000022			27
1	PLATE, INFORMATION	1000023			26
A/R	LUBRICANT, DOW CORNING NO. 55		MIL-L-4343A		25
1	PLATE, IDENTIFICATION	1000024			24
4	SCREW, BUT HD, SELF-LKG SPL SOC	1000250-13			23
12	SCREW, CAP, SOC, HD, HEX	1000110-7			22
12	SCREW, CAP, SOC HD HEX	1000110-307			21
6	SCREW, CAP, SOC HD, HEX	1000110-305			20
2	PACKING, PREFORMED, "O" RING	1000159-6			19
1	PACKING, PREFORMED "O" RING	1000159-5			18
1	VALVE, PRESSURE, ASSY.	1000234			17
2	COUPLING, HALF QUICK, DISCONNECT	1000135			16
4	SPRING, FASTENER	1000187			15
4	COVER, SPRING FASTENER	1000185			14
4	SCREW, FASTENER	1000188			13
1	COVER ACCESS RESOLVER MODULE	1000163			12
1	PACKING, PREFORMED, "O" RING	1000159-3			11
2	PACKING, PREFORMED "O" RING	1000159-1			10
2	PACKING, PREFORMED, "O" RING	1000159-2			9
1	MT., CONN ASSY IG-X OUTER AXIS	1000142			8
1	MT. CONN. ASSY I-X OUTER AXIS	1000099			7
1	INTERGIMBAL SUB-ASSEMBLY IG-X OUTER AXIS	1000205			6
1	INTERGIMBAL SUB-ASSEMBLY I-X OUTER AXIS	1000006			5
1	CASE, COVER, FIXED	1000081		SEE NOTE 5	4
1	CASE, COVER, MOVABLE ASSY.	1000082			3
1	OUTER AXIS, ASSEMBLY	1000202			2
1	MACHINE ASSY, CASE CENTER	1000085			1

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
NEXT ASSY USED ON
APPLICATION

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED E J Boyce DATE 8-12-63
CHECKED
DRAWN R W C 5-20-63
APPROVED N.A.S.A.
Jack Barnard
M I T APPROVAL DATE
W Koppen 14 Aug 63

INERTIAL MEASURING UNIT ASSEMBLY

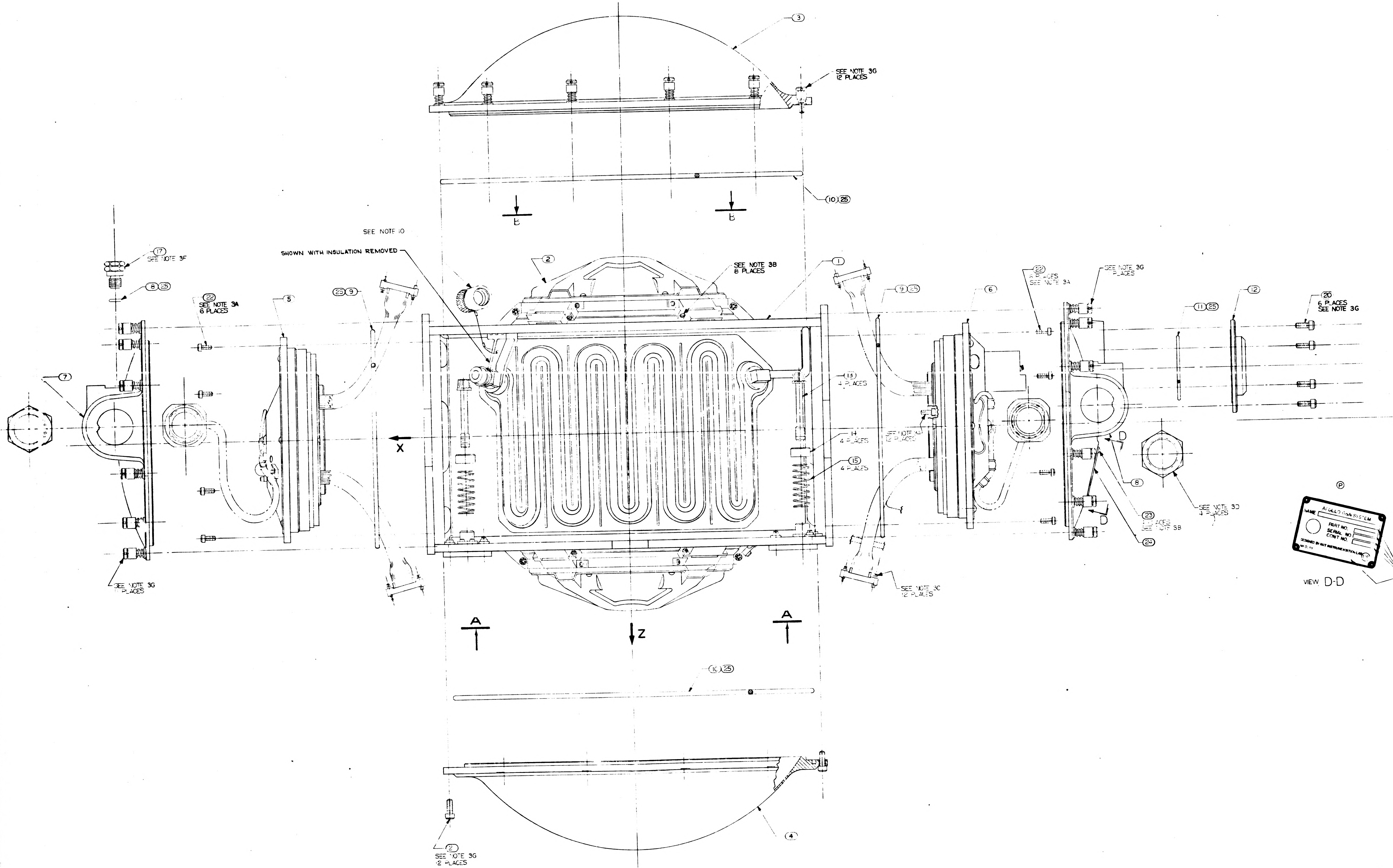
SCALE 1/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000201
SHEET 1 OF

4H

1000201 REV Y SHEET 1

3/1000201



8
7
6
5
③
SEE NOTE 3G
12 PLACES
⑩㉕
B
B
SEE NOTE 10
SHOWN WITH INSULATION REMOVED
②
SEE NOTE 3B
8 PLACES
①
⑰
SEE NOTE 3F
⑧㉕
㉒
SEE NOTE 3A
6 PLACES
⑤
㉕⑨
⑨㉕
⑥
㉒
6 PLACES
SEE NOTE 3A
SEE NOTE 3G
PLACES
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⑳
6 PLACES
SEE NOTE 3G
⑦
X
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4 PLACES
⑭
4 PLACES
⑮
4 PLACES
SEE NOTE 3A
12 PLACES
D
D
⑧
㉓
PLACES
SEE NOTE 3B
㉔
SEE NOTE 3D
4 PLACES
Ⓟ
APOLLO G&N SYSTEM
NAME
PART NO.
SERIAL NO
CONT NO.
DESIGNED BY MIT INSTRUMENTATION LAB
MFD. BY
US
SEE NOTE
VIEW D-D
SEE NOTE 3G
PLACES
SEE NOTE 3C
12 PLACES
A
A
Z
⑩㉕
④
②
SEE NOTE 3G
12 PLACES

5

7

6

5

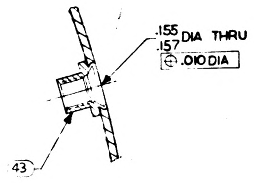
2/1000201

Ⓝ

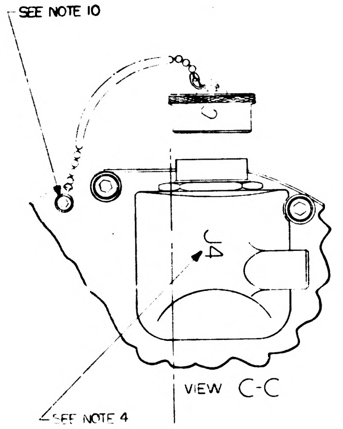
SCREW SELECTION CHART	
DRAWING NUMBER	USED ON
NAS1352C04LL4 NAS1352C04LL6 NAS1352C04LL8	STABLE MEMBER
1000110-1 1000110-2 1000110-3 1000110-302	MIDDLE AND OUTER AXIS

Ⓤ TABLE 1

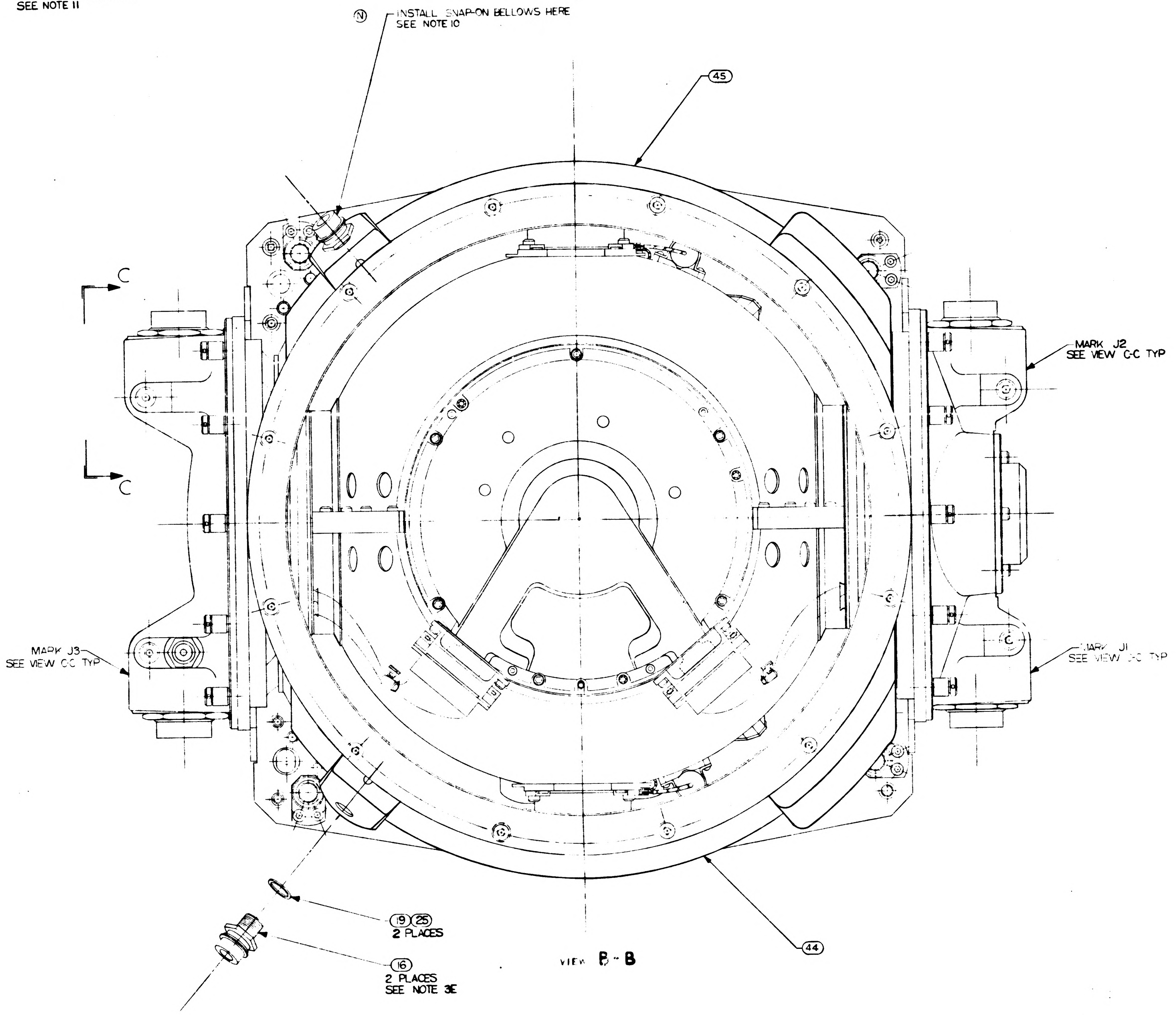
GYRO WHEEL TYPES	PART NO.
3 SIMONDS	1007050-1
2 SIMONDS 1 GRAPHMO	1007050-2
1 SIMONDS 2 GRAPHMO	1007050-3
3 GRAPHMO	1007050-4



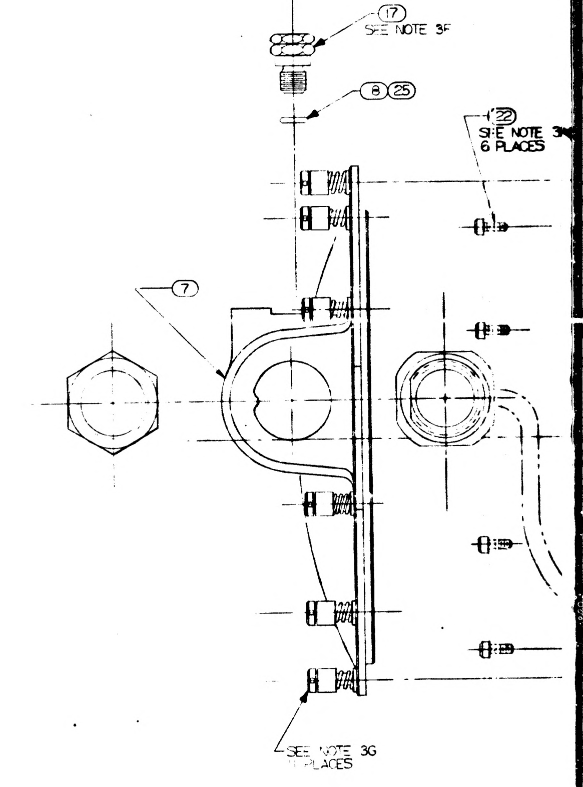
Ⓝ VIEW E
TYPICAL INSTALLATION
SEE NOTE 11



VIEW C-C



VIEW B-B



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001 & FTM 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 2.0 IN. LB. AT FINAL SEATING, NOT TO EXCEED 10 IN. LB. WHILE ENGAGING PINS
   - D. 85.0 IN. LB.
   - E. 70.0 IN. LB.
   - F. 65.0 IN. LB.
   - G. 30.0 IN. LB.
   - Ⓢ H. 3.5 IN. LB.
4. MARK CHARACTERS $\frac{23}{27}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN.
5. CASE COVER FIXED, NASA DRAWING 1000241, MAY BE USED AS AN ALTERNATE
6. ENGRAVE CHARACTERS $\frac{10}{13}$ HIGH AND FILL, COLOR BLACK, PER ND 1002019

Ⓝ 7. ㉖㉗㉘㉙ & ㉚ ~~INSTALLED DURING STORING & SHIPPING~~

Ⓝ 8. BALANCE WEIGHTS AND NUTS TO BE SELECTED FROM APPLICABLE DRAWINGS AND INSTALLED PER ATP1000001. SELECT SCREWS FROM CHART

9. USE DRAWING NUMBERS 1000016 GIMBAL ASSEMBLY OUTLINE AND 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓢ Ⓝ 10. PROTECTIVE COVER, ELECT. NASA DRAWING NO. 1001495, PROTECTIVE COVER, COOLANT, NASA DRAWING NO. 1001494, MOUNTING PAD COVERS, NASA DRAWING NO'S 1001460, 1001464 & 1001461 1001465, ~~SNAP-ON BELLOWS, NASA DRAWING NO. 1000402~~, TO BE REMOVED ONLY WHEN REQUIRED DURING TEST AND INSTALLATION, OR TO PROVIDE HEATER POWER TO INERTIAL COMPONENTS. USE SELF LOCKING SCREWS, NAS 1352C04LL4, OR EQUIV, TO SECURE 1001495 TO CONNECTOR MOUNT. ASSY'S ⑦ AND ⑧ SCREWS NOT TO PROJECT BELOW MOUNTING SURFACE ON ⑦ & ⑧. REMOVE PROTECTIVE COVER MOUNTING SCREWS [illegible] IMMEDIATELY PRIOR TO INSTALLATION.

Ⓝ 11. SECURE BALANCE WEIGHTS, ITEMS ㊱ THRU ㊵ TO GIMBALS WITH SCREWS PER SELECTION CHART, AND ITEM ㊸ AT REQUIRED LOCATIONS ON MIDDLE AND OUTER GIMBALS. SEE VIEW E FOR TYPICAL INSTALLATION DATA. CAUTION: DO NOT INSTALL ITEM ㊸ IN LOCATIONS THAT WILL PREVENT FREE ROTATION OF GIMBALS.

Ⓝ 12. TEMPERATURE OF ASSEMBLY MUST BE MAINTAINED BETWEEN 120°F AND 140°F. PULSED INTEGRATING PENDULUM, NASA DRAWING NO. 1000013, MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS THESE LIMITS. GYRO PREALIGNED ASSY., NASA DRAWING NO. 1000012 MUST BE RECALIBRATED IF TEMPERATURE EXCEEDS 40°F TO 160°F RANGE.

Ⓢ 13. STAMP OR ENGRAVE SERIAL NUMBERS OF IRIGS, NASA DWG. NO. 1000012, AND PIPS NASA NO. 1000013 IN APPROPRIATE BLOCKS PER ND 1002019

Ⓤ 14. ITEM ㉙ TO BE SELECTED AND MAINTAINED IN CONJUNCTION WITH THIS ASSEMBLY. ITEM ㉙ TO BE ASSEMBLED ON 1007152 WITH 15 TO 17 IN-LB OF TORQUE AT I.S.S. LEVEL. SELECT ITEM ㉙ FROM TABLE 1.

15. FOR SPARES PROCUREMENT THIS ASSEMBLY MUST MEET THE REQUIREMENTS OF PS 1000201.

1000201

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQ'D.
1000202	Outer Axis Assy	1
1000085	Case, Center, Machined Assembly	1
1000099	Connector Mount Assembly One Speed	1
1000109	Fastener Assembly	4
1000082	Case Cover, Movable, Assembly	1
1000081	Case, Cover, Fixed Assembly	1
1000135	Connector Water	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

IMU ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000201

SHEET OF

1000202

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00488	3-5-63	AJB	WK

PART NO.	Description	Req'd.	
1000203	Middle Axis Assy	1	
1000103	Outer Gimbal Housing Assy	1	
1000205	Intergimbal Sub-Assy, 16 Speed	1	
1000006	Intergimbal Sub-Assy, 1 Speed	1	
1007013	28 VDC Regulator	1	Ⓐ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000201	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

OUTER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
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CAMBRIDGE, MASS.

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1000202

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1000202

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00488	3-5-63	ajb WK
	B	TDRR 00606	3-20-63	ajb WK

PART NO.	Description	Req'd.	
1000203	Middle Axis Assy	1	
1000103	Outer Gimbal Housing Assy	1	
1000205	Intergimbal Sub-Assy, 16 Speed	1	
1000006	Intergimbal Sub-Assy, 1 Speed	1	
1007013	28 VDC Regulator	1	Ⓐ
1000235	Clamp, Capacitor	2	
1000239	Cover, Connector Mount	2	
1000244	Clip	1	

MASTER

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
NEXT ASSY	USED ON

APPLICATION

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FRACTIONS DECIMALS ANGLES
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MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W Kupfer	12/12/62

OUTER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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INCHES
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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00488	3-5-63	ajB	wk
	B	TDRR 00606	3-20-63	ajB	wk
	C	TDRR 00765	4-10-63	ajB	wk

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Ⓜ

PART NO.	Description	Req'd.	
1000203	Middle Axis Assy	1	
1000103	Outer Gimbal Housing Assy	1	
1000205	Intergimbal Sub-Assy, 16 Speed	1	
1000006	Intergimbal Sub-Assy, 1 Speed	1	
1007013	28 VDC Regulator	1	Ⓐ
1000235	Clamp, Capacitor	2	
1000239	Cover, Connector Mount	2	
1000244	Clip	1	
1000143	Cover, Bracket, Connector	4	
1000256	Clamp, Transducer	1	
1000257	Bracket, Transducer	1	

MASTER

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
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CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

OUTER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00132					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00488	3-5-63	agB	wK
	B	TDRR 00606	3-20-63	agB	wK
	C	TDRR 00765	4-10-63	agB	wK
	D	TDRR 01062	5-1-63	agB	wK

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M
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PART NO.	Description	Req'd.
1000203	Middle Axis Assy	1
1000103	Outer Gimbal Housing Assy	1
1000205	Intergimbal Sub-Assy, 16 Speed	1
1000006	Intergimbal Sub-Assy, 1 Speed	1
1007013	28 VDC Regulator	1
1000235	Clamp, Capacitor	2
1000239	Cover, Connector Mount	2
1000244	Clip	1
1000143	Cover, Bracket, Connector	4
~~1000256~~	~~Clamp, Transducer~~	~~1~~
~~1000257~~	~~Bracket, Transducer~~	~~1~~
1000157	Clamp, Blower	4
1000219	Blower Variable Speed	2

Ⓐ

MASTER

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES DO NOT SCALE THIS DRAWING MATERIAL:	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153 APPROVED A J Boyce DATE 12/11/62 CHECKED DRAWN APPROVED FOR MSC W J Rhine 12-12-62 MIT/IL APPROVAL W Kupfer DATE 12/12/62	OUTER AXIS ASSEMBLY SCALE UNIT WT. CODE IDENT.	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS. DWG. NO. MANNED SPACECRAFT CENTER HOUSTON TEXAS NASA DRAWING NO. 1000202 SHEET OF
NEXT ASSY	USED ON				
APPLICATION					

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PHOTOGRAPHIC SCALE ONLY

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ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00132			
	A	TDRR 00488	3-5-63	agb	WK
	B	TDRR 00606	3-20-63	agb	WK
	C	TDRR 00765	4-10-63	agB	WK
	D	TDRR 01062	5-1-63	agB	WK
	E	TDRR 01319	5-21-63	agB	WK

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PART NO.	Description	Req'd.
1000203	Middle Axis Assy	1
1000103	Outer Gimbal Housing Assy	1
1000205	Intergimbal Sub-Assy, 16 Speed	1
1000006	Intergimbal Sub-Assy, 1 Speed	1
1007013	28 VDC Regulator	1 Ⓐ
1000235	Clamp, Capacitor	2
1000239	Cover, Connector Mount	2
1000244	Clip	1
1000143	Cover, Bracket, Connector	4
~~1000256~~	~~Clamp, Transducer~~	~~1~~
~~1000257~~	~~Bracket, Transducer~~	~~1~~
1000157	Clamp. Blower	4
1000219	Blower Variable Speed	2
1000222	Connector, Electrical Plug 9 contacts	2

MASTER

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

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TOLERANCES ON
FRACTIONS DECIMALS ANGLES

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MATERIAL:

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

OUTER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00488	3-5-63	ajB	WK
	B	TDRR 00606	3-20-63	ajB	WK
	C	TDRR 00765	4-10-63	ajB	WK
	D	TDRR 01062	5-1-63	ajB	WK
	E	TDRR 01319	5-21-63	ajB	WK
	F	TDRR 01380	5-29-63	ajB	WK

PART NO.	Description	Req'd.
1000203	Middle Axis Assy	1
1000103	Outer Gimbal Housing Assy	1
1000205	Intergimbal Sub-Assy, 16 Speed	1
1000006	Intergimbal Sub-Assy, 1 Speed	1
1007013	28 VDC Regulator	1
1000235	Clamp, Capacitor	2
1000239	Cover, Connector Mount	2
1000244	Clip	1
1000143	Cover, Bracket, Connector	4
~~[illegible]~~	~~Clamp, Transducer~~	~~1~~
~~[illegible]~~	~~Bracket, Transducer~~	~~1~~
1000157	Clamp, Blower	4
1000219	Blower Variable Speed	2
1000222	Connector, Electrical Plug 9 contacts	2
1000288	Saturable Reactor	2

Ⓐ

MASTER

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

DATE

APPROVED A J Boyce 12/11/62

CHECKED

DRAWN

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL DATE
W Wrigley 12/12/62

OUTER AXIS ASSEMBLY

SCALE

UNIT WT.

CODE IDENT.

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NASA DRAWING NO.
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INCHES
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REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00488	3-5-63	ajB WK
	B	TDRR 00606	3-20-63	ajB WK
	C	TDRR 00765	4-10-63	ajB WK
	D	TDRR 01062	5-1-63	ajB WK
	E	TDRR 01319	5-21-63	ajB WK
	F	TDRR 01380	5-29-63	ajB WK
	G	REPLACED BY REV H WITH CHANGES TDRR 02407	8-5-63	ajB WK

M M M M M M

PART NO.	Description	Req'd.
1000203	Middle Axis Assy	1
1000103	Outer Gimbal Housing Assy	1
1000205	Intergimbal Sub-Assy, 16 Speed	1
1000006	Intergimbal Sub-Assy, 1 Speed	1
1007013	28 VDC Regulator	1
1000235	Clamp, Capacitor	2
1000239	Cover, Connector Mount	2
1000244	Clip	1
1000143	Cover, Bracket, Connector	4
~~[illegible]~~	~~Clamp, Transducer~~	~~1~~
~~[illegible]~~	~~Bracket, Transducer~~	~~1~~
1000157	Clamp, Blower	4
1000219	Blower Variable Speed	2
1000222	Connector, Electrical Plug 9 contacts	2
1000288	Saturable Reactor	2

Ⓐ

REPLACED BY REV H WITH CHANGES

MASTER

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		
APPROVED FOR MSC	12-12-62	
MIT/IL APPROVAL		DATE
		12/12/62

OUTER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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SHEET OF

INCHES
0 1 2
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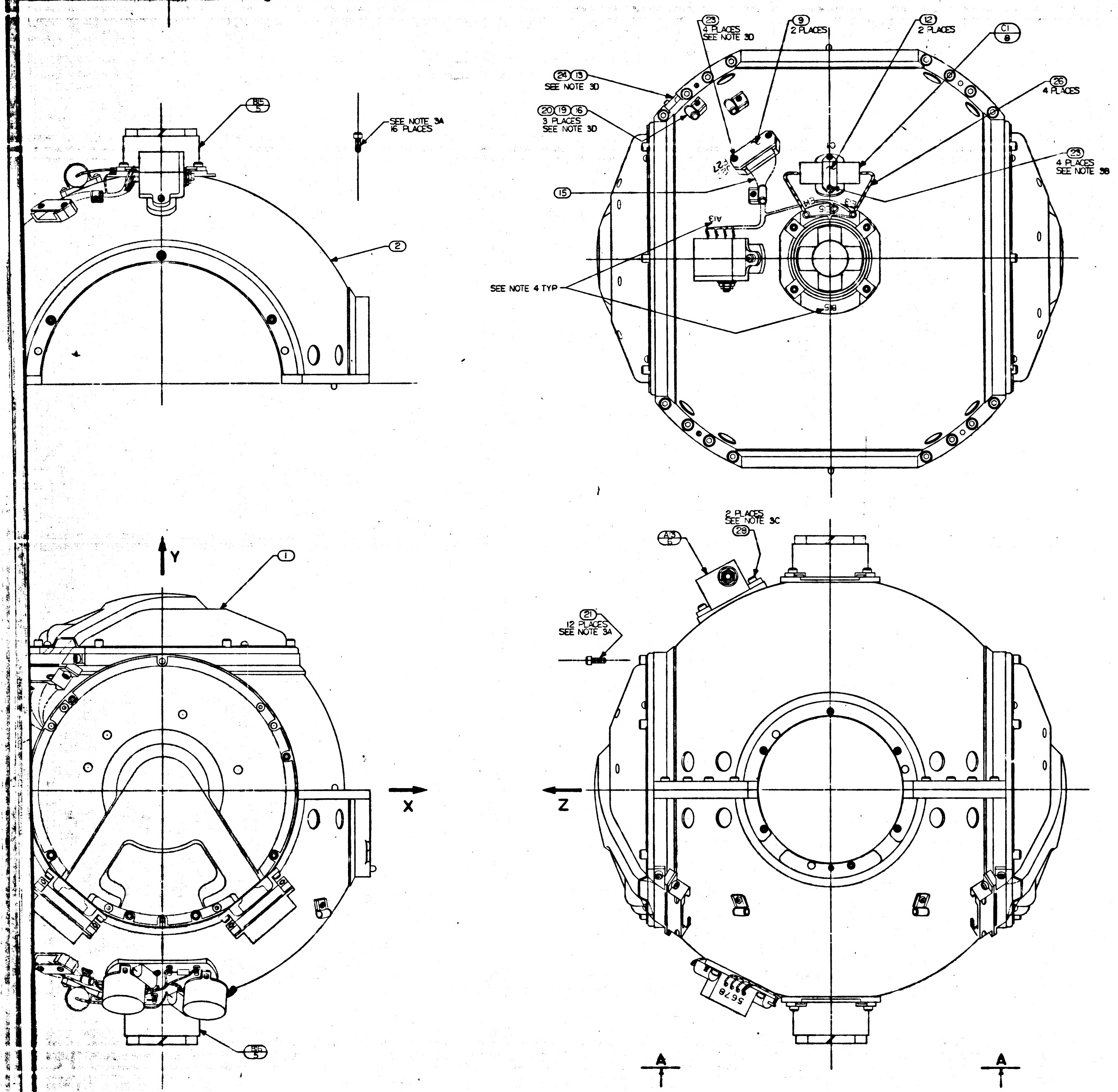
REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63	WK



BIS 5
SEE NOTE 3A 16 PLACES
2
(23) 4 PLACES SEE NOTE 3D
(9) 2 PLACES
(12) 2 PLACES
C1 / 8
(24)(13) SEE NOTE 3D
(20)(19)(16) 3 PLACES SEE NOTE 3D
(26) 4 PLACES
(23) 4 PLACES SEE NOTE 3B
(15)
A13
E14
E15
E13
B15
SEE NOTE 4 TYP
Y
X
1
BIS 5
A13 / 6
2 PLACES SEE NOTE 3C
(28)
(21) 12 PLACES SEE NOTE 3A
Z
A
A

REPLACES REV G WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
10	SCREW CAP SOC HD HEX	1000110-302			28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
4	INSULATION SLEEVING	1006776-19		1 3/8 LONG	26
1	SCREW BUT HD SELF LKG SPL SOC	1000250-12			25
1	SCREW, CAP, SELF LKG HEX HD SOC	NAS608C440LL6			24
28	SCREW, CAP, SELF LKG HEX HD SOC	NAS608C440LL4			23
4	SCREW, CAP, SELF LKG HEX HD SOC	NAS608C256LL4			22
12	SCREW, CAP SOC HD HEX	1000110-7			21
9	SCREW, CAP SOC HD HEX	1000110-1			20
9	WASHER, CABLE CLAMP	1000223			19
3	CLAMP, CABLE	1000220-5			18
2	CLAMP, CABLE	1000220-4			17
4	CLAMP, CABLE	1000220-3			16
1	WIRING HARNESS "C" O.A.	1000124			15
1	WIRING HARNESS "B" O.A.	1000034			14
1	CLIP, OUTER GIMBAL	1000244			13
2	CLAMP, CAPACITOR, OUT. GIMBAL	1000235			12
8	CLAMP, BLOWER	1000157			11
4	COVER, BRACKET, CONNECTOR	1000143			10
2	COVER, CONN. MT., OUTER GIMBAL	1000239			9
2	CAPACITOR, FIXED	1010264-38			8
2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
1	REGULATOR, 28 VOLT DC	1007013			6
2	BLOWER, VARIABLE SPEED	1000219			5
2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
2	RESISTOR, FIXED	1010325-500			3
1	HOUSING ASS'Y, OUTER GIMBAL	1000103			2
1	MIDDLE AXIS ASSEMBLY	1000203			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DU000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
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MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED: [illegible] 8-5-63
CHECKED
DRAWN MORSE 6-3-63
APPROVED FOR MSC
MIT IL APPROVAL: W Cuffey DATE 7 Aug 63

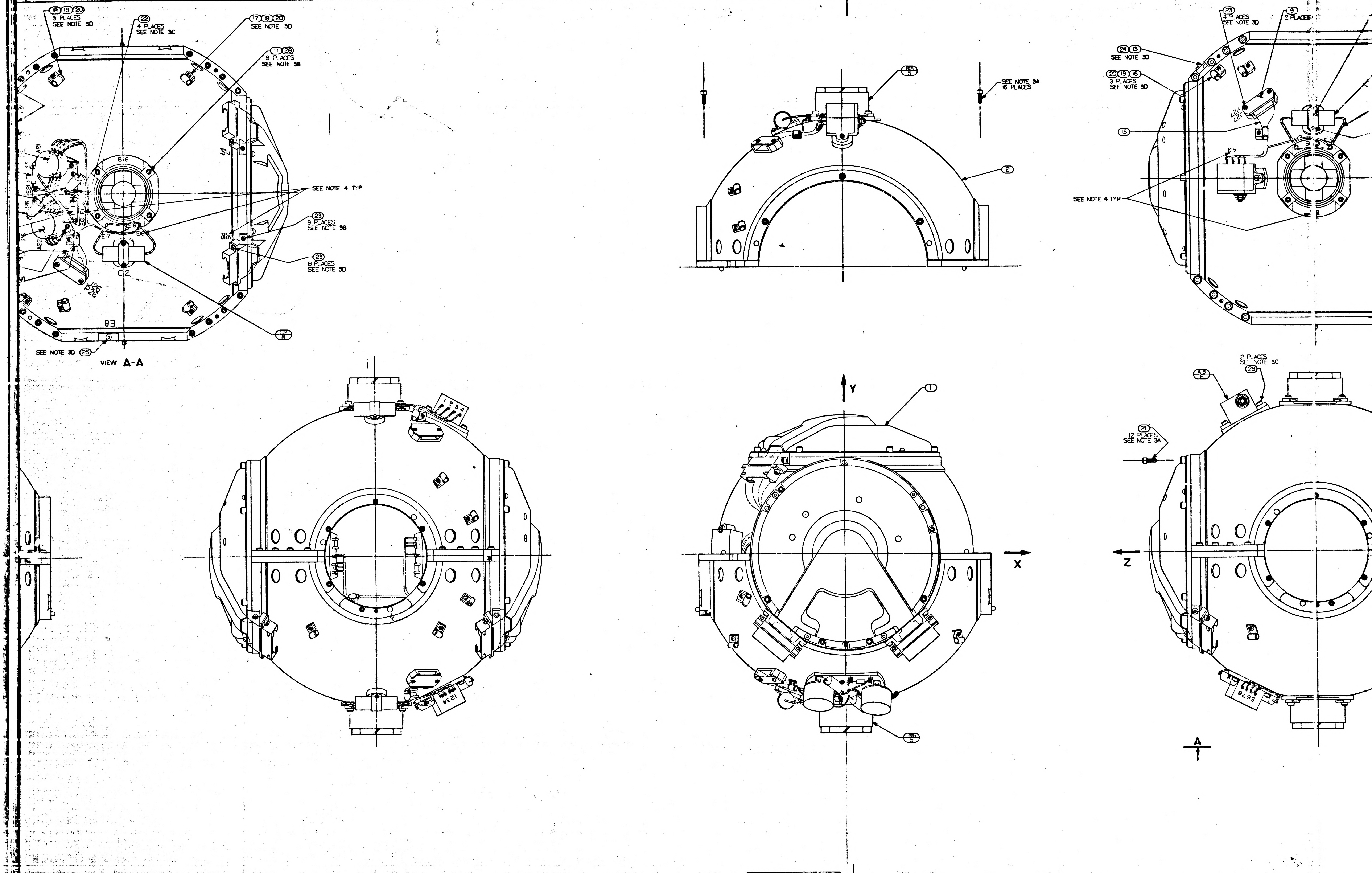
OUTER AXIS ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000202
SHEET 1 OF 1 SHEET

1000202 H

000202 REV H SHT 1

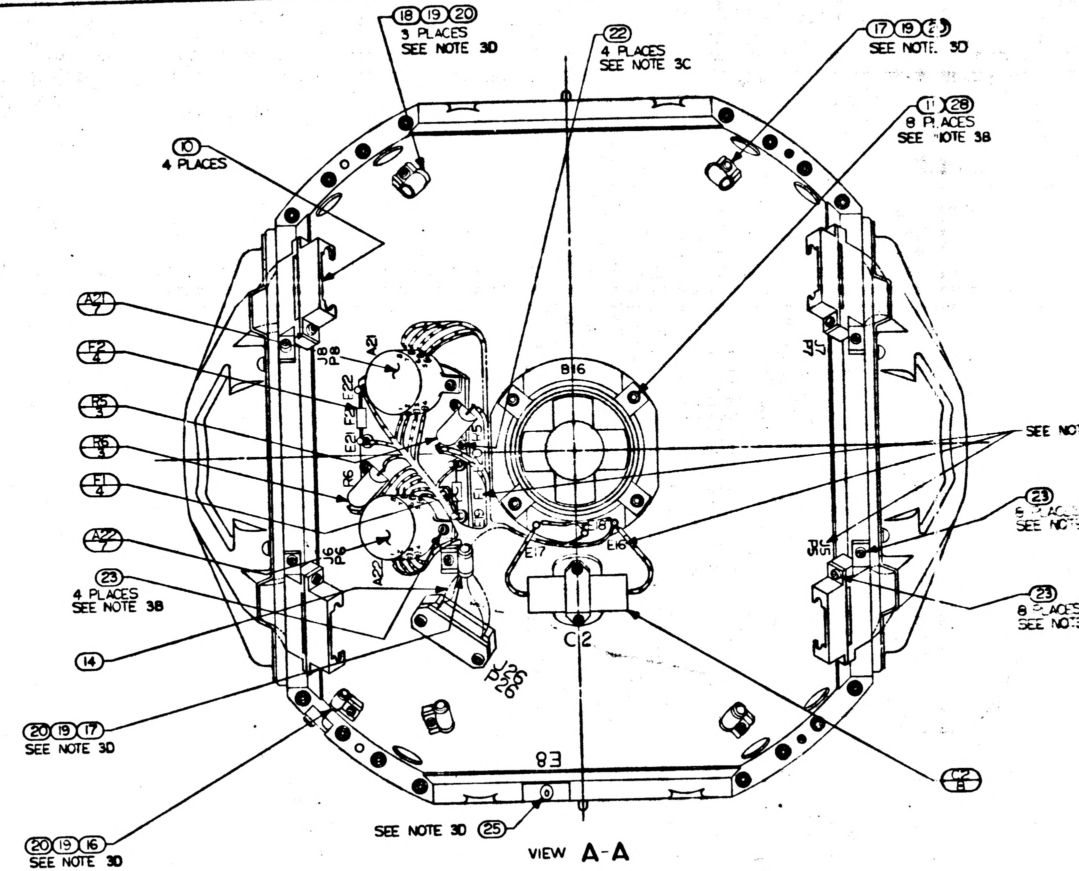

7
6
5
4
3
18 19 20
3 PLACES
SEE NOTE 3D
22
4 PLACES
SEE NOTE 3C
17 19 20
SEE NOTE 3D
11 28
8 PLACES
SEE NOTE 3B
A21
E21
P6
A22
B16
E18
E17
E16
C2
J7
P7
J5
P5
J26
P26
SEE NOTE 4 TYP
23
8 PLACES
SEE NOTE 3B
23
8 PLACES
SEE NOTE 3D
C2
8
E8
SEE NOTE 3D 25
VIEW A-A
B5
5
SEE NOTE 3A
16 PLACES
2
23
4 PLACES
SEE NOTE 3D
9
2 PLACES
24 13
SEE NOTE 3D
20 19 16
3 PLACES
SEE NOTE 3D
15
J27
P27
A13
E14
E13
SEE NOTE 4 TYP
1 2 3 4
1 2 3 4
Y
1
X
B5
5
2 PLACES
SEE NOTE 3C
A13
6
28
21
12 PLACES
SEE NOTE 3A
Z
5 6 7 8
A

1000202 REV. H SHT. 1

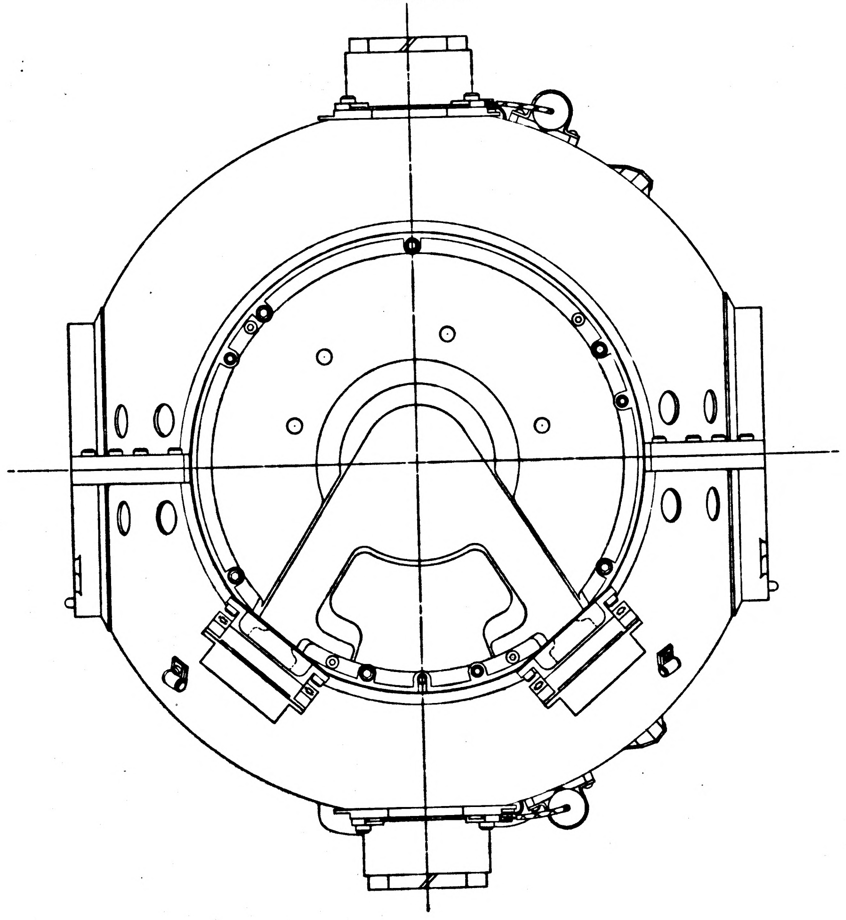
INCHES
0 2
PHOTOGRAPHIC SCALE ONLY

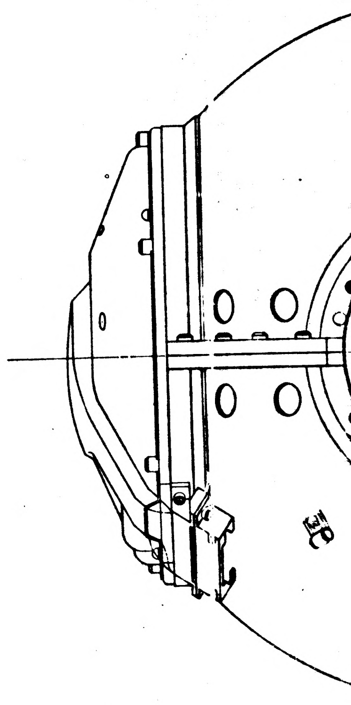
F-2

WIRING LEGEND					
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15-T1	E15	
2	RED		B15-T4	E13	
3	GRN		B15-T5	E14	
4	YEL		B16-T1	E18	
5	RED		B16-T4	E16	
6	GRN		B16-T5	E17	


(18)(19)(20)
3 PLACES
SEE NOTE 3D
(22)
4 PLACES
SEE NOTE 3C
(17)(19)(2
SEE NOTE 3D
(1)(28)
8 PLACES
SEE NOTE 3B
(10)
4 PLACES
A21 7
F2 4
R5 3
R6 3
F1 4
A22 7
(23)
4 PLACES
SEE NOTE 3B
(14)
(20)(19)(17)
SEE NOTE 3D
(20)(19)(16)
SEE NOTE 3D
SEE NOTE 3D (25)
SEE NOT
(23)
8 PLACES
SEE NOT
(23)
8 PLACES
SEE NOT
C2 8
B16
J8
P8
A21
E22
F2
E21
R6
R5
F1
E19
E18
E17
E16
J6
P6
A22
J26
P26
C2
E8
J7
P7
J5
P5

VIEW A-A





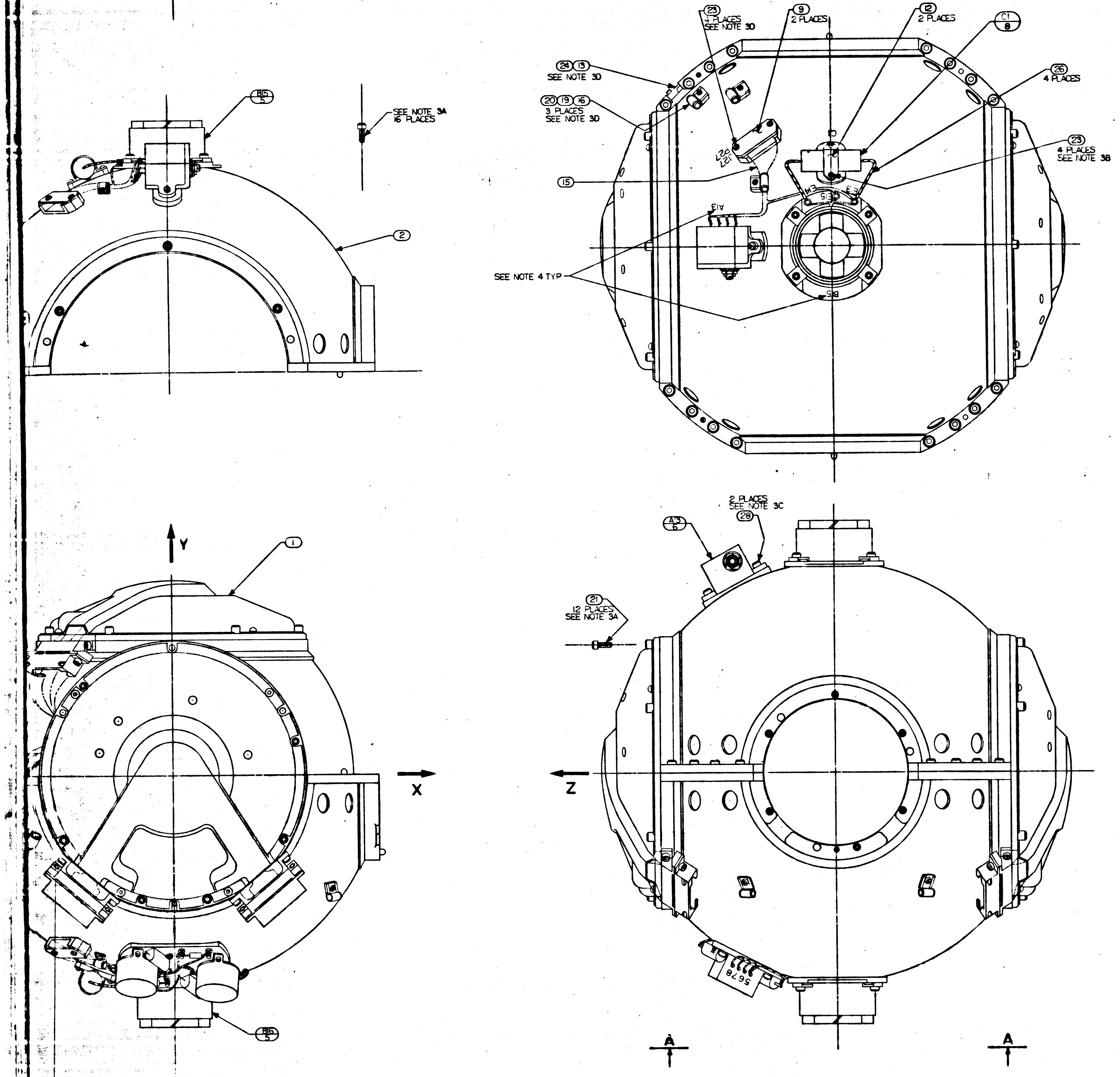
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   A. 10.0 IN. LB.
   B. 5.0 IN. LB.
   C. 3.5 IN. LB.
   D. INSTALL FINGER TIGHT
4. MARK CHARACTERS .10/.14 HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

34

	REV	SHT
1000202	H	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63	WK
	J	TDRR 03187	9-17-63	VK



23 4 PLACES SEE NOTE 3D
9 2 PLACES
12 2 PLACES
C1 8
24 13 SEE NOTE 3D
20 19 16 3 PLACES SEE NOTE 3D
26 4 PLACES
23 4 PLACES SEE NOTE 3B
15
A13
SEE NOTE 4 TYP
B15 5
SEE NOTE 3A 16 PLACES
2
1
Y
X
Z
A3 6
2 PLACES SEE NOTE 3C
28
21 12 PLACES SEE NOTE 3A
5678
B15 5
A
A

REPLACES REV G WITH CHANGES

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
10	SCREW CAP SOC HD HEX	1000110-302			28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
4	INSULATION SLEEVING	1005776-19		1 3/8 LONG	26
1	SCREW BUT HD, SELF LKG, SPL SOC	1000250-12			25
Ⓙ 1	SCREW, CAP, SELF LKG, HEX, HD, SOC	NAS1352C04LL6			24
Ⓙ 28	SCREW, CAP, SELF LKG, HEX, HD SOC	NAS1352CC4LL4			23
Ⓙ 4	SCREW, CAP, SELF LKG, HEX, HD, SOC	NAS1352C02LL4			22
12	SCREW, CAP SOC HD HEX	1000110-7			21
9	SCREW, CAP SOC HD HEX	1000110-1			20
9	WASHER CABLE CLAMP	1000223			19
3	CLAMP CABLE	1000220-5			18
2	CLAMP CABLE	1000220-4			17
4	CLAMP, CABLE	1000220-3			16
1	WIRING HARNESS "C" O.A.	1000124			15
1	WIRING HARNESS "B" O.A.	1000034			14
1	CLIP, OUTER GIMBAL	1000244			13
2	CLAMP CAPACITOR, OUT. GIMBAL	1000235			12
8	CLAMP, BLOWER	1000157			11
4	COVER, BRACKET CONNECTOR	1000143			10
2	COVER, CONN. MT, OUTER GIMBAL	1000239			9
2	CAPACITOR, FIXED	1010264-38			8
2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
1	REGULATOR, 28 VOLT DC	1000703			6
2	BLOWER, VARIABLE SPEED	1000219			5
2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
2	RESISTOR, FIXED	1010325-500			3
1	HOUSING ASSY, OUTER GIMBAL	1000103			2
1	MIDDLE AXIS ASSEMBLY	1000203			1

LIST OF PARTS AND MATERIALS

1000202 J

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED: DATE 8-5-63
CHECKED
DRAWN MORSE 6-5-63
APPROVED FOR MSC
MIT/IL APPROVAL W. Kupfer DATE 7 Aug 63

OUTER AXIS ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

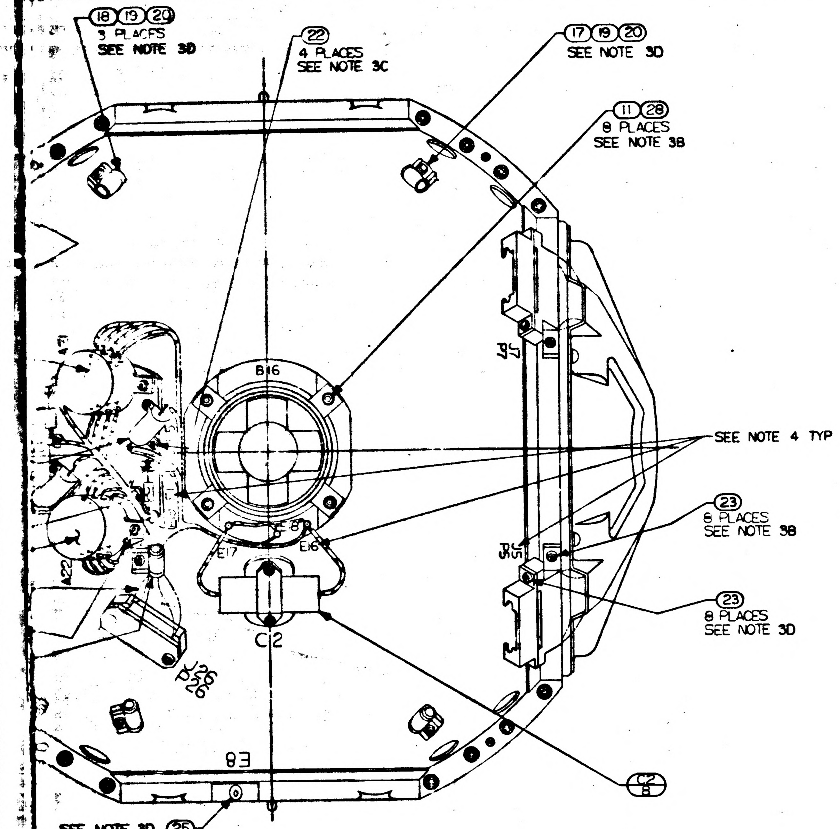
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000202
SHEET 1 OF 1 SHEET

1000202 REV J SH 1

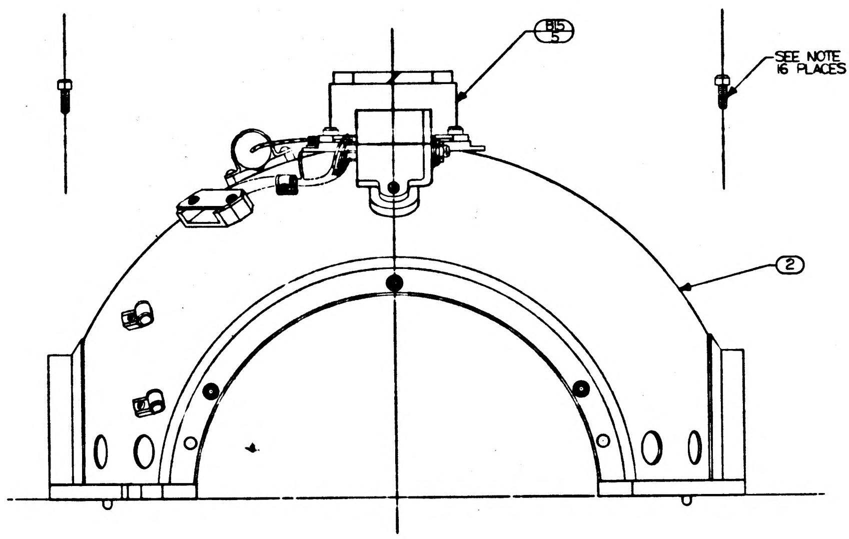
INCHES
PHOTOGRAPHIC SCALE ONLY

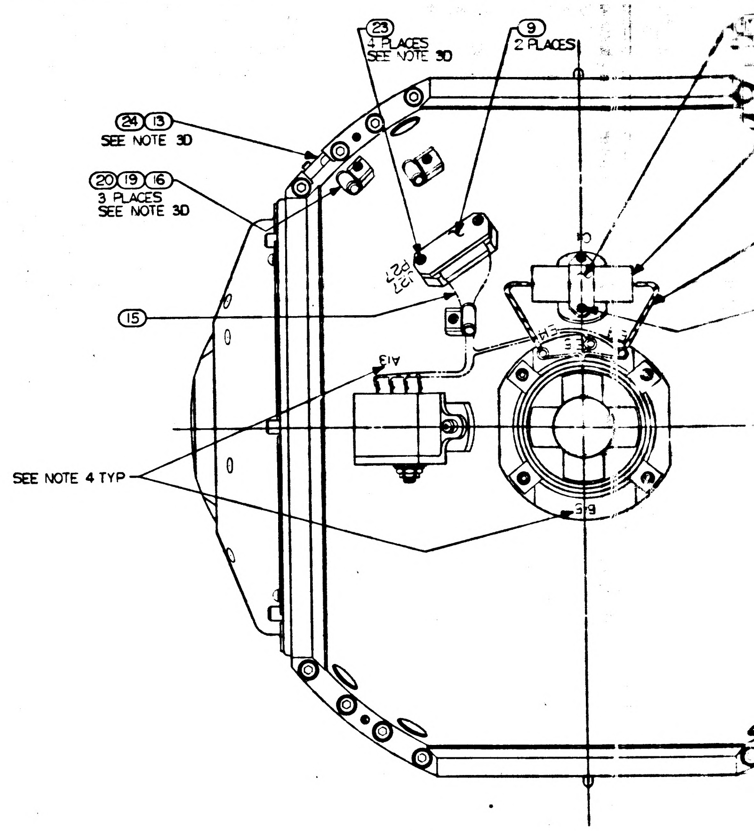
F3

(7H)


18 19 20
3 PLACES
SEE NOTE 3D
22
4 PLACES
SEE NOTE 3C
17 19 20
SEE NOTE 3D
11 28
8 PLACES
SEE NOTE 3B
B16
SEE NOTE 4 TYP
23
8 PLACES
SEE NOTE 3B
23
8 PLACES
SEE NOTE 3D
J7
P7
J5
P5
E8
E17
E16
C2
A21
A22
J26
P26
E8
C2
8
SEE NOTE 3D 25

VIEW **A-A**


B15
5
SEE NOTE 3A
16 PLACES
2


23
4 PLACES
SEE NOTE 3D
9
2 PLACES
24 13
SEE NOTE 3D
20 19 16
3 PLACES
SEE NOTE 3D
J27
P27
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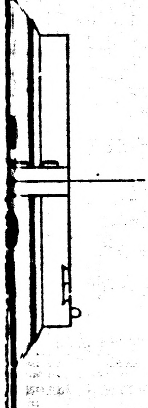
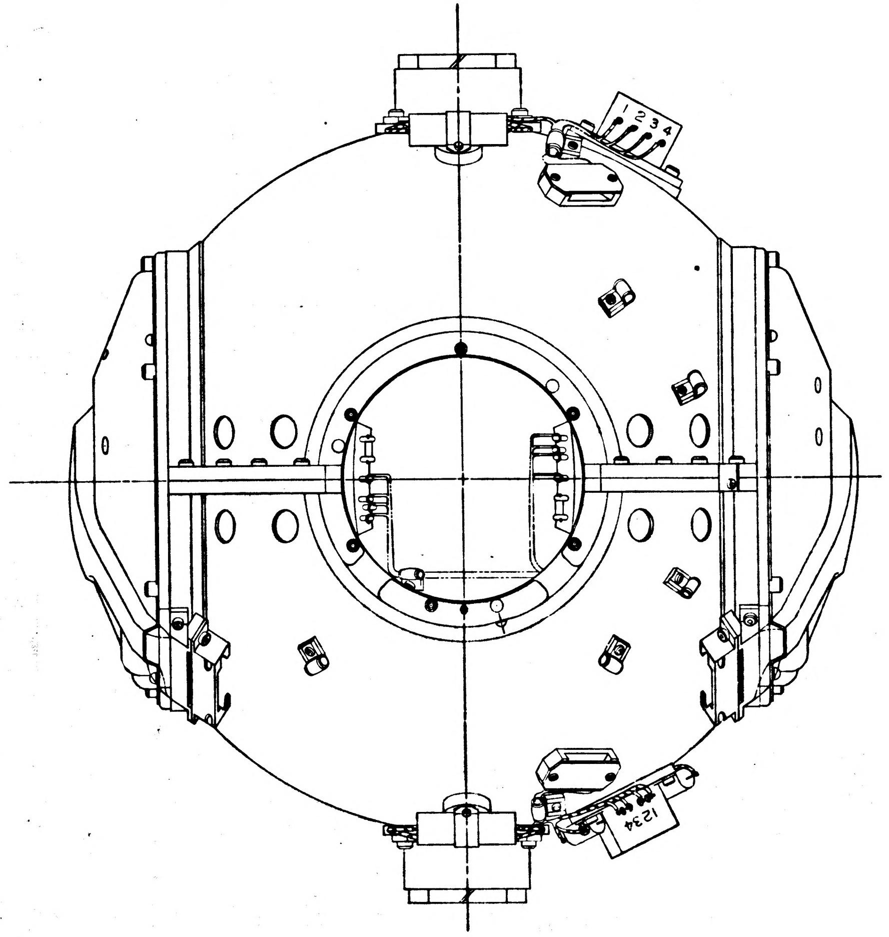
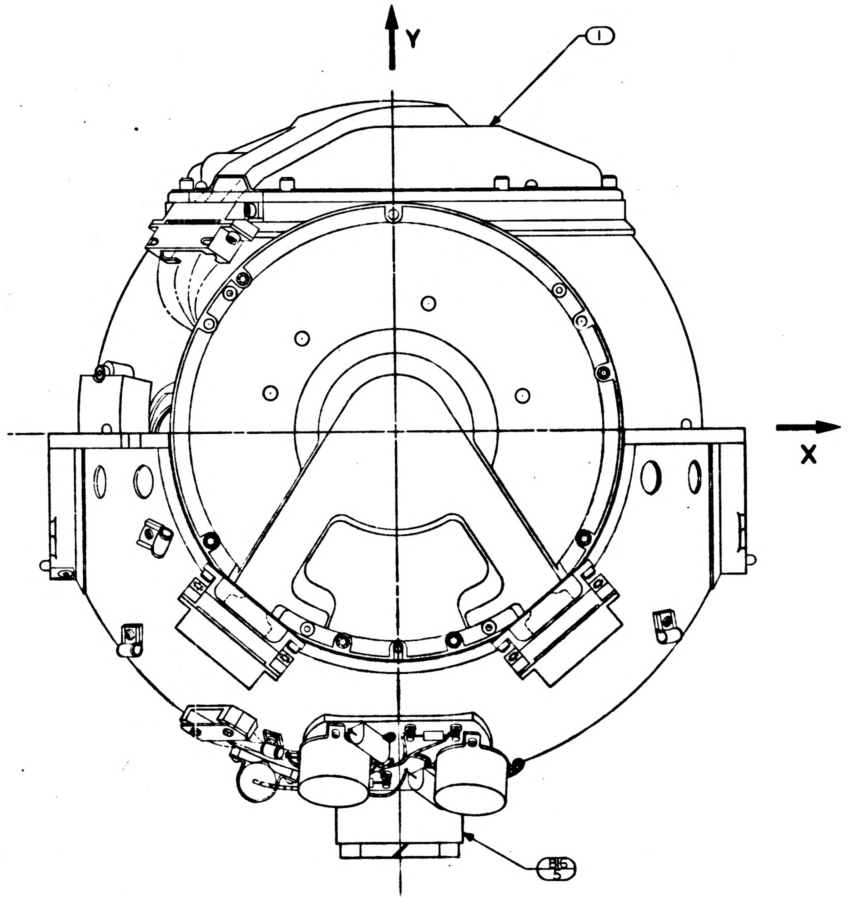
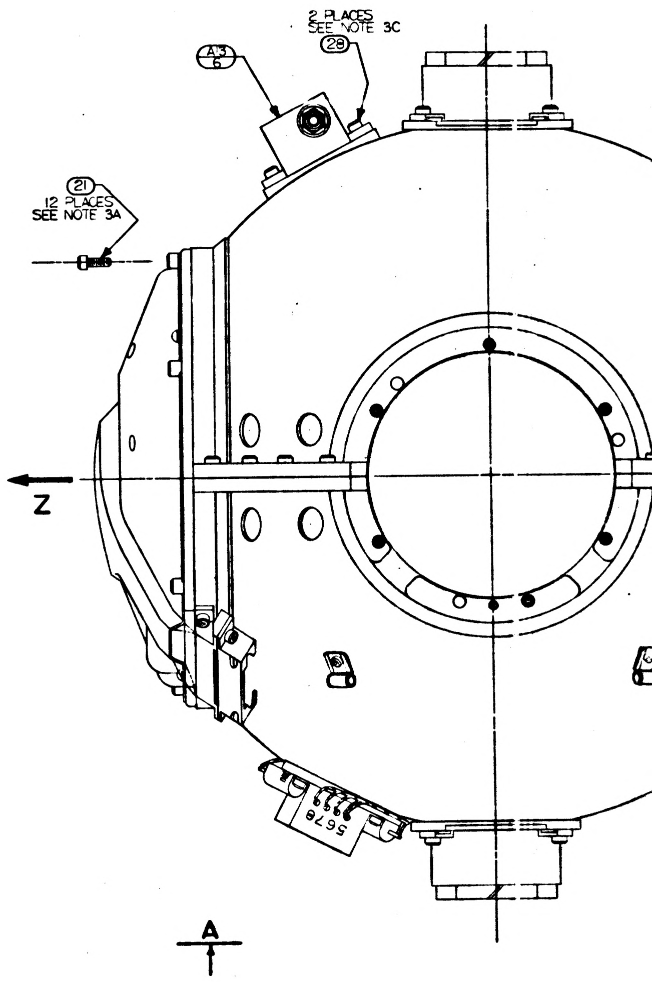
A13
E4
SEE NOTE 4 TYP
B9







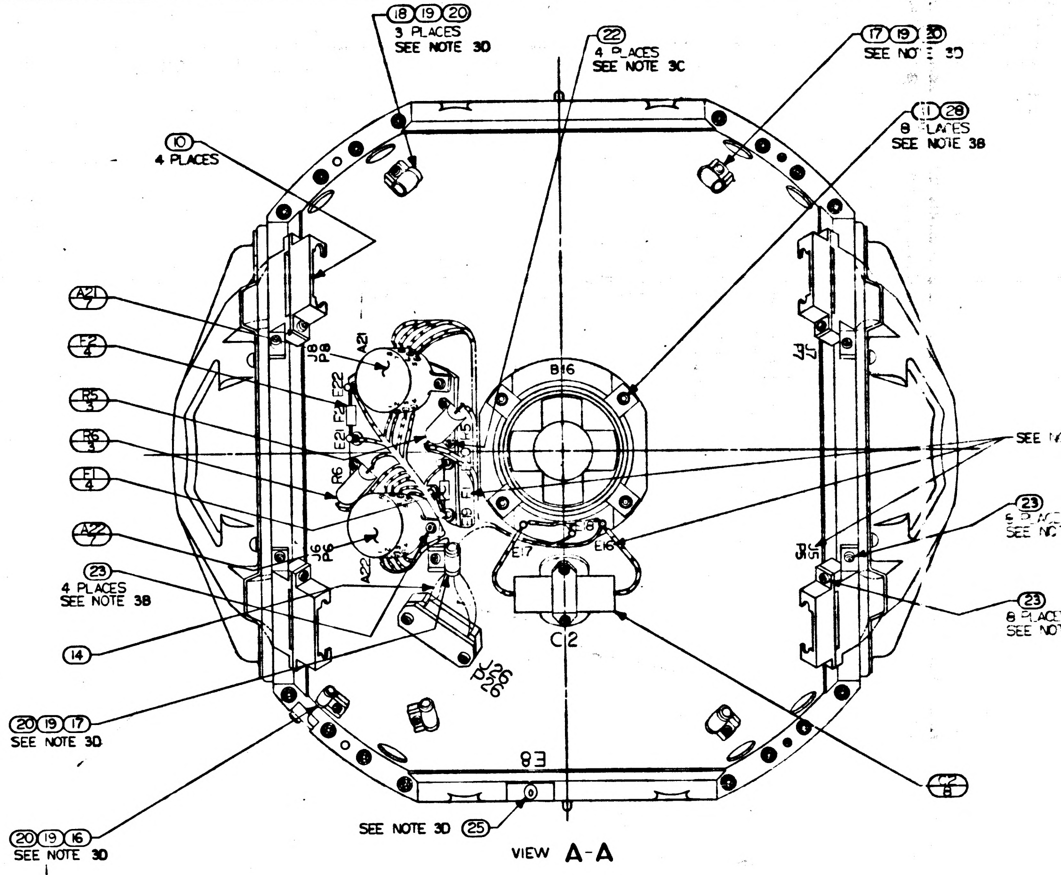

A3
6
2 PLACES
SEE NOTE 3C
28
21
12 PLACES
SEE NOTE 3A
Z
5 6 7 8
A

1000202	REV. J	SHT. 1

INCHES
PHOTOGRAPHIC SCALE ONLY

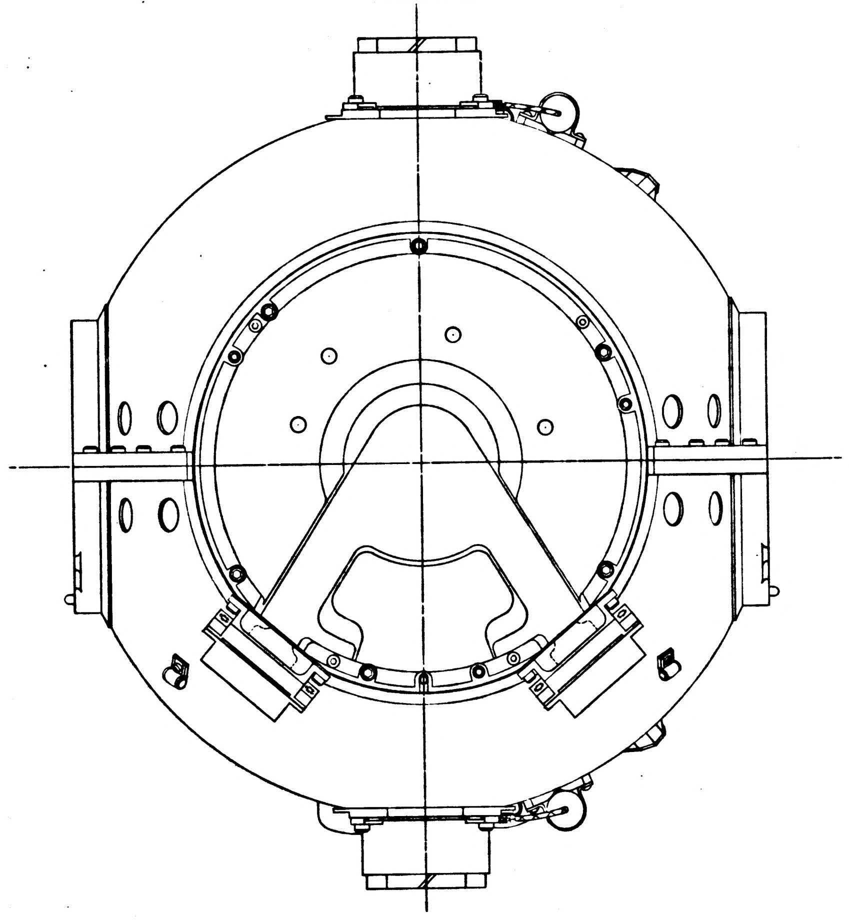
F-2

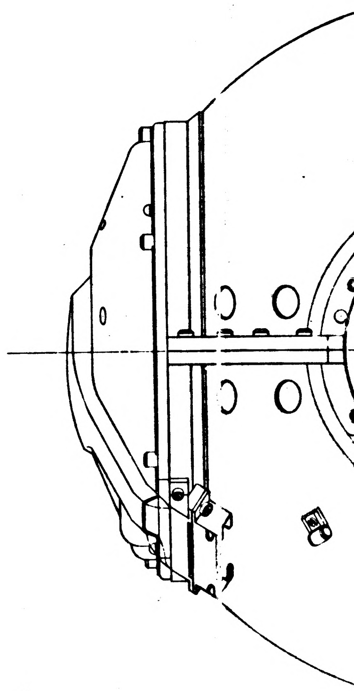
WIRING LEGEND					
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15-T1	E15	
2	RED		B15-T4	E13	
3	GRN		B15-T5	E14	
4	YEL		B16-T1	E18	
5	RED		B16-T4	E16	
6	GRN		B16-T5	E17	



(18)(19)(20)
3 PLACES
SEE NOTE 30
(22)
4 PLACES
SEE NOTE 3C
(17)(19)(20)
SEE NOTE 3D
(11)(28)
8 PLACES
SEE NOTE 3B
(10)
4 PLACES
A21 / 7
F2 / 4
R5 / 3
R6 / 3
F1 / 4
A22 / 7
(23)
4 PLACES
SEE NOTE 3B
(14)
(20)(19)(17)
SEE NOTE 3D
(20)(19)(16)
SEE NOTE 3D
SEE NOTE 3D (25)
C2 / 8
(23)
8 PLACES
SEE NO
(23)
8 PLACES
SEE NO
SEE N
J8
P8
A21
E22
F2
E21
R6
J6
P6
A22
R5
F1
E19
B16
E18
E17
E16
C2
J26
P26
E8
J7
P7
J5
P5

VIEW A-A

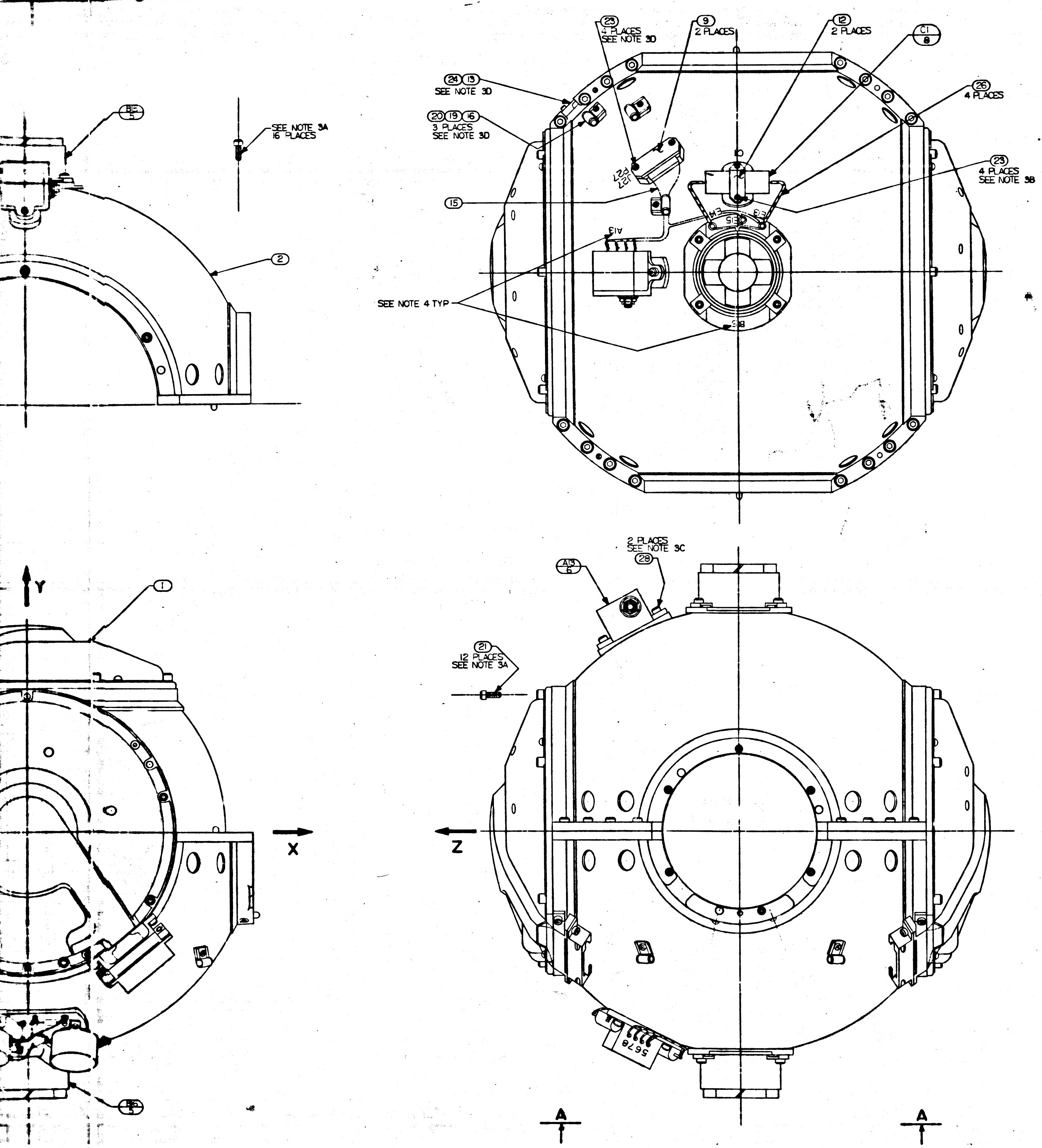




NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
    - A. 10.0 IN. LB.
    - B. 5.0 IN. LB.
    - C. 3.5 IN. LB.
    - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING (27); WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63		WK
	J	TDRR 03187	9-17-63		WK
	K	TDRR 06177	2-5-64		WK
	L	TDRR 06240	2-11-64		WK



23
4 PLACES
SEE NOTE 3D
9
2 PLACES
12
2 PLACES
C1
8
24 13
SEE NOTE 3D
20 19 16
3 PLACES
SEE NOTE 3D
26
4 PLACES
23
4 PLACES
SEE NOTE 3B
15
A13
SEE NOTE 4 TYP
SEE NOTE 3A
16 PLACES
2
1
Y
X
Z
A13
2 PLACES
SEE NOTE 3C
28
21
12 PLACES
SEE NOTE 3A
A
A

REPLACES REV G WITH CHANGES

MASTER

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(K)	2	SLEEVING, HEAT SHRINK	1010490-078			29
	10	SCREW CAP SOC HD HEX	1000110-302			28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	4	INSULATION SLEEVING	1006776-19		1 3/8 LONG	26
(K)	3	SCREW, BUT. HD, SELF, LKG, SPL SOC	1000250-12			25
(J)	1	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL6			24
(J)	28	SCREW, CAP, SELF, LKG, HEX, HD SOC	NAS1352C04LL4			23
(J)	4	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C02LL4			22
	12	SCREW, CAP SOC HD HEX	1000110-7			21
	9	SCREW, CAP SOC HD HEX	1000110-1			20
	9	WASHER, CABLE CLAMP	1000223			19
	4	CLAMP, CABLE	1000220-5			18
(L)	1	CLAMP, CABLE	1000220-4			17
	4	CLAMP, CABLE	1000220-3			16
	1	WIRING HARNESS "C" O.A.	1000124			15
	1	WIRING HARNESS "B" O.A.	1000034			14
	1	CLIP, OUTER GIMBAL	1000244			13
	2	CLAMP, CAPACITOR, OUT. GIMBAL	1000235			12
	8	CLAMP BLOWER	1000157			11
	4	COVER, BRACKET, CONNECTOR	1000143			10
	2	COVER, CONN. MT., OUTER GIMBAL	1000239			9
	2	CAPACITOR, FIXED	1010264-38			8
	2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
	1	REGULATOR, 28 VOLT DC	1007013			6
	2	BLOWER, VARIABLE SPEED	1000219			5
	2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
	2	RESISTOR, FIXED	1010325-500			3
	1	HOUSING ASS'Y, OUTER GIMBAL	1000103			2
	1	MIDDLE AXIS ASSEMBLY	1000203			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED | DATE 8-5-63
CHECKED
DRAWN MORSE 6-3-63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE
WKupfer 7 Aug 63

OUTER I AXIS ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT

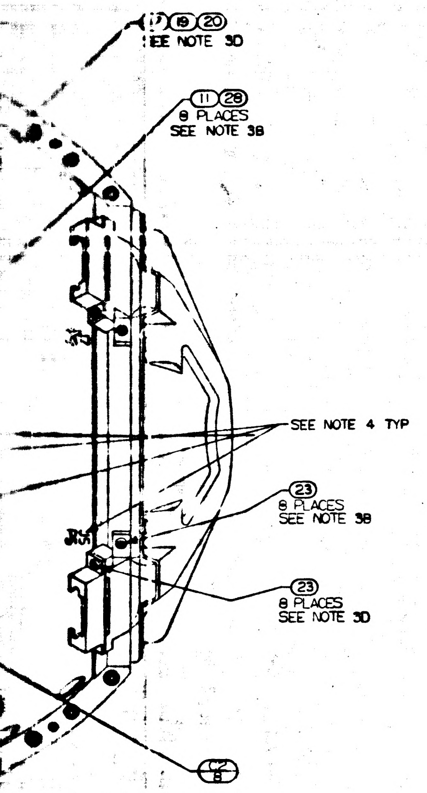
MIT
INSTRUMENTATION
LABORATORY
Cambridge, Mass.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000202
SHEET 1 OF 1 SHEET

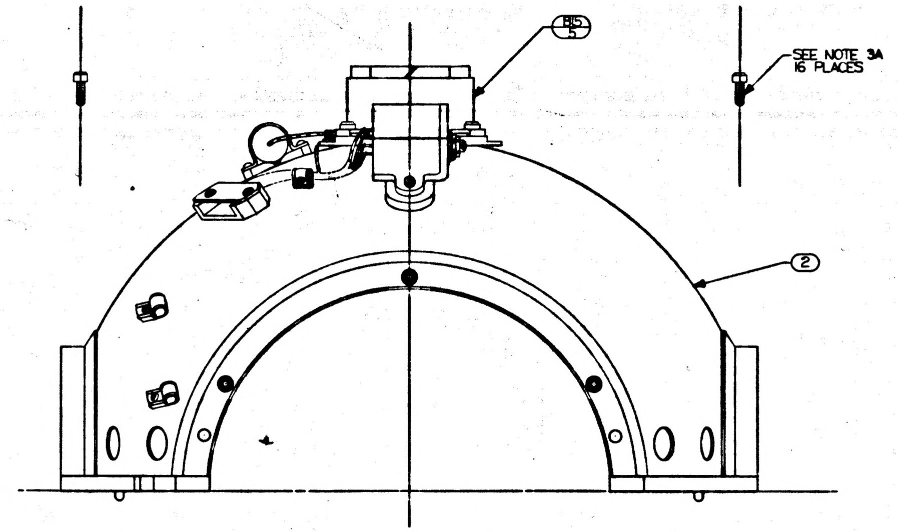
L
1000202

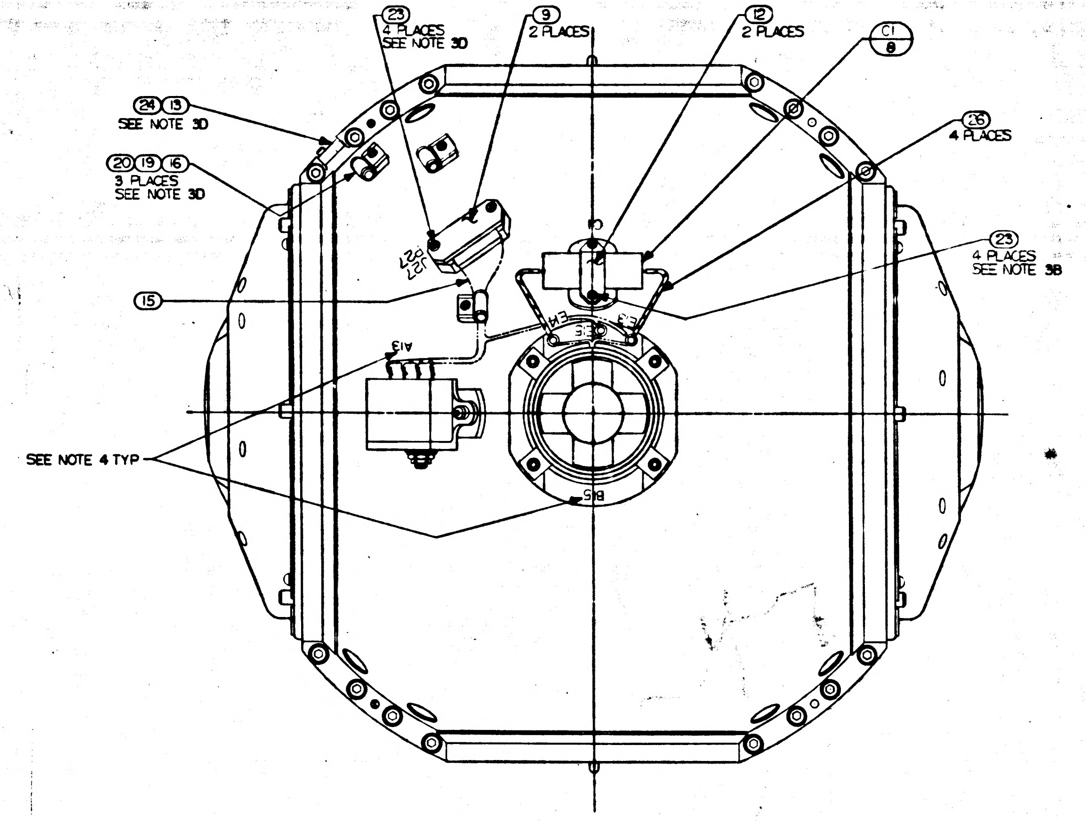
1000505

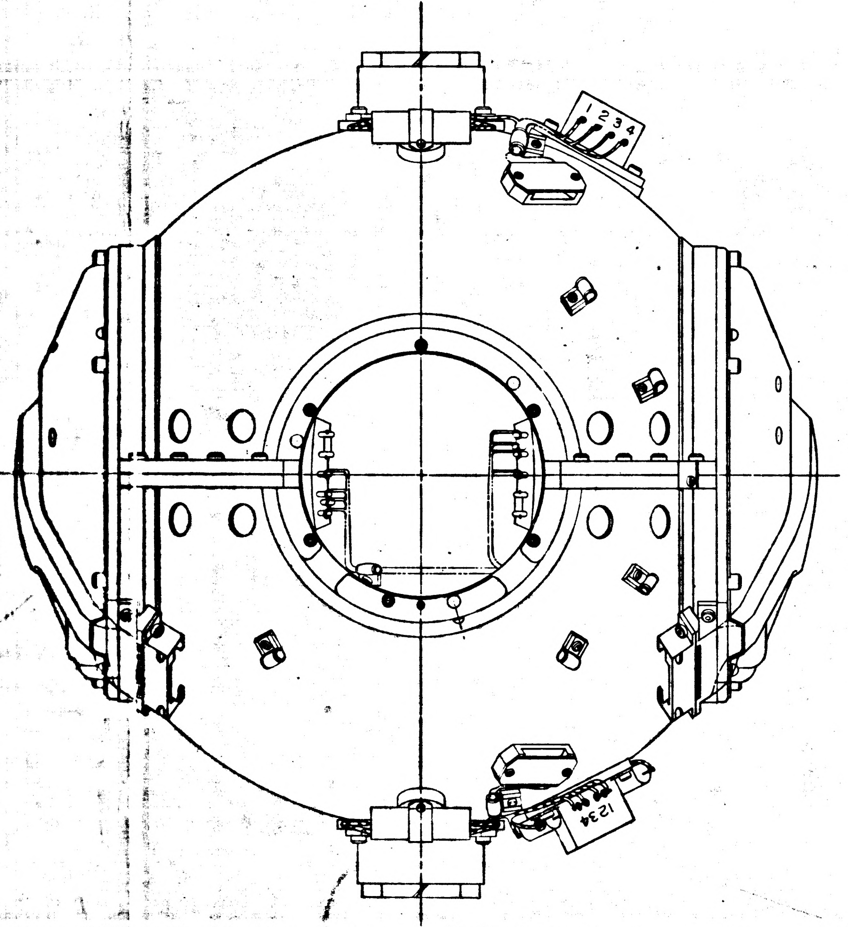
(34)

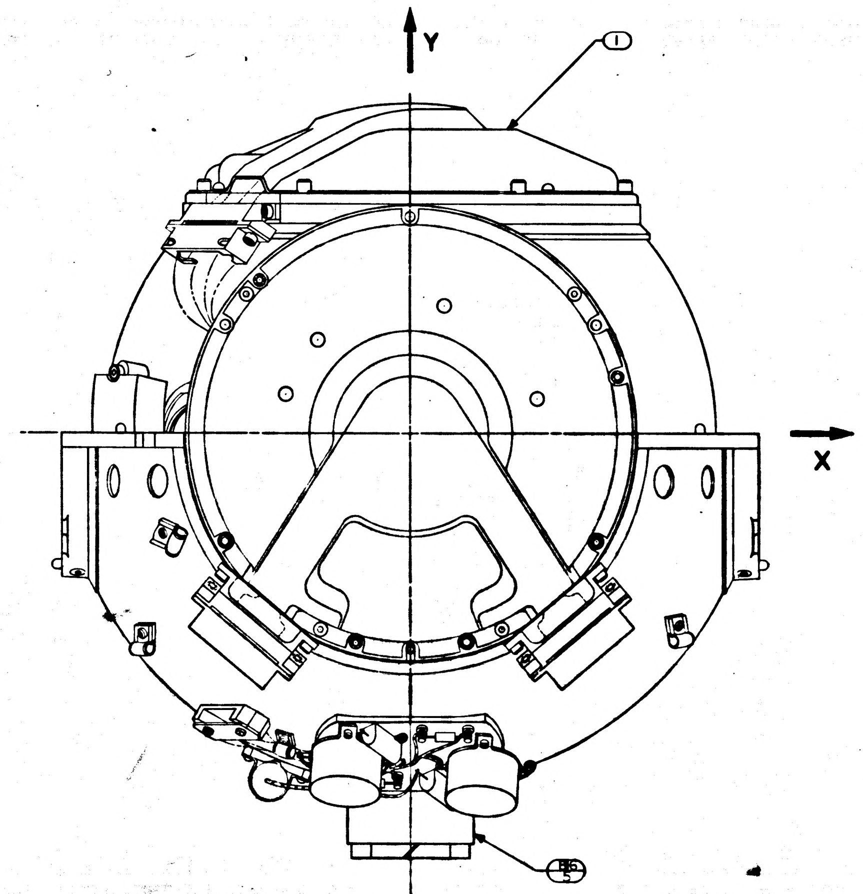
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

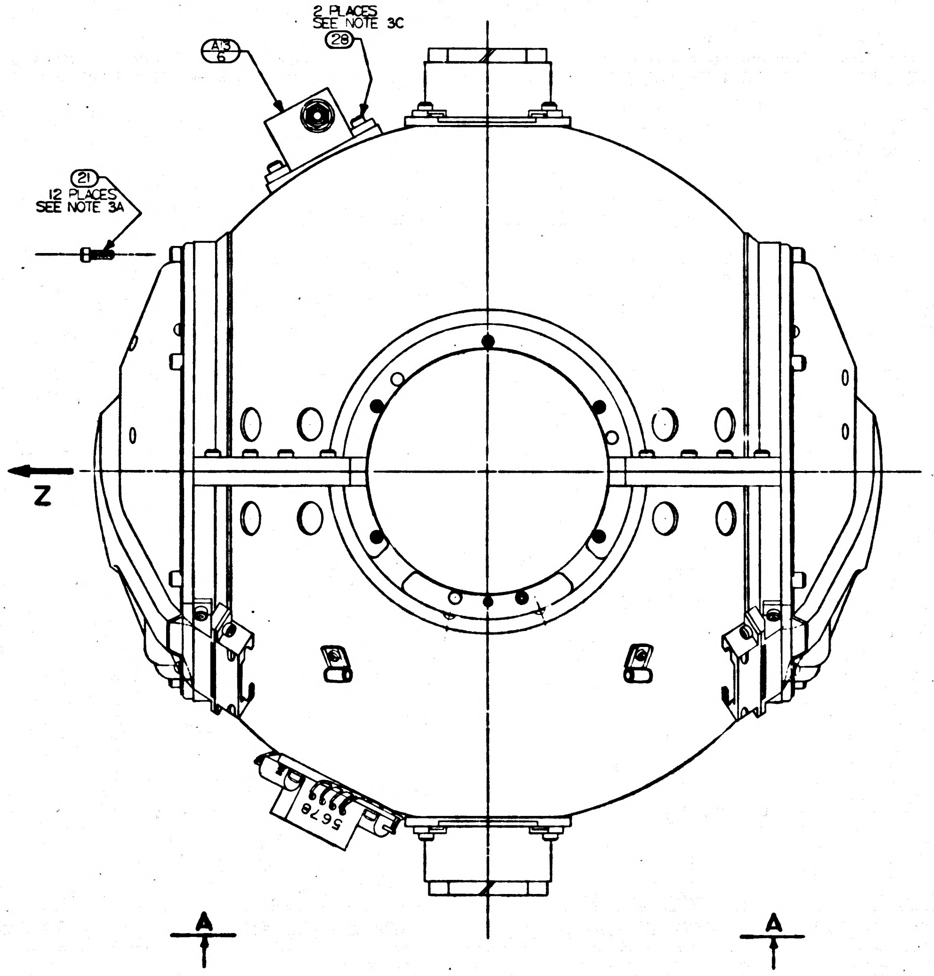

17 19 20
SEE NOTE 3D
11 28
8 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
23
8 PLACES
SEE NOTE 3B
23
8 PLACES
SEE NOTE 3D
C2
8


B15
5
SEE NOTE 3A
16 PLACES
2


23
4 PLACES
SEE NOTE 3D
9
2 PLACES
12
2 PLACES
C1
8
24 13
SEE NOTE 3D
20 19 16
3 PLACES
SEE NOTE 3D
26
4 PLACES
23
4 PLACES
SEE NOTE 3B
15
J27
P27
C1
E4
E3
E5
A13
SEE NOTE 4 TYP
B15





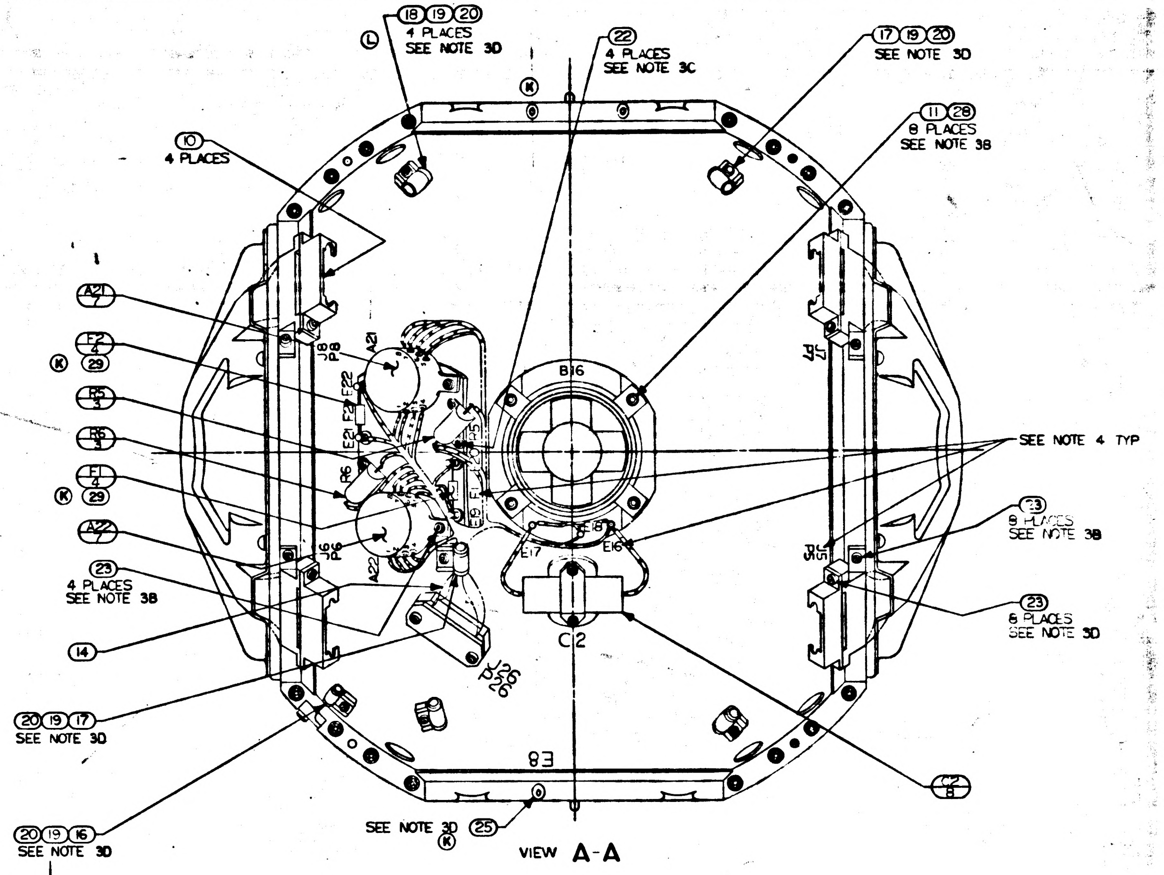

2 PLACES
SEE NOTE 3C
28
A13
6
21
12 PLACES
SEE NOTE 3A
Z
5 6 7 8
A
A

REPLAC

MAST

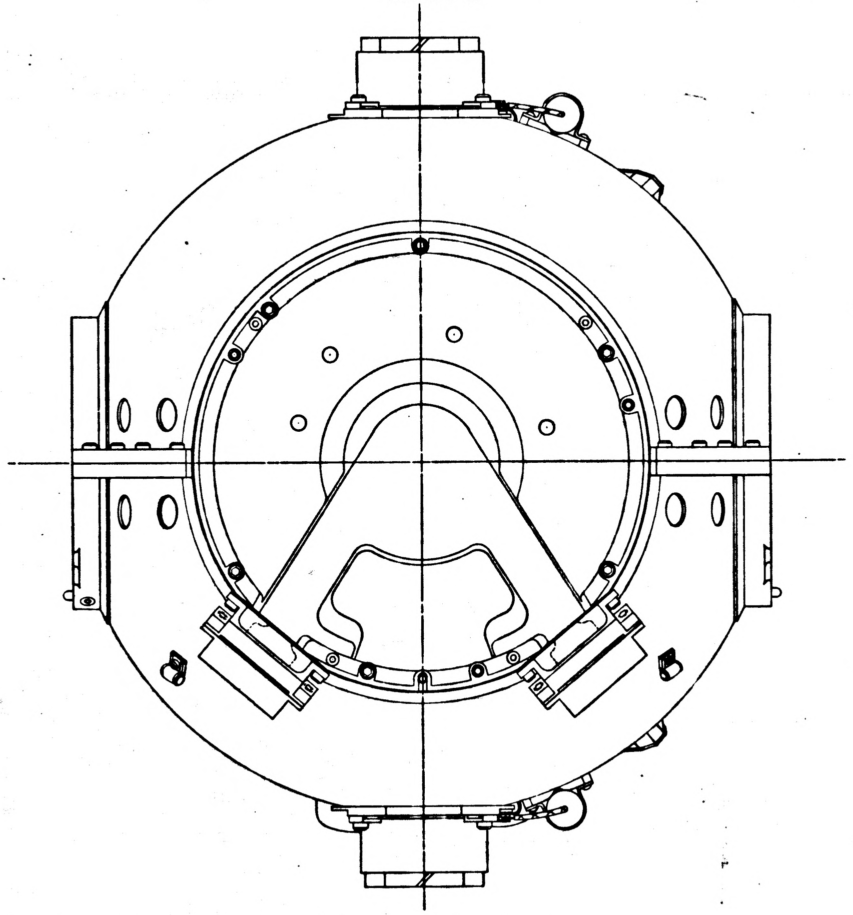
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

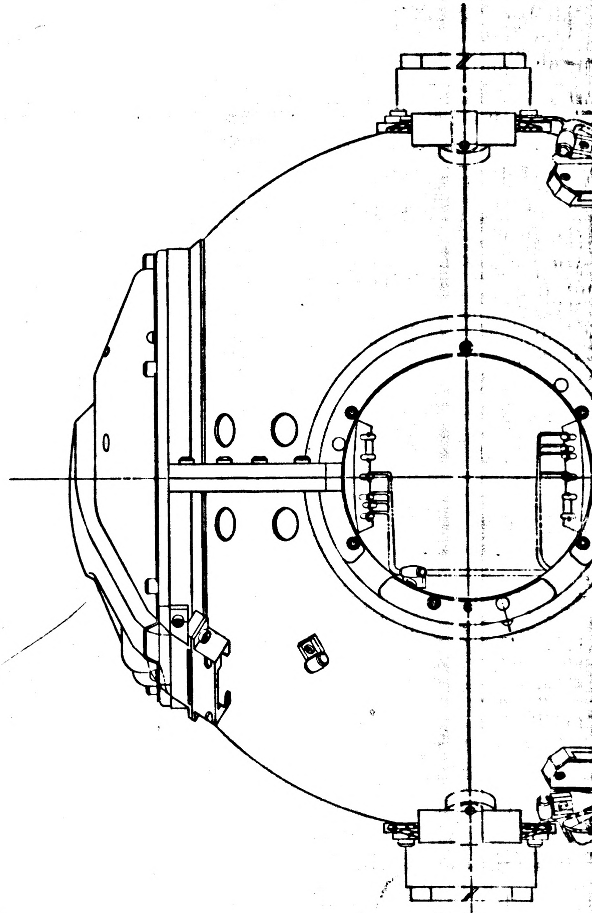
WIRING LEGEND					
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15-T1	E15	
2	RED		B15-T4	E13	
3	GRN		B15-T5	E14	
4	YEL		B16-T1	E18	
5	RED		B16-T4	E16	
6	GRN		B16-T5	E17	



(18)(19)(20)
4 PLACES
SEE NOTE 3D
(L)
(22)
4 PLACES
SEE NOTE 3C
(K)
(17)(19)(20)
SEE NOTE 3D
(11)(28)
8 PLACES
SEE NOTE 3B
(10)
4 PLACES
A21 7
F2 4
(K) (29)
R5 3
R6 3
F1 4
(K) (29)
A22 7
(23)
4 PLACES
SEE NOTE 3B
(14)
(20)(19)(17)
SEE NOTE 3D
(20)(19)(16)
SEE NOTE 3D
SEE NOTE 3D (25)
(K)
J8 P8
A21
F22
F2
E21
R6
R5
E20
F1
E19
J6 P6
A22
J26 P26
B16
E18
E17
E16
C2
E8
J7 P7
J5 P5
SEE NOTE 4 TYP
(23)
8 PLACES
SEE NOTE 3B
(23)
8 PLACES
SEE NOTE 3D
C2 8

VIEW A-A





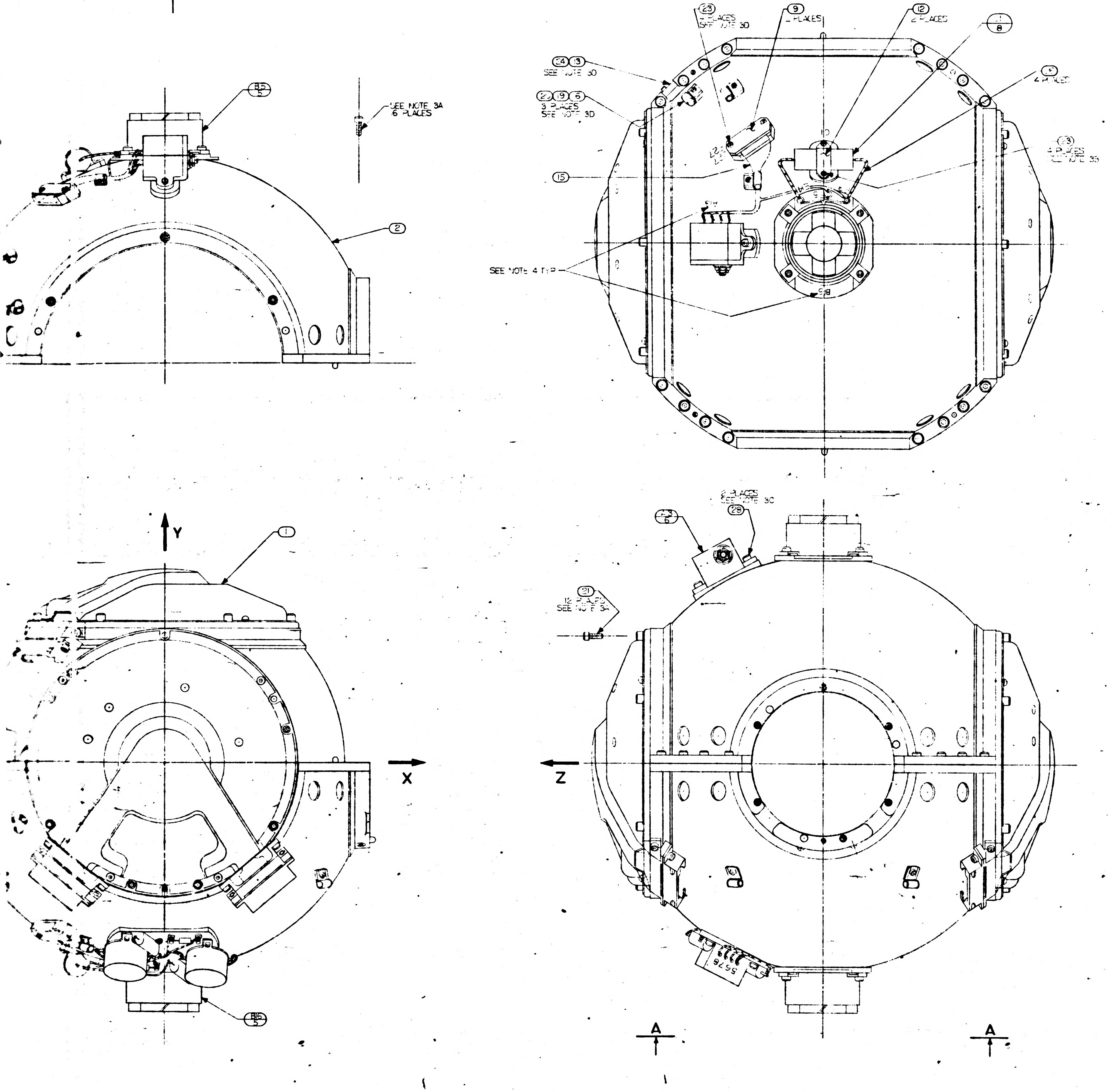
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 3.5 IN. LB.
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

	REV	SH
1000202	J	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63		WK
	J	TDRR 03187	9-17-63		WK
	K	TDRR 06177	2-6-64		WK
	L	TDRR 06240	2-11-64		WK
	M	REVISED PER TDRR 07576	17 APR 64	JHR	



(23) 4 PLACES SEE NOTE 3D
(9) 2 PLACES
(12) 2 PLACES
(21)/(8)
(24)(13) SEE NOTE 3D
(20)(19)(6) 3 PLACES SEE NOTE 3D
(3) 4 PLACES
(23) 4 PLACES SEE NOTE 3D
(15)
SEE NOTE 4 TYP
B15
E4
E5
SEE NOTE 3A 6 PLACES
(2)
(1)
Y
X
Z
(25) 6
(29) 2 PLACES SEE NOTE 3C
(21) 12 PLACES SEE NOTE 3A
A
A

REPLACES REV G WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	SLEEVING, HEAT SHRINK	1010490-078			29
10	SCREW CAP SOC HD HEX	1000110-302			28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
4	INSULATION SLEEVING	1006776-19		1 3/8 LONG	26
3	SCREW, BUT. HD, SELF, LKG. SPL. SOC	1000250-12			25
1	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL6			24
28	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL4			23
4	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C02LL4			22
12	SCREW, CAP SOC HD HEX	1000110-7			21
9	SCREW, CAP SOC HD HEX	1000110-1			20
9	WASHER, CABLE CLAMP	1000223			19
4	CLAMP, CABLE	1000220-5			18
1	CLAMP, CABLE	1000220-4			17
4	CLAMP, CABLE	1000220-3			16
1	WIRING HARNESS "C" O.A.	1000124			15
1	WIRING HARNESS "B" O.A.	1000034			14
1	CLIP, OUTER GIMBAL	1000244			13
2	CLAMP, CAPACITOR, OUT. GIMBAL	1000235			12
8	CLAMP, BLOWER	1000157			11
4	COVER, BRACKET, CONNECTOR	1000143			10
2	COVER, CONN. MT., OUTER GIMBAL	1000239			9
2	CAPACITOR, FIXED	1010264-38			8
2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
1	REGULATOR, 28 VOLT DC	1007013			6
2	BLOWER, VARIABLE SPEED	1000219			5
2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
2	RESISTOR, FIXED	1010325-500			3
1	HOUSING ASS'Y, OUTER GIMBAL	1000103			2
1	MIDDLE AXIS ASSEMBLY	1000208			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9 153
APPROVED [illegible] DATE 8 5 63
CHECKED
DRAWN
APPROVED FOR MSC
MIT/IL APPROVAL W. Kupfer DATE 7 Aug 63

OUTER AXIS ASSEMBLY

SCALE
UNIT WT
CODE IDENT

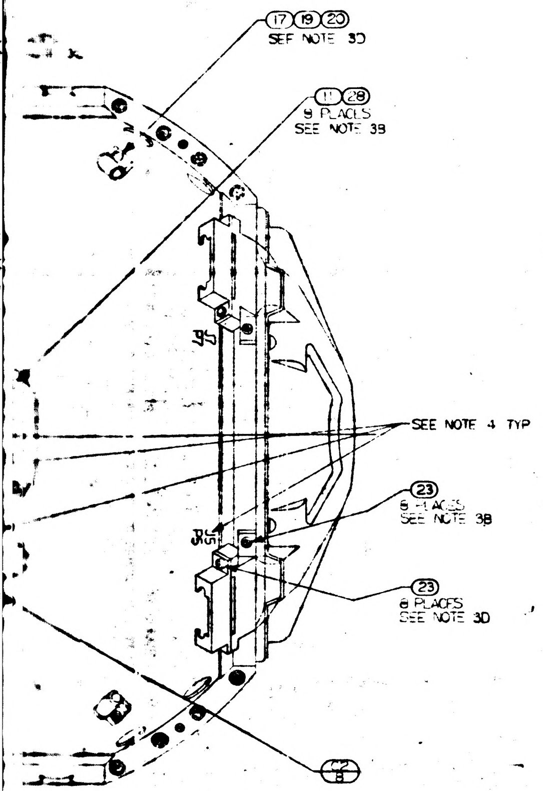
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000202
SHEET 1 OF [illegible]

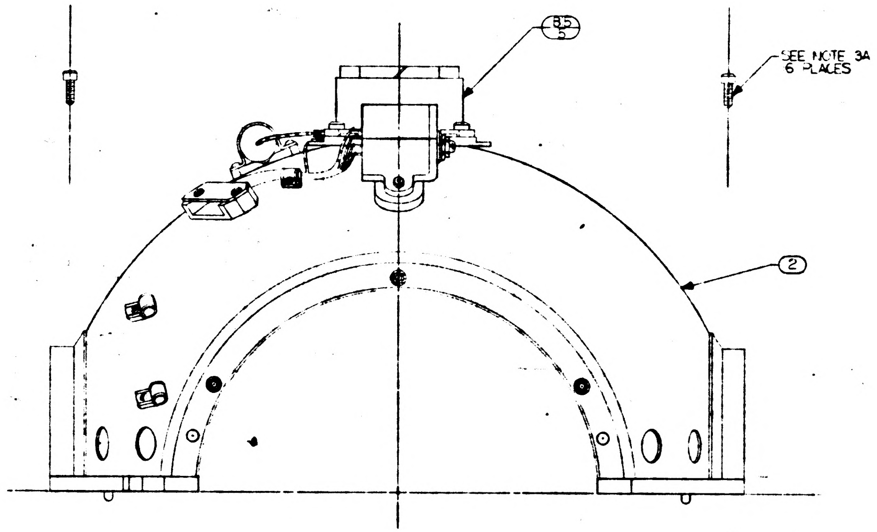
M
1000202

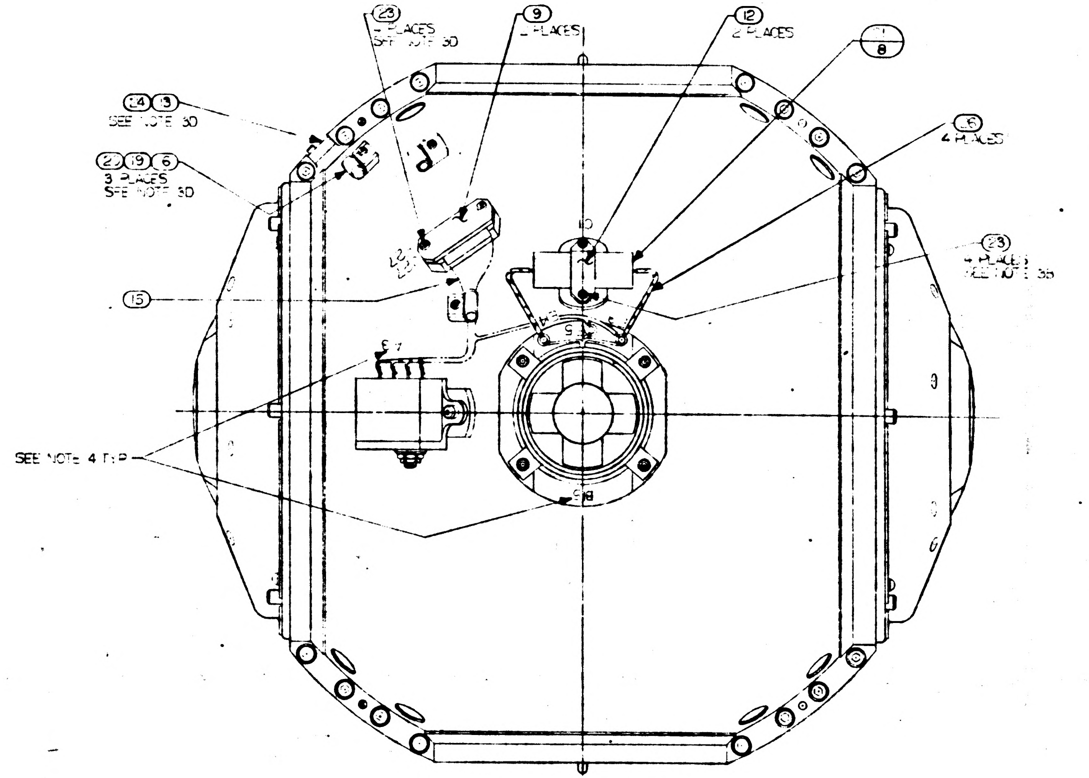
3

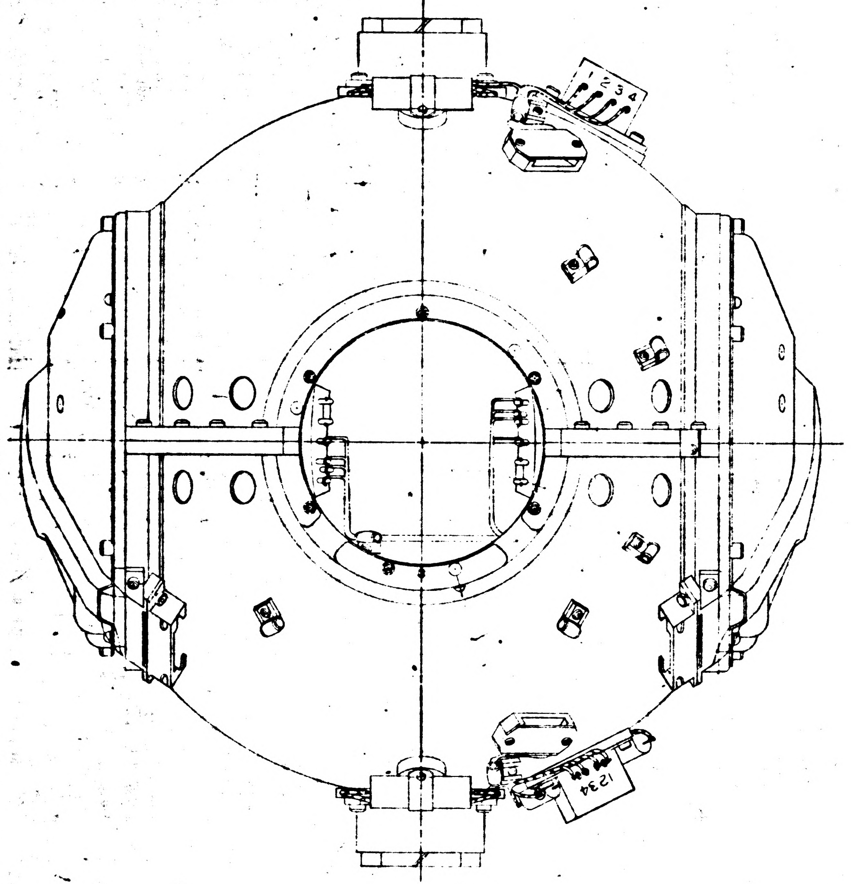
1000202 M

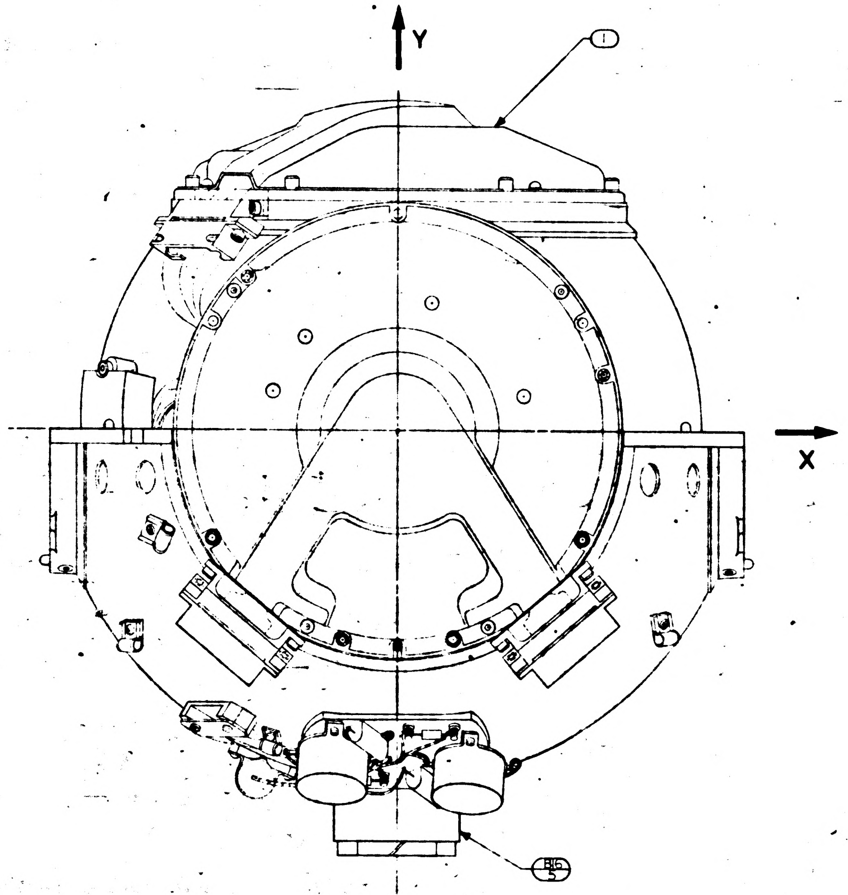
(34)

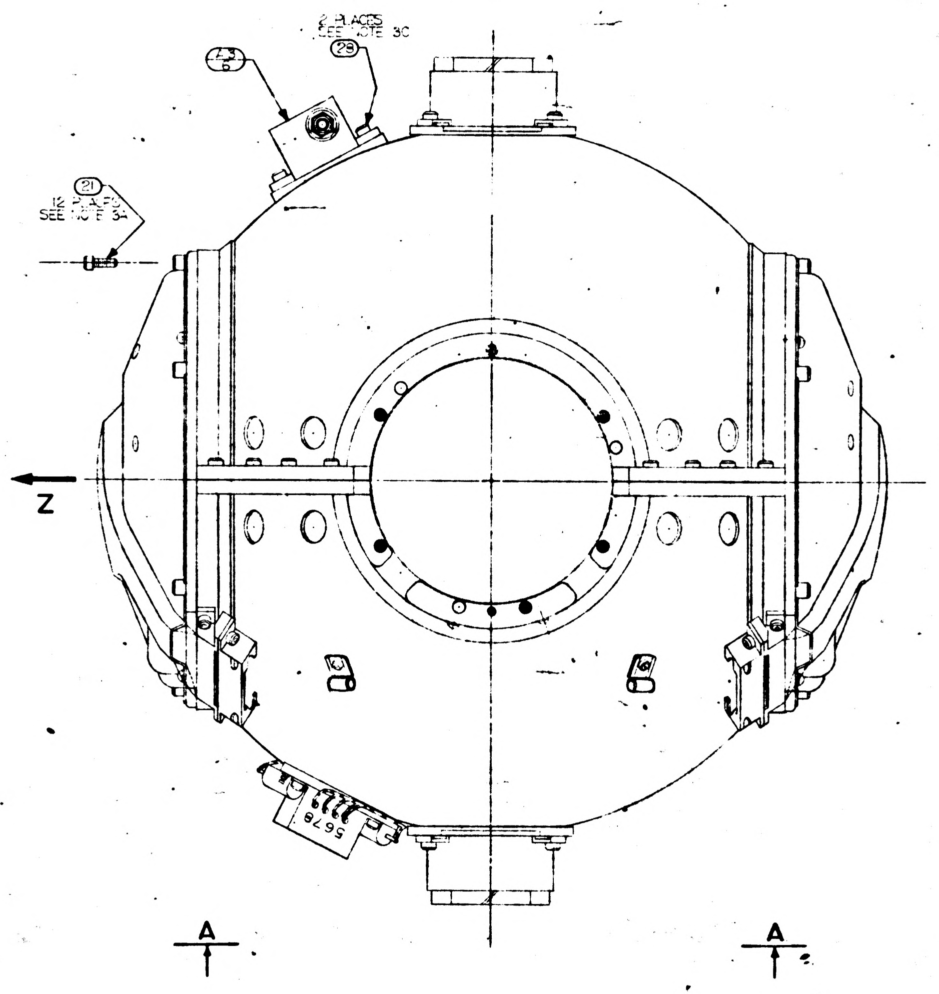

17 19 20
SEF NOTE 3D
11 28
9 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
23
6 PLACES
SEE NOTE 3B
23
8 PLACES
SEE NOTE 3D
22
8


SEE NOTE 3A
6 PLACES


23
4 PLACES
SEE NOTE 3D
9
2 PLACES
12
2 PLACES
8
24 13
SEE NOTE 3D
22 19 6
3 PLACES
SEE NOTE 3D
16
4 PLACES
23
4 PLACES
SEE NOTE 3B
15
SEE NOTE 4 TYP



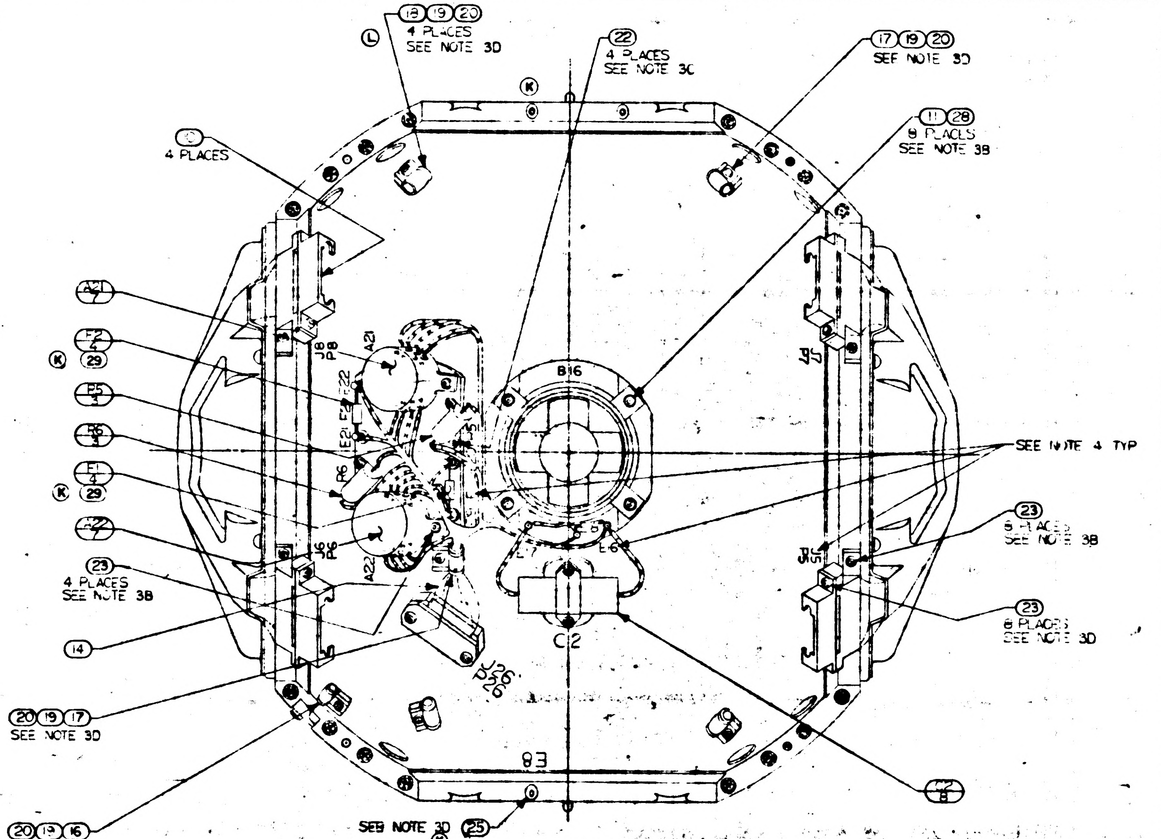

Y
X


43
5
2 PLACES
SEE NOTE 3C
29
21
12 PLACES
SEE NOTE 3A
Z
A
A

2 1000202 M 1

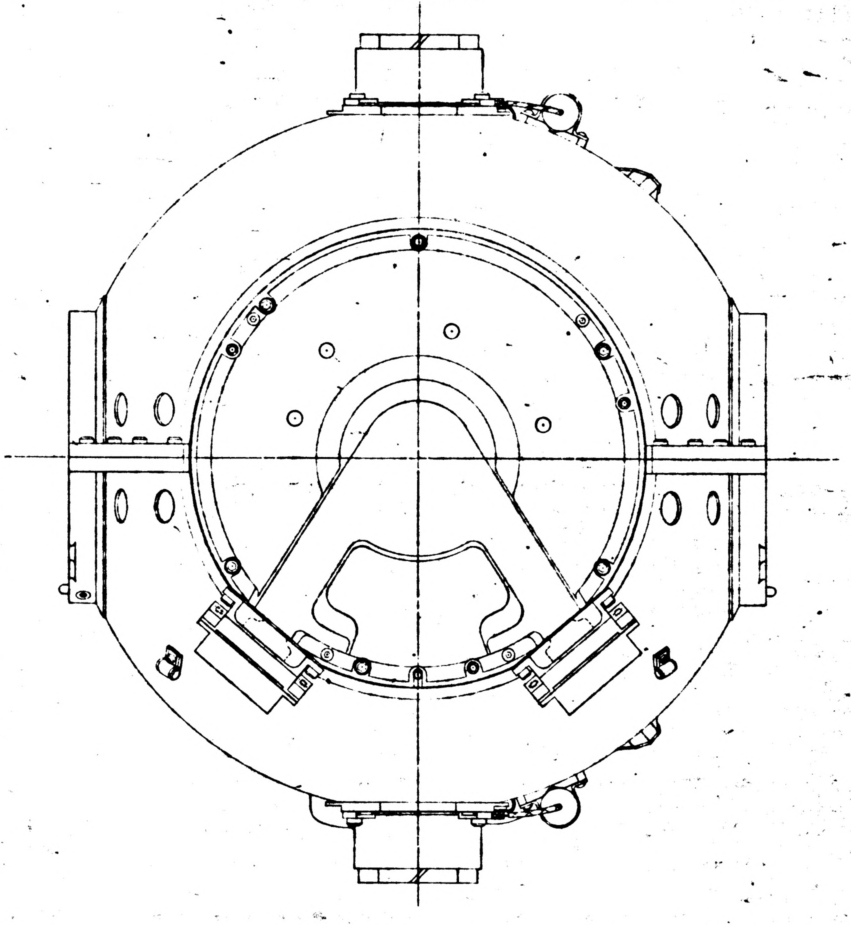
1000505

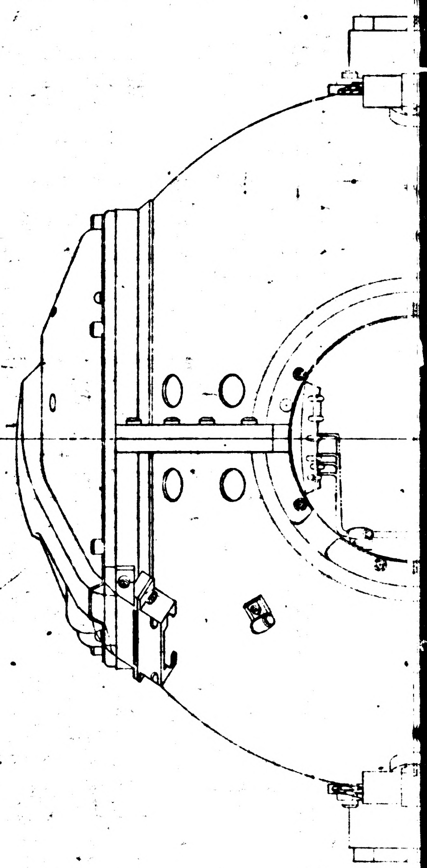
WIRING LEGEND					
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15-T1	E15	
2	RED		B15-T4	E13	
3	GRN		B15-T5	E14	
4	YEL		B16-T1	E18	
5	RED		B16-T4	E16	
6	GRN		B16-T5	E17	



⑱⑲⑳ 4 PLACES SEE NOTE 3D
Ⓛ
㉒ 4 PLACES SEE NOTE 3C
⑰⑲⑳ SEE NOTE 3D
⑪㉘ 8 PLACES SEE NOTE 3B
⑩ 4 PLACES
Ⓚ
A21 7
F2 4
Ⓚ ㉙
P5 3
P6 3
F1 4
Ⓚ ㉙
A22 7
㉓ 4 PLACES SEE NOTE 3B
⑭
⑳⑲⑰ SEE NOTE 3D
⑳⑲⑯ SEE NOTE 3D
SEE NOTE 3D ㉕
Ⓚ
J8 P8
A21
E22
E21
P6
J6 P6
A22
B16
E7
E6
C2
J26 P26
E3
J7
J5
SEE NOTE 4 TYP
㉓ 8 PLACES SEE NOTE 3B
㉓ 8 PLACES SEE NOTE 3D
C2 8

VIEW A-A





NOTES

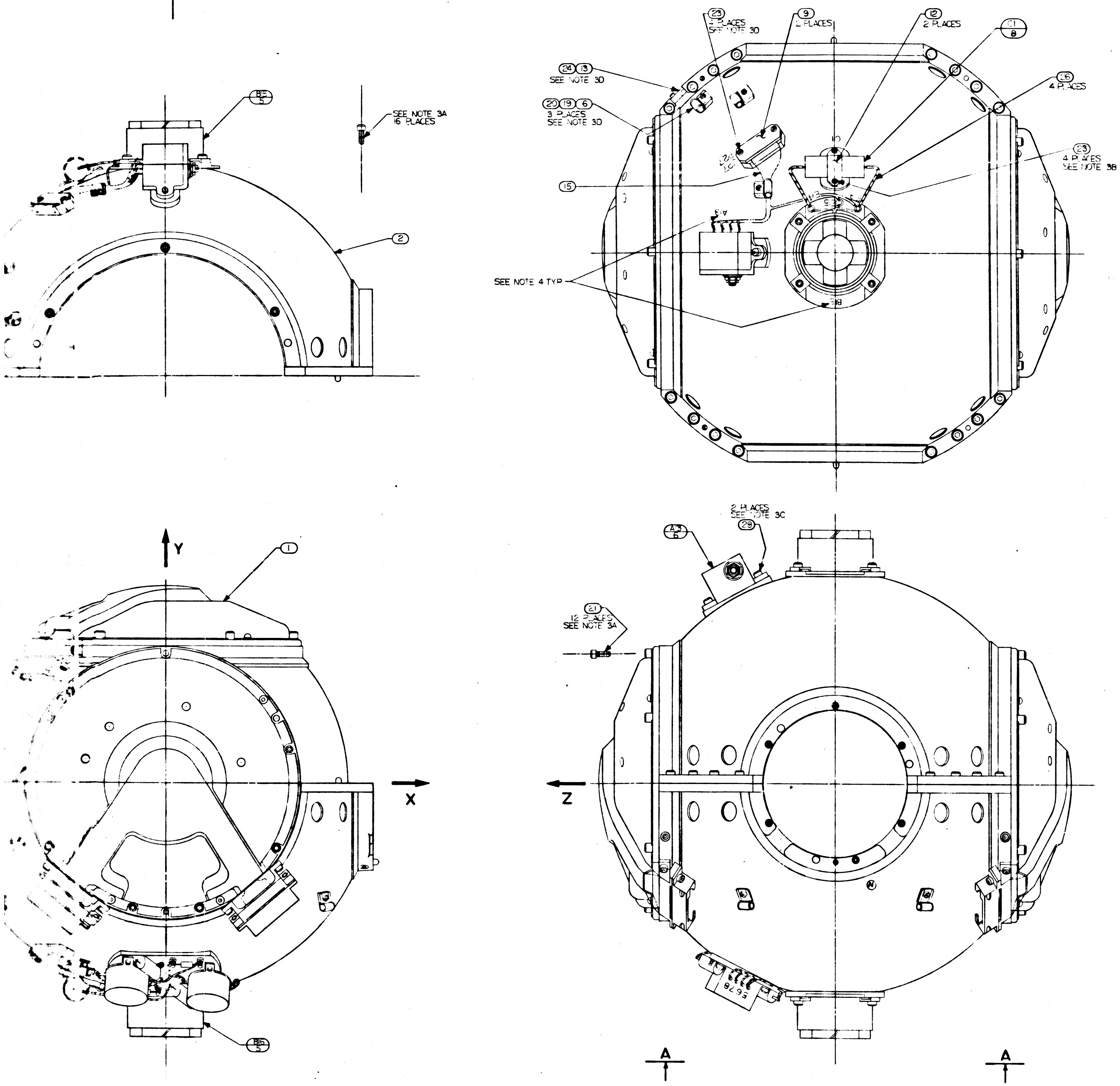
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 3.5 IN. LB.
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

D C B A

1

	REV	SHT
1000202	J	1

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63		WK
	J	TDRR 03187	9-17 63		WK
	K	TDRR 06177	2-6-64		WK
	L	TDRR 06240	2-11-64		WK
	M	REVISED PER TDRR 07576	17 APR 64	JHR	
	N	REVISED PER TDRR 08082	12 MAY 64	JG	CP



REPLACES REV G WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
Ⓚ	2	SLEEVING, HEAT SHRINK	1010490-078			29
	10	SCREW CAP SOC HD HEX	1000110-302			28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	4	INSULATION SLEEVING	1006776-19		1 3/16 LONG	26
Ⓚ Ⓝ	4	SCREW, BUT. HD, SELF, LKG. SPL. SOC	1000250-12			25
Ⓙ	1	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL6			24
Ⓙ	28	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL4			23
Ⓙ	4	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C02LL4			22
	12	SCREW, CAP SOC HD HEX	1000110-7			21
	9	SCREW, CAP SOC HD HEX	1000110-1			20
	9	WASHER, CABLE CLAMP	1000223			19
Ⓛ	4	CLAMP, CABLE	1000220-5			18
	1	CLAMP, CABLE	1000220-4			17
	4	CLAMP, CABLE	1000220-3			16
	1	WIRING HARNESS "C" O.A.	1000124			15
	1	WIRING HARNESS "B" O.A.	1000034			14
	1	CLIP, OUTER GIMBAL	1000244			13
	2	CLAMP, CAPACITOR, OUT. GIMBAL	1000235			12
	8	CLAMP, BLOWER	1000157			11
	4	COVER, BRACKET, CONNECTOR	1000143			10
	2	COVER, CONN. MT, OUTER GIMBAL	1000239			9
	2	CAPACITOR, FIXED	1010264-38			8
	2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
	1	REGULATOR, 28 VOLT DC	1007013			6
	2	BLOWER, VARIABLE SPEED	1000219			5
	2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
	2	RESISTOR, FIXED	1010325-500			3
	1	HOUSING ASSY, OUTER GIMBAL	1000103			2
	1	MIDDLE AXIS ASSEMBLY	1000208			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153 DATE
APPROVED 8-5-63
CHECKED
DRAWN MORSE 6-3-63
APPROVED FOR MSC
MIT/IL APPROVAL W Kupfer DATE 7 Aug 63

OUTER AXIS ASSEMBLY

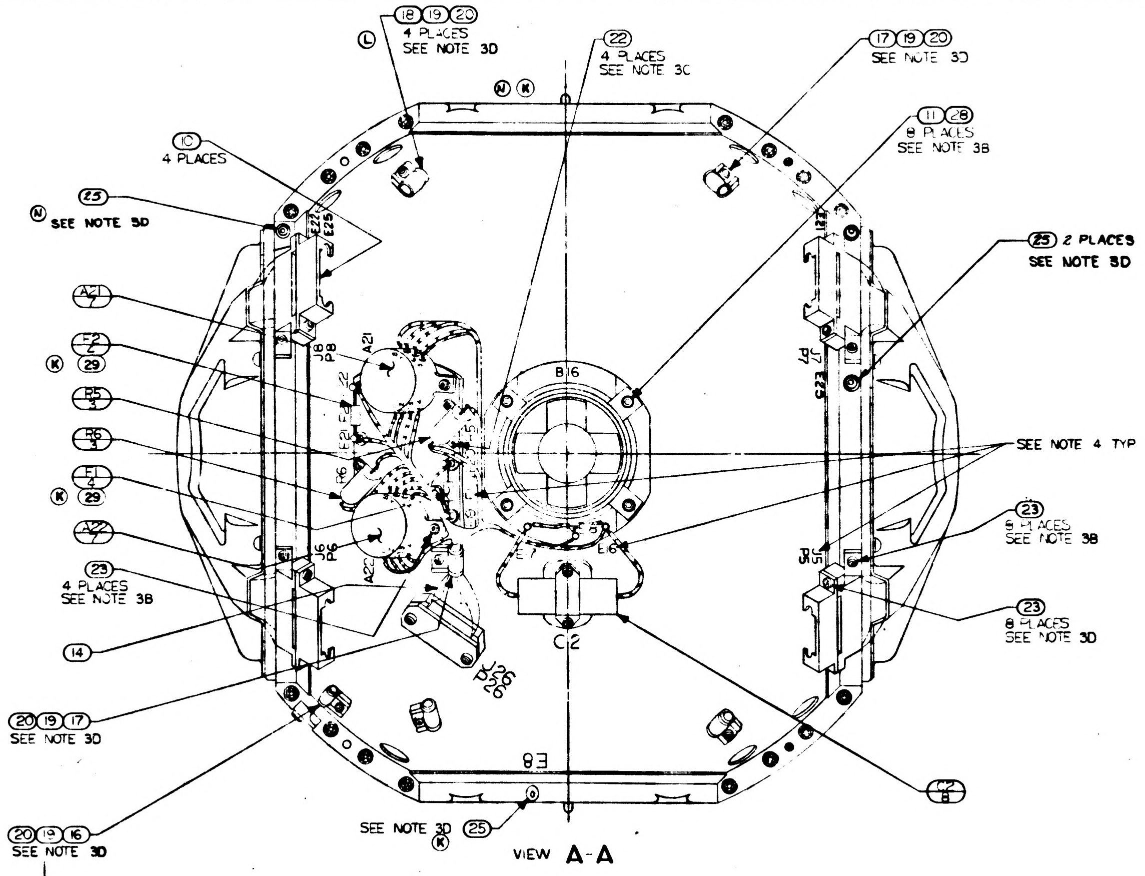
SCALE
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000202
SHEET 1 OF 1 SHEET

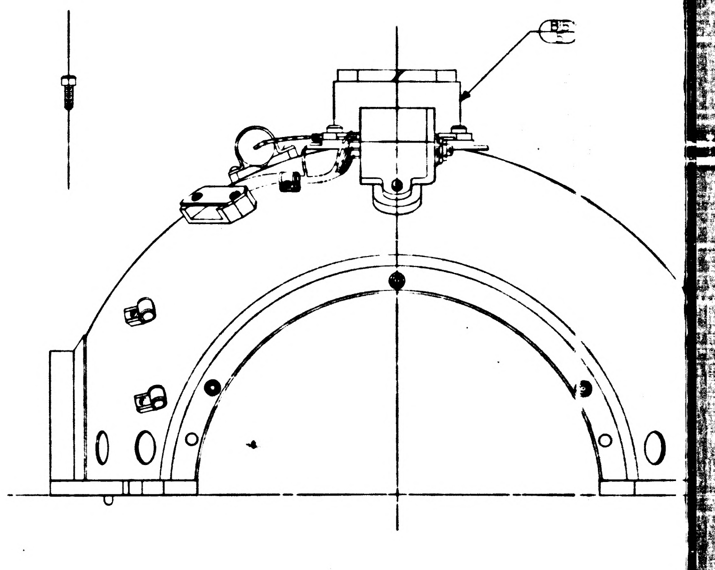
N
1000202

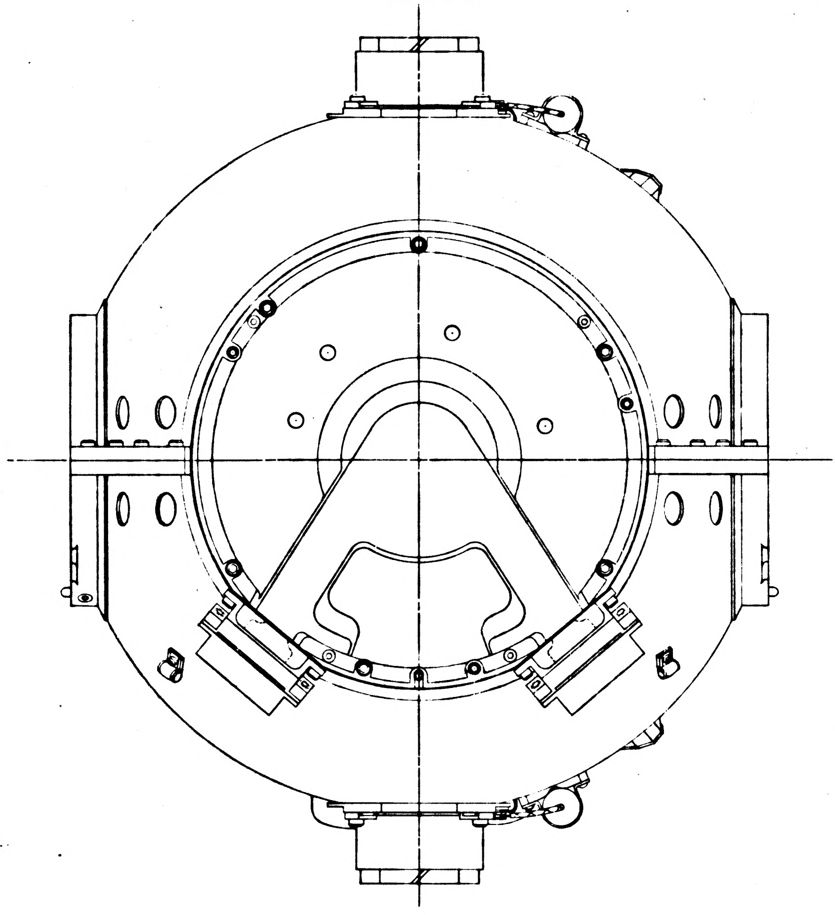
(34)

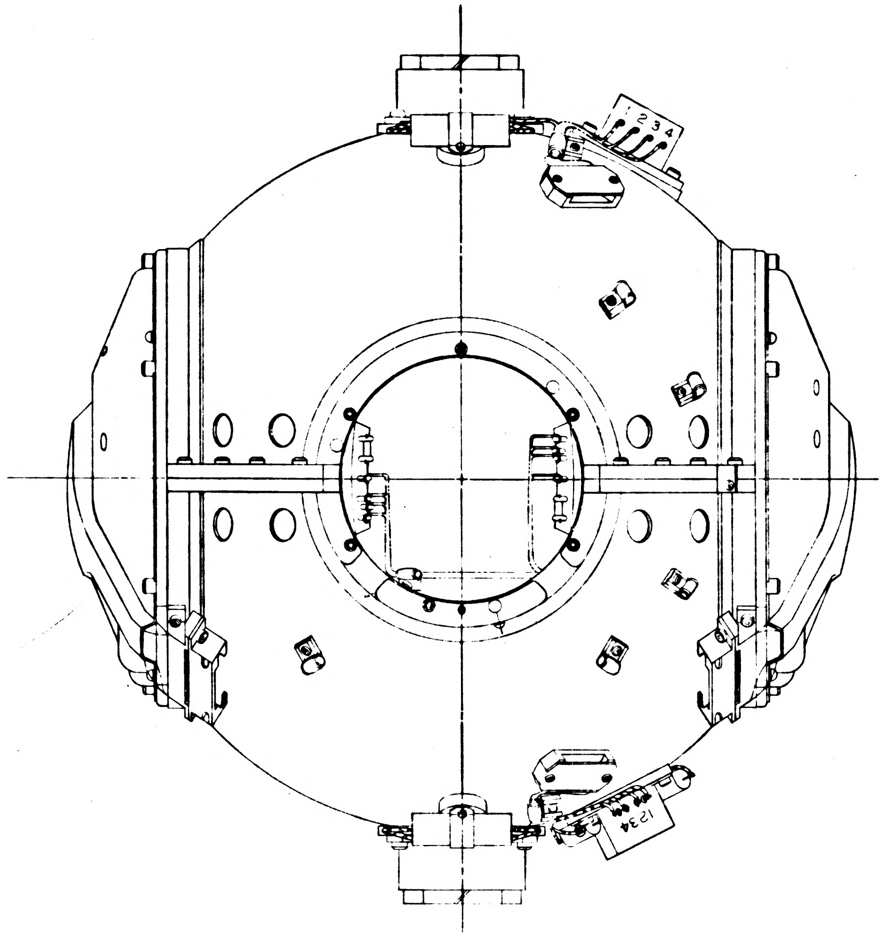
3/1000202


18 19 20
4 PLACES
SEE NOTE 3D
L
22
4 PLACES
SEE NOTE 3C
N K
17 19 20
SEE NOTE 3D
11 28
8 PLACES
SEE NOTE 3B
10
4 PLACES
25
N
SEE NOTE 3D
25 2 PLACES
SEE NOTE 3D
N
A21
7
F2
2
K 29
R5
3
R6
3
F1
4
K 29
A22
7
23
4 PLACES
SEE NOTE 3B
14
20 19 17
SEE NOTE 3D
20 19 16
SEE NOTE 3D
SEE NOTE 3D 25
K
SEE NOTE 4 TYP
23
8 PLACES
SEE NOTE 3B
23
8 PLACES
SEE NOTE 3D
C2
8
E22
E25
J8
P8
A21
E21
F2
R5
R6
F1
J6
P6
A22
B16
E7
E16
C2
J26
P26
E8
J7
P7
E23
J5
P5

VIEW A-A


B5

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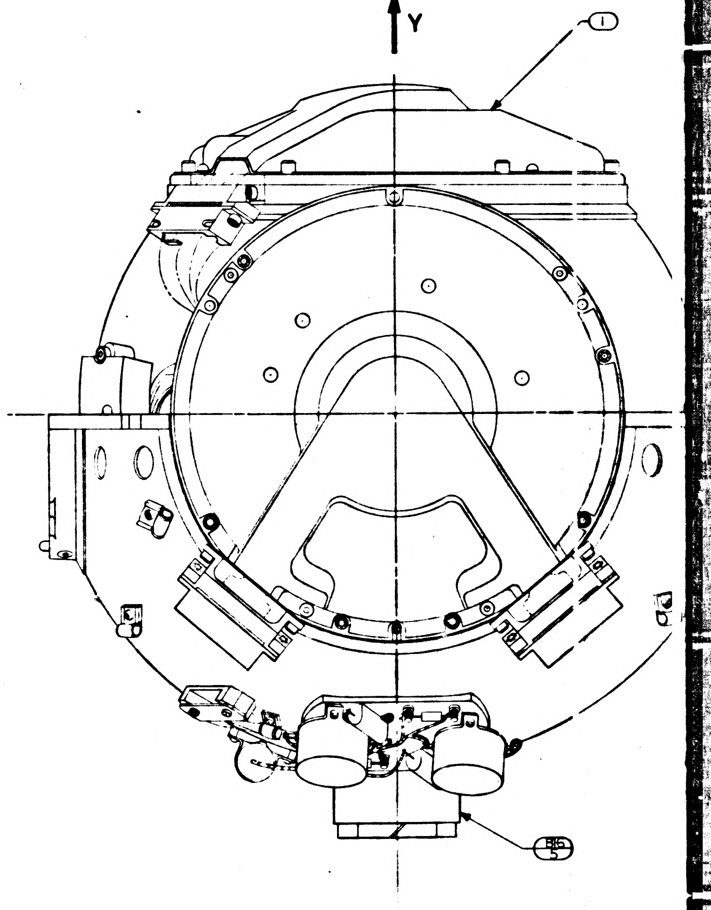
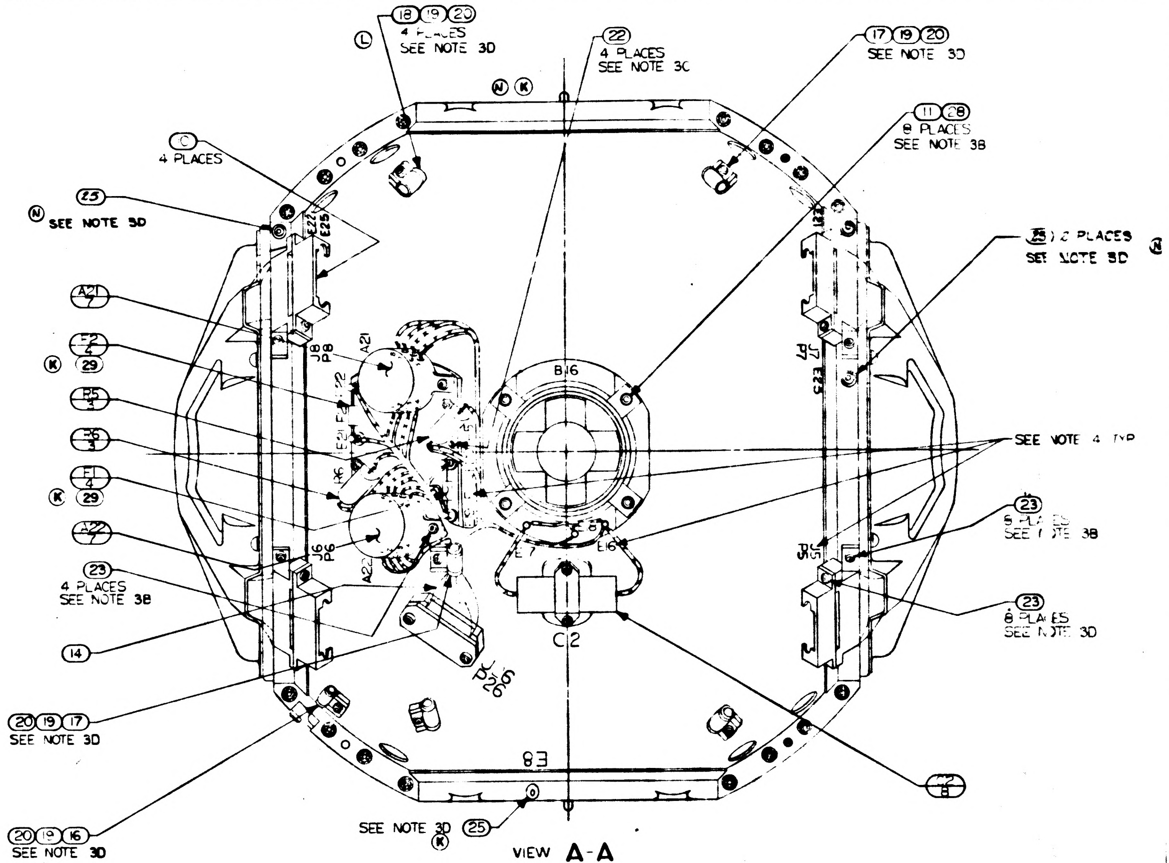
1 2 3 4

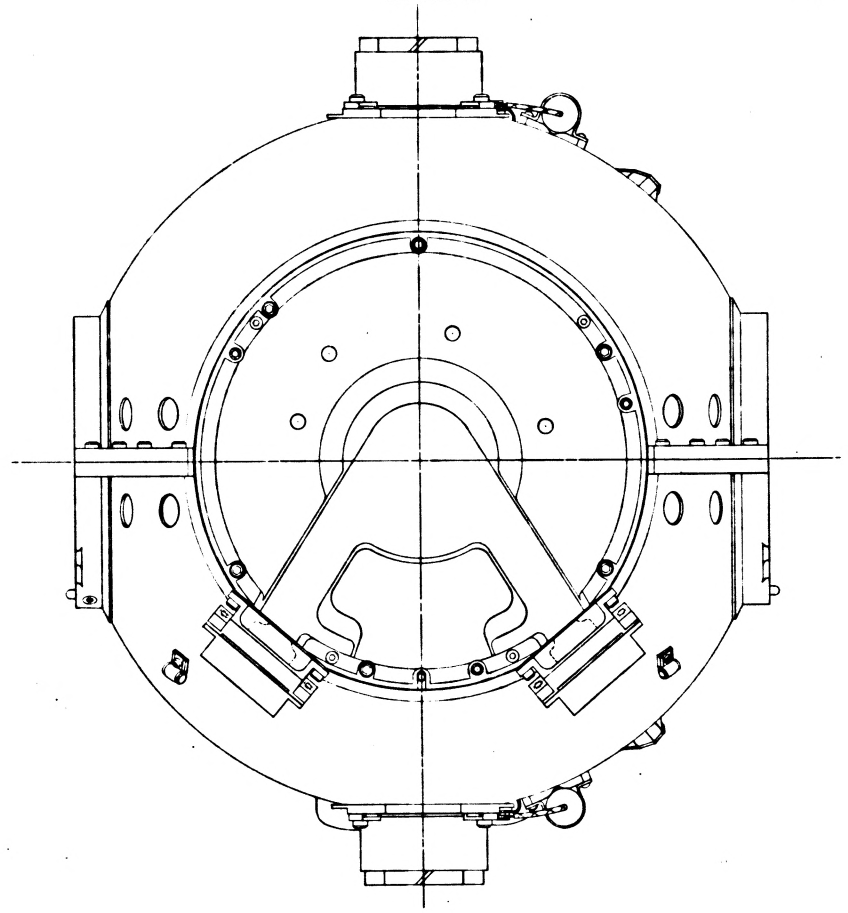

Y
1
B16
5

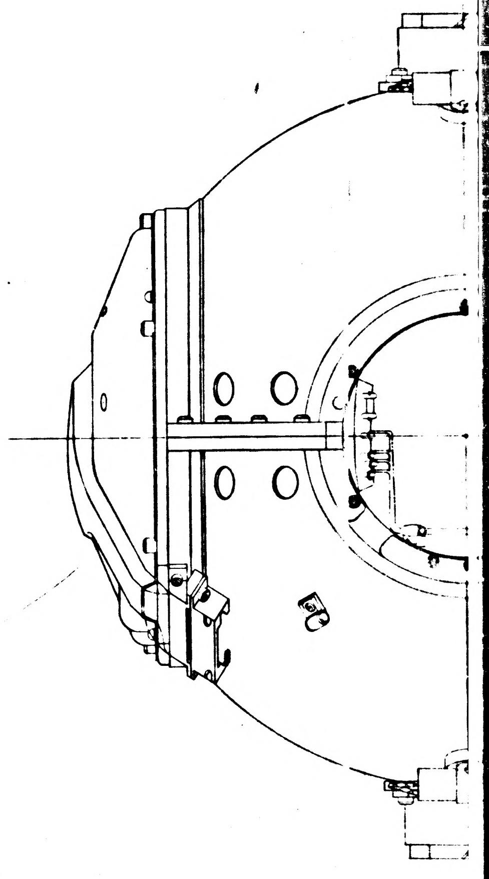
WIRING LEGEND					
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15-T1	E15	
2	RED		B15-T4	E13	
3	GRN		B15-T5	E14	
4	YEL		B16-T1	E18	
5	RED		B16-T4	E16	
6	GRN		B16-T5	E17	



⑱⑲⑳ 4 PLACES SEE NOTE 3D
Ⓛ
㉒ 4 PLACES SEE NOTE 3C
Ⓝ Ⓚ
⑰⑲⑳ SEE NOTE 3D
⑪㉘ 8 PLACES SEE NOTE 3B
C 4 PLACES
㉕ Ⓝ SEE NOTE 3D
㉕ 2 PLACES SEE NOTE 3D Ⓝ
A21 7
F2 4 Ⓚ ㉙
R5 3
R6 3
F1 4 Ⓚ ㉙
A22 7
㉓ 4 PLACES SEE NOTE 3B
⑭
⑳⑲⑰ SEE NOTE 3D
⑳⑲⑯ SEE NOTE 3D
SEE NOTE 4 TYP
㉓ 8 PLACES SEE NOTE 3B
㉓ 8 PLACES SEE NOTE 3D
M2 8
SEE NOTE 3D ㉕ Ⓚ
B16
C2
E8
E16
E7
J8 P8
A21
J6 P6
A22
J16 P26
J7 P7
E22 E25
E23

VIEW **A-A**





NOTES
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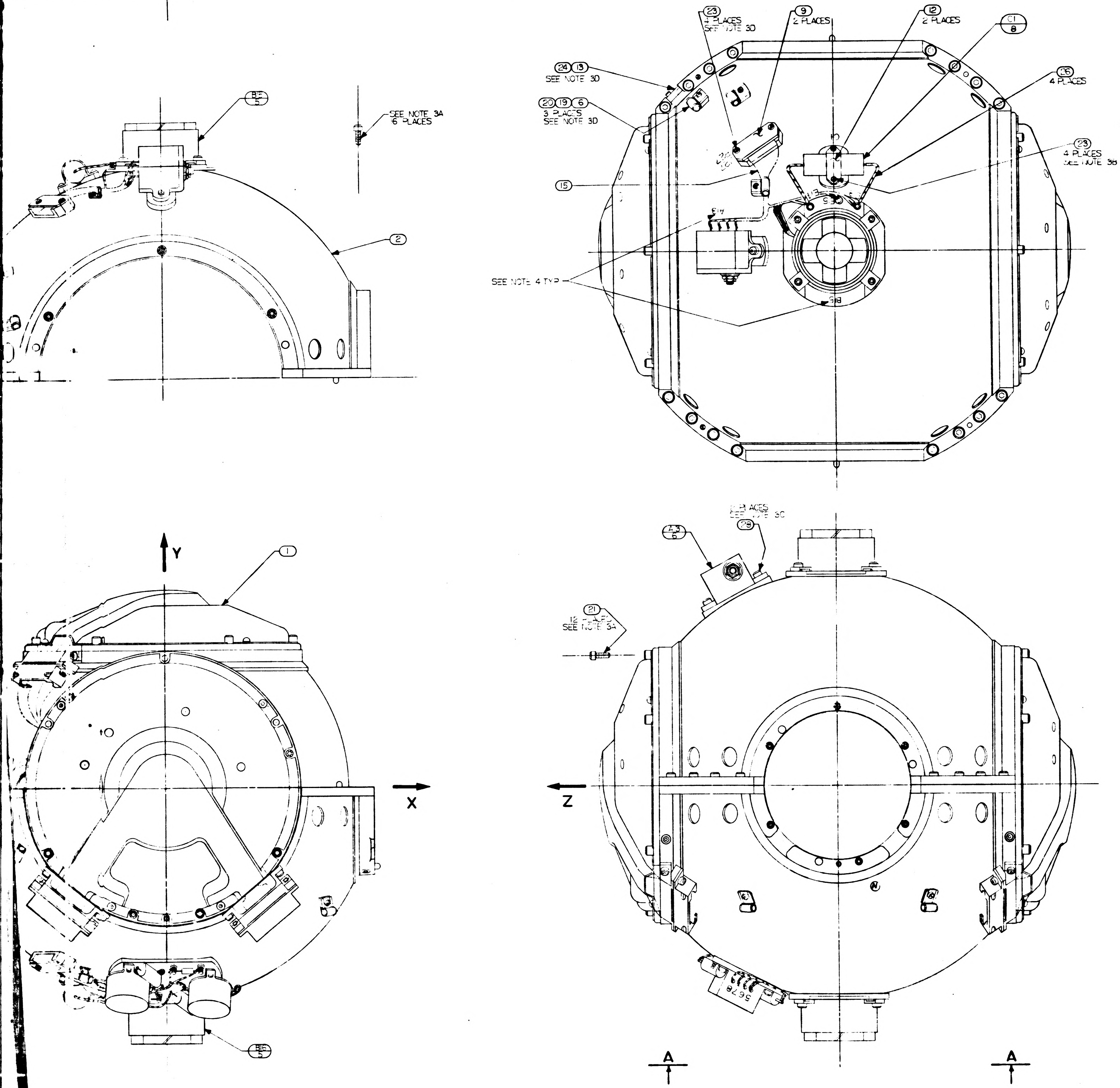
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 3.5 IN. LB.
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

1000202	REV N	SHT 1

1/1000202

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63		WK
	J	TDRR 03187	9-17-63		VK
	K	TDRR 06177	2-6-64		WK
	L	TDRR 06240	2-11-64		WK
	M	REVISED PER TDRR 07576	17 APR 64	JHE	
	N	REVISED PER TDRR 08082	12 MAY 64	JG	CP
	P	REVISED PER TDRR 10901	21 JUL 64	JWP	CMK



REPLACES REV G WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
Ⓚ	2	SLEEVING, HEAT SHRINK	1010490-078			29
	10	SCREW CAP SOC HD HEX	1000110-302			28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	4	INSULATION SLEEVING	1006776-19		1 3/8 LONG	26
Ⓚ Ⓝ	4	SCREW, BUT. HD, SELF, LKG. SPL. SOC	1000250-12			25
Ⓙ	1	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL6			24
Ⓙ	28	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL4			23
Ⓙ	4	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C02LL4			22
	12	SCREW, CAP SOC HD HEX	1000110-7			21
	9	SCREW, CAP SOC HD HEX	1000110-1			20
	9	WASHER, CABLE CLAMP	1000223			19
	4	CLAMP, CABLE	1000220-5			18
Ⓛ	1	CLAMP, CABLE	1000220-4			17
	4	CLAMP, CABLE	1000220-3			16
	1	WIRING HARNESS "C" O.A.	1000124			15
	1	WIRING HARNESS "B" O.A.	1000034			14
	1	CLIP, OUTER GIMBAL	1000244			13
	2	CLAMP, CAPACITOR, OUT. GIMBAL	1000235			12
	8	CLAMP, BLOWER	1000157			11
	4	COVER, BRACKET, CONNECTOR	1000143			10
	2	COVER, CONN. MT., OUTER GIMBAL	1000239			9
	2	CAPACITOR, FIXED	1010264-38			8
	2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
	1	REGULATOR, 28 VOLT DC	1007013			6
	2	BLOWER, VARIABLE SPEED	1000219			5
	2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
	2	RESISTOR, FIXED	1010325-500			3
	1	HOUSING ASS'Y, OUTER GIMBAL	1000103			2
	1	MIDDLE AXIS ASSEMBLY	1000208			1

LIST OF PARTS AND MATERIALS

1000202 P

NEXT ASSY	USED ON
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED — DATE 8-5-63
CHECKED
DRAWN MORSE 6-3-63
APPROVED FOR MSC
MIT APPROVAL W Kupfer DATE 7 Aug 63

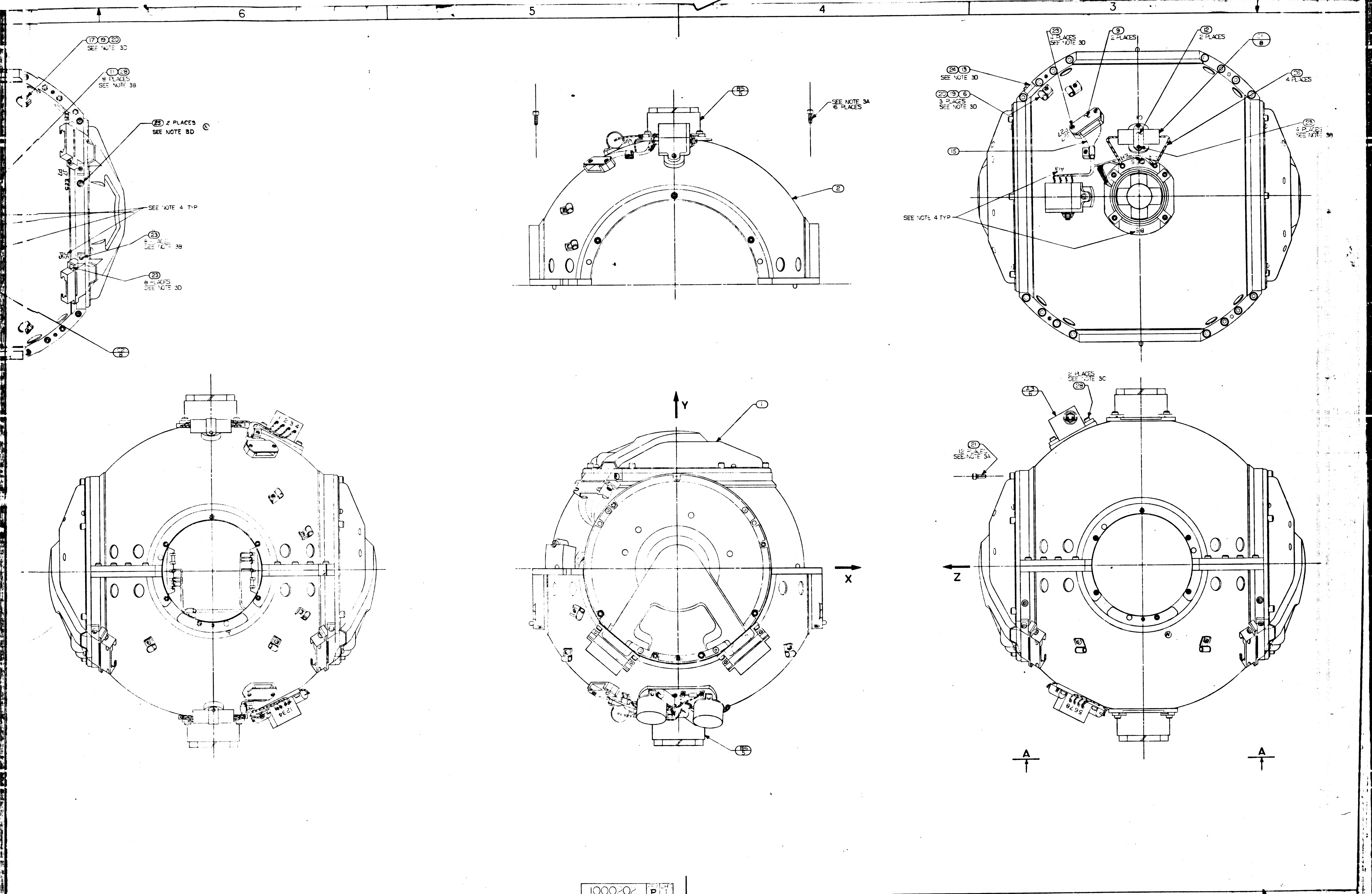
OUTER AXIS ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000202
SHEET 1 OF 1 SHEET

(3H)

3/1000202

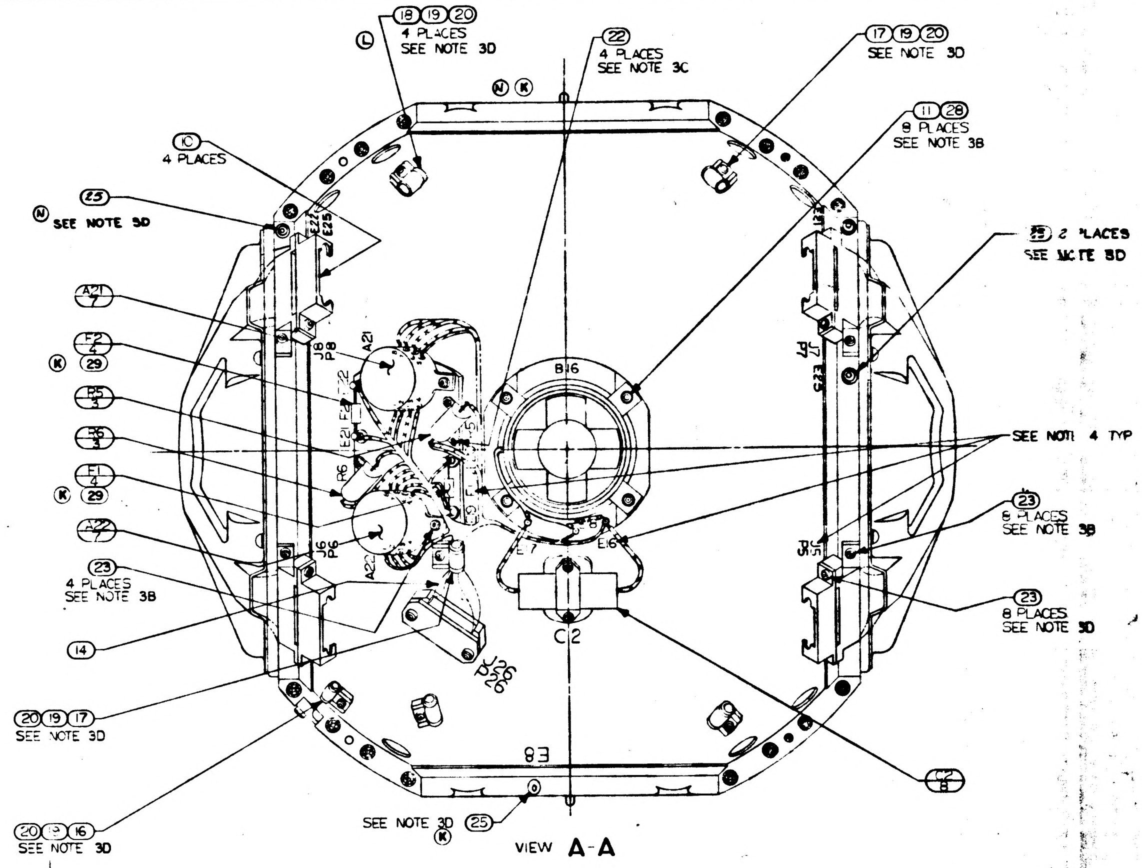

6
5
4
3
17 19 20
SEE NOTE 3D
11 28
9 PLACES
SEE NOTE 3B
25 2 PLACES
SEE NOTE 3D
E21
J7
P7
E23
SEE NOTE 4 TYP
23
8 PLACES
SEE NOTE 3B
J5
P5
23
8 PLACES
SEE NOTE 3D
B15
5
SEE NOTE 3A
16 PLACES
2
23
4 PLACES
SEE NOTE 3D
9
2 PLACES
12
2 PLACES
C1
8
24 13
SEE NOTE 3D
20 19 6
3 PLACES
SEE NOTE 3D
26
4 PLACES
23
4 PLACES
SEE NOTE 3B
15
J27
P27
A13
E4
E5
SEE NOTE 4 TYP
1 2 3 4
1234
1
Y
X
B15
5
2 PLACES
SEE NOTE 3C
A13
6
28
21
12 PLACES
SEE NOTE 3A
Z
5678
A
A

1000202 P

6
5
4
3

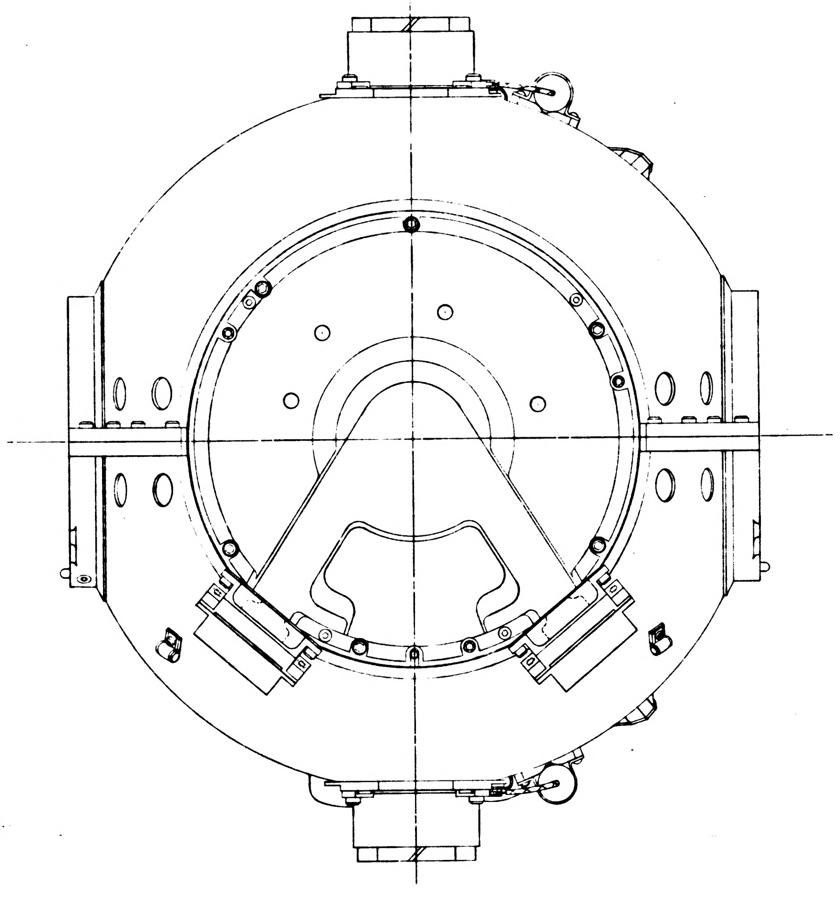
2/1000202

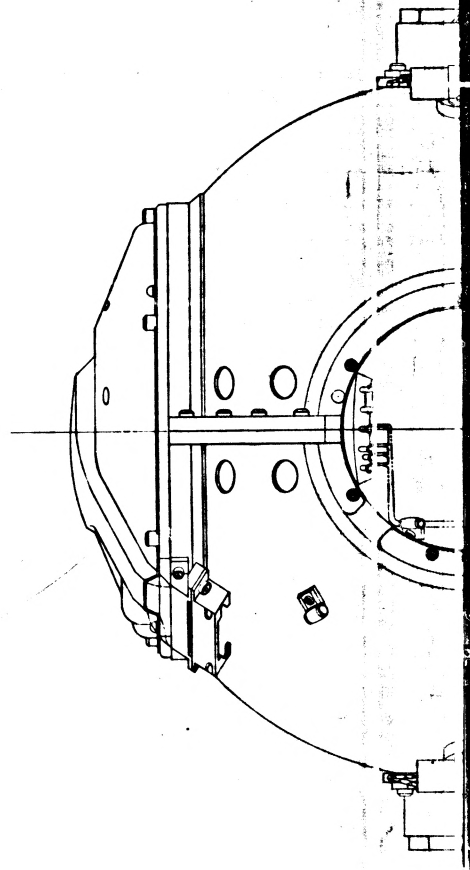
WIRING LEGEND					
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15-T1	E15	
2	RED		B15-T4	E13	
3	GRN		B15-T5	E14	
4	YEL		B16-T1	E18	
5	RED		B16-T4	E16	
6	GRN		B16-T5	E17	



(18)(19)(20) 4 PLACES SEE NOTE 3D
(L)
(22) 4 PLACES SEE NOTE 3C
(N) (K)
(17)(19)(20) SEE NOTE 3D
(11)(28) 8 PLACES SEE NOTE 3B
(10) 4 PLACES
(25) (N) SEE NOTE 3D
E22
E25
(25) 2 PLACES SEE NOTE 3D
A21 7
F2 4
(K) (29)
R5 3
R6 3
F1 4
(K) (29)
A22 7
(23) 4 PLACES SEE NOTE 3B
(14)
(20)(19)(17) SEE NOTE 3D
(20)(19)(16) SEE NOTE 3D
J8
P8
A21
E22
F2
E21
R6
J6
P6
A22
J26
P26
B16
E17
E16
C2
E8
J7
P7
E23
J5
P5
SEE NOTE 4 TYP
(23) 8 PLACES SEE NOTE 3B
(23) 8 PLACES SEE NOTE 3D
C2 8
SEE NOTE 3D (25)
(K)

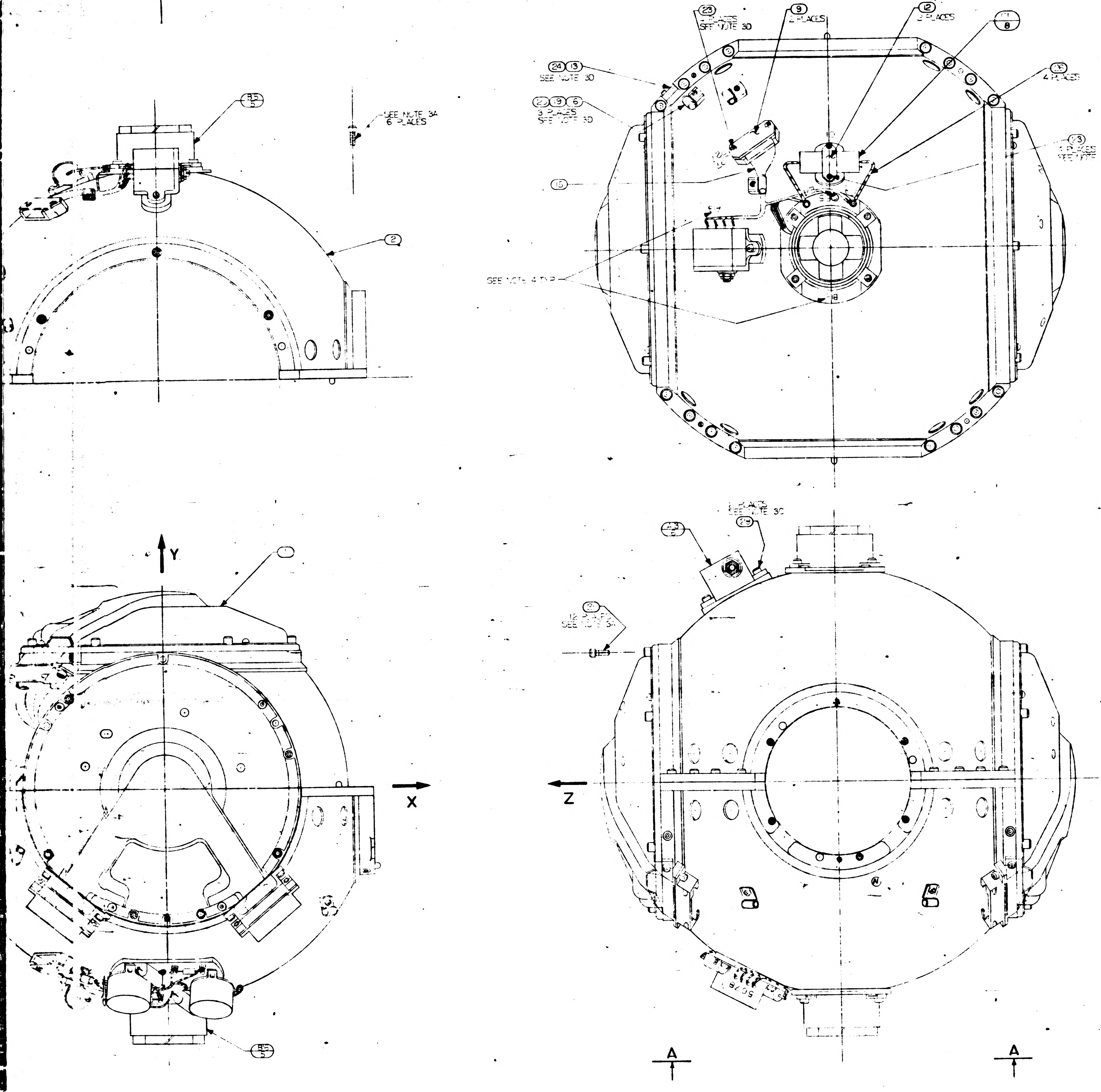
VIEW A-A





NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ±7%
    - A. 10.0 IN. LB.
    - B. 5.0 IN. LB.
    - C. 3.5 IN. LB.
    - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63		WK
	J	TDRR 03187	9-17-63		NR
	K	TDRR 06177	2-6-64		WK
	L	TDRR 06240	2-11-64		WK
	M	REVISED PER TDRR 07576	17 APR 64	JHR	
	N	REVISED PER TDRR 08082	12 MAY 64	JG	CP
	P	REVISED PER TDRR 10901	21 JUL 64	JWP	
	R	REVISED PER TDRR 14543	4 DEC 64	JWP	



REPLACES REV G WITH CHANGES

2	SLEEVING, HEAT SHRINK	1010490-078			29
10	SCREW CAP SOC HD HEX	1000110-302			28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
4	INSULATION SLEEVING	1006776-19		1 3/8 LONG	26
4	SCREW, BUT. HD. SELF, LKG. SPL SOC	1000250-12			25
1	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL6			24
28	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL4			23
4	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C02LL4			22
12	SCREW, CAP SOC HD HEX	1000110-7			21
9	SCREW, CAP SOC HD HEX	1000110-1			20
9	WASHER, CABLE CLAMP	1000223			19
4	CLAMP, CABLE	1000220-5			18
1	CLAMP, CABLE	1000220-4			17
4	CLAMP, CABLE	1000220-3			16
1	WIRING HARNESS "C" Q.A.	1000124			15
1	WIRING HARNESS "B" Q.A.	1000034			14
1	CLIP OUTER GIMBAL	1000244			13
2	CLAMP, CAPACITOR, OUT. GIMBAL	1000235			12
8	CLAMP, BLOWER	1000157			11
4	COVER, BRACKET, CONNECTOR	1000143			10
2	COVER, CONN. MT., OUTER GIMBAL	1000239			9
2	CAPACITOR FIXED	1010264-38			8
2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
1	REGULATOR 28 VOLT DC	1007013			6
2	BLOWER, VARIABLE SPEED	1000219			5
2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
2	RESISTOR, FIXED	1010325-500			3
1	HOUSING ASS'Y, OUTER GIMBAL	1000103			2
1	MIDDLE AXIS ASSEMBLY	1000208			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

1000202 R

1000201	C_1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED 8-5-63
CHECKED
DRAWN
APPROVED FOR MSC
INITIAL APPROVAL DATE
7 Aug 63

OUTER AXIS ASSEMBLY

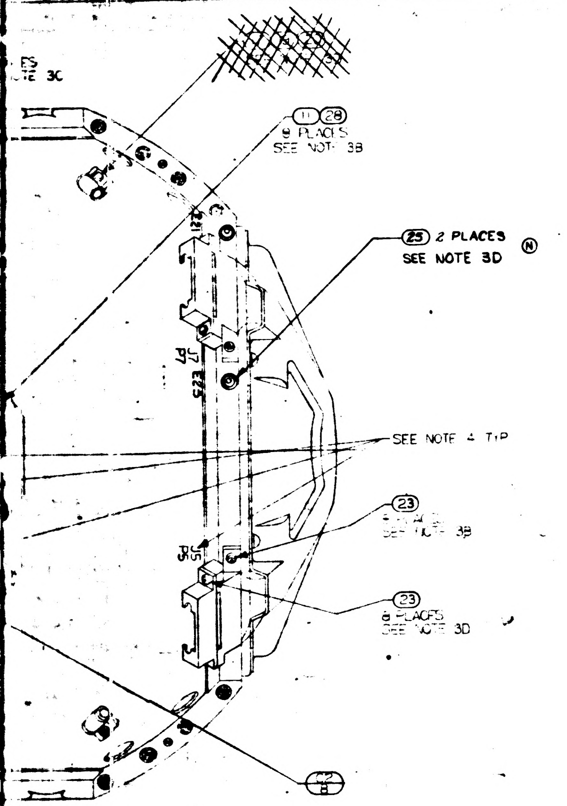
SCALE
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000202
SHEET 1 OF 1 SHEET

1000202 R

(3H)

3/1000202



ES
NOTE 3C
11 28
8 PLACES
SEE NOTE 3B
25 2 PLACES
SEE NOTE 3D
N
J21
J7
P7
E23
SEE NOTE 4 TYP
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8 PLACES
SEE NOTE 3B
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P5
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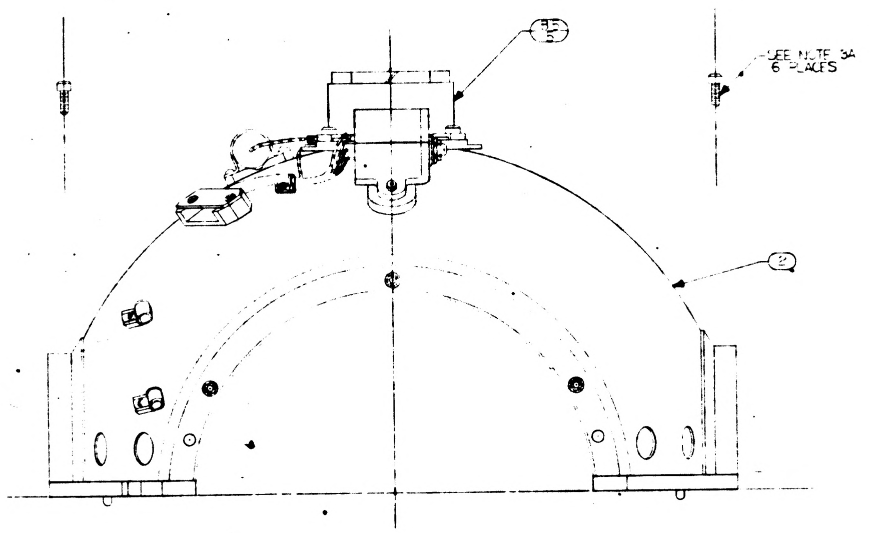
8 PLACES
SEE NOTE 3D



SEE NOTE 3A
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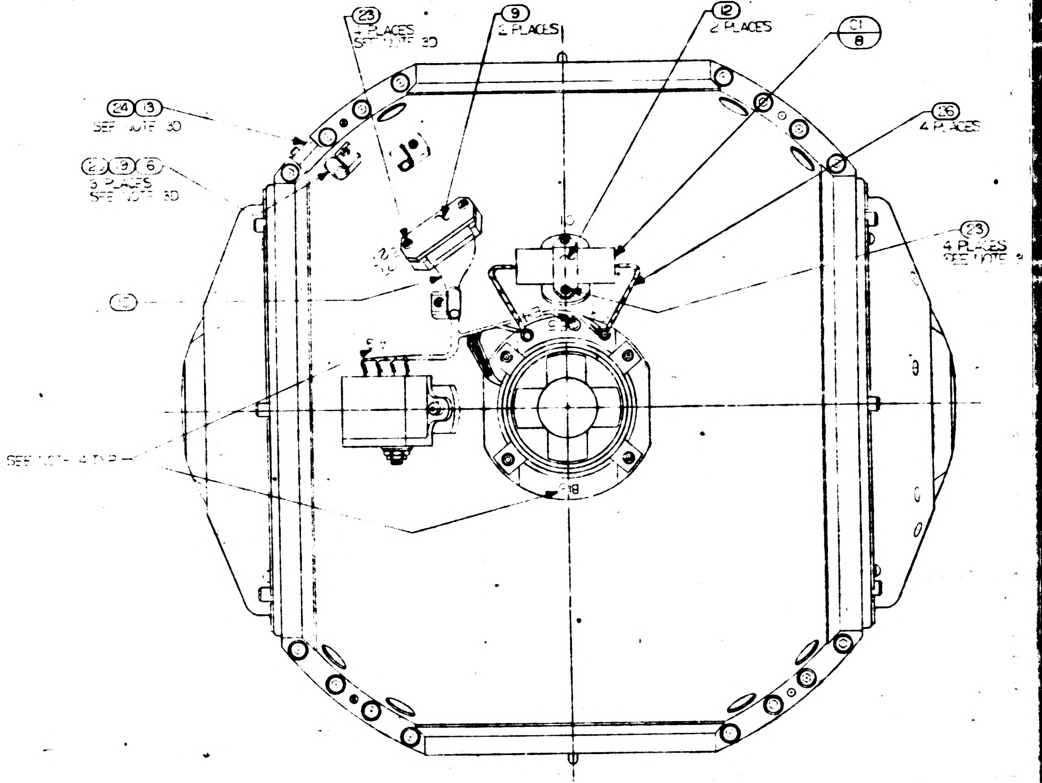

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2 PLACES
SEE NOTE 3D
9
2 PLACES
12
2 PLACES
C1
8
24 13
SEE NOTE 3D
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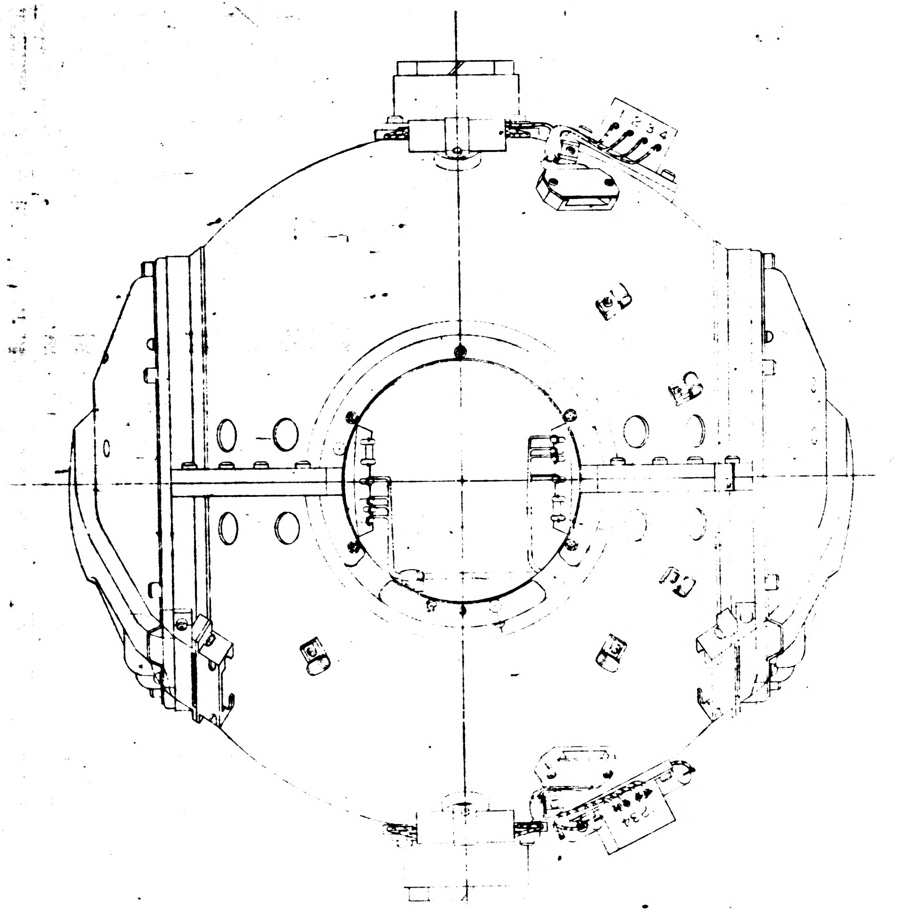
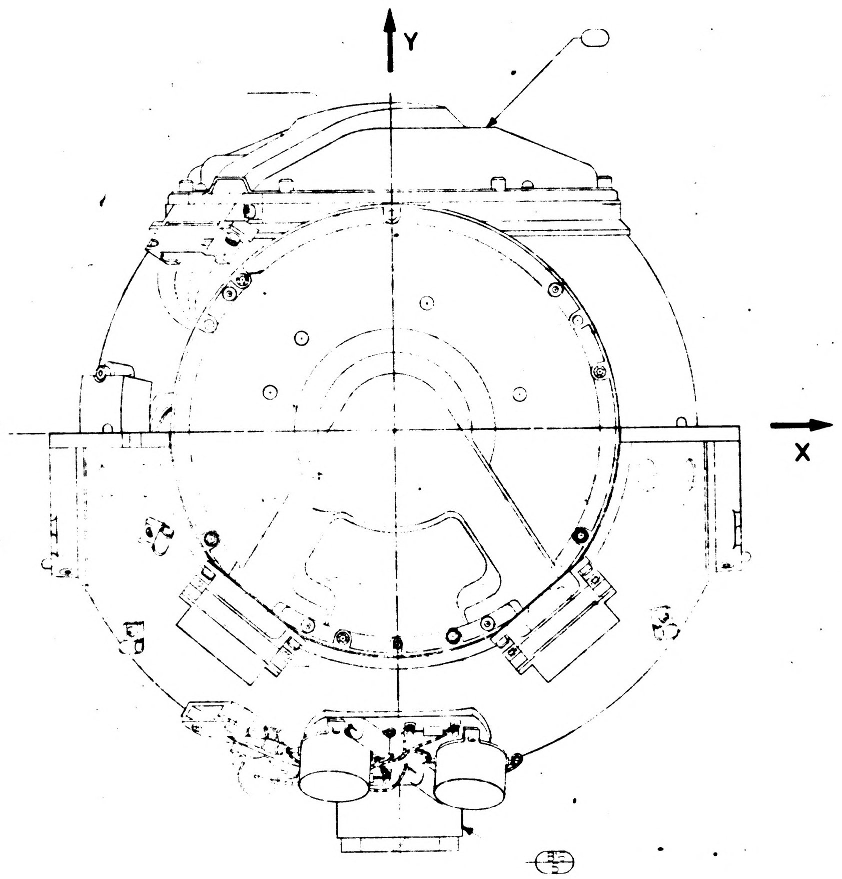
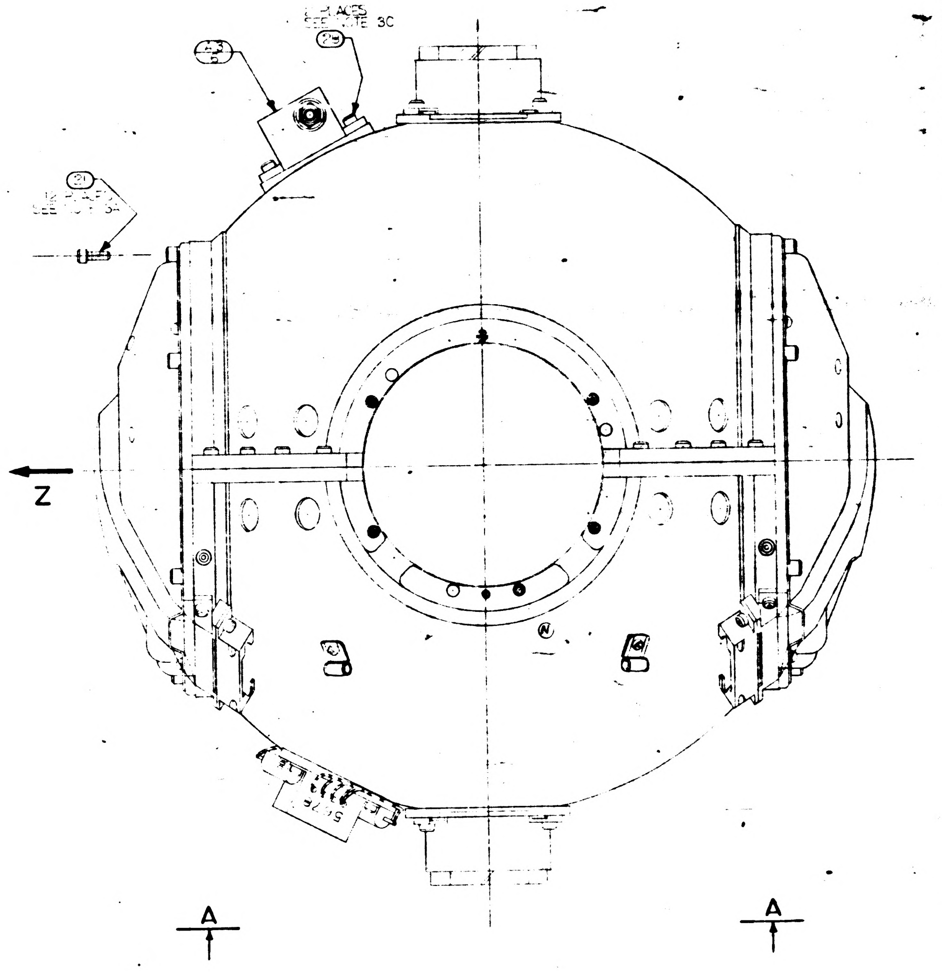
3 PLACES
SEE NOTE 3D
26
4 PLACES
23
4 PLACES
SEE NOTE
SEE NOTE 4 TYP
B15







PLACES
SEE NOTE 3C
29
SEE NOTE 3A
Z
A
A

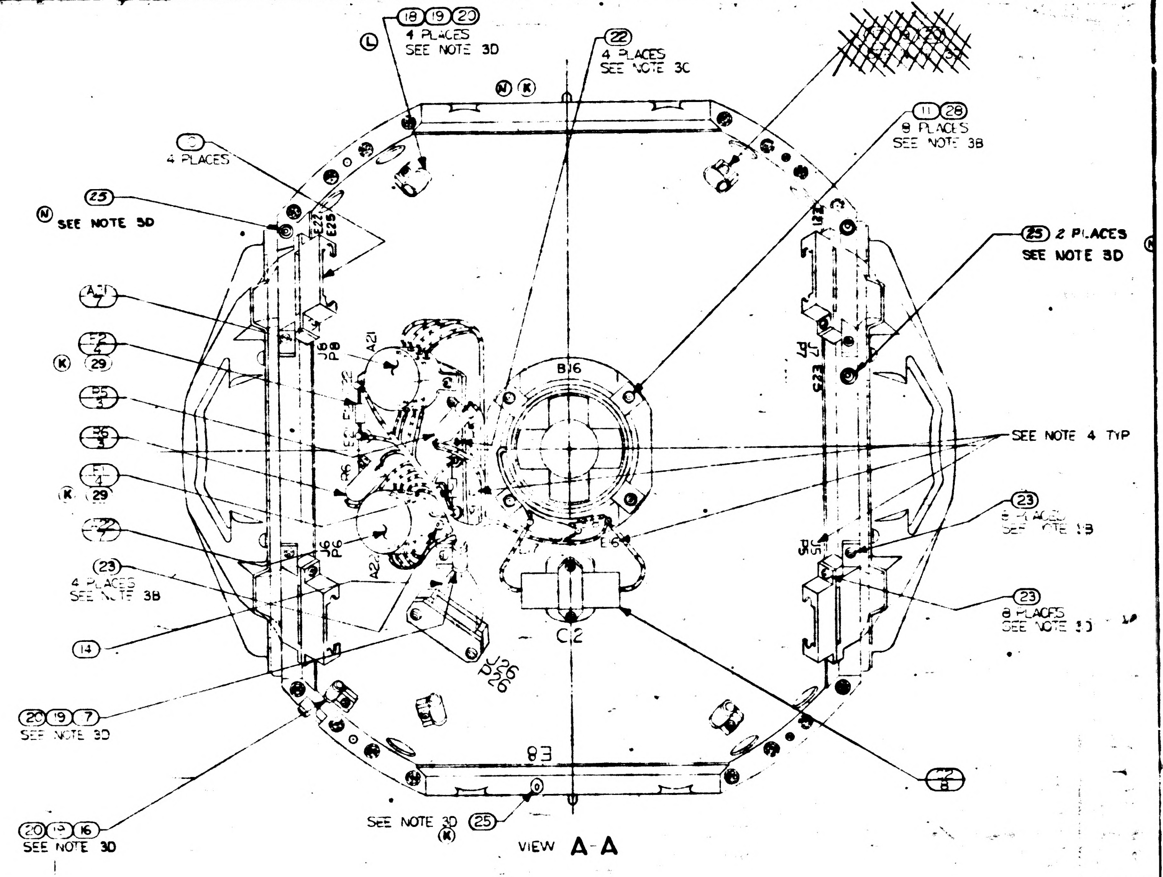
10C0202 R

2/1000202

1000505

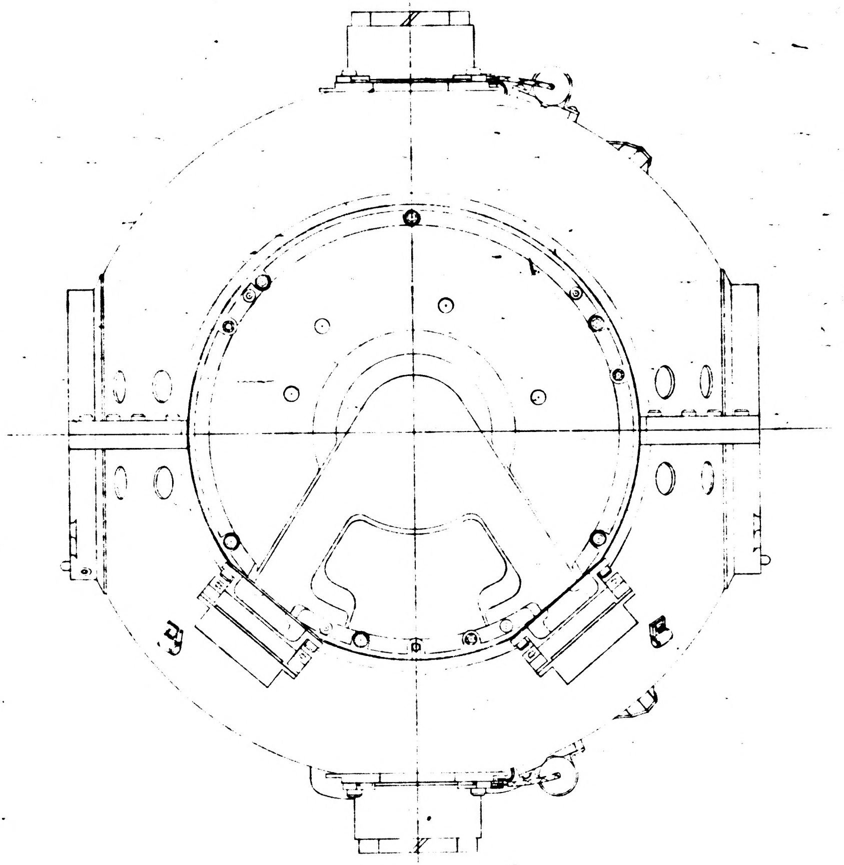
WIRING LEGEND

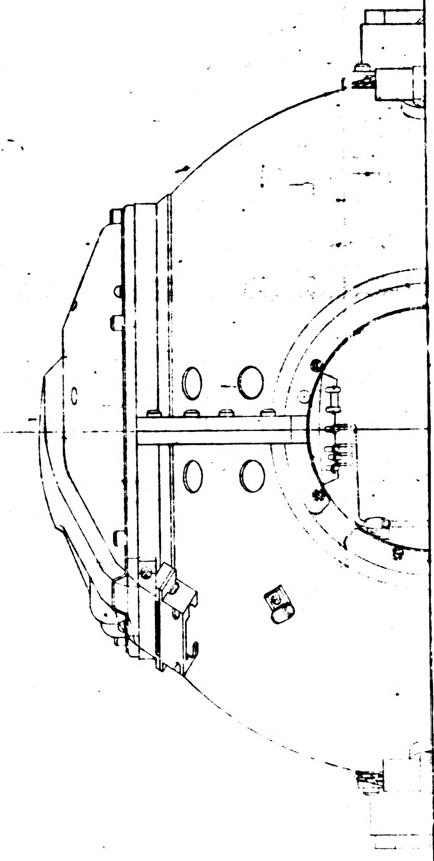
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15 T1	E15	
2	RED		B15 T4	E13	
3	GRN		B15 T5	E14	
4	YEL		B16 T[illegible]	E18	
5	RED		B16 T4	E16	
6	GRN		B16 T5	E17	



(18)(19)(20)
4 PLACES
SEE NOTE 3D
(L)
(22)
4 PLACES
SEE NOTE 3C
(N) (K)
(11)(28)
8 PLACES
SEE NOTE 3B
4 PLACES
(25)
(N) SEE NOTE 3D
E22
E25
(25) 2 PLACES
SEE NOTE 3D
A21
J6
P8
B16
J7
P7
E23
SEE NOTE 4 TYP
(K) (29)
(K) (29)
(23)
8 PLACES
SEE NOTE 3B
(23)
4 PLACES
SEE NOTE 3B
J6
P6
A22
J5
P5
(14)
(23)
8 PLACES
SEE NOTE 3D
E7
E6
C2
J26
P26
(20)(19)(7)
SEE NOTE 3D
E8
(20)(19)(16)
SEE NOTE 3D
SEE NOTE 3D (25)
(K)

VIEW **A-A**

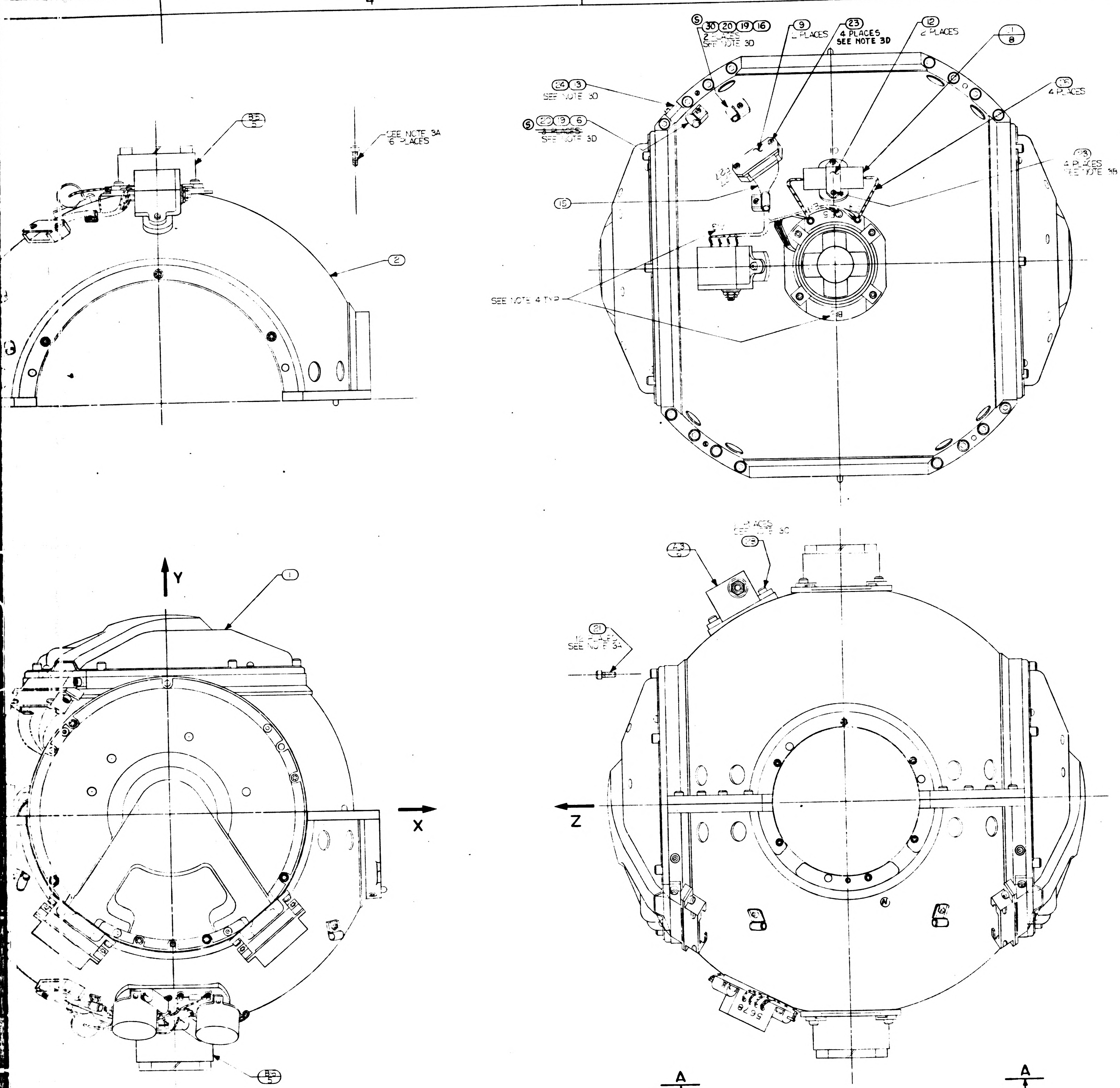




NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000001
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB.
   - B. 5.0 IN. LB.
   - C. 3.5 IN. LB.
   - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER NO 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	H	REPLACES REV G WITH CHANGES TDRR 02407	8-5-63		WK
Ⓜ	J	TDRR 03187	9-17-63		WK
	K	TDRR 06177	2-6-64		WK
Ⓜ	L	TDRR 06240	2-11-64		WK
Ⓜ	M	REVISED PER TDRR 07576	17 APR 64	JHR	
Ⓜ	N	REVISED PER TDRR 08082	12 MAY 64	JG	CP
Ⓜ	P	REVISED PER TDRR 10901	21 JUL 64	JWP	
	R	REVISED PER TDRR 4543	4 SEC 64	JWP	
	S	REVISED PER TDRR 14545	9 DEC 69	JWP	



4
3
2
1
D
C
B
A
(5) (30) (20) (19) (16)
2 PLACES
SEE NOTE 3D
(9)
2 PLACES
(23)
4 PLACES
SEE NOTE 3D
(12)
2 PLACES
(1)
(8)
(13)
4 PLACES
(24) (3)
SEE NOTE 3D
(5) (22) (19) (6)
3 PLACES
SEE NOTE 3D
(17)
4 PLACES
SEE NOTE 3B
(15)
SEE NOTE 4 TYP
(25)
SEE NOTE 3A
6 PLACES
(2)
(1)
Y
X
Z
(21)
SEE NOTE 3A
(25)
(29)
SEE NOTE 3D
5678
A
A

REPLACES REV G WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
	7	WASHER, FLAT, ROUND	MS15795-703			30
Ⓚ	2	SLEEVING, HEAT SHRINK	1010490-078			29
	10	SCREW CAP SOC HD HEX	1000110-302			28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	4	INSULATION SLEEVING	1006776-19		1 3/8 LONG	26
Ⓚ Ⓝ	4	SCREW BUT. HD. SELF, LKG. SPL. SOC	1000250-12			25
Ⓙ	1	SCREW, CAP, SELF, LKG, HEX. HD. SOC	NAS1352C04LL6			24
Ⓙ	28	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C04LL4			23
Ⓙ	4	SCREW, CAP, SELF, LKG, HEX, HD, SOC	NAS1352C02LL4			22
	12	SCREW CAP SOC HD HEX	1000110-7			21
	9	SCREW CAP SOC HD HEX	1000110-1			20
	9	WASHER, CABLE CLAMP	1000223			19
	4	CLAMP, CABLE	1000220-5			18
Ⓛ	1	CLAMP, CABLE	1000220-4			17
	4	CLAMP, CABLE	1000220-3			16
	1	WIRING HARNESS "C" O.A.	1000124			15
	1	WIRING HARNESS "B" O.A.	1000034			14
	1	CLIP OUTER GIMBAL	1000244			13
	2	CLAMP, CAPACITOR, OUT. GIMBAL	1000235			12
	8	CLAMP, BLOWER	1000157			11
	4	COVER, BRACKET, CONNECTOR	1000143			10
	2	COVER, CONN. MT., OUTER GIMBAL	1000239			9
	2	CAPACITOR, FIXED	1010264-38			8
	2	SATURABLE, REACTOR BLOWER SPEED CONTROL	1000288			7
	1	REGULATOR, 28 VOLT DC	1007013			6
	2	BLOWER, VARIABLE SPEED	1000219			5
	2	FUSE, PIGTAIL, SUBMIN	1000170-10			4
	2	RESISTOR, FIXED	1010325-500			3
	1	HOUSING ASS'Y, OUTER GIMBAL	1000103			2
	1	MIDDLE AXIS ASSEMBLY	1000203			1

LIST OF PARTS AND MATERIALS

1000202 S

NEXT ASSY	USED ON
1000201	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
APPROVED: AJ Boyce 8-5-63
DRAWN: MORSE 6-3-63
APPROVED FOR MSC
MIT APPROVAL: W. Kupfer 7 Aug 63

OUTER AXIS ASSEMBLY

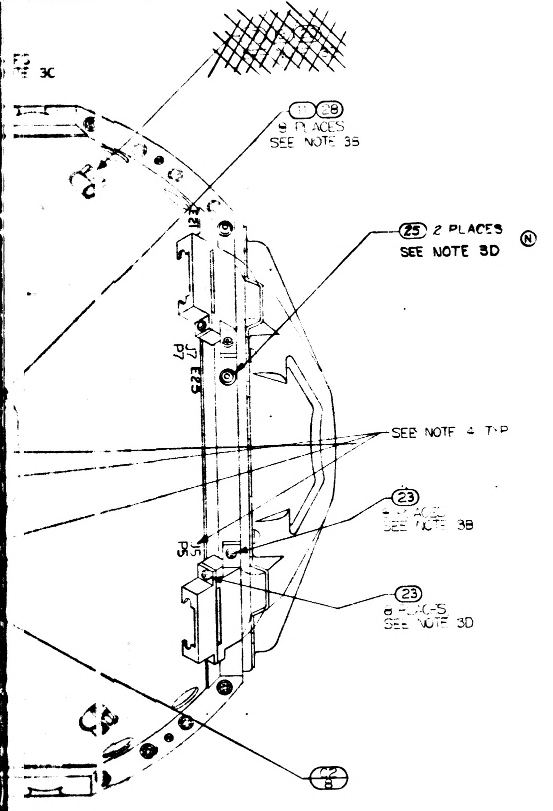
SCALE
UNIT WT
CODE IDENT

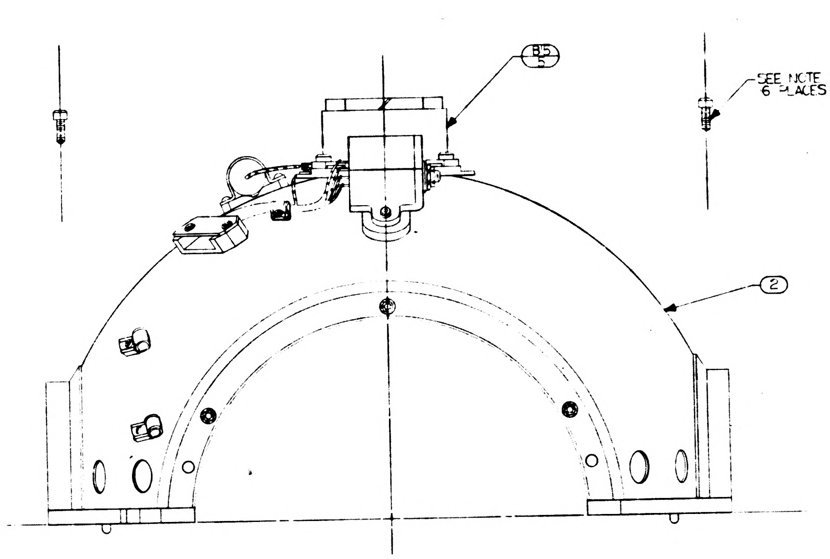
M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DWG NO. 1000202
SHEET 1 OF 1 SHEET

1000202 S

3I/1000202


3C
28
8 PLACES
SEE NOTE 3B
25 2 PLACES
SEE NOTE 3D
N
J7
P7
E23
SEE NOTE 4 TYP
23
SEE NOTE 3B
J5
P5
23
8 PLACES
SEE NOTE 3D
C2
8


SEE NOTE 3A
6 PLACES
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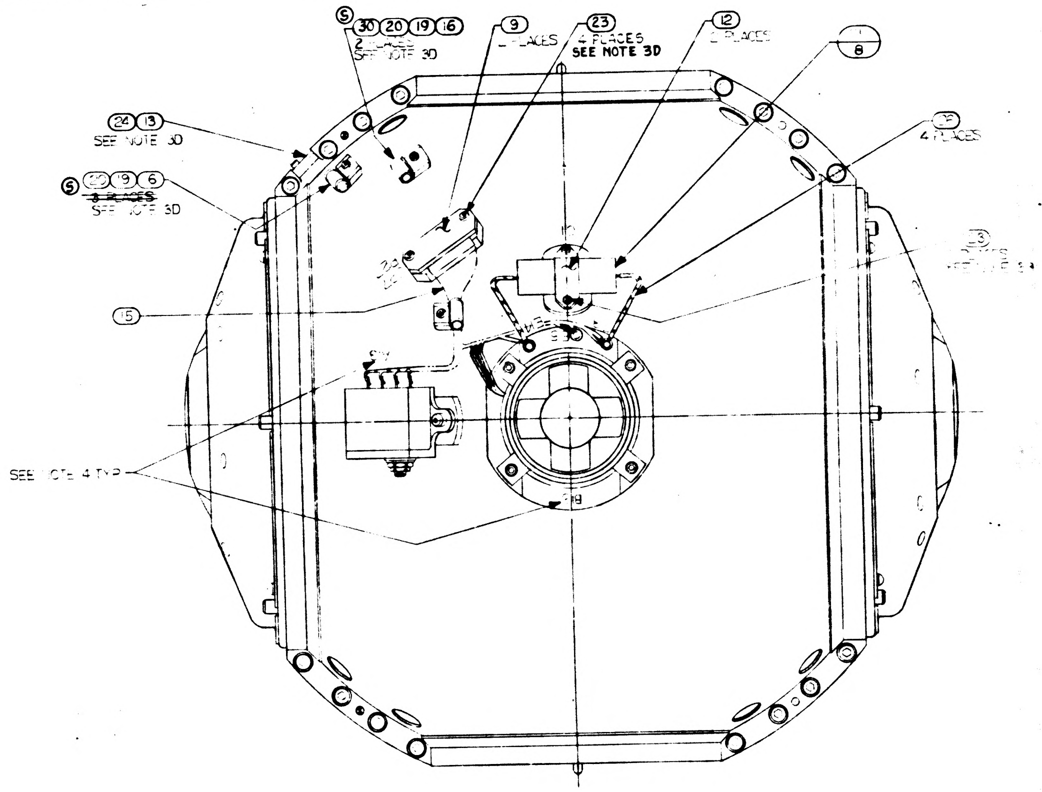
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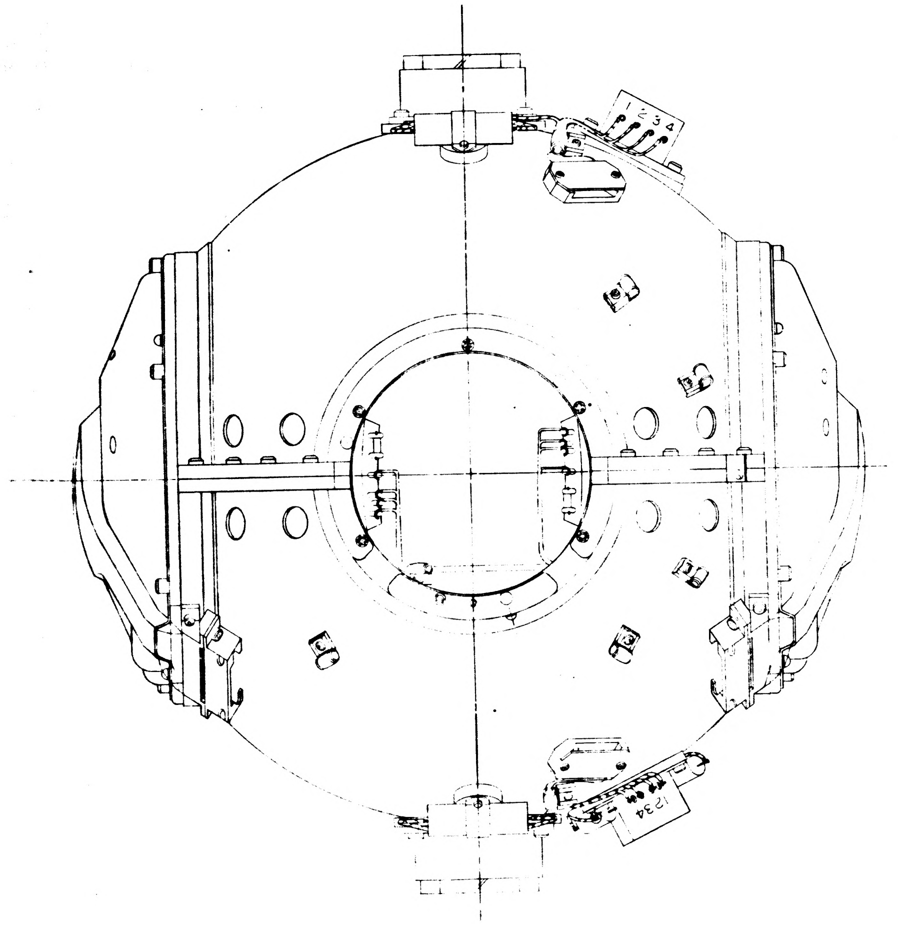
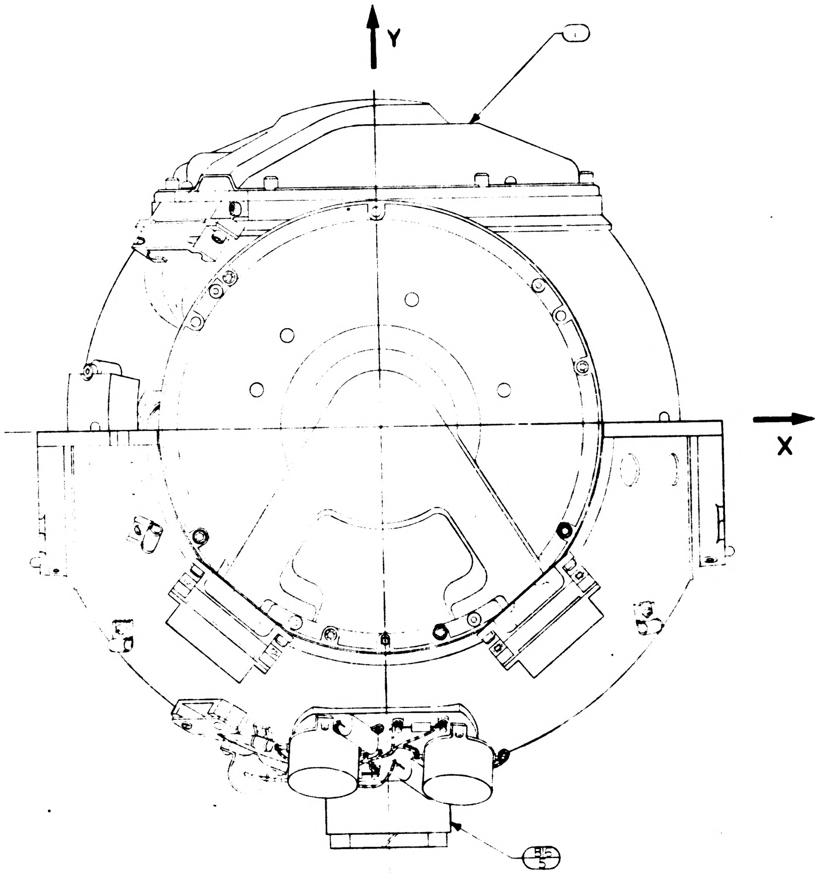
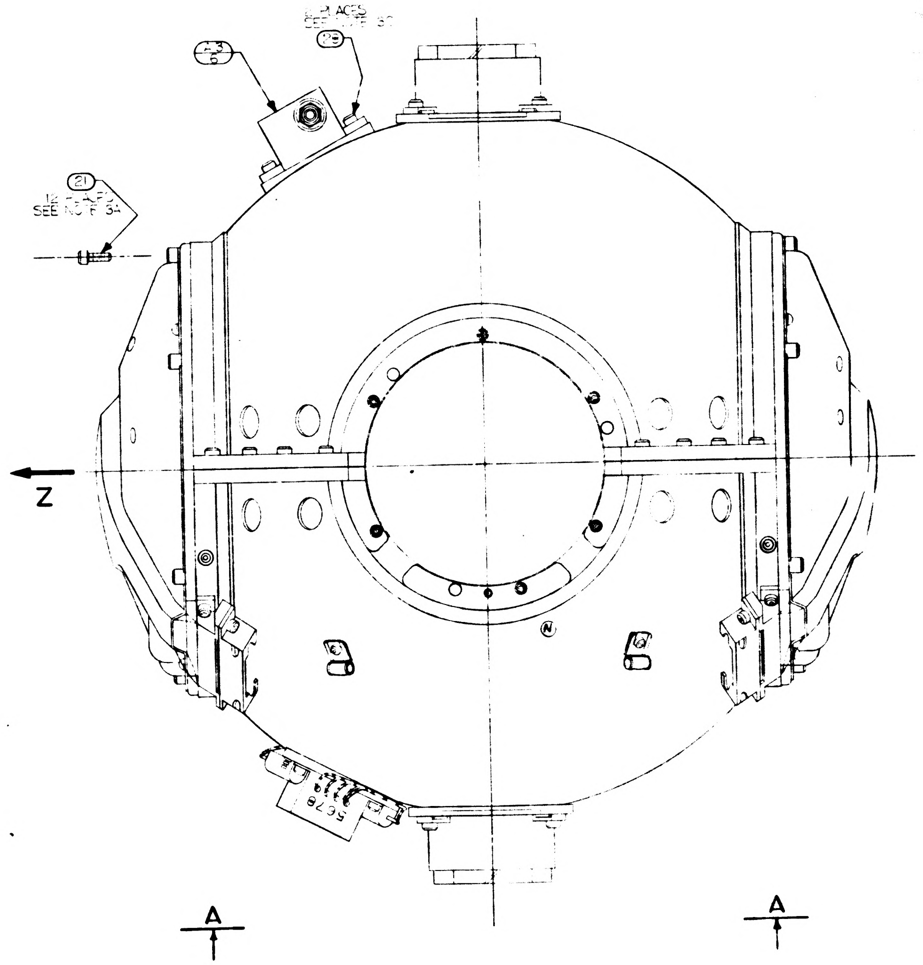
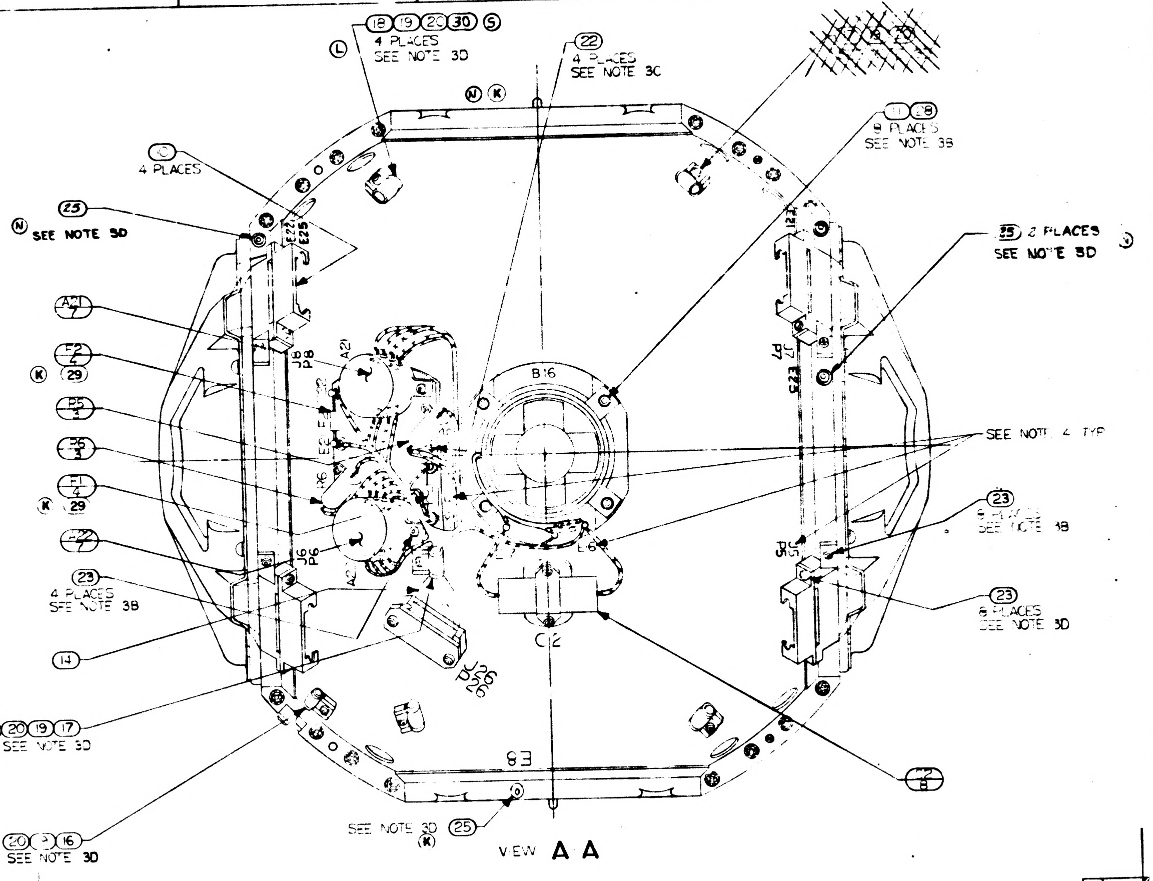
30 20 19 16
2 PLACES
SEE NOTE 3D
9
PLACES
23
4 PLACES
SEE NOTE 3D
12
PLACES
8
24 13
SEE NOTE 3D
S
20 19 6
~~8 PLACES~~
SEE NOTE 3D
4 PLACES
23
15
SEE NOTE 4 TYP


1 2 3 4
J 3 4

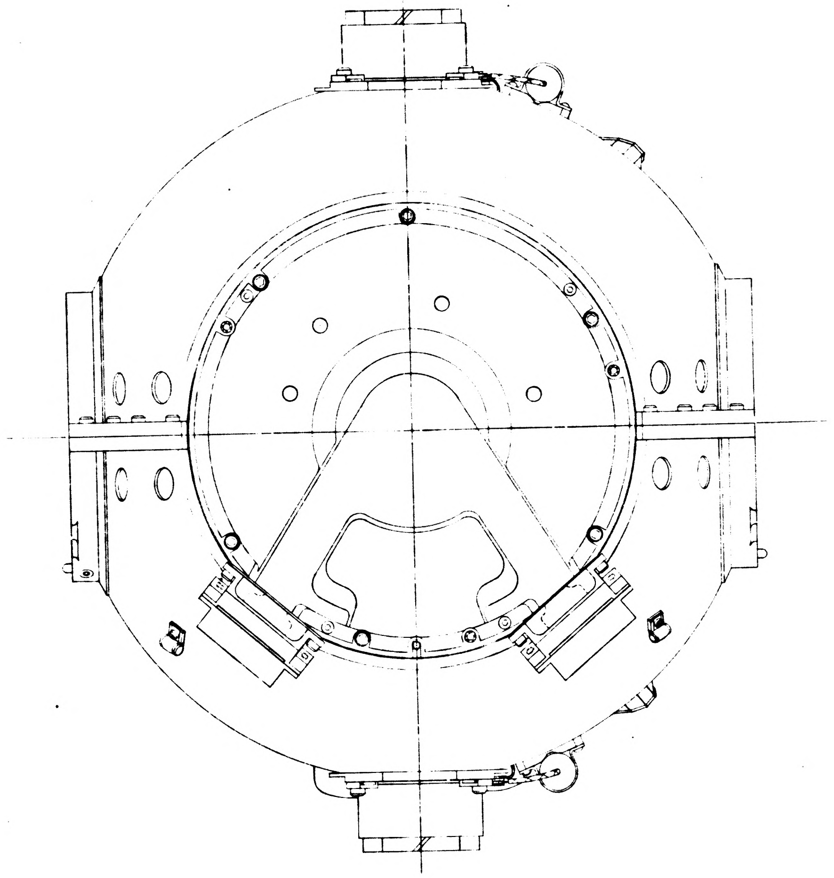

Y
X

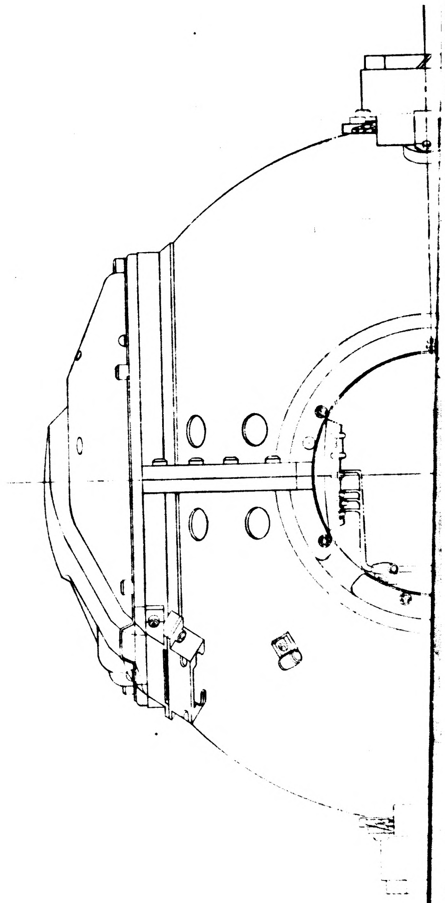

PLACES
SEE NOTE 3D
21
SEE NOTE 3A
Z
N
A
A

WIRING LEGEND					
COND. NO.	COLOR	FIND NO	FROM	TO	TWIST
1	YEL		B15 T1	E15	
2	RED		B15 T4	E13	
3	GRN		B15-T5	E14	
4	YEL		B16-T1	E18	
5	RED		B16 T4	E16	
6	GRN		B16 T5	E17	



18 19 20 30 S
L
4 PLACES
SEE NOTE 3D
22
4 PLACES
SEE NOTE 3C
M K
8 PLACES
SEE NOTE 3B
4 PLACES
25
N SEE NOTE 3D
25 2 PLACES
SEE NOTE 3D
29
K
B16
SEE NOTE 4 TYP
23
SEE NOTE 3B
23
4 PLACES
SEE NOTE 3B
23
SEE NOTE 3D
14
C12
S
30 20 19 17
SEE NOTE 3D
E8
SEE NOTE 3D 25
K
SEE NOTE 3D
VIEW A A





NOTES

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3. SCREW TORQUE REQUIREMENTS ±7%
    - A. 10.0 IN. LB.
    - B. 5.0 IN. LB.
    - C. 3.5 IN. LB.
    - D. INSTALL FINGER TIGHT
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL STD 440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

1000202

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	Description	Req'd.
1000203	Middle Axis Assy	1
1000103	Outer Gimbal Housing Assy	1
1000205	Intergimbal Sub-Assy, 16 Speed	1
1000006	Intergimbal Sub-Assy, 1 Speed	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

OUTER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000202

SHEET OF

1000203

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00341	6FEB63	AJB	WK

PART NO.	DESCRIPTION	REQ'D
1000204	Inner Axis Assy	1
1000074	Middle Gimbal Housing Assy.	1
1000206	Intergimbal Sub-Assy, 16 Speed	1
1000097	Accelerometer Angular Differentiating	2
1000008	Intergimbal Sub-Assembly IX Middle Axis	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

MIDDLE AXIS ASSEMBLY

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000203

SHEET OF

1000203

REVISIONS TDRR 00132					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00341	6FEB63	ajB	WI
	B	TDRR 00643	26MAR63	ajB	WK

PART NO.	DESCRIPTION	REQ'D
1000204	Inner Axis Assy	1
1000074	Middle Gimbal Housing Assy.	1
1000206	Intergimbal Sub-Assy, 16 Speed	1
1000097	Accelerometer Angular Differentiating	2
1000008	Intergimbal Sub-Assembly IX Middle Axis	1
1007022	ADA Preamp Assembly	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
		DO NOT SCALE THIS DRAWING
1000202	DL 1000201	MATERIAL:
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE
APPROVED O J Boyer	12/11/62
CHECKED	
DRAWN	
APPROVED FOR MSC W J Rhine 12-12-62	
MIT/IL APPROVAL	DATE
W L Kupfer	12/12/62

MIDDLE AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
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CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
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NASA DRAWING NO.
1000203

SHEET OF

1000203

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00341	6FEB63	agB	WK
(11)	B	TDRR 00643	26MAR63	agB	WK
	C	TDRR 00764	10APR63	agB	WK

PART NO.	DESCRIPTION	REQ'D
1000204	Inner Axis Assy	1
1000074	Middle Gimbal Housing Assy.	1
1000206	Intergimbal Sub-Assy, 16 Speed	1
1000097	Accelerometer Angular Differentiating	2
1000008	Intergimbal Sub-Assembly IX Middle Axis	1
1007022	ADA Preamp Assembly	2
1000143	Cover, Bracket, Connector	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W S Kupfer	12/12/62

MIDDLE AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
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NASA DRAWING NO.
1000203

SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000203

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00341	6FEB63	agB	WK
	B	TDRR 00643	26MAR63	agB	WK
	C	TDRR 00764	10APR63	agB	WK
	D	REPLACED BY REV E WITH CHANGES TDRR 02305	29JULY63	agB	WK

PART NO.	DESCRIPTION	REQ'D
1000204	Inner Axis Assy	1
1000074	Middle Gimbal Housing Assy.	1
1000206	Intergimbal Sub-Assy, 16 Speed	1
1000097	Accelerometer Angular Differentiating	2
1000008	Intergimbal Sub-Assembly IX Middle Axis	1
1007022	ADA Preamp Assembly	2
1000143	Cover, Bracket, Connector	4

REPLACED BY REV E WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W J Kupfer	12/12/62

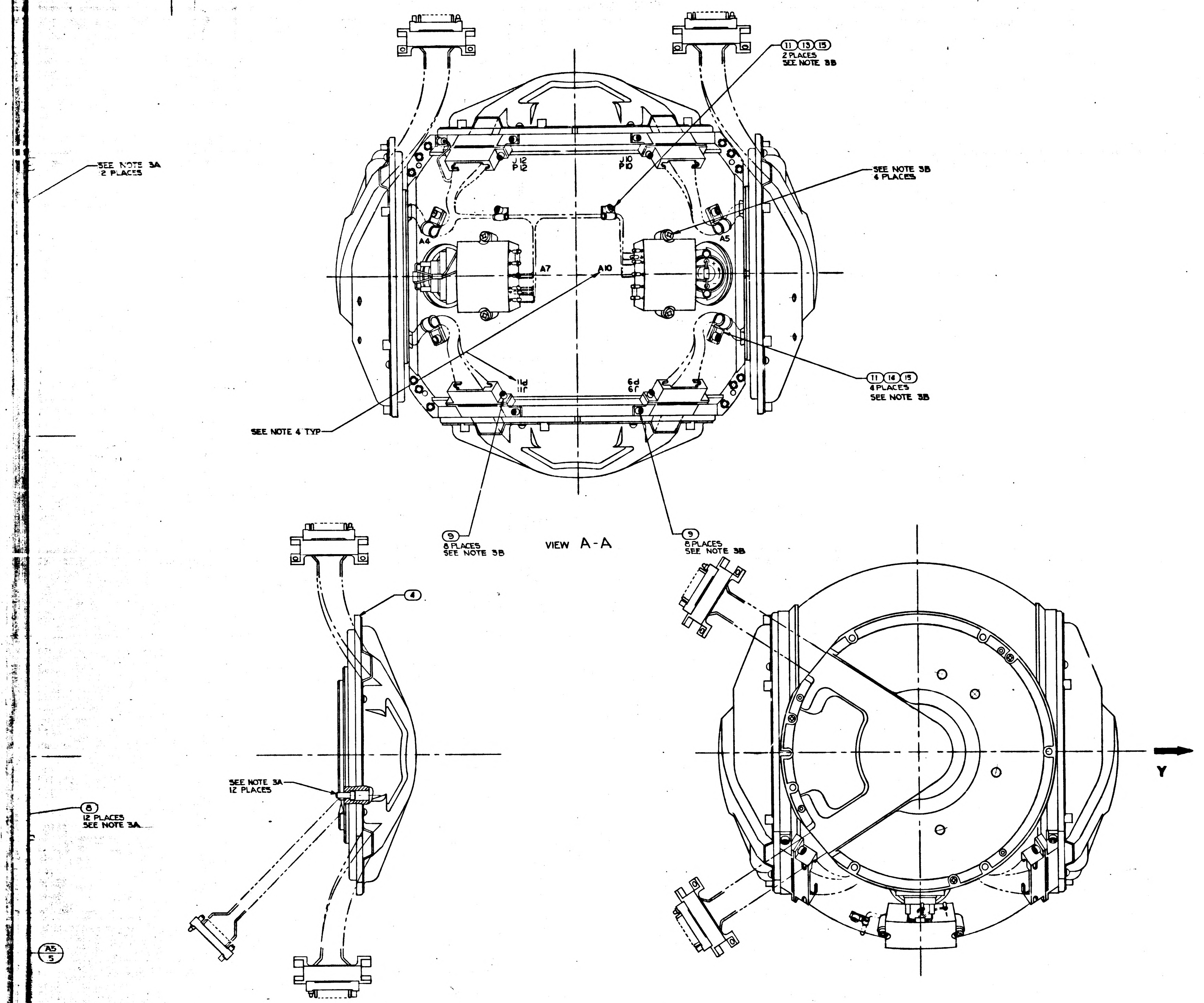
MIDDLE AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000203
SHEET OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	E	REPLACES REV D WITH CHANGES TDRR 02305	7-29-65	



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2 PLACES
SEE NOTE 3B
SEE NOTE 3A
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J12
P12
J10
P10
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A7
A10
11d
11f
6d
6f
11 14 15
4 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
9
8 PLACES
SEE NOTE 3B
9
8 PLACES
SEE NOTE 3B
4
SEE NOTE 3A
12 PLACES
8
12 PLACES
SEE NOTE 3A
A5
5
Y

VIEW A-A

REPLACES REV D WITH CHANGES

A/R	SOLDER	SNGO WARP 2	QQ-S-571		16
6	WASHER, CABLE CLAMP	1000223			15
4	CLAMP, CABLE	1000220-4			14
2	CLAMP, CABLE	1000220-3			13
4	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS608C256LL4			12
6	SCREW, CAP, SOC HD, HEX	1000110-1			11
1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			10
16	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS608C440LL4			9
12	SCREW, CAP, SOC. HD., HEX	1000110-7			8
4	COVER, BRACKET CONN	1000143			7
2	ADA PREAMP ASSY. M.G.	1007022			6
2	ACCEL. ANGULAR DIFFERENTIATING	1000097			5
1	INTERGIMBAL SUB-ASSY 16X M.A.	1000206			4
1	INTERGIMBAL SUB-ASSY 1X M.A.	1000008			3
1	INNER AXIS ASSY.	1000204			2
1	HOUSING ASSY. M.G.	1000074			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153

		DATE
APPROVED		5-31-63
CHECKED		
DRAWN	R.G.S.	4-8-63

APPROVED FOR MSC
Jack Barnard
MIT/IL APPROVAL DATE
W Kupfer 31 Jul 63

MIDDLE AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000203
SHEET 1 OF 1

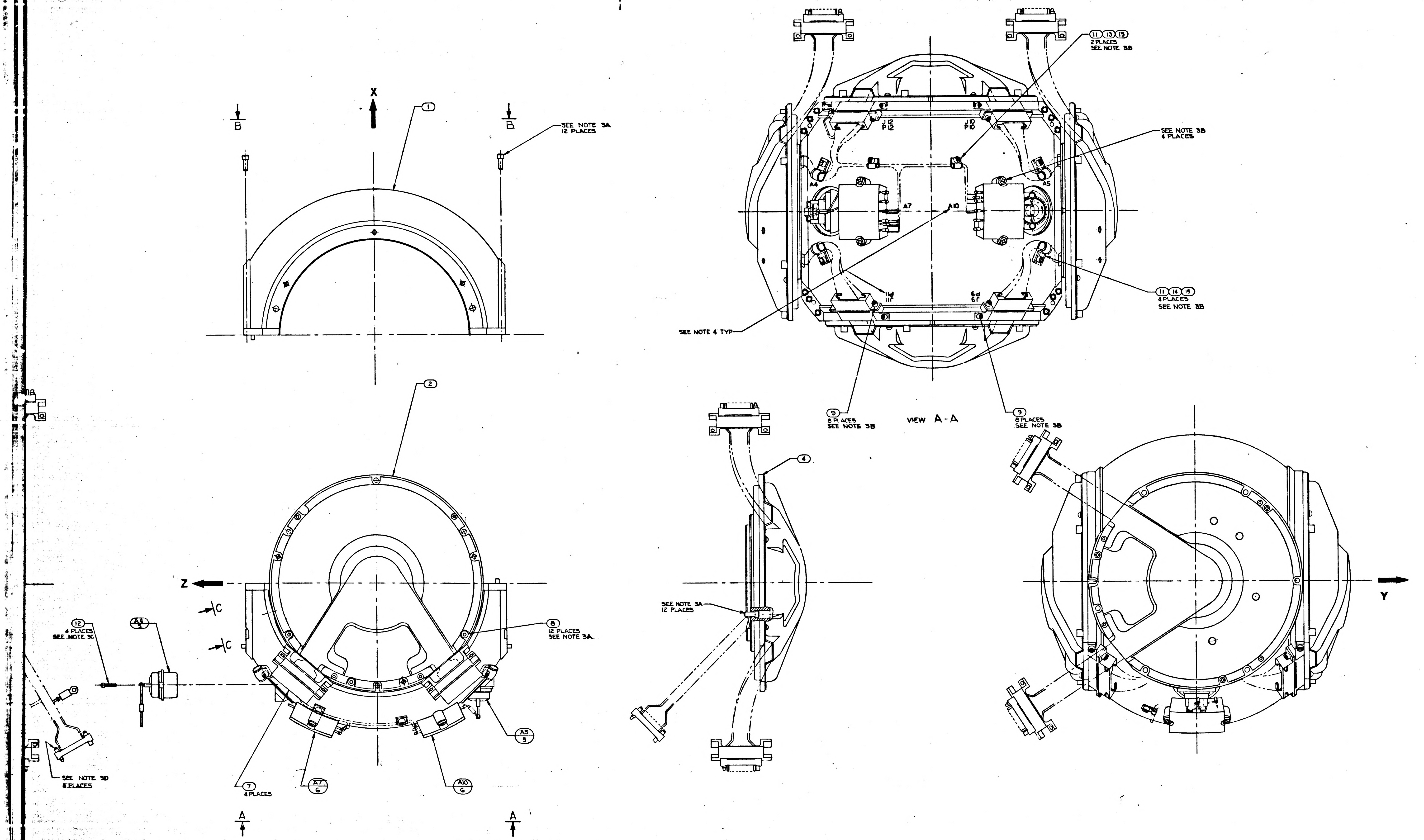
1000203 E

	REV	SHEET
1000203	E	1

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

E3



X
B
B
1
SEE NOTE 3A
12 PLACES
2
Z
C
C
12
4 PLACES
SEE NOTE 3C
A4
5
8
12 PLACES
SEE NOTE 3A
A5
5
SEE NOTE 3D
8 PLACES
7
4 PLACES
A7
6
A10
6
A
A
11 13 15
2 PLACES
SEE NOTE 3B
J12
P12
J10
P10
SEE NOTE 3B
4 PLACES
A4
A5
A7
A10
11d
11f
6d
6f
11 14 15
4 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
9
8 PLACES
SEE NOTE 3B
VIEW A-A
9
8 PLACES
SEE NOTE 3B
4
SEE NOTE 3A
12 PLACES
Y

REPLACES RE

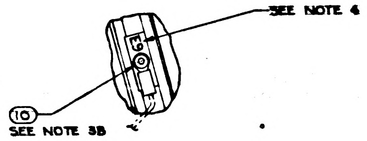
MASTER

1000203 | REV E | SHEET 1

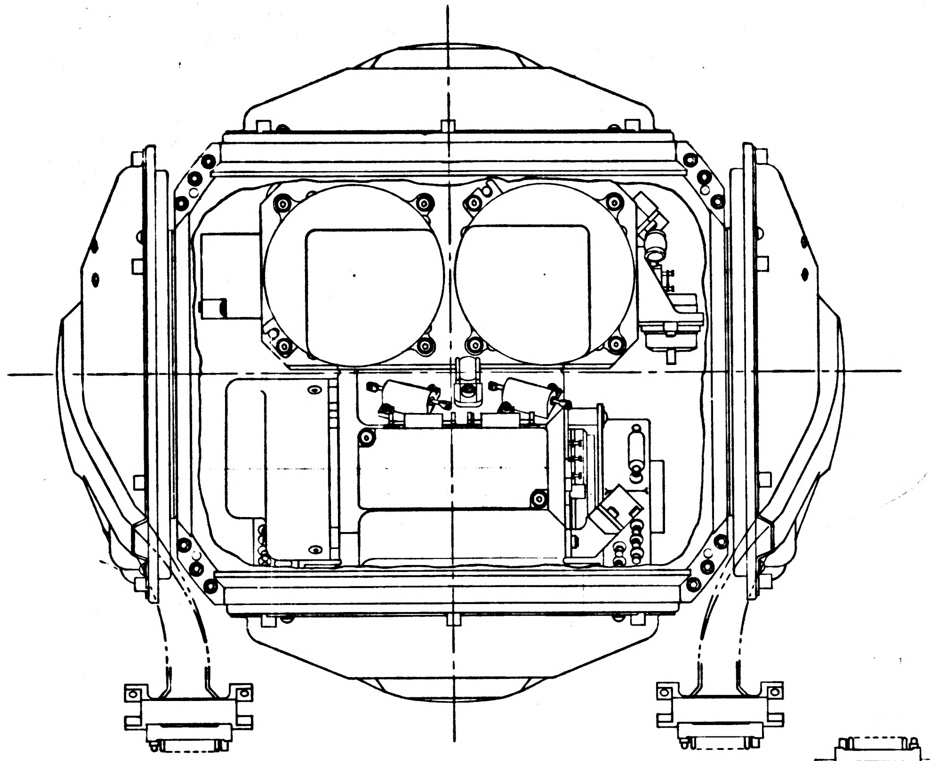
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

E-2

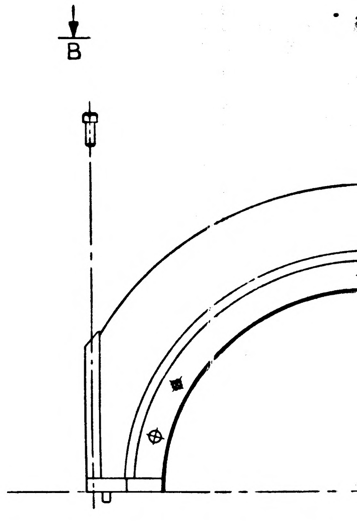
WIRING LEGEND					
COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 6
1-1	WHITE		A4 - +	A7-2	8
1-2	BLACK		A4 - -	A7-1	
2-1	WHITE		A5 - +	A10-1	8
2-2	BLACK		A5 - -	A10-2	

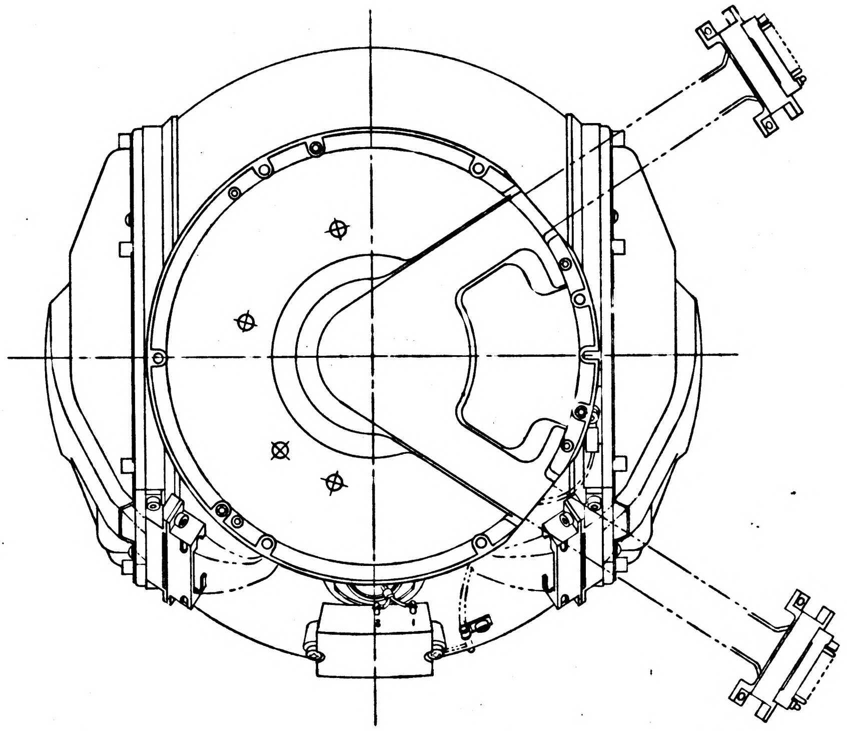

SEE NOTE 4
10
SEE NOTE 3B

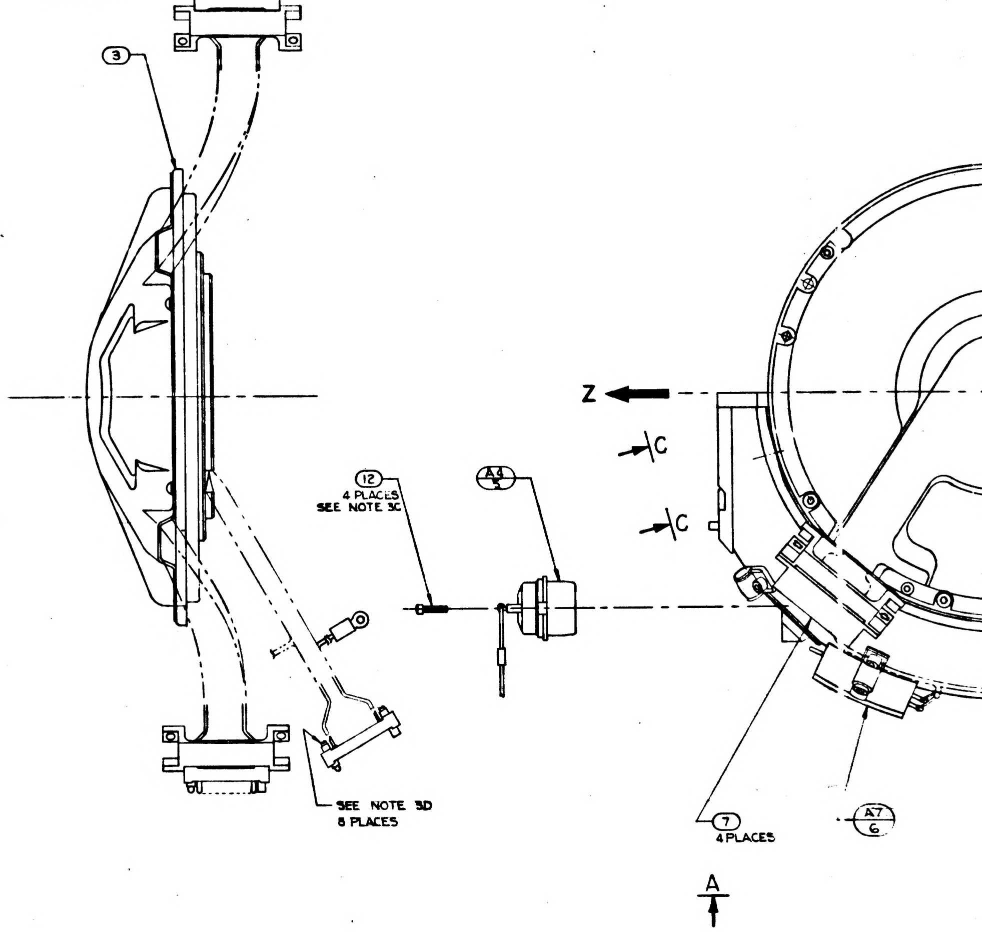
VIEW C-C



VIEW B-B






3
Z
C
C
12
4 PLACES
SEE NOTE 3C
A4
5
SEE NOTE 3D
8 PLACES
7
4 PLACES
A7
6
A

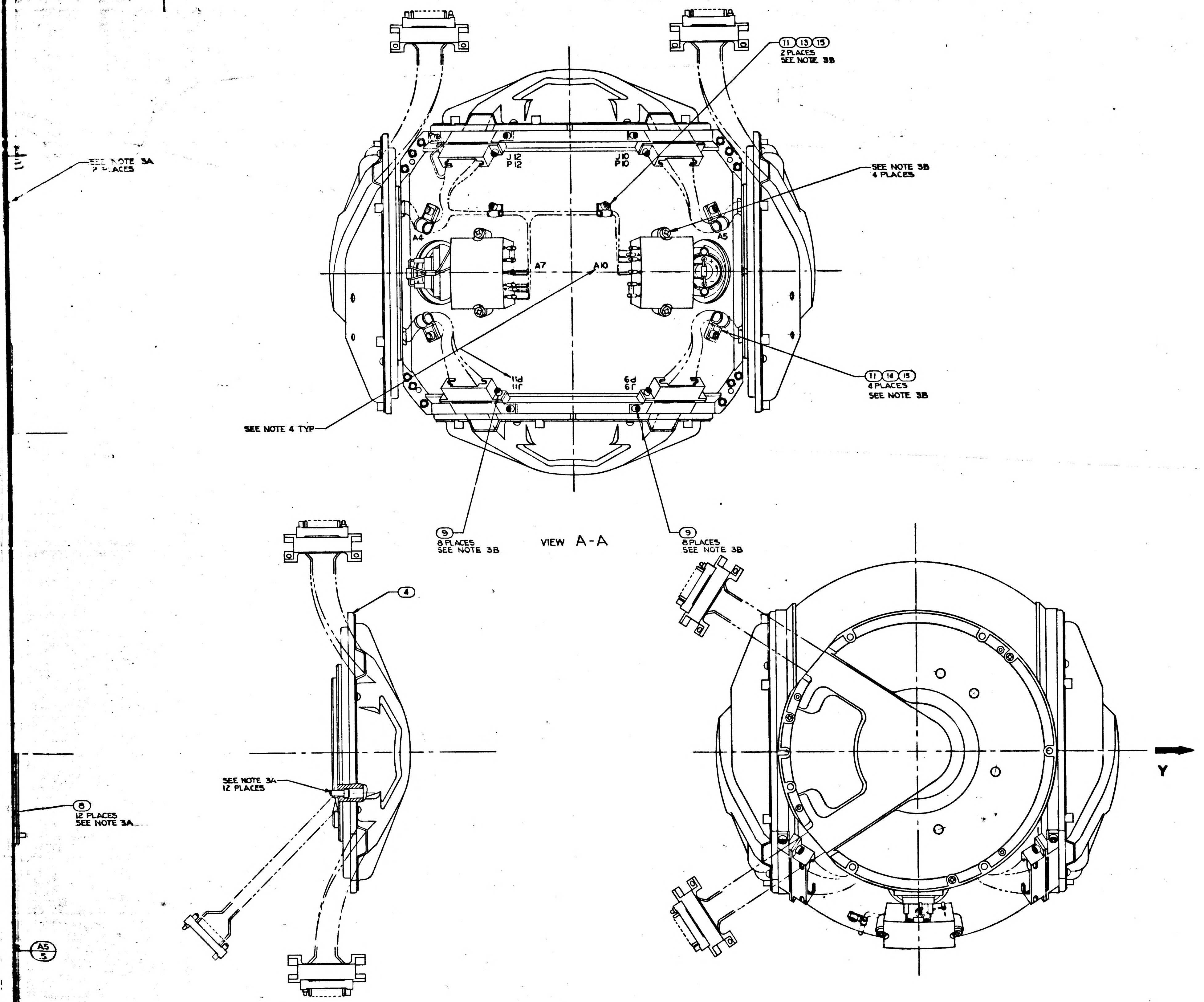
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB
   - B. 5.0 IN. LB
   - C. 3.5 IN. LB
   - D. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL-STD-440 USING ⑯; WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

	REV	SHEET
1000203	E	1

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	E	REPLACES REV D WITH CHANGES TDRR 02305	7-29-63		
	F	TDRR 03185	9-26-63		JKT



11 13 15
2 PLACES
SEE NOTE 3B
SEE NOTE 3A
2 PLACES
J12
P12
J10
P10
SEE NOTE 3B
4 PLACES
A4
A5
A7
A10
11d
11r
6d
6r
11 14 15
4 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
9
8 PLACES
SEE NOTE 3B
VIEW A-A
9
8 PLACES
SEE NOTE 3B
4
SEE NOTE 3A
12 PLACES
8
12 PLACES
SEE NOTE 3A
A5
5
Y

REPLACES REV D WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
A/R	SOLDER	SNGO WARP 2	QQ-S-571		16
6	WASHER, CABLE CLAMP	1000223			15
4	CLAMP, CABLE	1000220-4			14
2	CLAMP, CABLE	1000220-3			13
Ⓕ 4	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C02LL4			12
6	SCREW, CAP, SOC HD, HEX	1000110-1			11
1	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			10
Ⓕ 16	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			9
12	SCREW, CAP, SOC HD., HEX	1000110-7			8
4	COVER, BRACKET CONN	1000143			7
2	ADA PREAMP ASSY. M.G.	1007022			6
2	ACCEL. ANGULAR DIFFERENTIATING	1000097			5
1	INTERGIMBAL SUB-ASSY 16X M.A.	1000206			4
1	INTERGIMBAL SUB-ASSY 1X M.A.	1000008			3
1	INNER AXIS ASSY.	1000204			2
1	HOUSING ASSY. M.G.	1000074			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED DATE 7-29-63
CHECKED
DRAWN R.G.S. 4-8-63
APPROVED FOR MSC
Jack Barnard
INIT'L APPROVAL DATE
31

MIDDLE AXIS ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000203
SHEET 1 OF 1

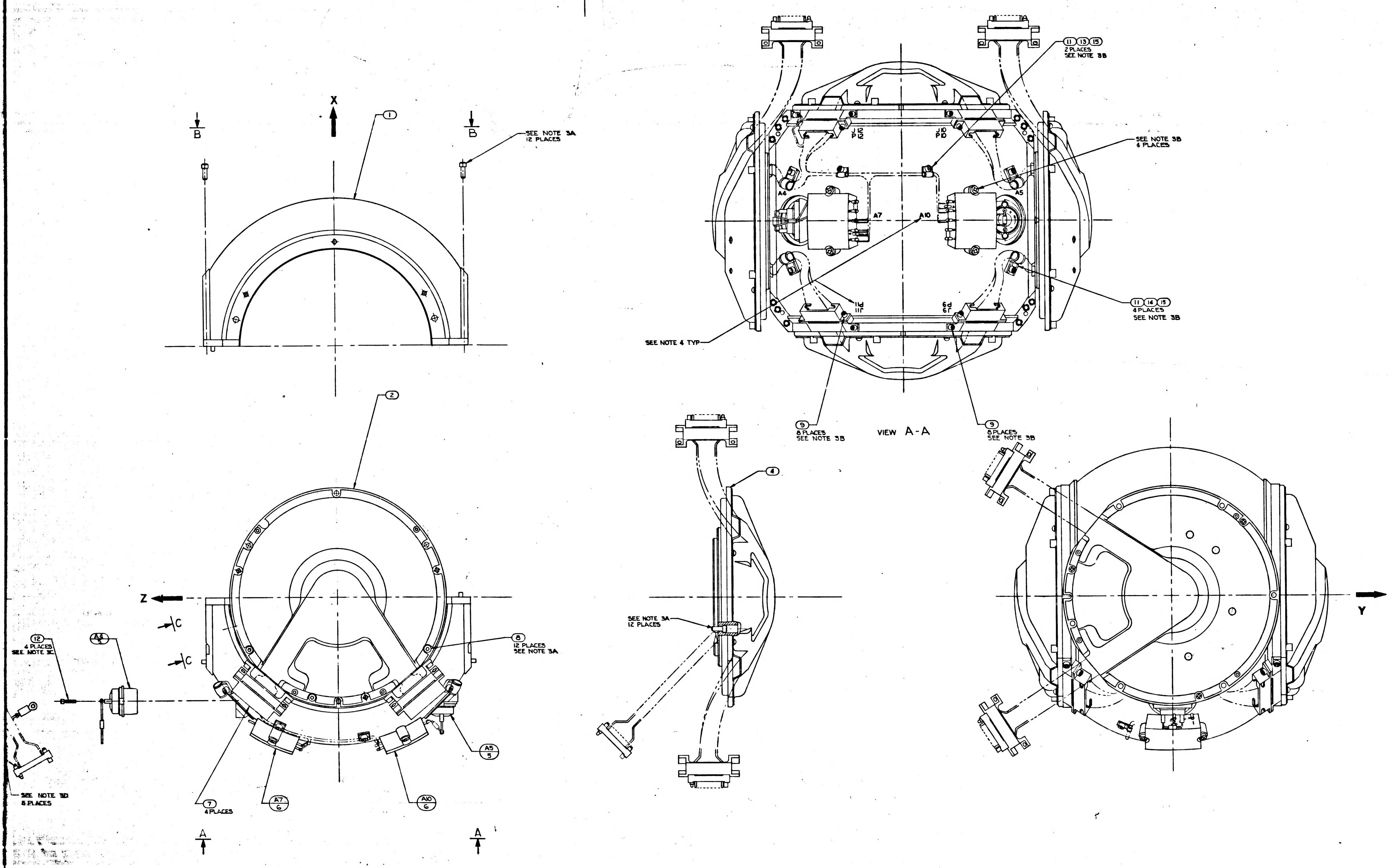
1000203 REV F SHEET 1

1000203 F

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

F3


X
B
B
SEE NOTE 3A
12 PLACES
1
2
11 13 15
2 PLACES
SEE NOTE 3B
J12
P12
J10
P10
SEE NOTE 3B
4 PLACES
A4
A5
A7
A10
P11
J11
P9
J9
11 14 15
4 PLACES
SEE NOTE 3B
SEE NOTE 4 TYP
9
8 PLACES
SEE NOTE 3B
VIEW A-A
9
8 PLACES
SEE NOTE 3B
4
Z
C
C
12
4 PLACES
SEE NOTE 3C
A4
5
8
12 PLACES
SEE NOTE 3A
SEE NOTE 3A
12 PLACES
Y
A5
5
SEE NOTE 3D
8 PLACES
7
4 PLACES
A7
6
A10
6
A
A

REPLACES REV D

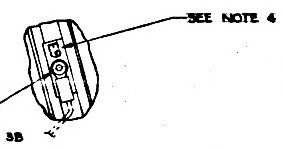
MASTER

	REV	SHEET
1000203	F	1

INCHES
PHOTOGRAPHIC SCALE ONLY

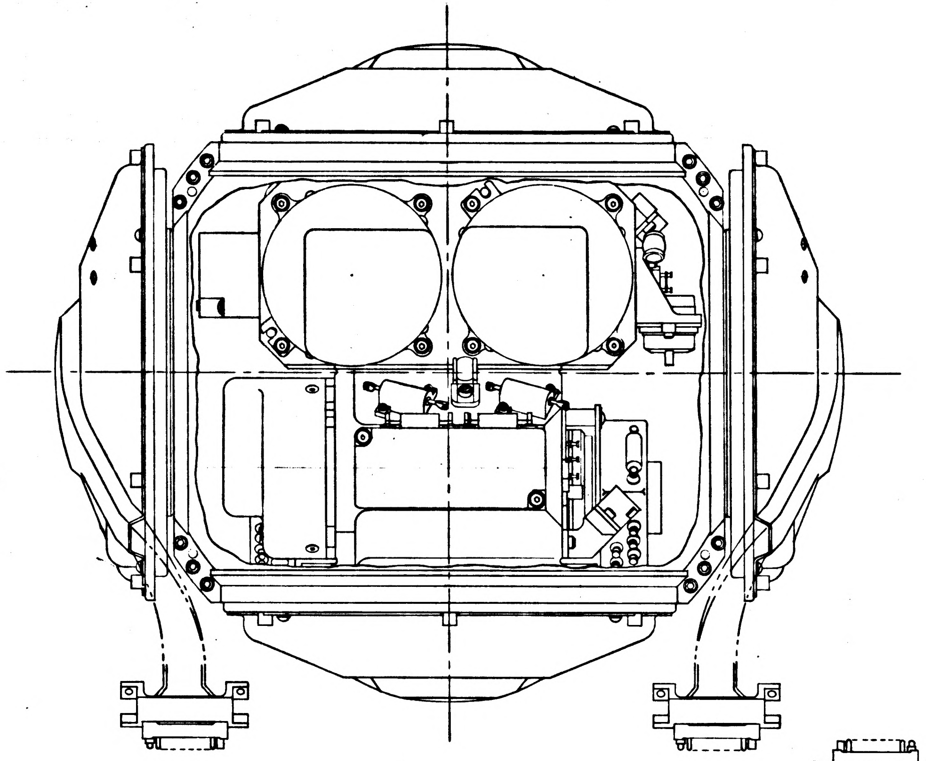
F-2

WIRING LEGEND					
COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 6
1-1	WHITE		A4 - +	A7-2	8
.-2	BLACK		A4 - -	A7- 1	
2-1	WHITE		A5 - +	A10 - 1	8
2-2	BLACK		A5 - -	A10 - 2	



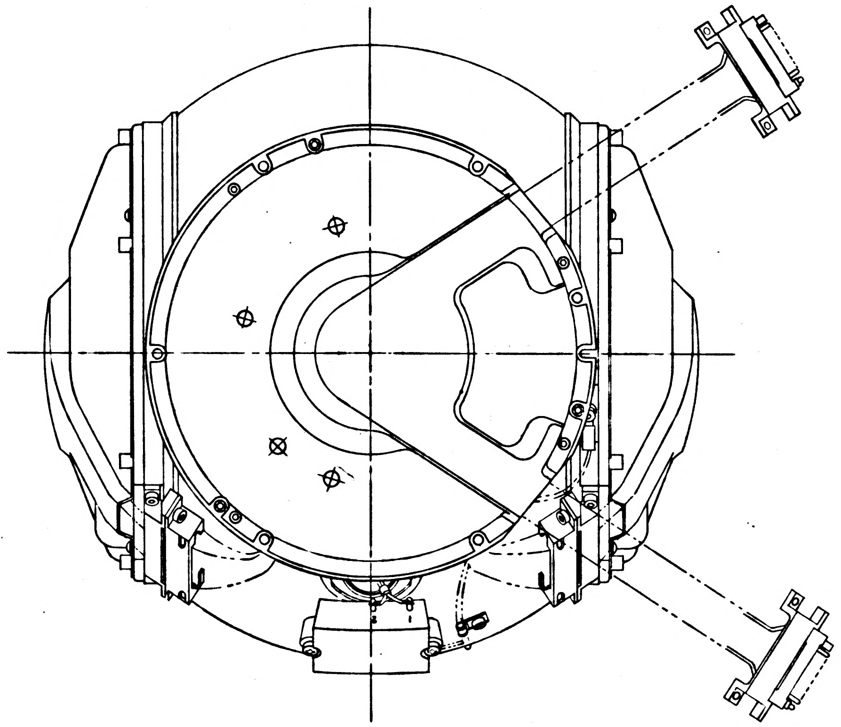
SEE NOTE 4
10
SEE NOTE 3B

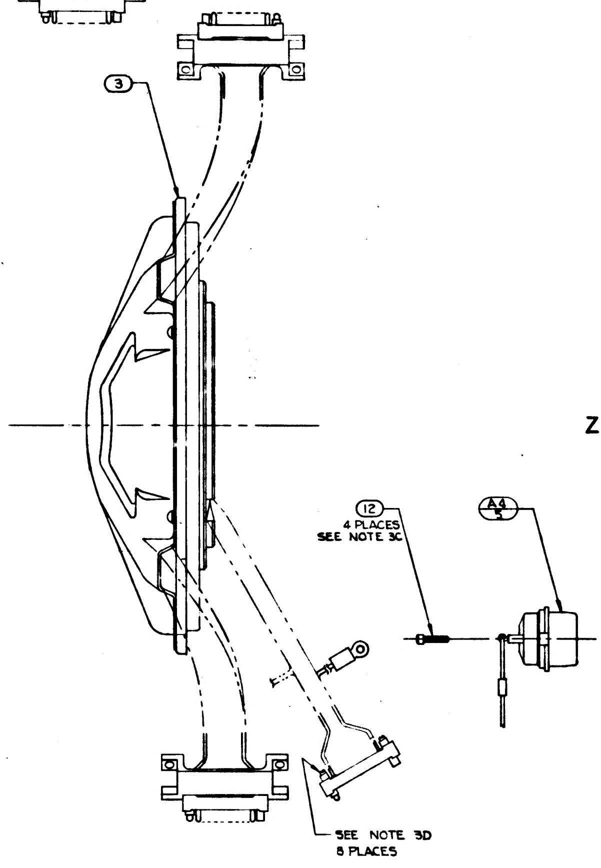
VIEW C-C



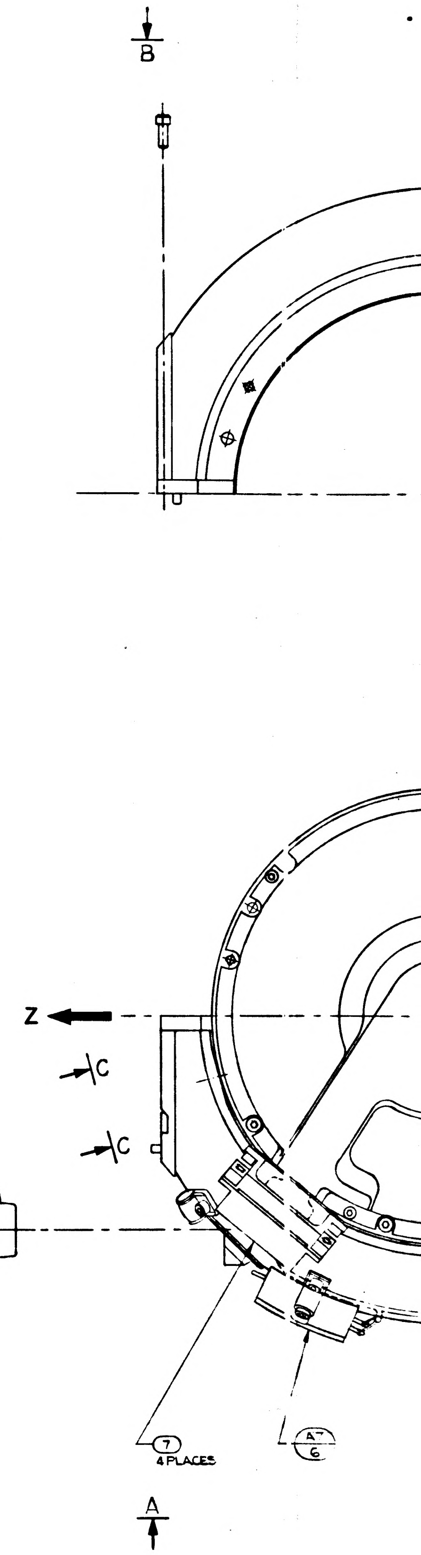
VIEW B-B

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP 1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   - A. 10.0 IN. LB
   - B. 5.0 IN. LB
   - C. 3.5 IN. LB
   - D. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL-STD-440 USING ⑯: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE





3
12
4 PLACES
SEE NOTE 3C
A4
5
SEE NOTE 3D
8 PLACES



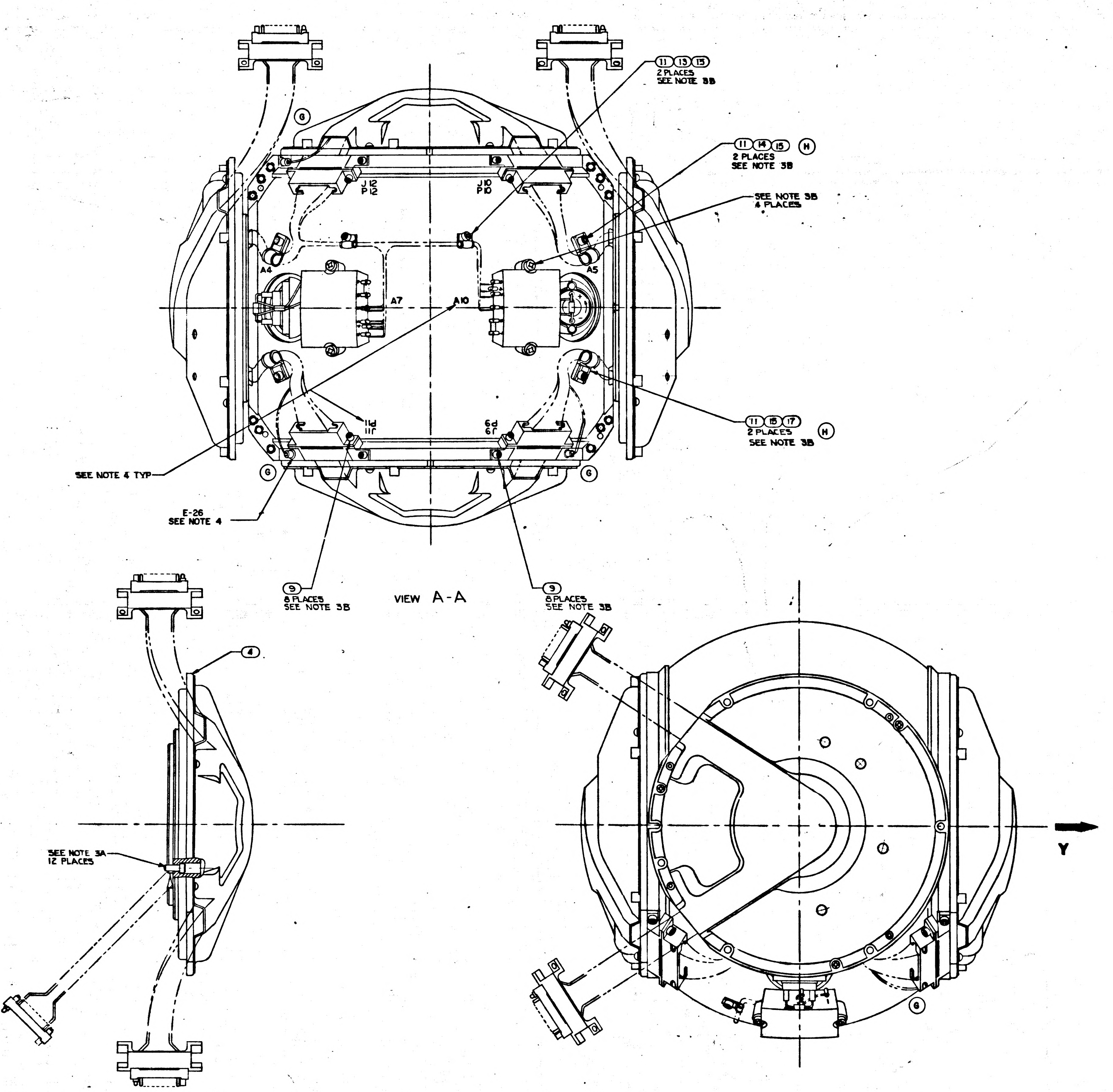
B
Z
C
C
7
4 PLACES
A7
6
A

1000203 | REV F | SHEET 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	E	REPLACES REV D WITH CHANGES TDRR 02305	7-29-65		
	F	TDRR 03185	9-26-63		
	G	TDRR 06178	2-6-64		
	H	TDRR 06237	2-11-64		

12 PLACES
SEE NOTE 3A



11 13 15
2 PLACES
SEE NOTE 3B
11 14 15 H
2 PLACES
SEE NOTE 3B
SEE NOTE 3B
4 PLACES
J12
P12
J10
P10
A4
A5
A7
A10
11 15 17
2 PLACES
SEE NOTE 3B
H
SEE NOTE 4 TYP
E-26
SEE NOTE 4
G
9
8 PLACES
SEE NOTE 3B
9
8 PLACES
SEE NOTE 3B
4
SEE NOTE 3A
12 PLACES
G
Y

VIEW A-A

REPLACES REV D WITH CHANGES

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(H)	2	CLAMP, CABLE	1000220-5			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	6	WASHER, CABLE CLAMP	1000223			15
	4	CLAMP, CABLE	1000220-4			14
	2	CLAMP, CABLE	1000220-3			13
(F)	4	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C02LL4			12
	6	SCREW, CAP, SOC HD, HEX	1000110-1			11
(G)	3	SCREW, BUT. HD, SELF LKG, SPL SOC	1000250-12			10
(F)	16	SCREW, CAP. SELF LKG, HEX HD, SOC	NAS1352C04LL4			9
	12	SCREW, CAP, SOC. HD., HEX	1000110-7			8
	4	COVER. BRACKET CONN	1000143			7
	2	ADA PREAMP ASSY. M.G.	1007022			6
	2	ACCEL. ANGULAR DIFFERENTIATING	1000097			5
	1	INTERGIMBAL SUB-ASSY 16X M.A.	1000206			4
	1	INTERGIMBAL SUB-ASSY 1X M.A.	1000008			3
	1	INNER AXIS ASSY.	1000204			2
	1	HOUSING ASSY. M.G.	1000074			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN R.G.S. 4-8-63
APPROVED FOR MSC
Jack Barnard
MIT I.L. APPROVAL DATE
31/6/63

MIDDLE AXIS
ASSEMBLY

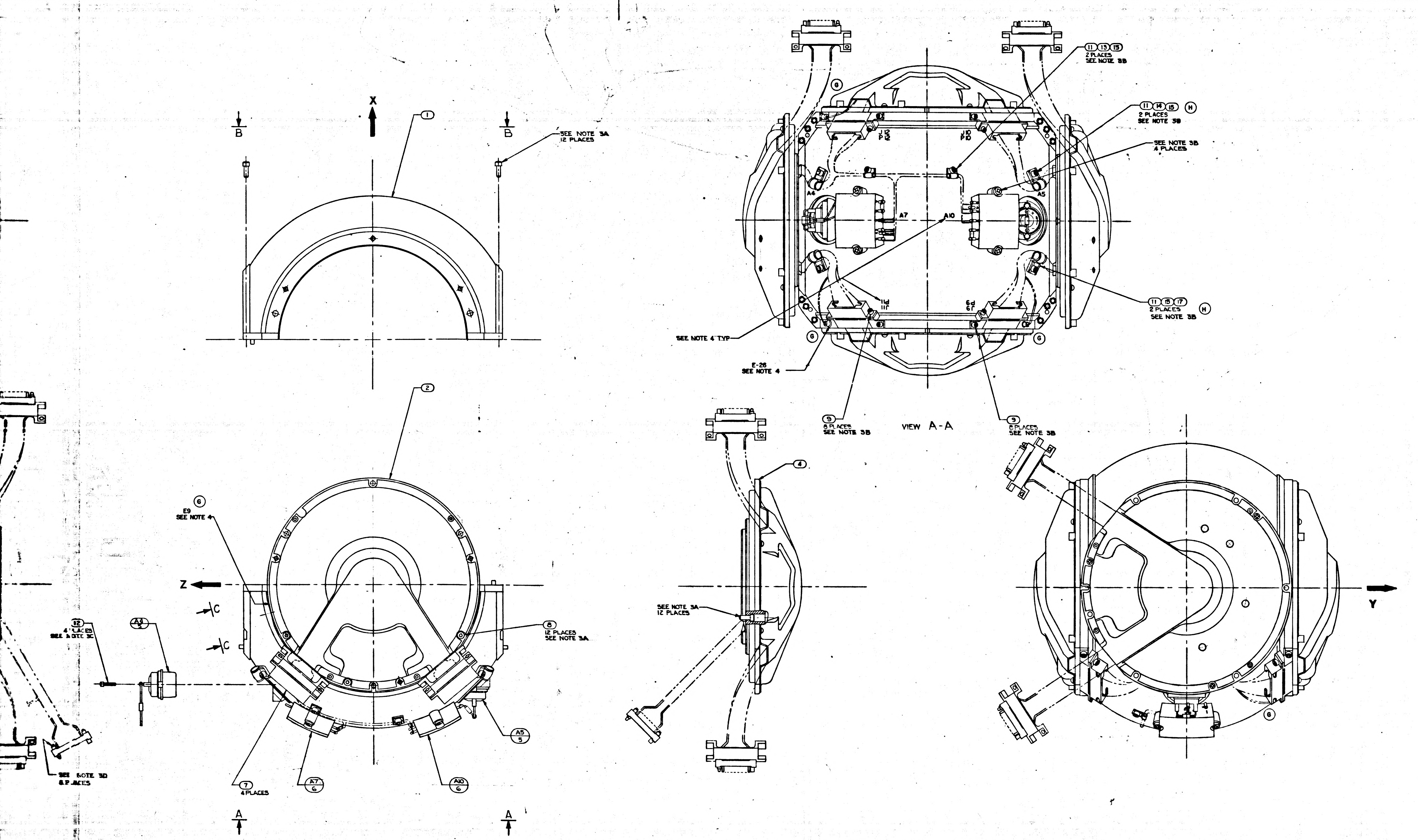
SCALE 1/1
UNIT WT.
CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000203
SHEET 1 OF 1

1000203
H

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY


X
B
B
1
SEE NOTE 3A
12 PLACES
11 13 15
2 PLACES
SEE NOTE 3B
11 14 15 H
2 PLACES
SEE NOTE 3B
SEE NOTE 3B
4 PLACES
G
J12
P12
J10
P10
A4
A5
A7
A10
11d
11f
6d
6f
11 15 17
2 PLACES
SEE NOTE 3B
H
SEE NOTE 4 TYP
G
G
E-26
SEE NOTE 4
9
8 PLACES
SEE NOTE 3B
VIEW A-A
9
8 PLACES
SEE NOTE 3B
2
6
E9
SEE NOTE 4
Z
C
C
12
4 PLACES
SEE NOTE 3C
A4
5
8
12 PLACES
SEE NOTE 3A
A5
5
SEE NOTE 3D
8 PLACES
7
4 PLACES
A7
6
A10
6
A
A
4
SEE NOTE 3A
12 PLACES
Y
G

REPLACES REV D WITH

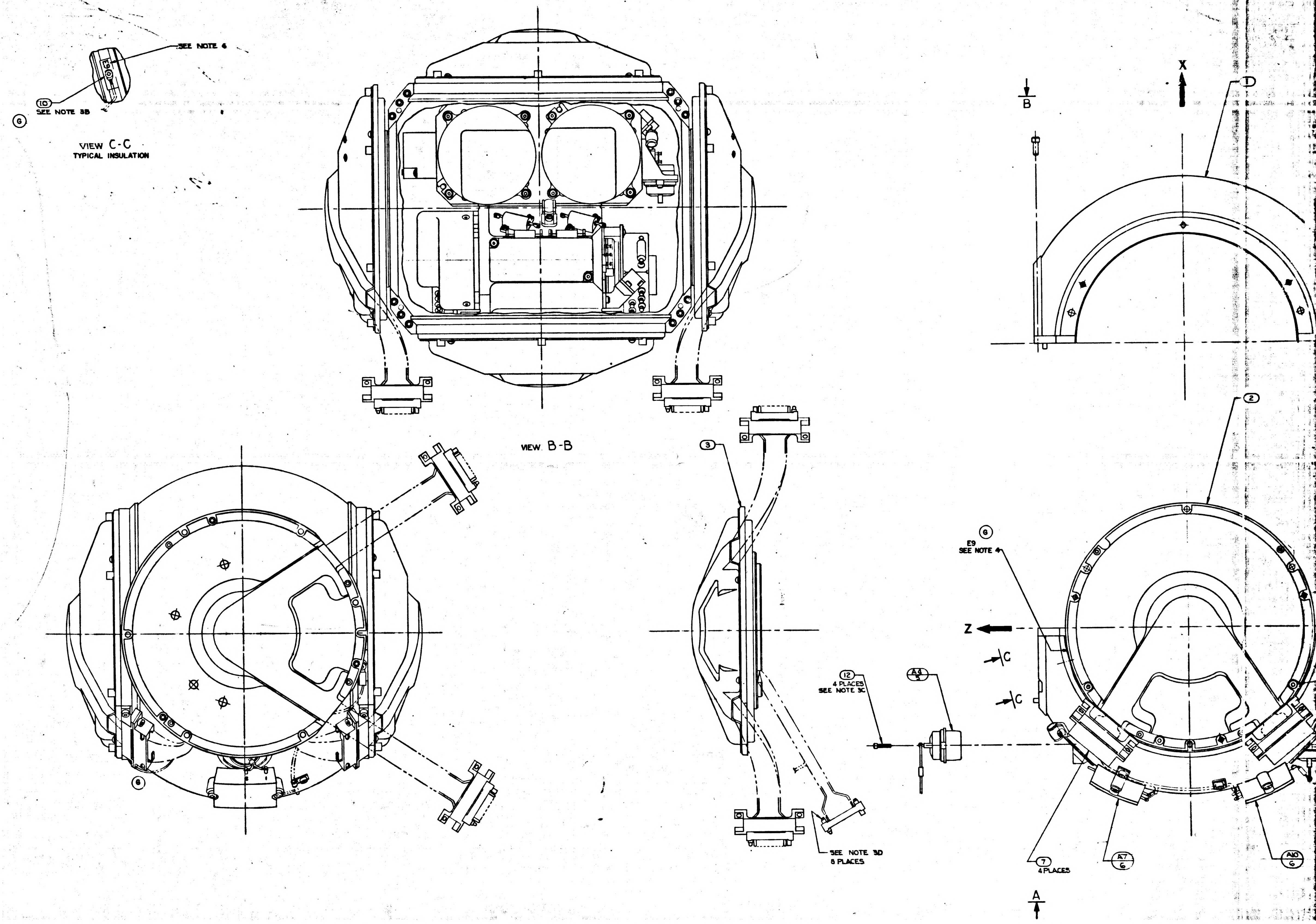
1000203 REV H SHEET 1

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

WIRING LEGEND

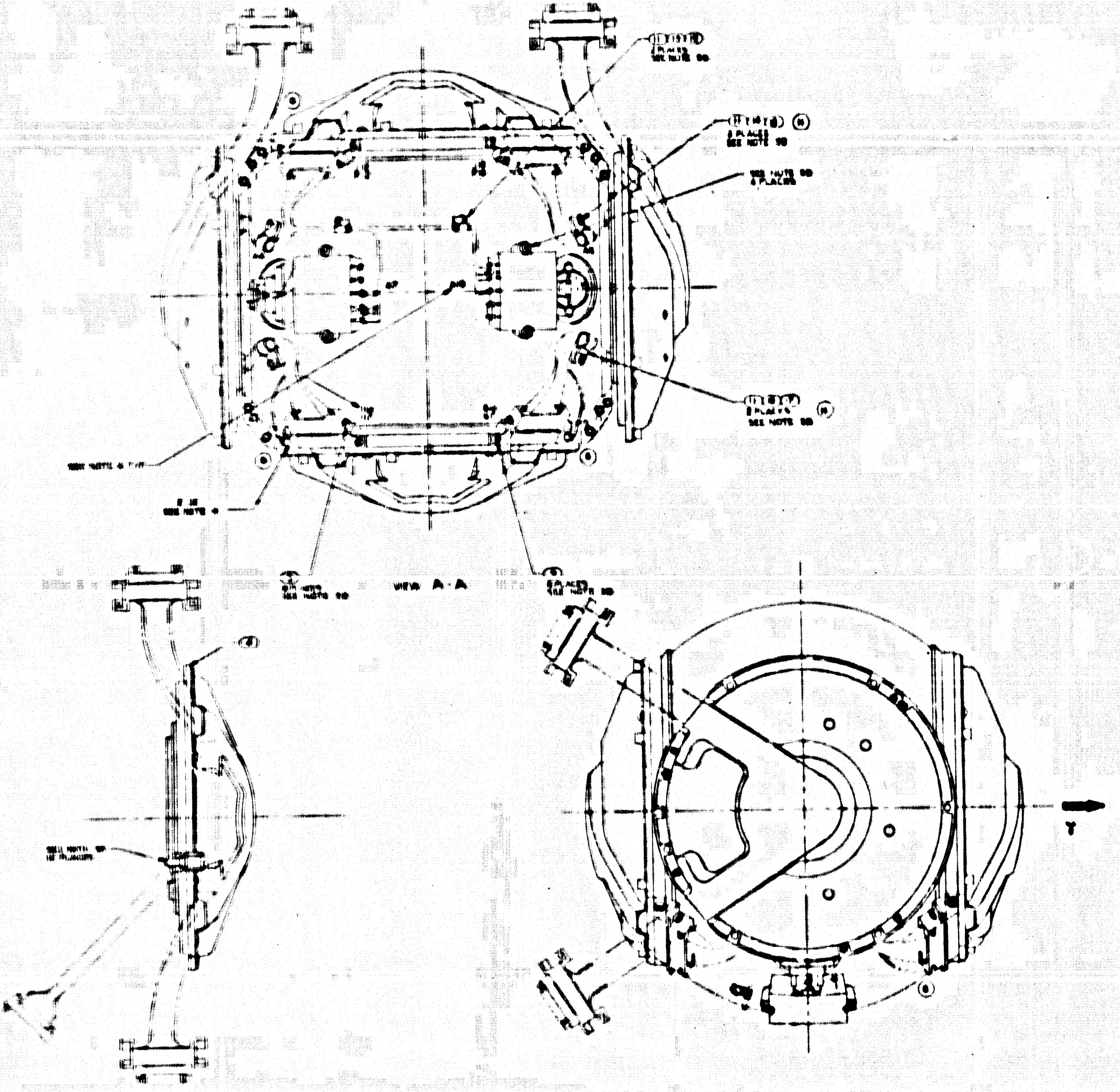
COND NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 6
1-1	WHITE		A4 - +	A7-2	8
1-2	BLACK		A4 - -	A7-1	
2-1	WHITE		A5 - +	A10-1	8
2-2	BLACK		A5 - -	A10-2	


SEE NOTE 4
E9
10
SEE NOTE 3B
6
VIEW B-B
B
X
D
2
3
6
E9
SEE NOTE 4
Z
C
C
12
4 PLACES
SEE NOTE 3C
A4
5
SEE NOTE 3D
8 PLACES
7
4 PLACES
A7
6
A10
6
A

VIEW C-C
TYPICAL INSULATION

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   A. 10.0 IN. LB
   B. 5.0 IN. LB
   C. 3.5 IN. LB
   D. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
4. MARK CHARACTERS $^{.10}_{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL-STD-440 USING ⑯; WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

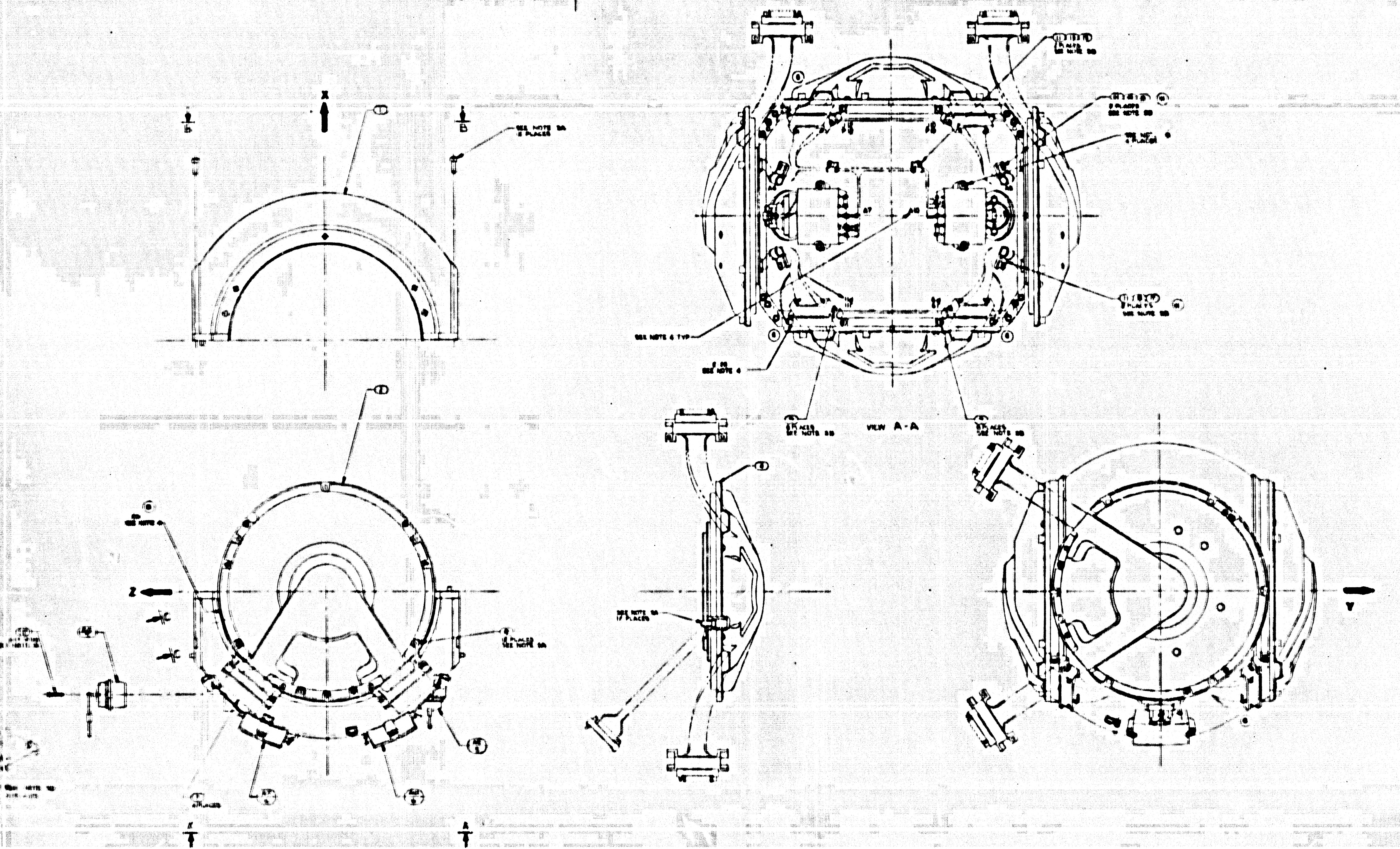

SEE NOTE 10
3 PLACES
SEE NOTE 10
VIEW A-A
Y

REPLACES REV D WITH CHANGES

	CLAMP, CABLE	[illegible]
	[illegible]	[illegible]
	WASHER, CABLE CLAMP	[illegible]
	CLAMP, CABLE	[illegible]
	CLAMP, CABLE	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	HOUSING ASSY	[illegible]

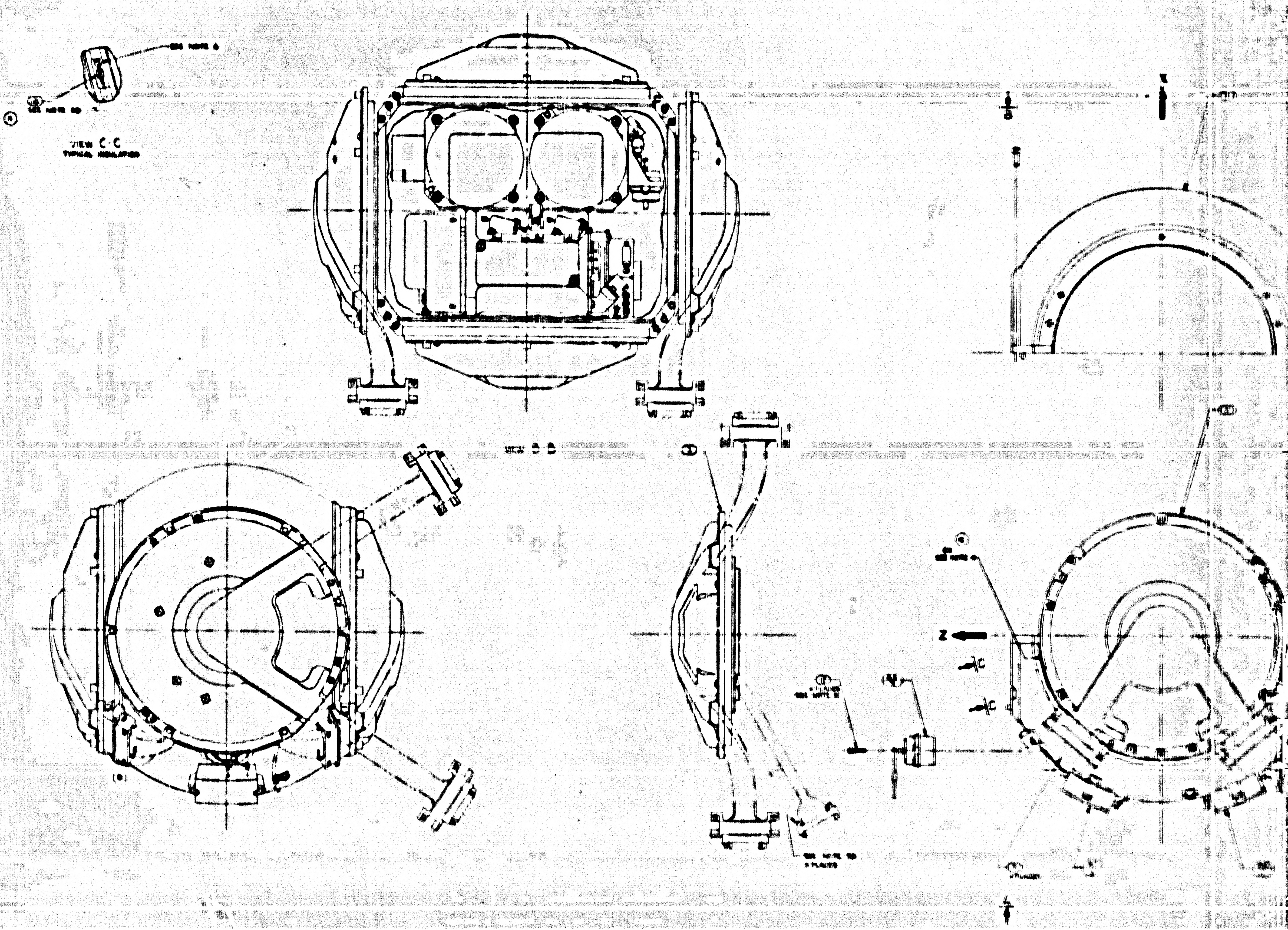
LIST OF PARTS AND MATERIALS

MIDDLE AXIS
ASSEMBLY


X
B
B
SEE NOTE 5A
SEE NOTE 4 TYP
SEE NOTE 4
SEE NOTE 5B
SEE NOTE 5B
VIEW A-A
SEE NOTE 5A
Z
SEE NOTE 5A
Y
A
A

1000203 F 1

[illegible]					
[illegible]	COLOR	[illegible]	[illegible]	[illegible]	SEE NOTE
[illegible]	WHITE		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	
[illegible]	WHITE		[illegible]	[illegible]	
[illegible]	BLACK		[illegible]	[illegible]	[illegible]

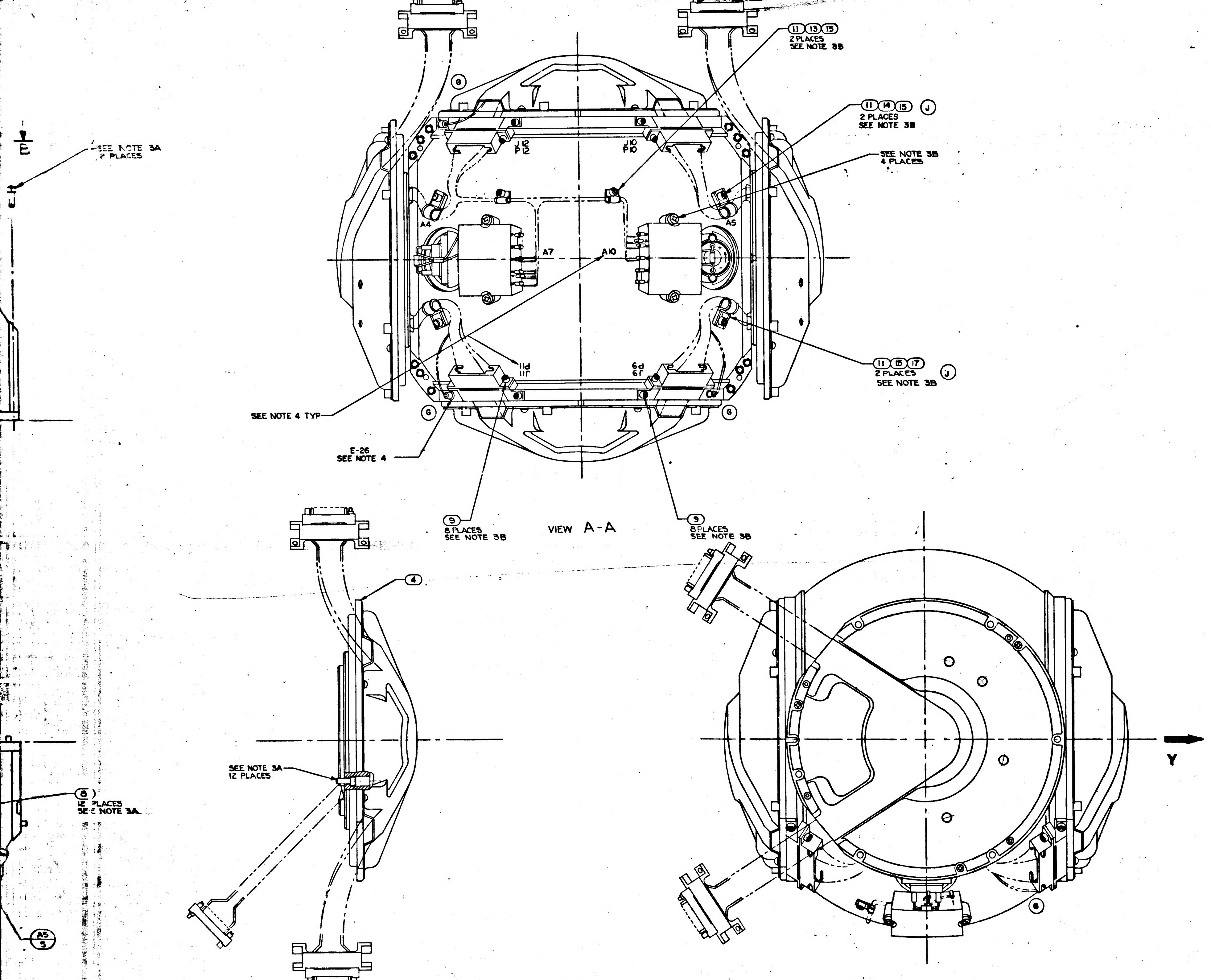

SEE NOTE 6
SEE NOTE 5D
VIEW C-C
TYPICAL INSULATION
VIEW B-B
Z
C
C
SEE NOTE 4
4 PLACES
SEE NOTE 5D
SEE NOTE 5D
4 PLACES
4 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. [illegible]
3. [illegible]
   - A. [illegible]
   - B. [illegible]
   - C. [illegible]
   - D. [illegible] AT FINAL [illegible]
4. WIRE CHARACTERS [illegible]
5. [illegible]
6. TWISTED CONDUCTORS TO CONSIST OF A FULL TURN PER INCH MIN.
7. USE DRAWING [illegible] WIRING DIAGRAM FOR REFERENCE.

1000203

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	E	REPLACES REV D WITH CHANGES TDRR 02308	7-29-63		
	F	TDRR 03185	9-26-63		
	G	TDRR 06178	2-6-64		
	H	TDRR 06237	2-11-64		
	J	TDRR 06239	3-24-64		



(11)(13)(15) 2 PLACES SEE NOTE 3B
(11)(14)(15) 2 PLACES SEE NOTE 3B (J)
SEE NOTE 3B 4 PLACES
SEE NOTE 3A 2 PLACES
E
J12 P12
J10 P10
A4
A5
A7
A10
(11)(15)(17) 2 PLACES SEE NOTE 3B (J)
J11 P11
J9 P9
SEE NOTE 4 TYP
E-26 SEE NOTE 4
(6)
(9) 8 PLACES SEE NOTE 3B
(9) 8 PLACES SEE NOTE 3B
VIEW A-A
(4)
SEE NOTE 3A 12 PLACES
(8) 12 PLACES SEE NOTE 3A
A5
Y
A

REPLACES REV D WITH CHANGES

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
Ⓙ	2	CLAMP, CABLE	1000220-5			17
	A/R	SOLDER	SN60 WARP 2	QQ-S-571		16
	6	WASHER, CABLE CLAMP	1000223			15
Ⓙ	2	CLAMP, CABLE	1000220-4			14
	2	CLAMP, CABLE	1000220-3			13
Ⓕ	4	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C02LL4			12
	6	SCREW, CAP, SOC HD, HEX	1000110-1			11
⑥	3	SCREW, BUT. HD, SELF LKG, SPL SOC	1000250-12			10
Ⓕ	16	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			9
	12	SCREW, CAP, SOC. HD., HEX	1000110-7			8
	4	COVER, BRACKET CONN	1000143			7
	2	ADA PREAMP ASSY. M.G.	1007022			6
	2	ACCEL. ANGULAR DIFFERENTIATING	1000097			5
	1	INTERGIMBAL SUB-ASSY 16X M.A.	1000206			4
	1	INTERGIMBAL SUB-ASSY 1X M.A.	1000008			3
	1	INNER AXIS ASSY.	1000204			2
	1	HOUSING ASSY. M.G.	1000074			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	1000202
USED ON	DL 1000201
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN R.G.S. 4-8-63
APPROVED FOR MSC
MIT APPROVAL
DATE 31

MIDDLE AXIS ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000203
SHEET 1 OF 1

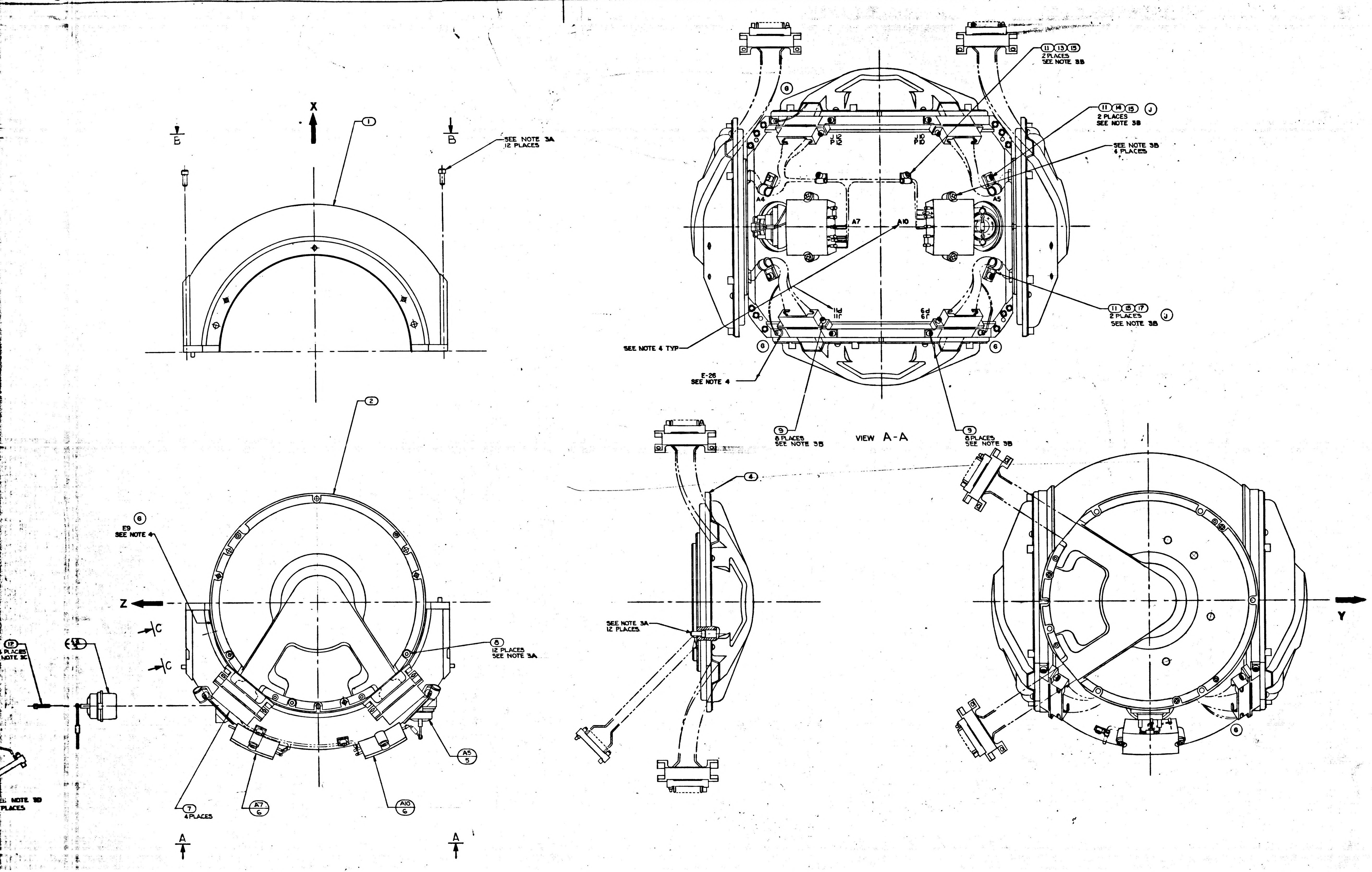
1000203
H

MASTER

1000203 REV J SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

E3


X
B
B
①
SEE NOTE 3A
12 PLACES
(11)(13)(15)
2 PLACES
SEE NOTE 3B
(11)(14)(15) (J)
2 PLACES
SEE NOTE 3B
SEE NOTE 3B
4 PLACES
J12
P12
J10
P10
A4
A5
A7
A10
P11
J11
P9
J9
(11)(16)(17)
2 PLACES (J)
SEE NOTE 3B
SEE NOTE 4 TYP
⑥
E-26
SEE NOTE 4
⑨
8 PLACES
SEE NOTE 3B
VIEW A-A
②
⑥
E9
SEE NOTE 4
Z
C
C
⑧
12 PLACES
SEE NOTE 3A
⑫
PLACES
NOTE 3C
NOTE 3D
PLACES
⑦
4 PLACES
A7
6
A10
6
A5
5
A
A
④
SEE NOTE 3A
12 PLACES
Y

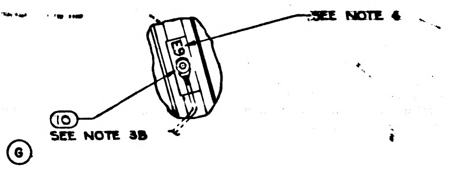
REPLACES REV D WITH CHANGES

MASTER

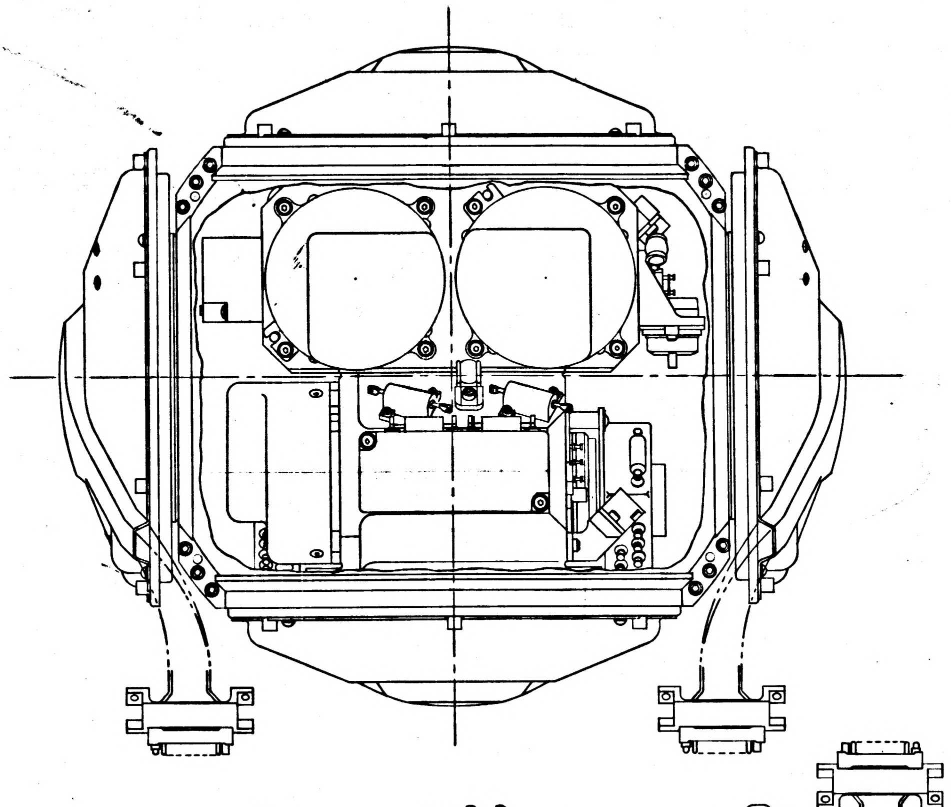
1000203 | REV J | SHEET 1

H 1000503

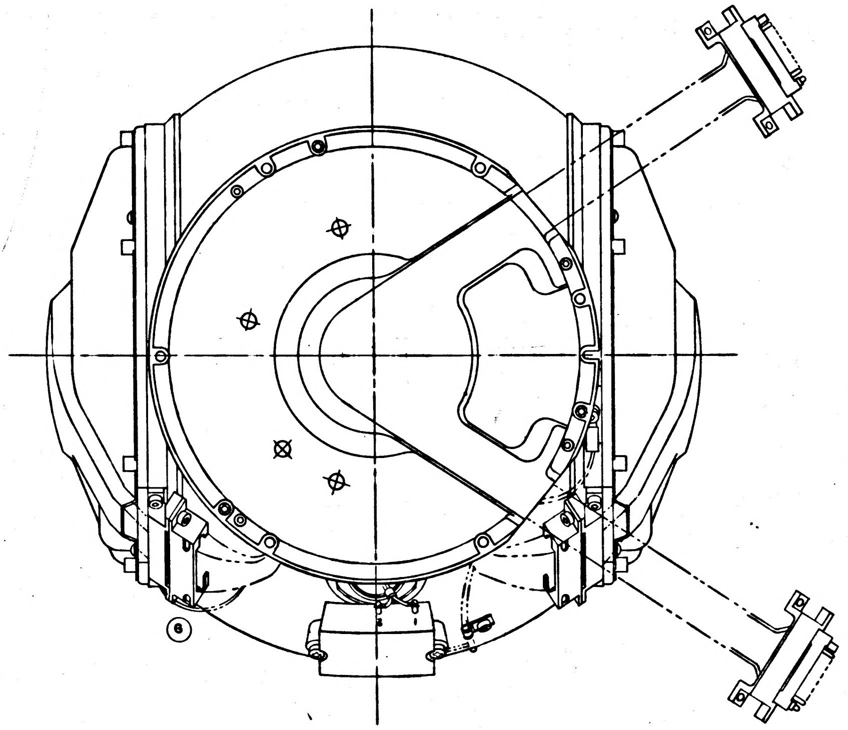
WIRING LEGEND					
COND NO.	COLOR	FIND NO.	FROM	TO	SEE CHART
1-1	WHITE		A4 - +	A7-2	8
1-2	BLACK		A4 - −	A7-1	
2-1	WHITE		A5 - +	A10-1	8
2-2	BLACK		A5 - −	A10-2	

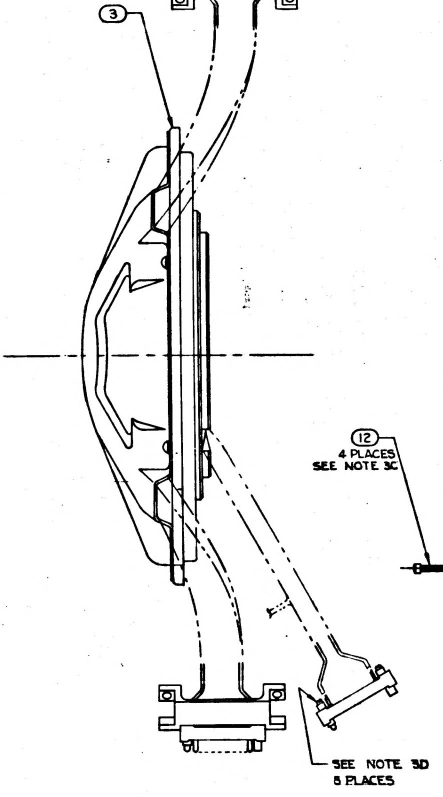

SEE NOTE 4
E9
10
SEE NOTE 3B
6

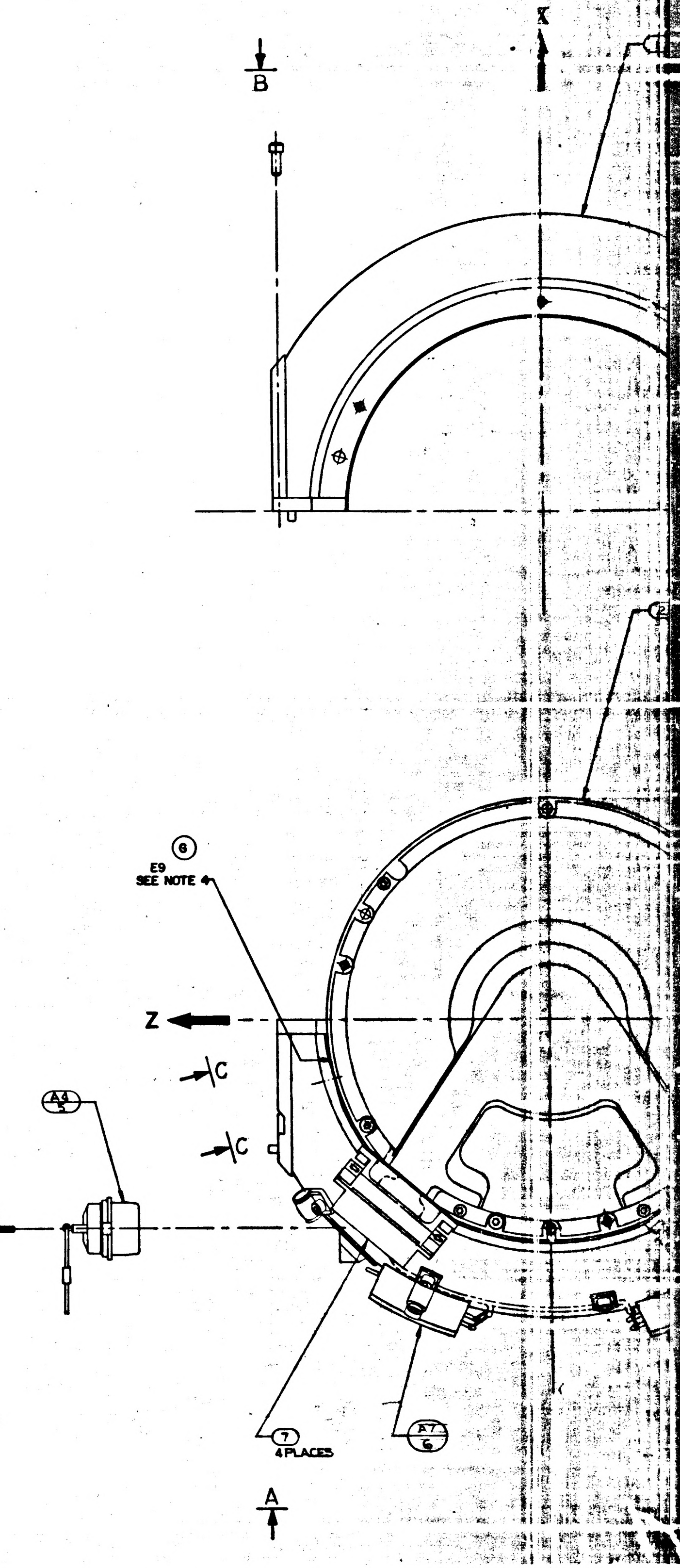
VIEW C-C
TYPICAL INSULATION



VIEW B-B




3
12
4 PLACES
SEE NOTE 3C
SEE NOTE 3D
8 PLACES


B
X
6
E9
SEE NOTE 4
Z
C
C
A4
5
7
4 PLACES
A7
6
A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP1000201
3. SCREW TORQUE REQUIREMENTS ±7%
   A. 10.0 IN. LB
   B. 5.0 IN. LB
   C. 3.5 IN. LB
   D. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL-STD-440 USING (16); WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

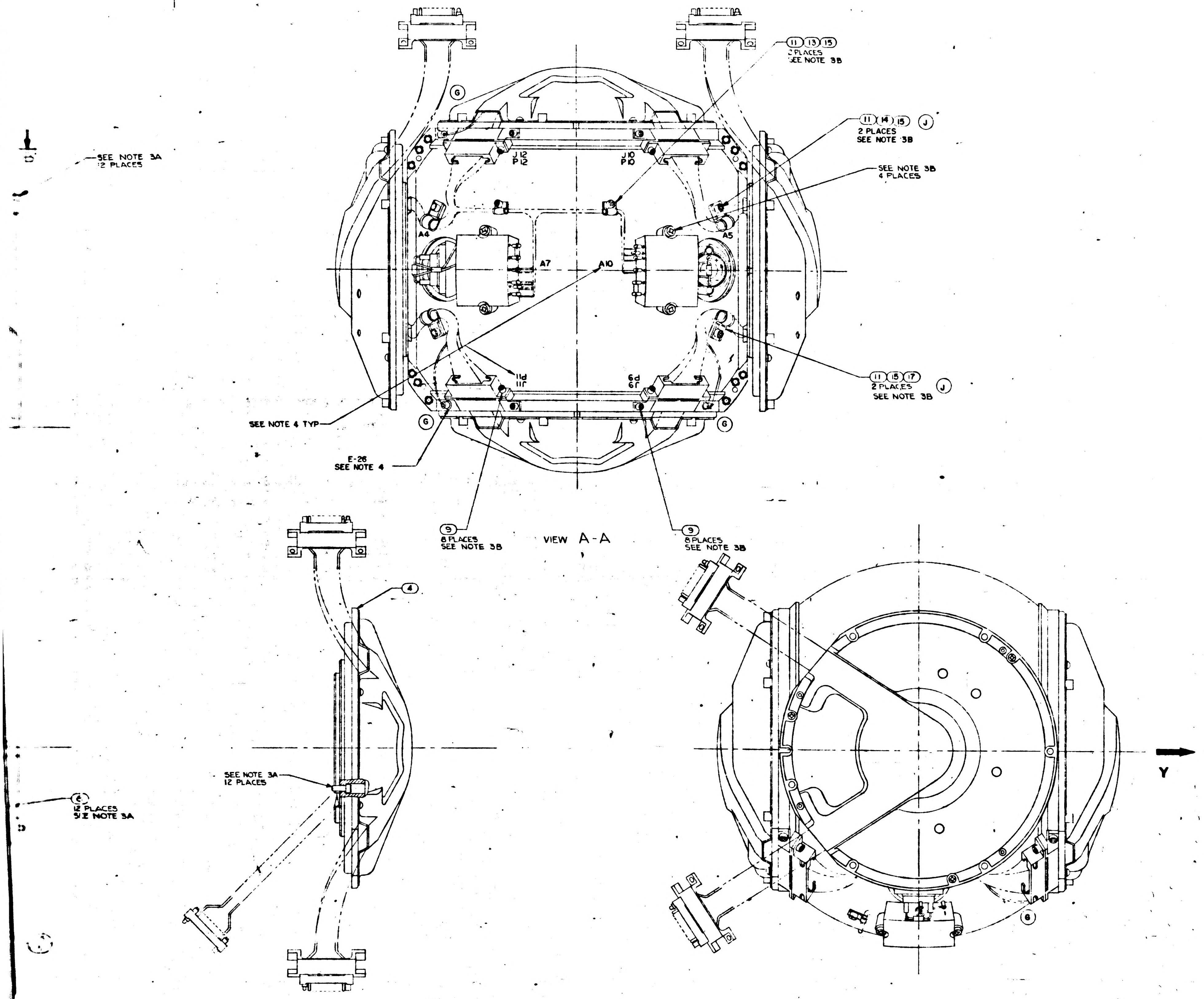
H 6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.~~
7. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓗ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000203	J	1

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	E	REPLACES REV D WITH CHANGES TDRR 52305	7-29-63	
	F	TDRR 03185	9-26-63	
	G	TDRR 06178		
	H	TDRR 06237	2-11-64	
	J	TDRR 06239	3-24-64	
	K	REVISED PER TDRR 07576	17 APR 64	JHR


SEE NOTE 3A
12 PLACES
⑪ ⑬ ⑮
2 PLACES
SEE NOTE 3B
⑪ ⑭ ⑮ Ⓙ
2 PLACES
SEE NOTE 3B
SEE NOTE 3B
4 PLACES
J12
P12
J10
P10
A4
A5
A7
A10
⑪ ⑮ ⑰ Ⓙ
2 PLACES
SEE NOTE 3B
11d
11f
6d
6f
SEE NOTE 4 TYP
E-26
SEE NOTE 4
Ⓖ
⑨
8 PLACES
SEE NOTE 3B
⑨
8 PLACES
SEE NOTE 3B
④
SEE NOTE 3A
12 PLACES
⑥
12 PLACES
SEE NOTE 3A
Y

VIEW A-A

REPLACES REV D WITH CHANGES

Ⓙ	2	CLAMP, CABLE	1000220-5			17
	A/R	SOLDER	SN60 WRP2	QQ-S-571		16
	6	WASHER, CABLE CLAMP	1000223			15
Ⓙ	2	CLAMP, CABLE	1000220-4			14
	2	CLAMP, CABLE	1000220-3			13
Ⓕ	4	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C02L4			12
	6	SCREW, CAP, SOC HD, HEX	1000110-1			11
Ⓖ	3	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			10
Ⓕ	16	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C04L4			9
	12	SCREW, CAP, SOC HD, HEX	1000110-7			8
	4	COVER, BRACKET, CONN	1000143			7
	2	ADA PREAMP ASSY, M.G	1007022			6
	2	ACCEL ANGULAR DIFFERENTIATING	000097			5
	1	INTERGIMBAL SUB-ASSY 16X M.A	1000206			4
	1	INTERGIMBAL SUB-ASSY 1X M.A.	1000008			3
	1	INNER AXIS ASSY.	1000204			2
	1	HOUSING ASSY, M.G.	1000074			1
	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED: 7-29-63
CHECKED
DRAWN: 4-8-63
APPROVED FOR MSC
Jack Barnard
MIT/IL APPROVAL: W Kupfer
DATE: 31 Jul 63

MIDDLE AXIS
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT

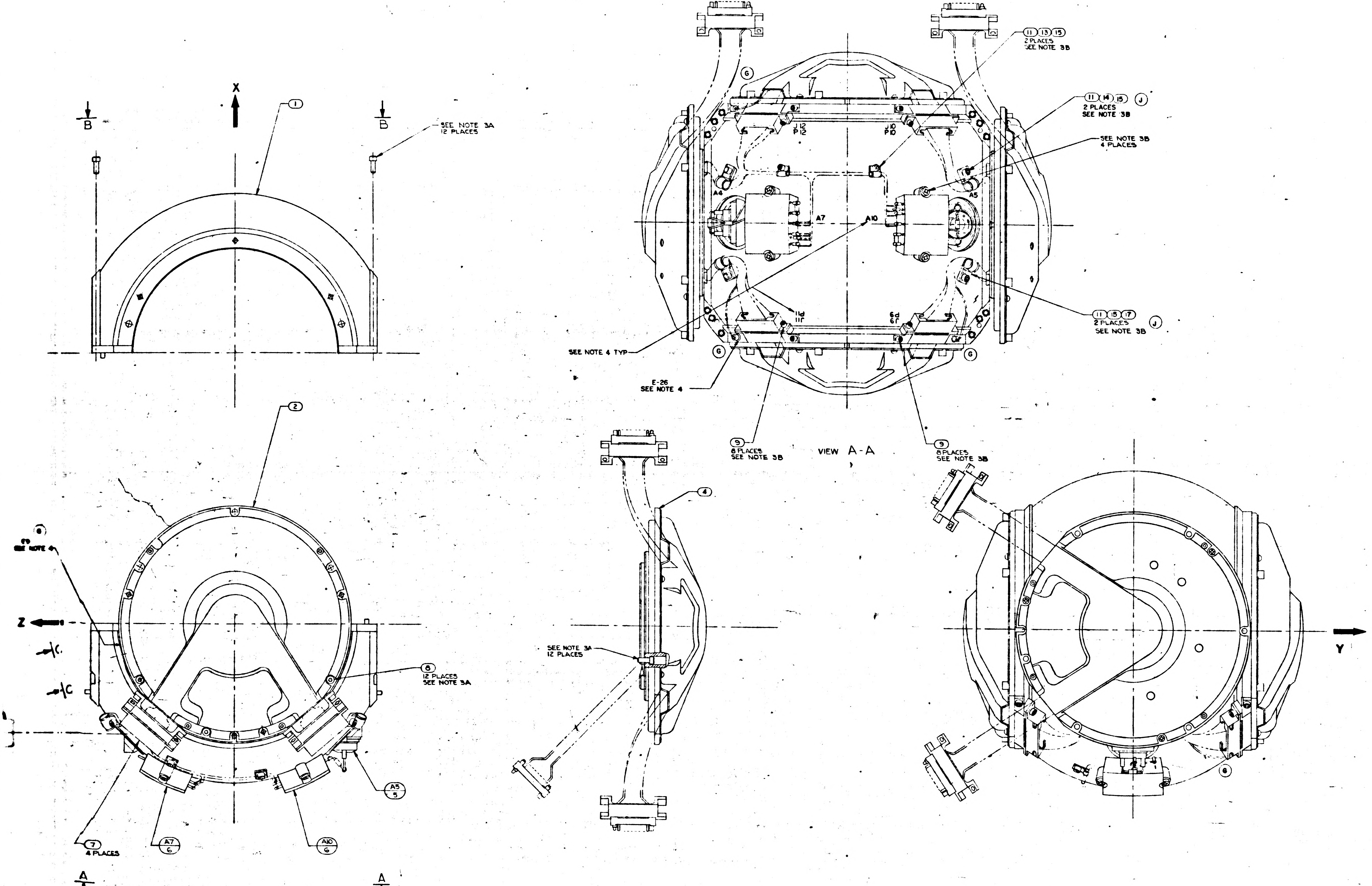
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000203
SHEET 1 OF 1

3

1000203 K

1000203 REV J SHEET 1

3H


X
B
B
SEE NOTE 3A
12 PLACES
1
2
Z
C
C
SEE NOTE 4
8
12 PLACES
SEE NOTE 3A
7
4 PLACES
A7
6
A10
6
A5
5
A
A
11 13 15
2 PLACES
SEE NOTE 3B
11 14 15 J
2 PLACES
SEE NOTE 3B
SEE NOTE 3B
4 PLACES
11 15 17 J
2 PLACES
SEE NOTE 3B
G
J12
P12
J10
P10
A4
A5
A7
A10
11d
11r
6d
6r
SEE NOTE 4 TYP
E-26
SEE NOTE 4
9
8 PLACES
SEE NOTE 3B
9
8 PLACES
SEE NOTE 3B
VIEW A-A
4
SEE NOTE 3A
12 PLACES
Y
6

REPLACES PE7 D WITH CHANGES

J	2	CLAMP,CA
	A/R	SOLDER
	6	WASHER
J	2	CLAMP,
	2	CLAMP
	4	SCREW,
	6	SCREW,
G	3	SCREW,
	16	SCREW,
	12	SCREW,
	4	COVER,
	2	ADA PRE
	2	ACCEL AN
		INTERGIM
	1	INTERGIM
	1	INNER
	1	HOUSING
	QTY REQD	

1000202	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

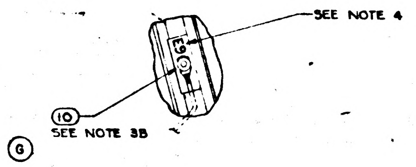
MATERIAL

M I T
INSTRUMENTATION
CONTRACT
NAS 9 153

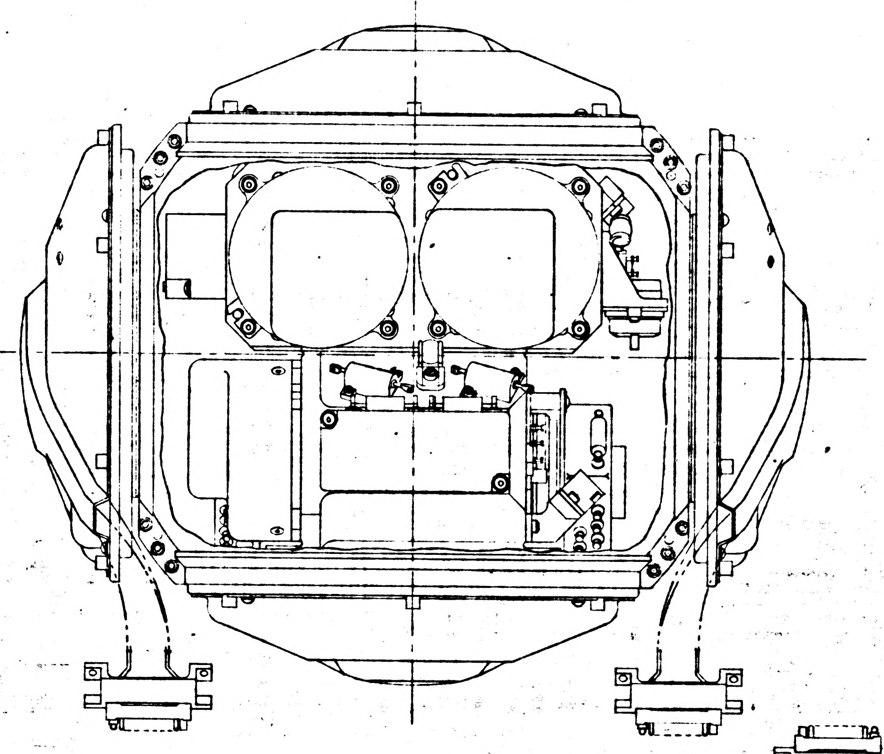
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC
MIT/IL APPROVAL
W Kupfer

K 1000503

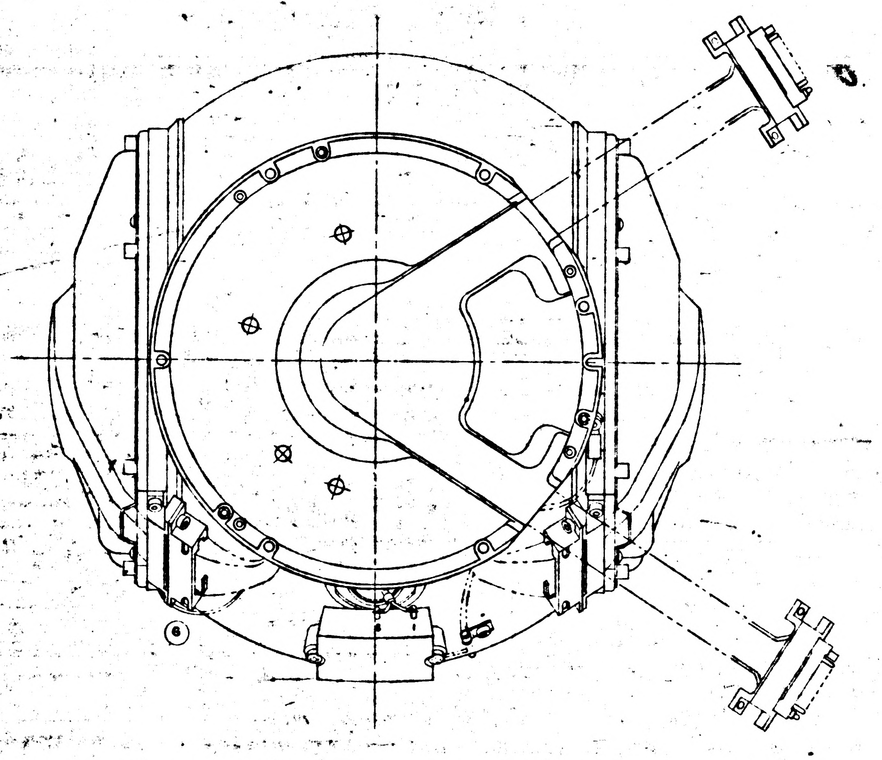
WIRING LEGEND					
COND NO	COLOR	FIND NO.	FROM	TO	SEE CHART
1-1	WHITE		A4 - +	A7-2	8
1-2	BLACK		A4 - -	A7-1	
2-1	WHITE		A5 - +	A10-1	8
2-2	BLACK		A5 - -	A10-2	

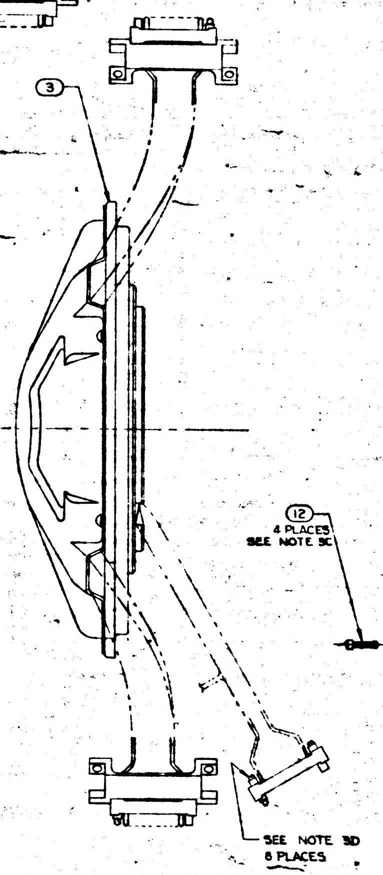

SEE NOTE 4
E9
10
SEE NOTE 3B
G

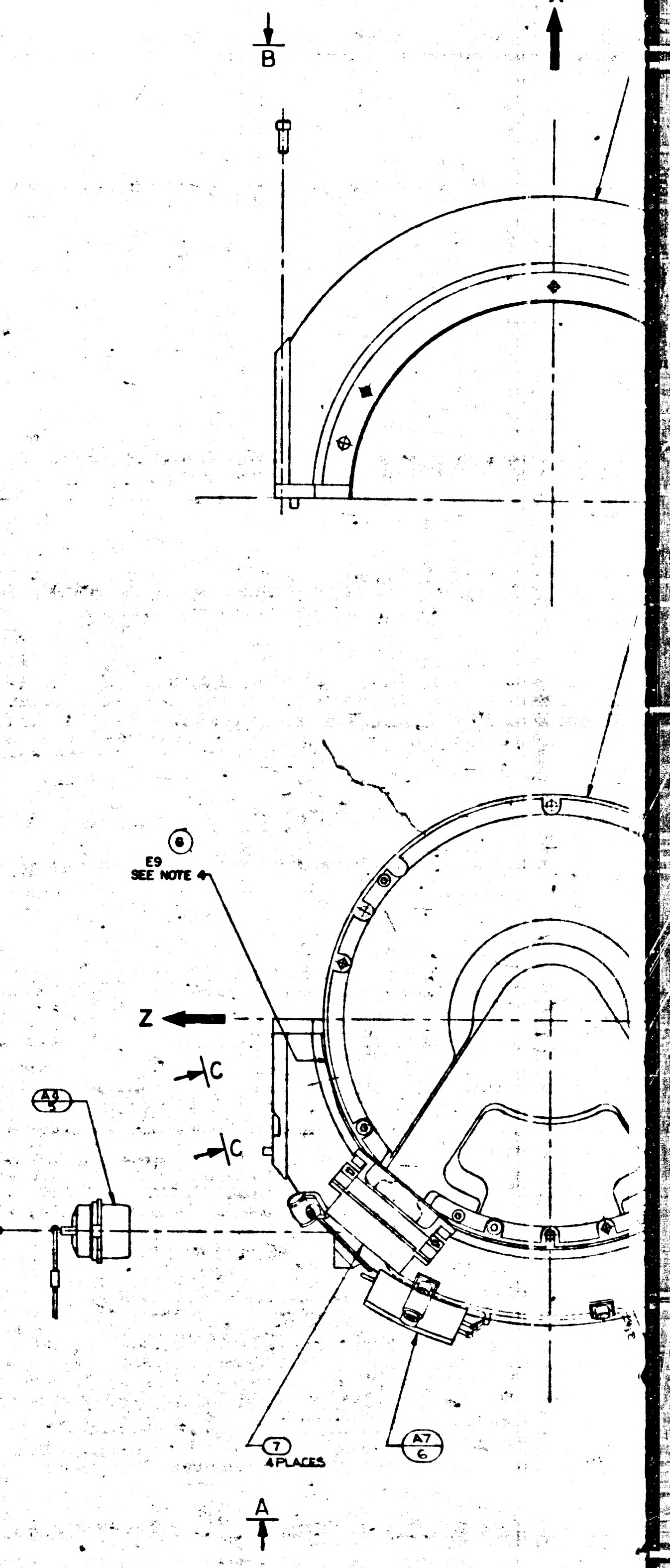
VIEW C-C
TYPICAL INSULATION



VIEW B-B




3
SEE NOTE 3D
8 PLACES


B
X
12
4 PLACES
SEE NOTE 3C
A4
5
6
E9
SEE NOTE 4
Z
C
C
7
4 PLACES
A7
6
A

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP1000001
3. SCREW TORQUE REQUIREMENTS ±7%
    - A. 10.0 IN. LB
    - B. 5.0 IN. LB
    - C. 3.5 IN. LB
    - D. 2.0 IN. LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN. LB WHILE ENGAGING PINS
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL-STD-440 USING ⑯: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

H 6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.~~

7. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

Ⓗ

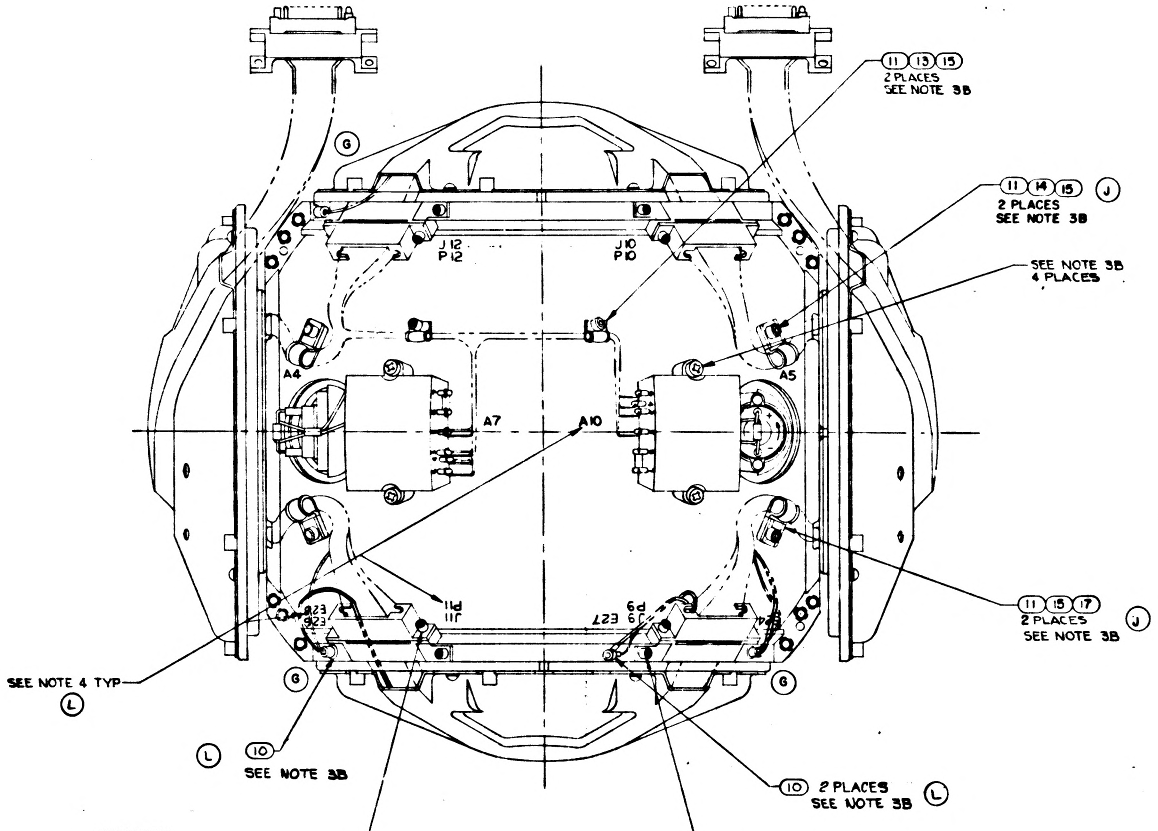
NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1

	REV	SHEET
1000203	K	1

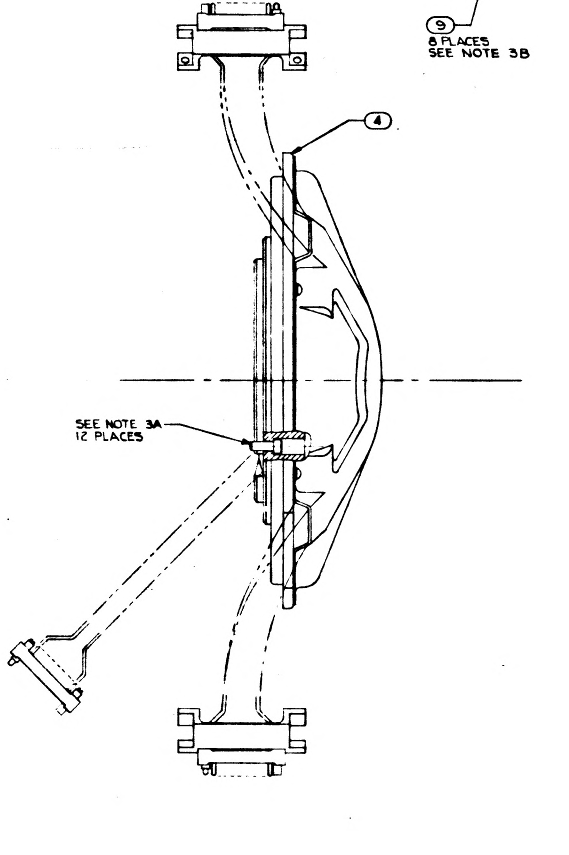
REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	E	REPLACES REV D WITH CHANGES TDRR 02305	7-29-63		
	F	TDRR 03185	9-26-63		JK
	G	TDRR 06178			WR
	H	TDRR 06237	2-11-64		WR
	J	TDRR 06239	3-24-64		WR
	K	REVISED PER TDRR 07576	17 APR 64	JHR	
	L	REVISED PER TDRR 08082	12 MAY 64	JG	CP

SEE NOTE 3A
12 PLACES



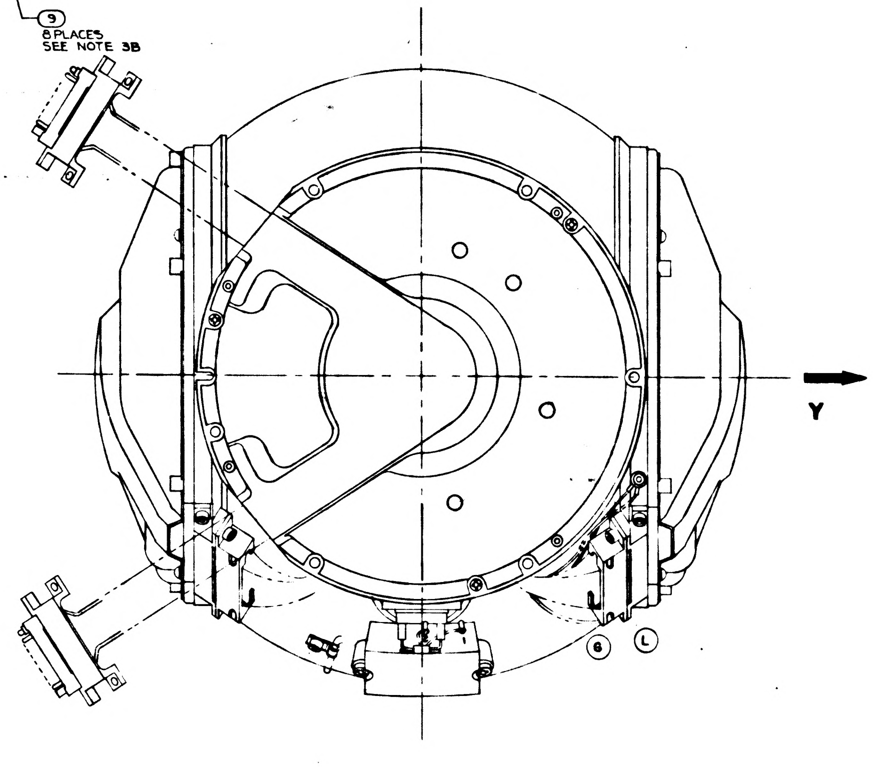
11 13 15
2 PLACES
SEE NOTE 3B
G
11 14 15 J
2 PLACES
SEE NOTE 3B
SEE NOTE 3B
4 PLACES
J12
P12
J10
P10
A4
A5
A7
A10
J11
P11
J9
P9
E27
E23
SEE NOTE 4 TYP
L
11 13 17
2 PLACES
SEE NOTE 3B
J
G
L
10
SEE NOTE 3B
10 2 PLACES
SEE NOTE 3B
L
9
8 PLACES
SEE NOTE 3B
9
8 PLACES
SEE NOTE 3B

VIEW A-A



4
SEE NOTE 3A
12 PLACES

8
12 PLACES
SEE NOTE 3A



REPLACES REV D WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	CLAMP, CABLE	1000220-5			17
A/R	SOLDER	SNGO WARP 2	QQ-S-571		16
6	WASHER, CABLE CLAMP	1000223			15
2	CLAMP, CABLE	1000220-4			14
2	CLAMP, CABLE	1000220-3			13
4	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C02LL4			12
6	SCREW, CAP, SOC HD, HEX	1000110-1			11
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			10
16	SCREW, CAP, SELF LKG, HEX HD, SOC	NAS1352C04LL4			9
12	SCREW, CAP SOC HD, HEX	1000110-7			8
4	COVER, BRACKET CONN	1000143			7
2	ADA PREAMP ASSY M.G.	1007022			6
2	ACCEL ANGULAR DIFFERENTIATING	1000097			5
1	INTERGIMBAL SUB-ASSY 16X M.A.	1000206			4
1	INTERGIMBAL SUB-ASSY 1X M.A.	1000008			3
1	INNER AXIS ASSY.	1000204			2
1	HOUSING ASSY M.G.	1000074			1

LIST OF PARTS AND MATERIALS

1000202	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9153
APPROVED | DATE 7-29-63
CHECKED
DRAWN R.G.S. 4-8-63
APPROVED FOR MSC Jack Barnard
NASA APPROVAL W Kupfer | DATE 31/4/63

MIDDLE AXIS ASSEMBLY

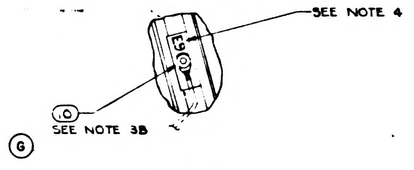
SCALE 1/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
Cambridge, Mass.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000203
SHEET 1 OF 1

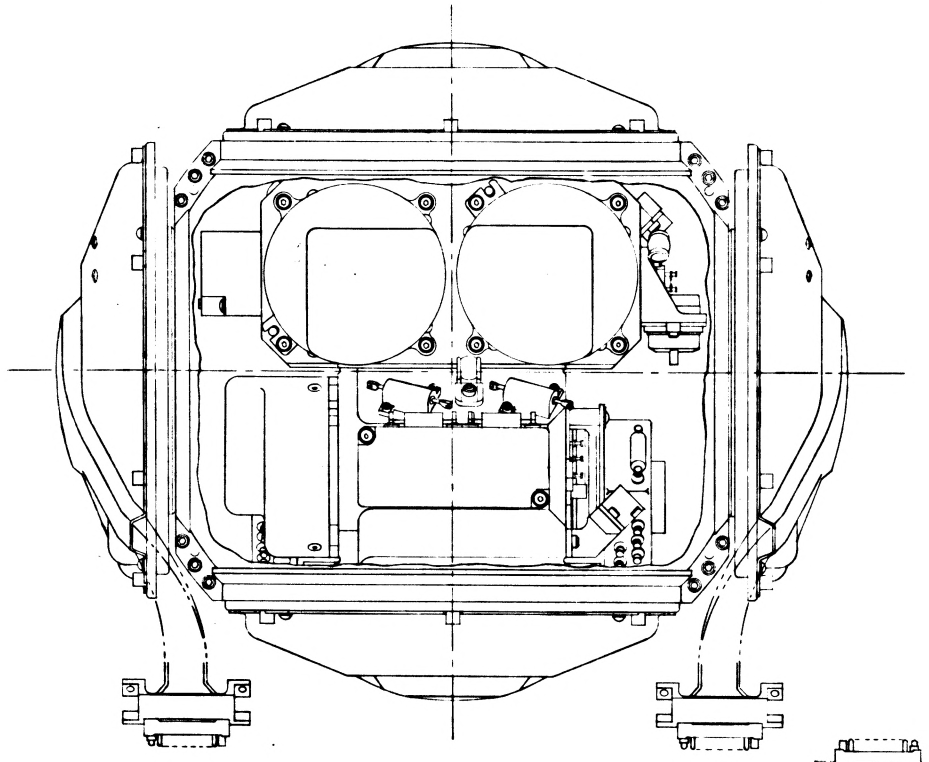
1000203 L

1000203 | REV L | SHEET 1

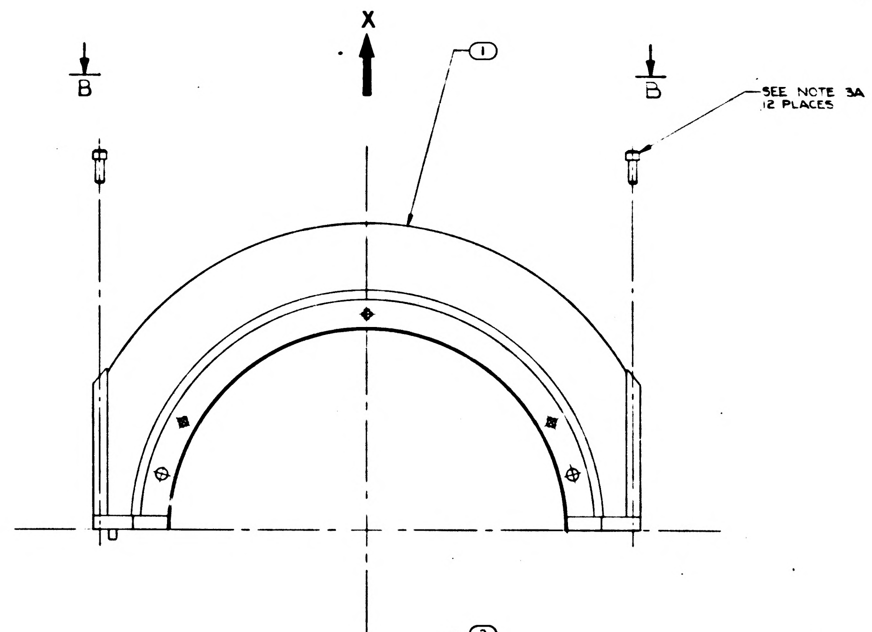
3/1000203

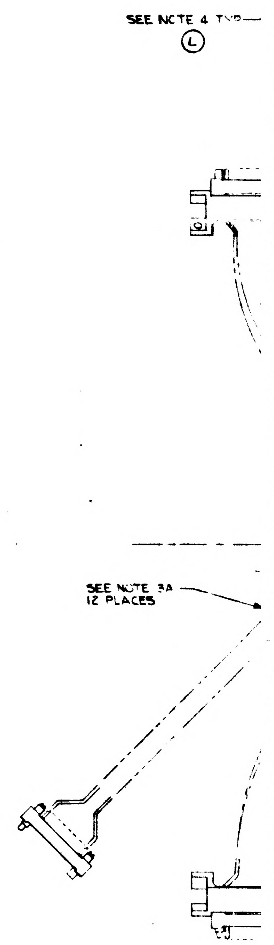

SEE NOTE 4
10
SEE NOTE 3B
G

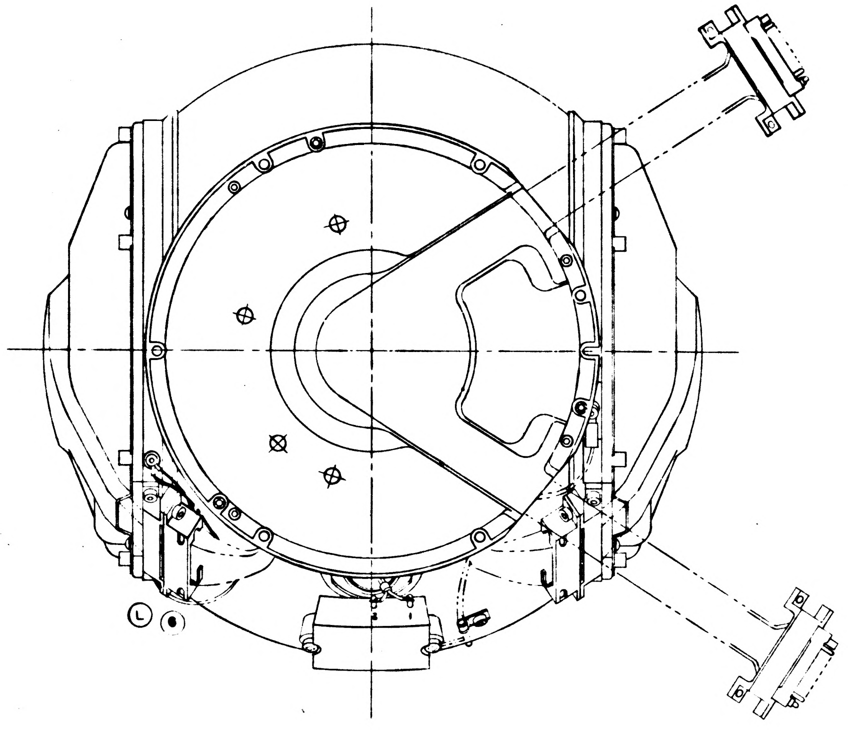
VIEW C-C
TYPICAL INSULATION

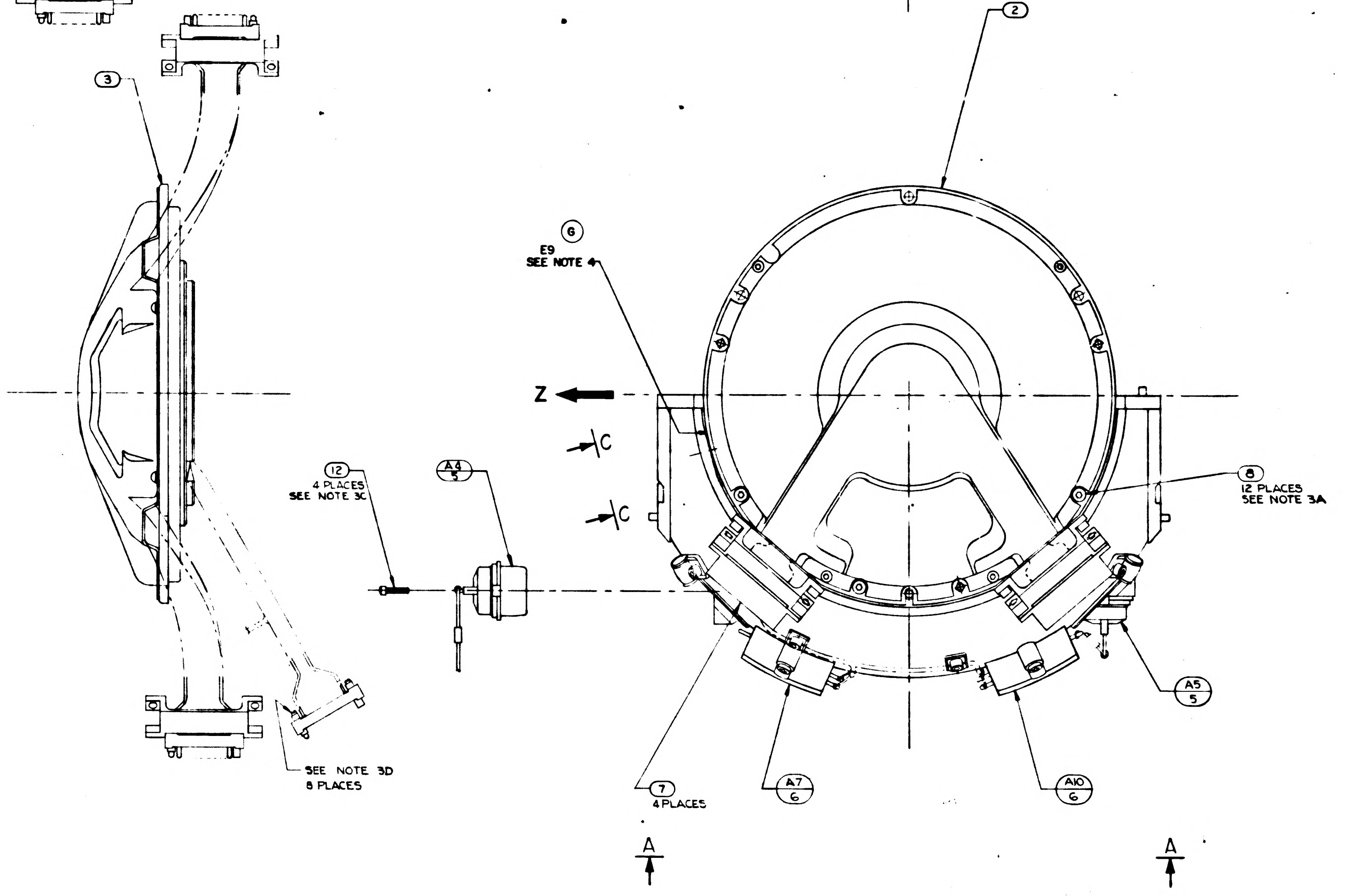


VIEW B-B


B
X
1
B
SEE NOTE 3A
12 PLACES


SEE NOTE 4 TYP
L
SEE NOTE 3A
12 PLACES




3
2
G
E9
SEE NOTE 4
Z
C
C
12
4 PLACES
SEE NOTE 3C
A4
5
8
12 PLACES
SEE NOTE 3A
A5
5
7
4 PLACES
A7
6
A10
6
SEE NOTE 3D
8 PLACES
A
A

D 70327

TO EXCEED .0 IN.LB WHILE

AT LOCATIONS SHOWN
SHALL BE WITHIN .06 OF

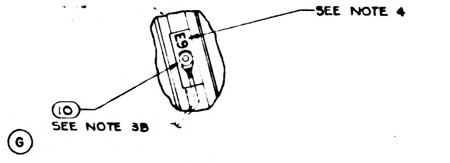
~~INCH MIN~~
FOR REFERENCE

Ⓗ

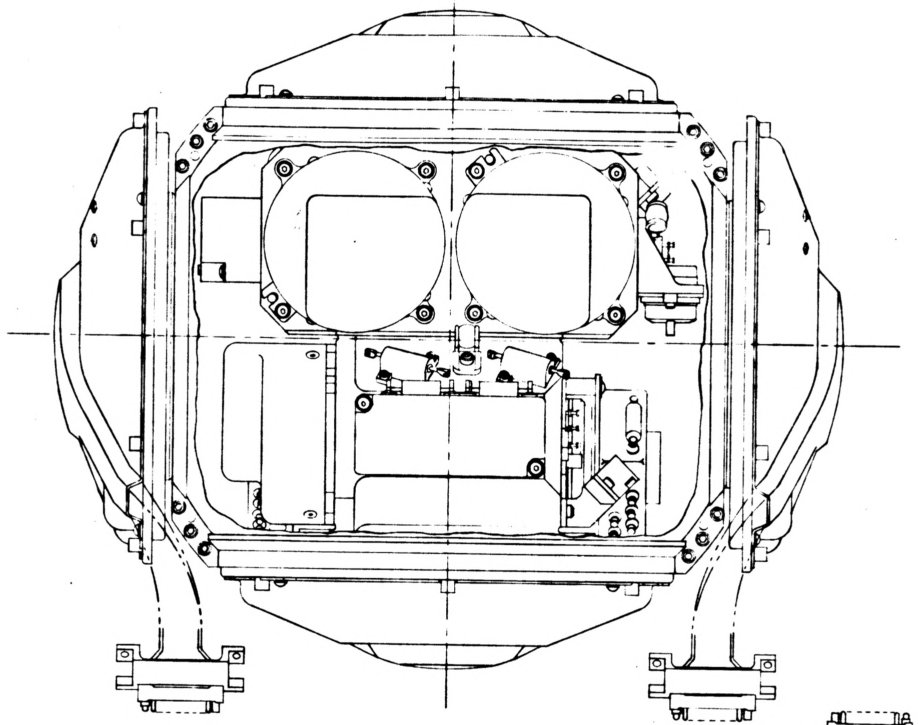
TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

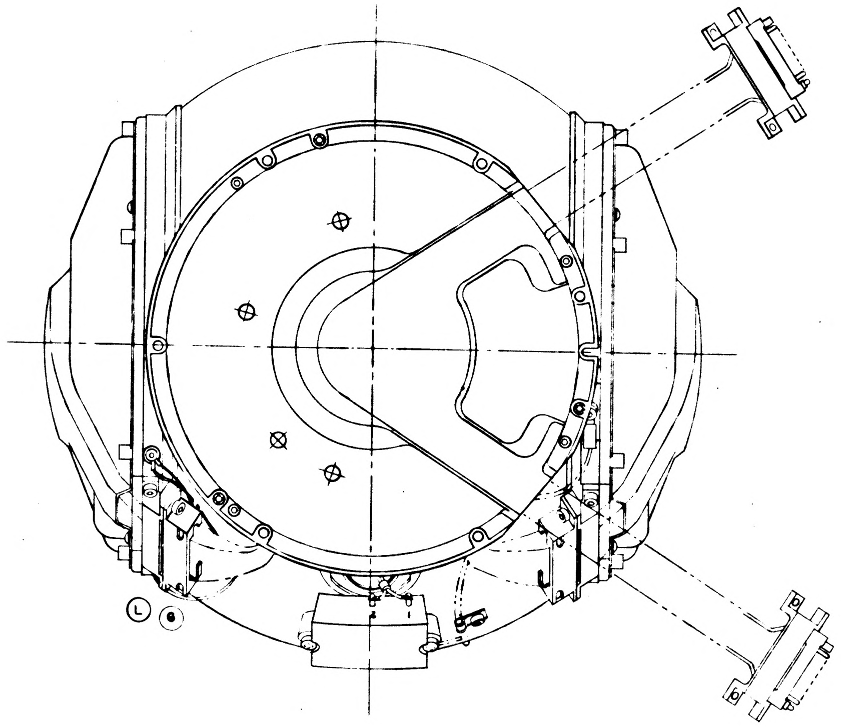
WIRING LEGEND					
COND NO	COLOR	FIND NO.	FROM	TO	SEE CHART
1-1	WHITE		A4 - +	A7-2	8
1-2	BLACK		A4 - -	A7-1	
2-1	WHITE		A5 - +	A10-1	8
2-2	BLACK		A5 - -	A10-2	

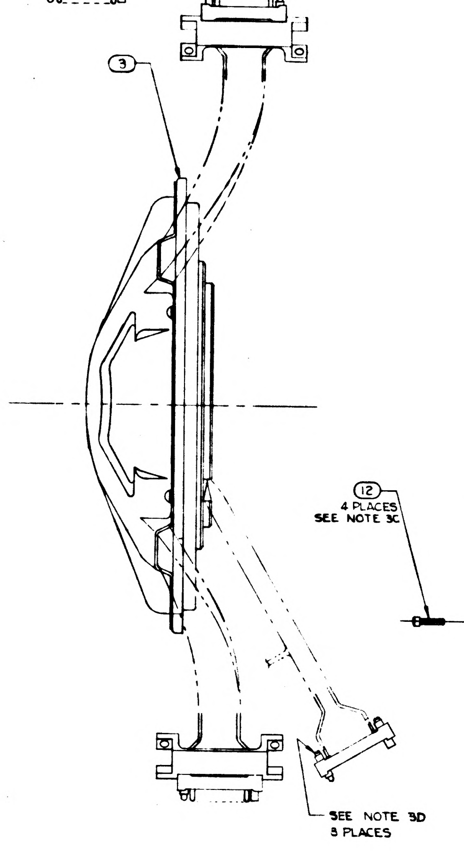

SEE NOTE 4
E9
10
SEE NOTE 3B
G

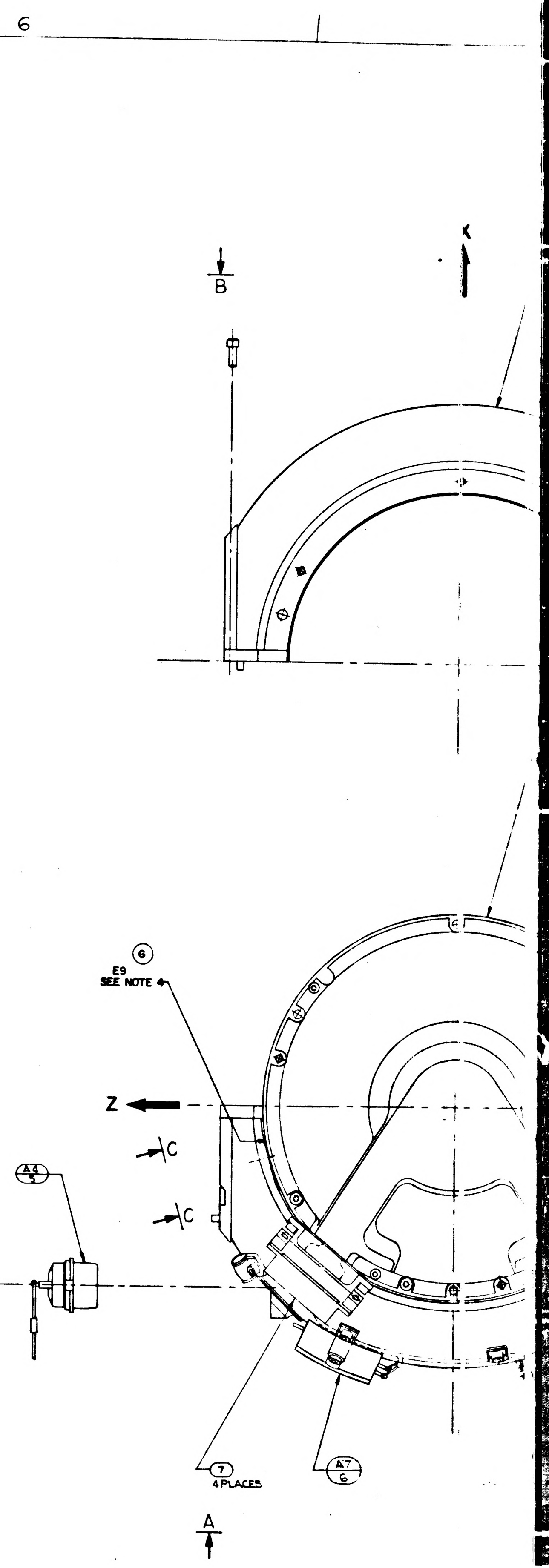
VIEW C-C
TYPICAL INSULATION



VIEW B-B




3
12
4 PLACES
SEE NOTE 3C
SEE NOTE 3D
3 PLACES


B
G
E9
SEE NOTE 4
Z
C
C
A4
5
7
4 PLACES
A7
6
A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE & TEST PER REQUIREMENTS OF ATP1000001
3. SCREW TORQUE REQUIREMENTS ±7%
   A. 10.0 IN.LB
   B. 5.0 IN.LB
   C. 3.5 IN.LB
   D. 2.0 IN.LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN.LB WHILE ENGAGING PINS
4. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK PER ND 1002019 AT LOCATIONS SHOWN
5. SOLDER PER MIL-STD-440 USING ⑯: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
H 6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.~~
7. USE DRAWING NO. 1000017 WIRING DIAGRAM FOR REFERENCE

Ⓗ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000203	L	1

1/1000203

1000203

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQ'D
1000204	Inner Axis Assy	1
1000074	Middle Gimbal Housing Assy.	1
1000206	Intergimbal Sub-Assy, 16 Speed	1
1000097	Accelerometer Angular Differentiating	2

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

MIDDLE AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

MIT
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DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000203

SHEET OF

1000204

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	REPLACED BY REV B WITH CHANGES TDRR 01687	6-13-63	ajB	WK

PART NO.	DESCRIPTION	REQ'D
1000005	Stable Member Assy	1
1000207	Intergimbal Sub-Assy, 16 Speed	1
1000010	Intergimbal Sub-Assy, 1 Speed	1

Ⓐ REPLACED BY REV B WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

INNER AXIS ASSEMBLY

SCALE UNIT WT. CODE IDENT.

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CAMBRIDGE, MASS.

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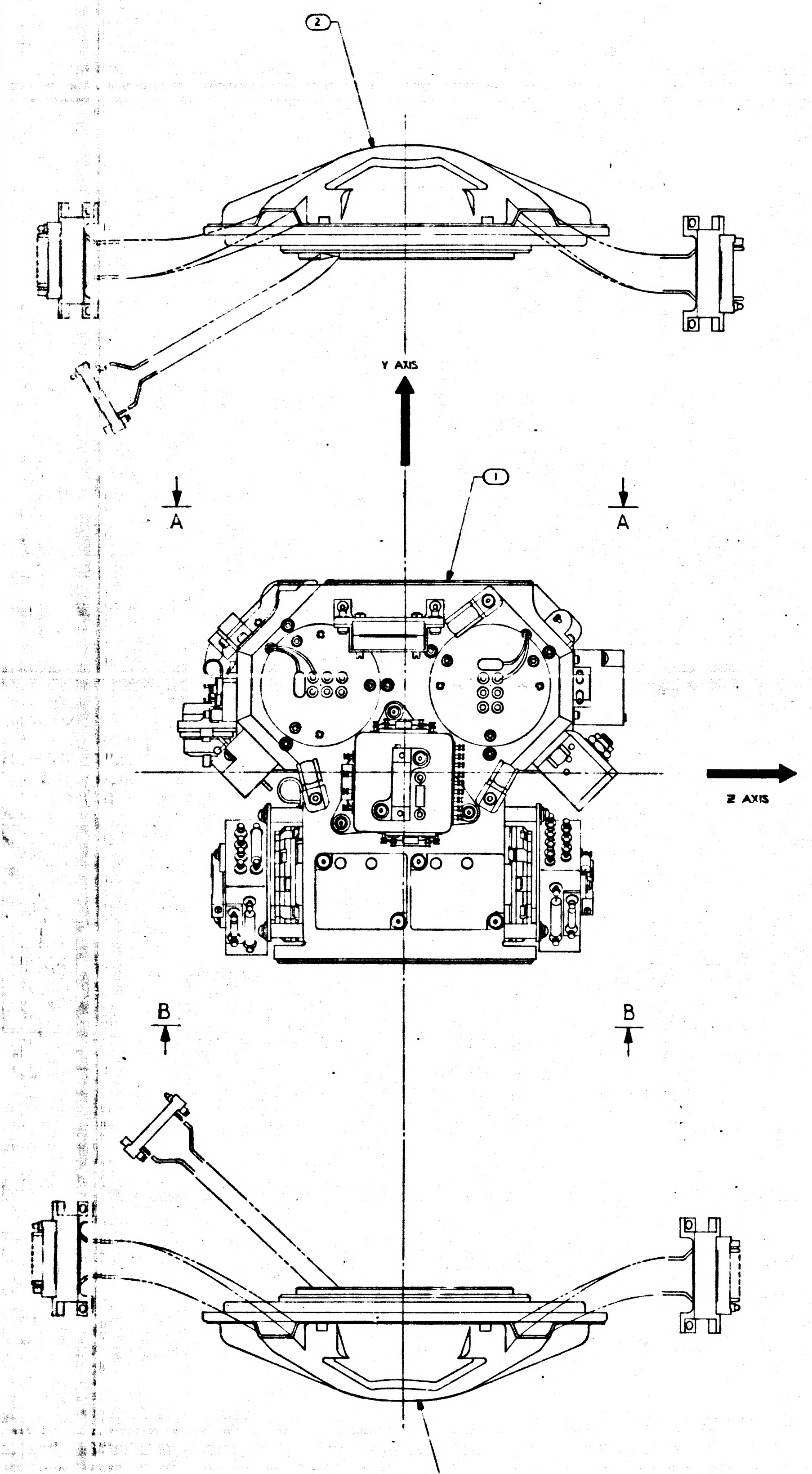
HOUSTON TEXAS

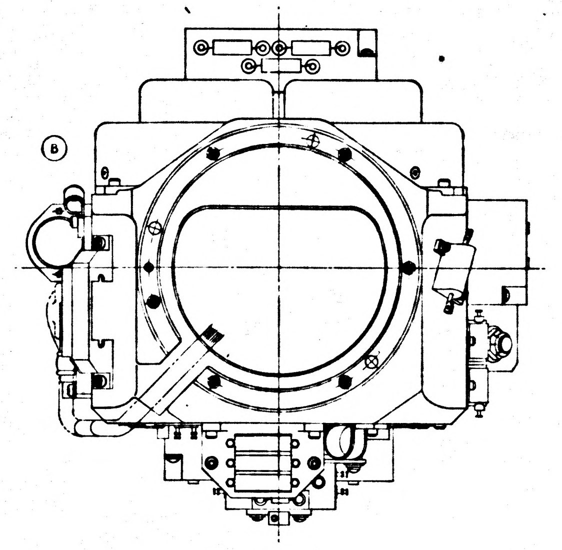
NASA DRAWING NO.
1000204

SHEET OF

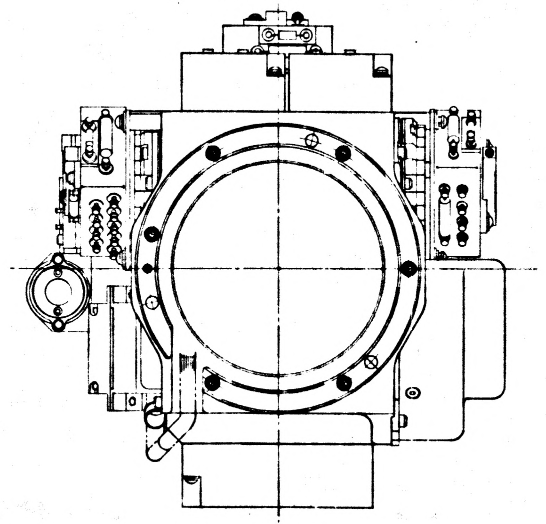
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	B	REPLACES REV A WITH CHANGES TDRR 01687	6-12-63	





VIEW A-A



VIEW B-B

REPLACES REV A WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	INTERGIMBAL SUB-ASSEMBLY 6X	1000207			3
1	INTERGIMBAL SUB-ASSEMBLY 7X	1000010			2
1	STABLE MEMBER ASSEMBLY	1000005			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

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CONTRACT
NAS 9-153

DRAWN PALERMO

APPROVED FOR MSC

MIT/IL APPROVAL

DATE 13 Jun 63

INNER AXIS
ASSEMBLY

SCALE 1/1

UNIT WT

CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

NASA
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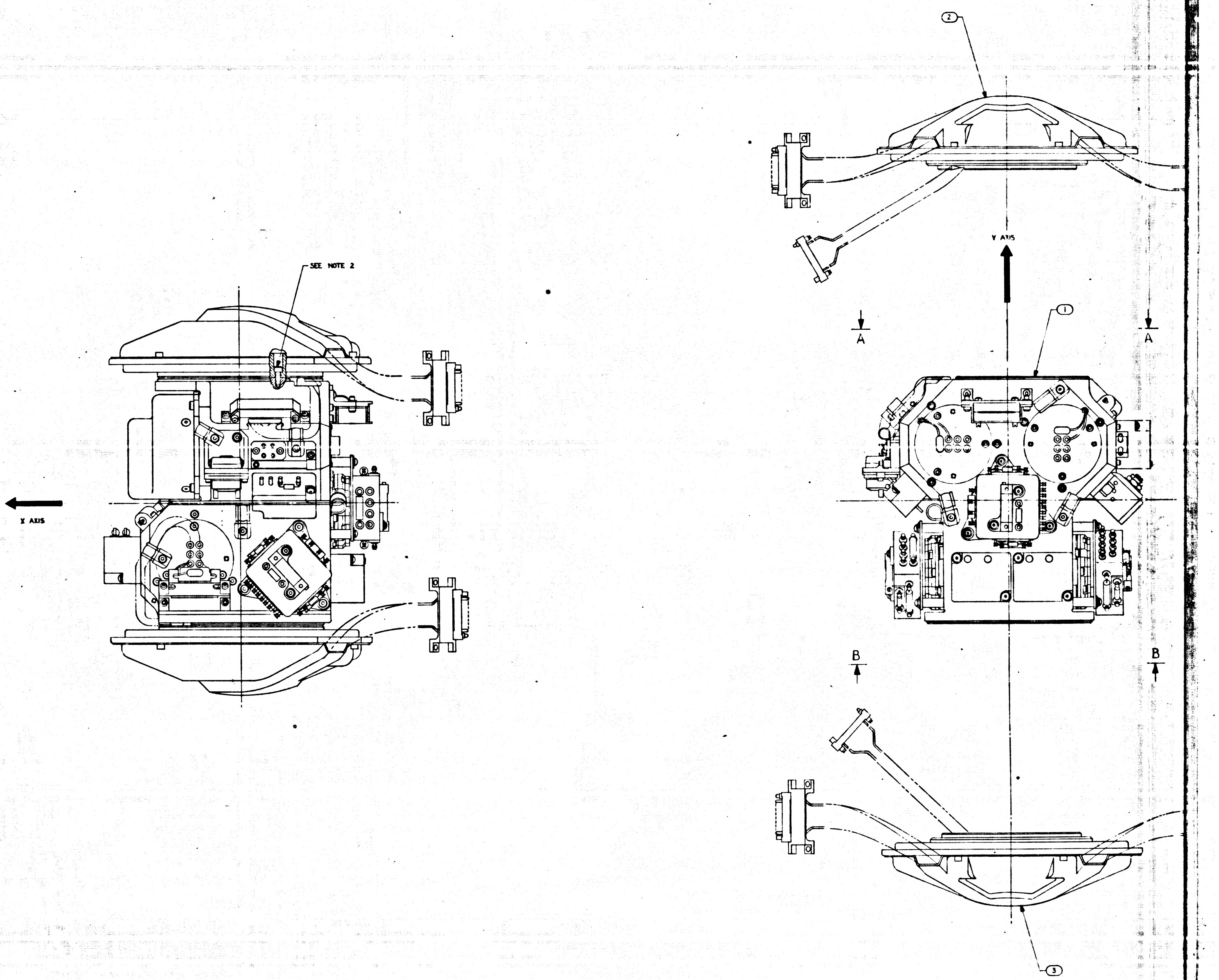
HOUSTON, TEXAS

NASA ENGINEERING NO.
1000204

SHEET 1 OF 1

1000204	SHT 1	REV B

INCHES
PHOTOGRAPHIC SCALE ONLY

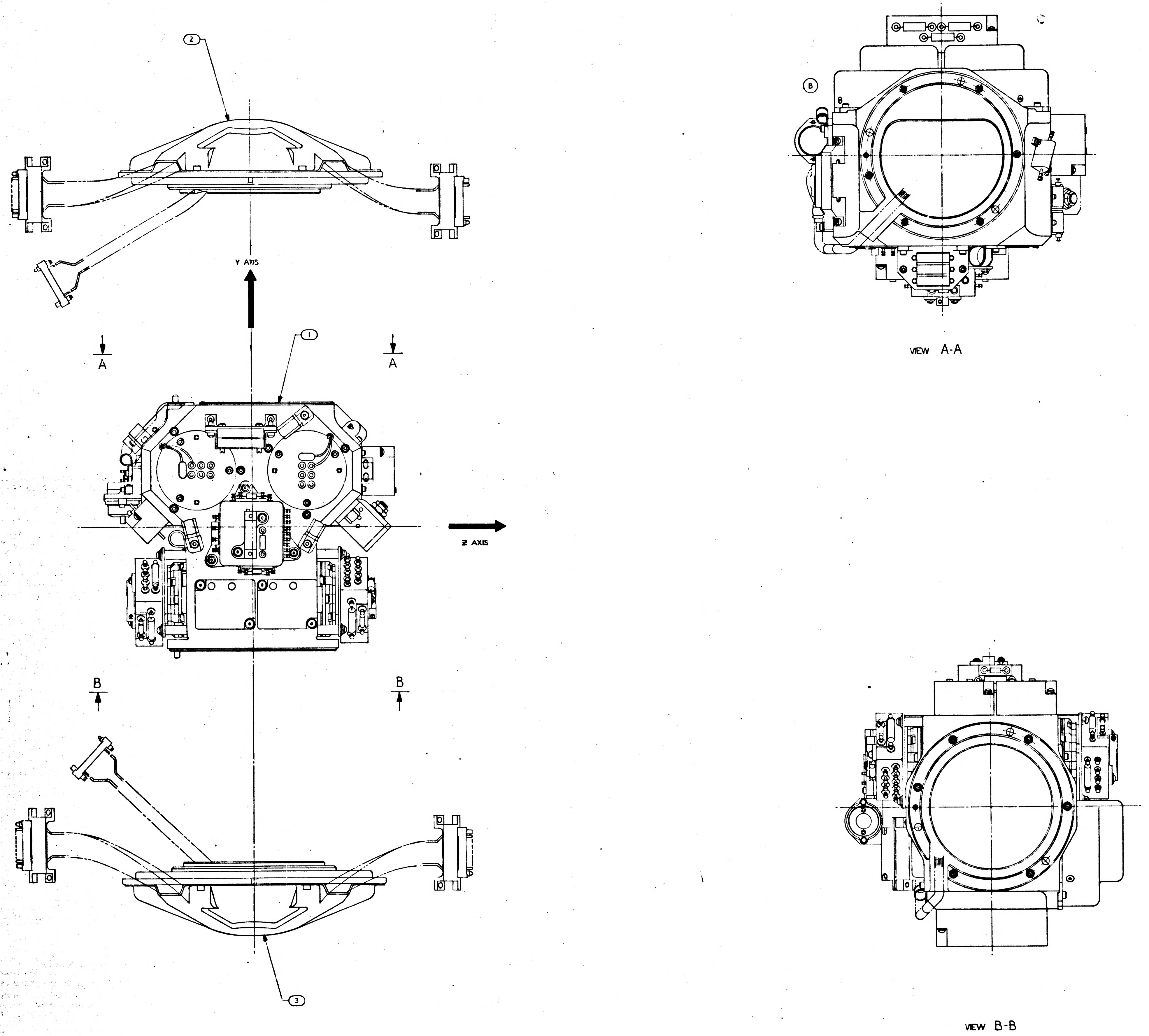

SEE NOTE 2
X AXIS
Y AXIS
①
②
③
A
A
B
B

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. SCREW TORQUE REQUIREMENTS: (±7%) 10 IN-LB - 12 PLACES.

	SHT	REV
1000204	1	B

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION
	B	REPLACES REV A WITH CHANGES TDRR 01647
	C	TDRR 01984
	D	TDRR 02 0



REPLACES REV A WITH CHANGES

QTY RECQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO
1	INTERGIMBAL SUB-ASSEMBLY 16X	1000207
1	INTERGIMBAL SUB-ASSEMBLY IX	1000010
1	STABLE MEMBER ASSEMBLY	1000005

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

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INSTRUMENTATION LAB
CONTRACT
NAS 9-153

APPROVED | DATE 5-29-63
CHECKED
DRAWN PALERMO 5-29-63
APPROVED FOR MSC
MIT/IL APPROVAL | DATE 19 Jun 63

INNER AXIS
ASSEMBLY

SCALE 1/1

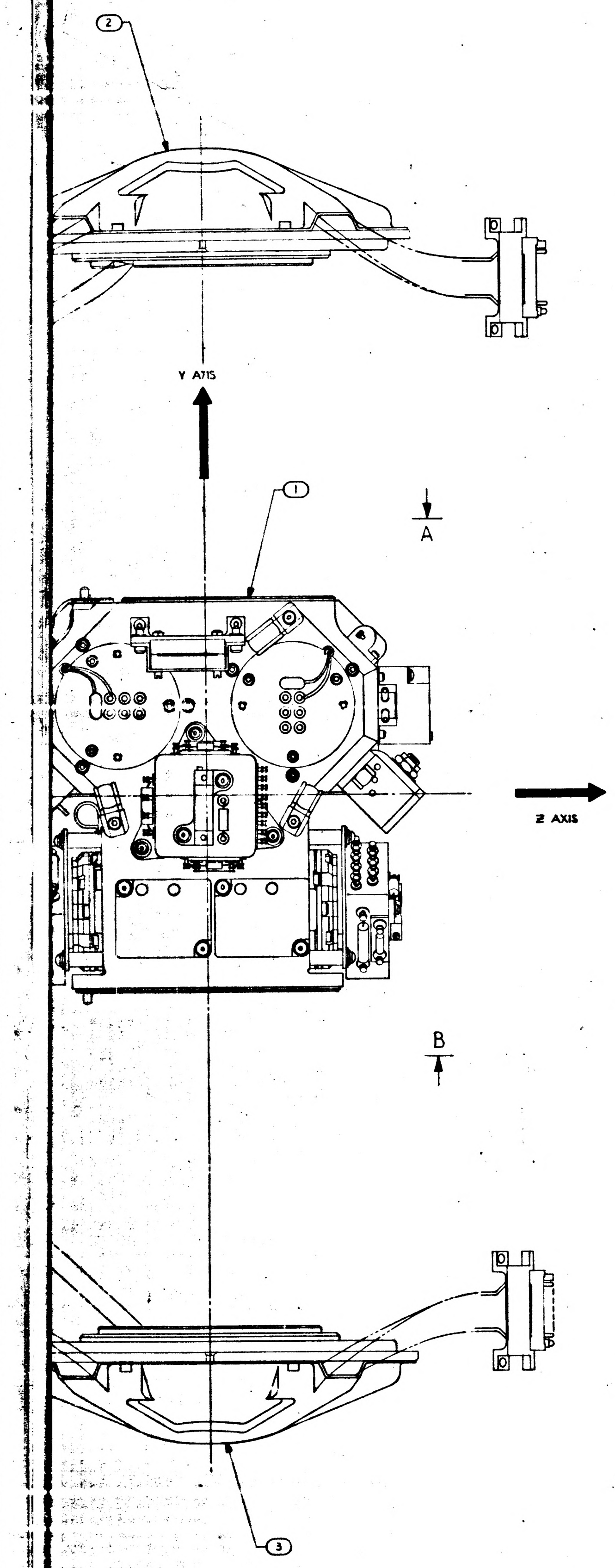
1000204 SHT 1 REV D

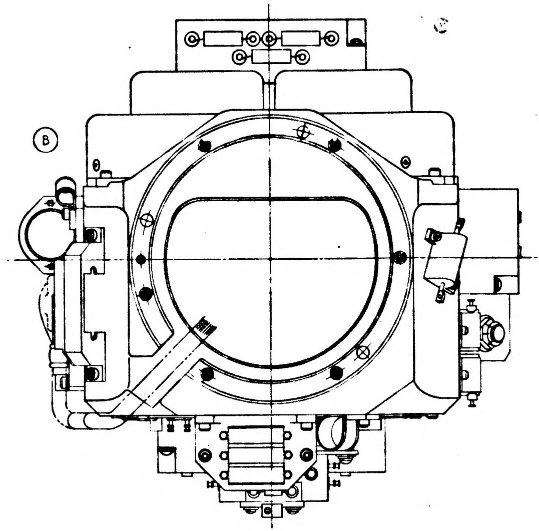
MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

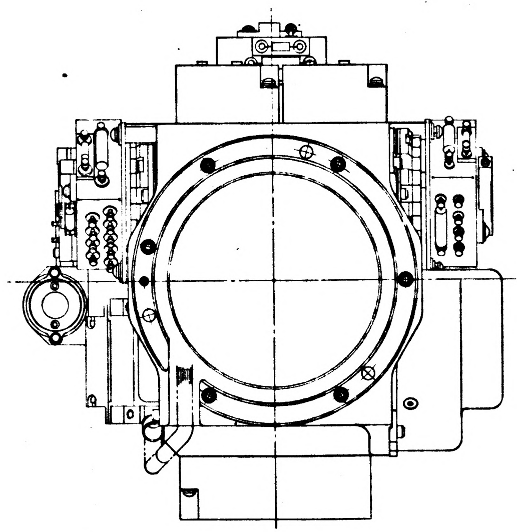
F-2

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	B	REPLACES REV A WITH CHANGES TDRR 01687	6-12-63	GJG	LA
	C	TDRR 01984	7-16-63	GJG	WR
	D	TDRR 02120	7-23-63	GJG	WR





VIEW A-A



VIEW B-B

REPLACES REV A WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	INTERGIMBAL SUB-ASSEMBLY 16X	1000207			3
1	INTERGIMBAL SUB-ASSEMBLY 1X	1000010			2
1	STABLE MEMBER ASSEMBLY	1000005			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000301

APPLICATION

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153

APPROVED GJ Kagan DATE 6-19-63
CHECKED
DRAWN PALERMO 5-29-63
APPROVED FOR MSC Jack Barnard
MIT/IL APPROVAL W Trageser DATE 19 June 63

INNER AXIS ASSEMBLY

SCALE 1/1
UNIT WT
CODE IDENT

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CAMBRIDGE, MASS.

DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000204
SHEET 1 OF 1

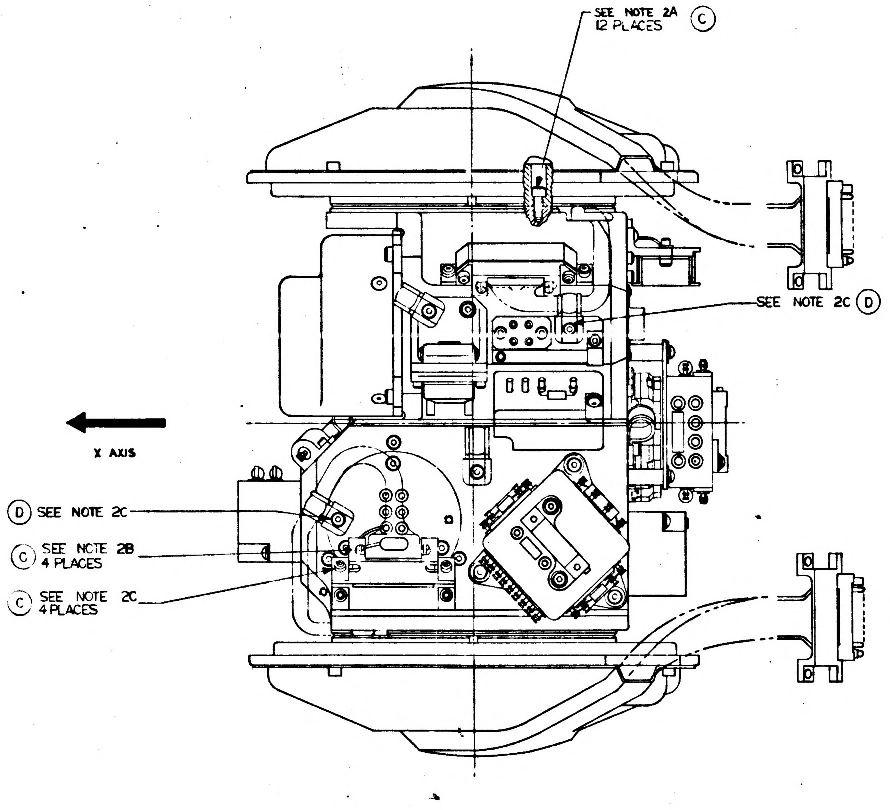
1000204 SHT 1 REV D

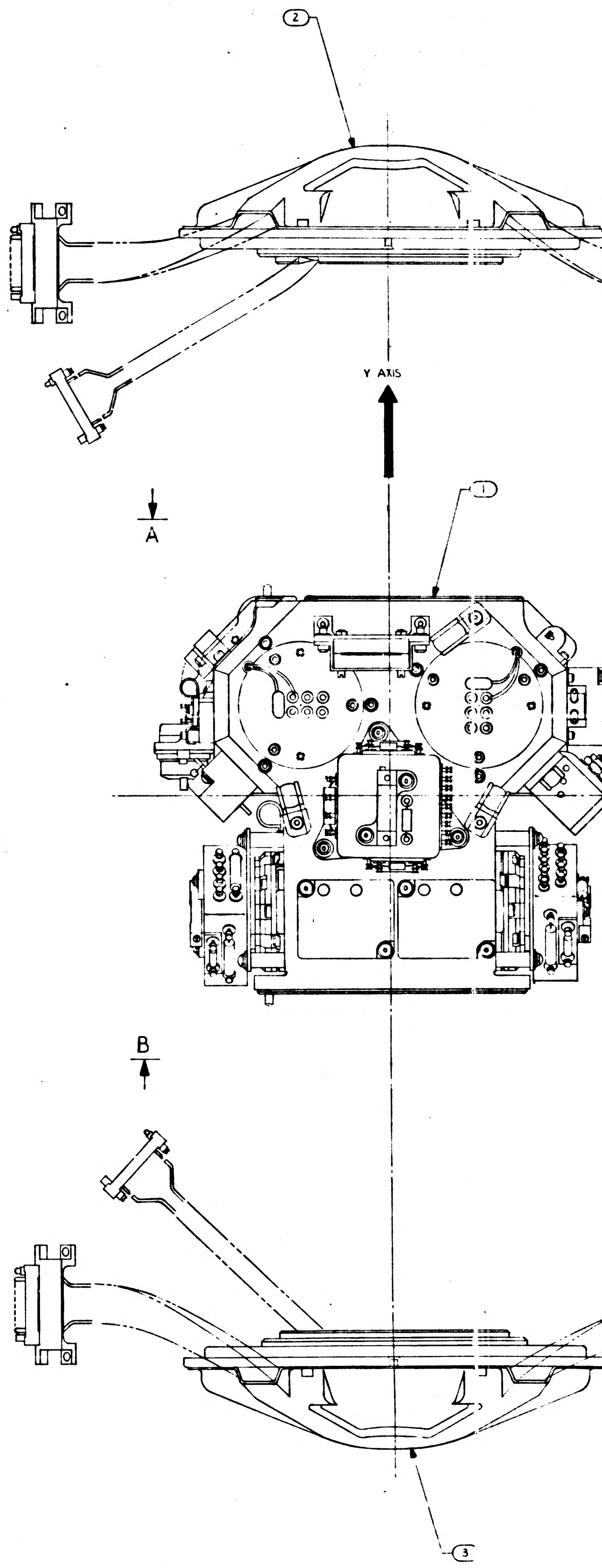
1000204 D

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

F-3


SEE NOTE 2A (C)
12 PLACES
SEE NOTE 2C (D)
X AXIS
(D) SEE NOTE 2C
(C) SEE NOTE 2B
4 PLACES
(C) SEE NOTE 2C
4 PLACES

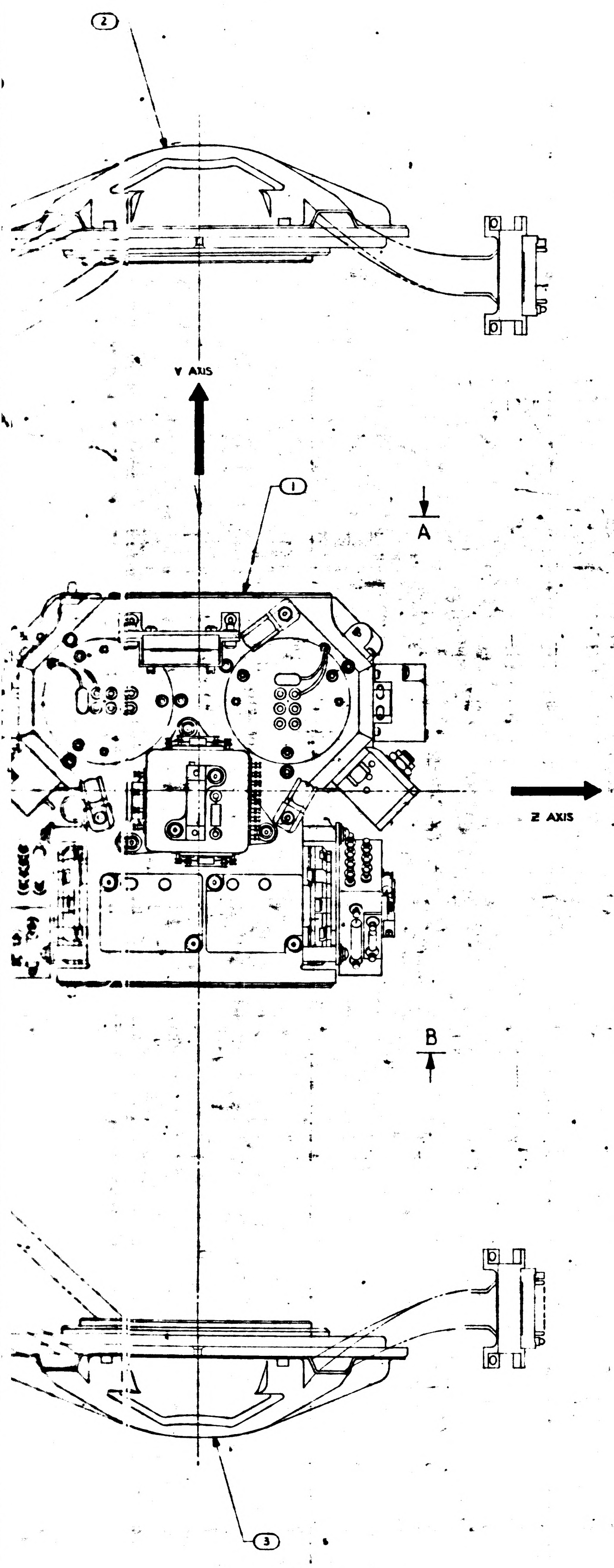

②
Y AXIS
A
①
B
③

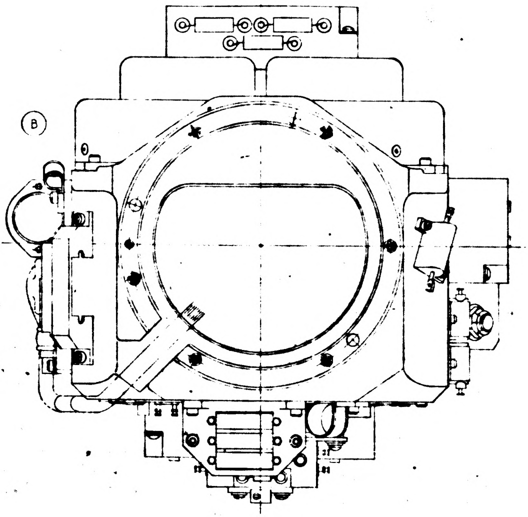
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
Ⓒ 2. SCREW TORQUE REQUIREMENTS: (±7%)
    A. 10.0 IN-LB
    B. 2.0 IN LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN-LB WHILE ENGAGING PINS
    C. 5.0 IN-LB
Ⓓ 3. ASSEMBLE PER REQUIREMENTS OF ATP 1000201

1000204	SHT 1	REV D

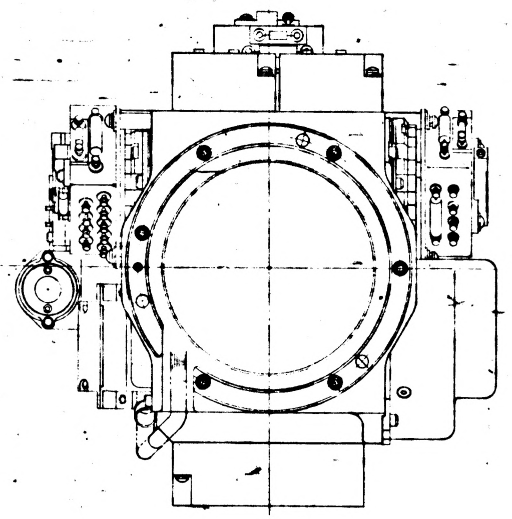
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	B	REPLACES REV A WITH CHANGES TDRR 01687	6-12-63	GJB	WK
	C	TDRR 01984	7-16-63	GJB	WK
	D	TDRR 02120	7-23-63	GJB	WK
	E	REVISED PER TDRR 07576	11 APR 64	JHR	





VIEW A-A



VIEW B-B

REPLACES REV A WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	INTERGIMBAL SUB-ASSEMBLY IbX	1000207			3
1	INTERGIMBAL SUB-ASSEMBLY IX	1000010			2
1	STABLE MEMBER ASSEMBLY	1000005			1

LIST OF PARTS AND MATERIALS

2

NEXT ASSY	USED ON
1000203	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		5-7-63
CHECKED		
DRAWN	PALERMO	5-29-63

APPROVED FOR MSC

MIT/IL APPROVAL	DATE
WT	19 Jun 63

INNER AXIS
ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
1/1	-	

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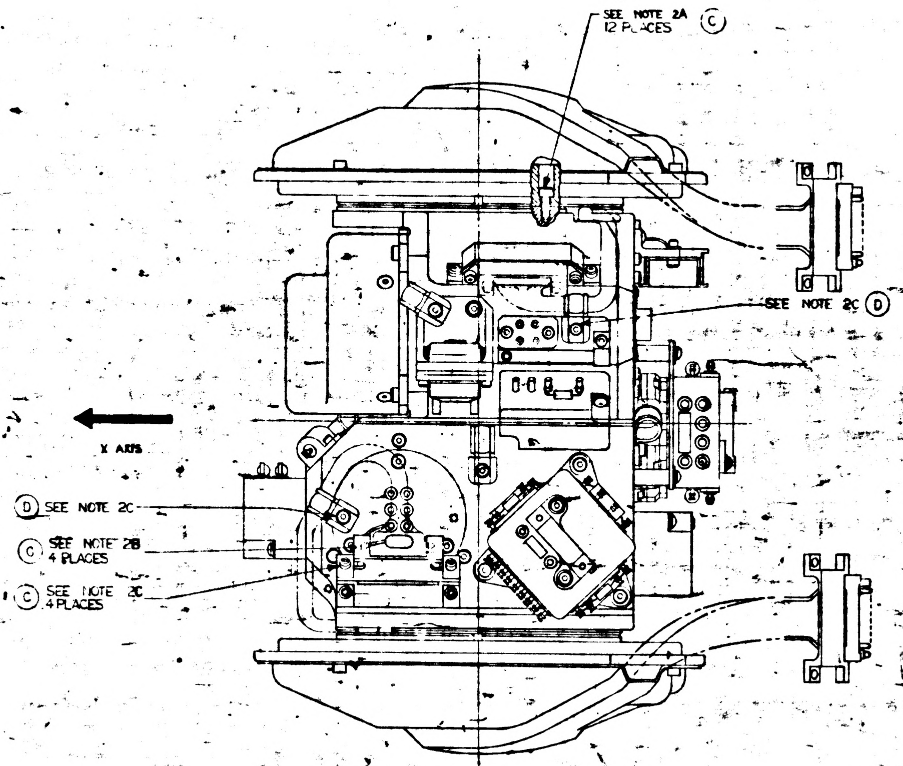
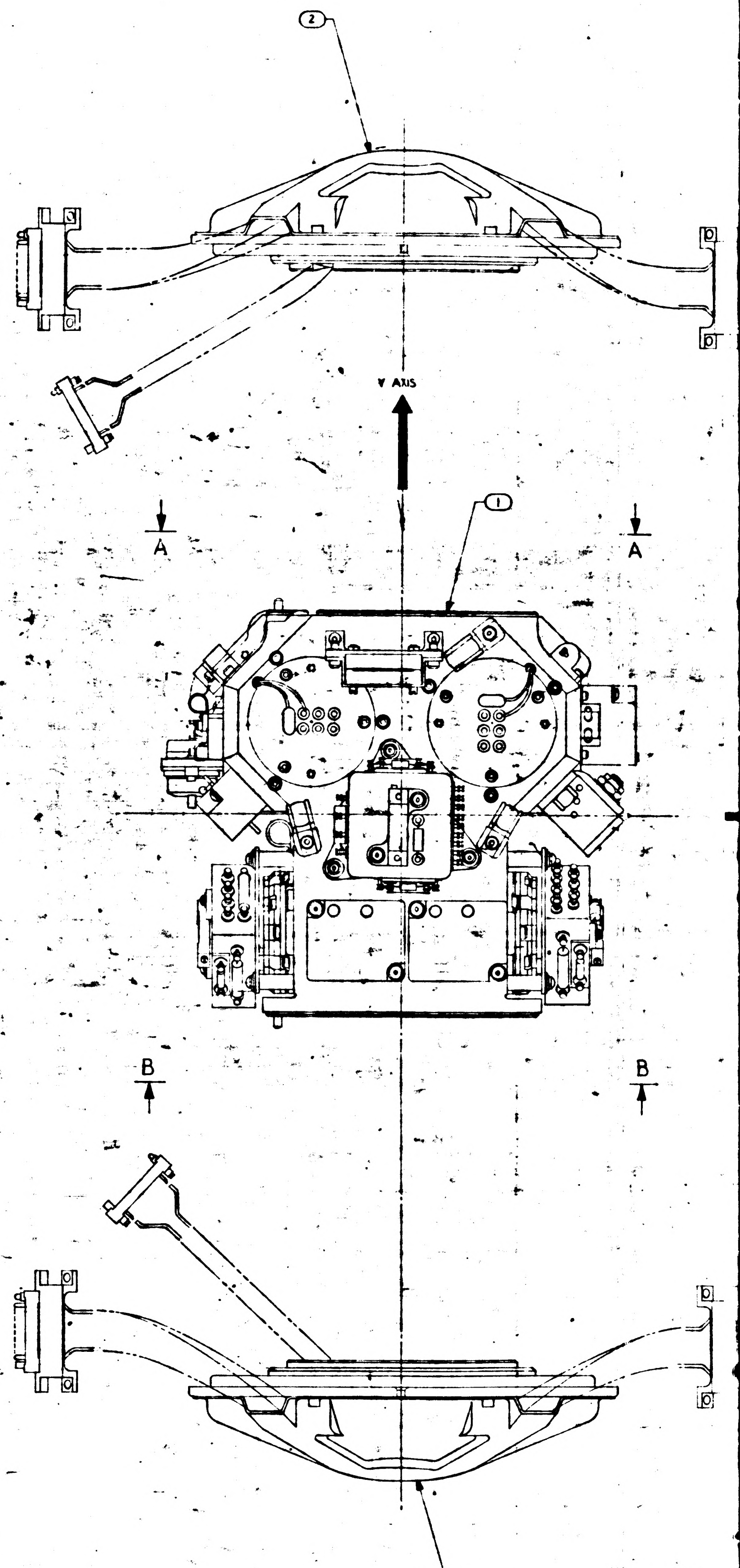
SHEET 1 OF 1

000204	SHT 1	REV E

1000204 E

1000204


SEE NOTE 2A
12 PLACES (C)
SEE NOTE 2C (D)
X AXIS
(D) SEE NOTE 2C
(C) SEE NOTE 2B
4 PLACES
(C) SEE NOTE 2C
4 PLACES


2
Y AXIS
1
A
A
B
B
3

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. (C) SCREW TORQUE REQUIREMENTS: (±7%)
   - A. 0.0 IN-LB
   - B. 2.0 IN-LB AT FINAL SEATING, NOT TO EXCEED 1.0 IN-LB WHILE ENGAGING PINS
   - C. 5.0 IN-LB
3. (D) ASSEMBLE PER REQUIREMENTS OF ATP 1000001

1

1000204	SH 1	REV E

1000204

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQ'D
1000005	Stable Member Assy	1
1000207	Intergimbal Sub-Assy, 16 Speed	1
1000010	Intergimbal Sub-Assy, 1 Speed	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

INNER AXIS ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.

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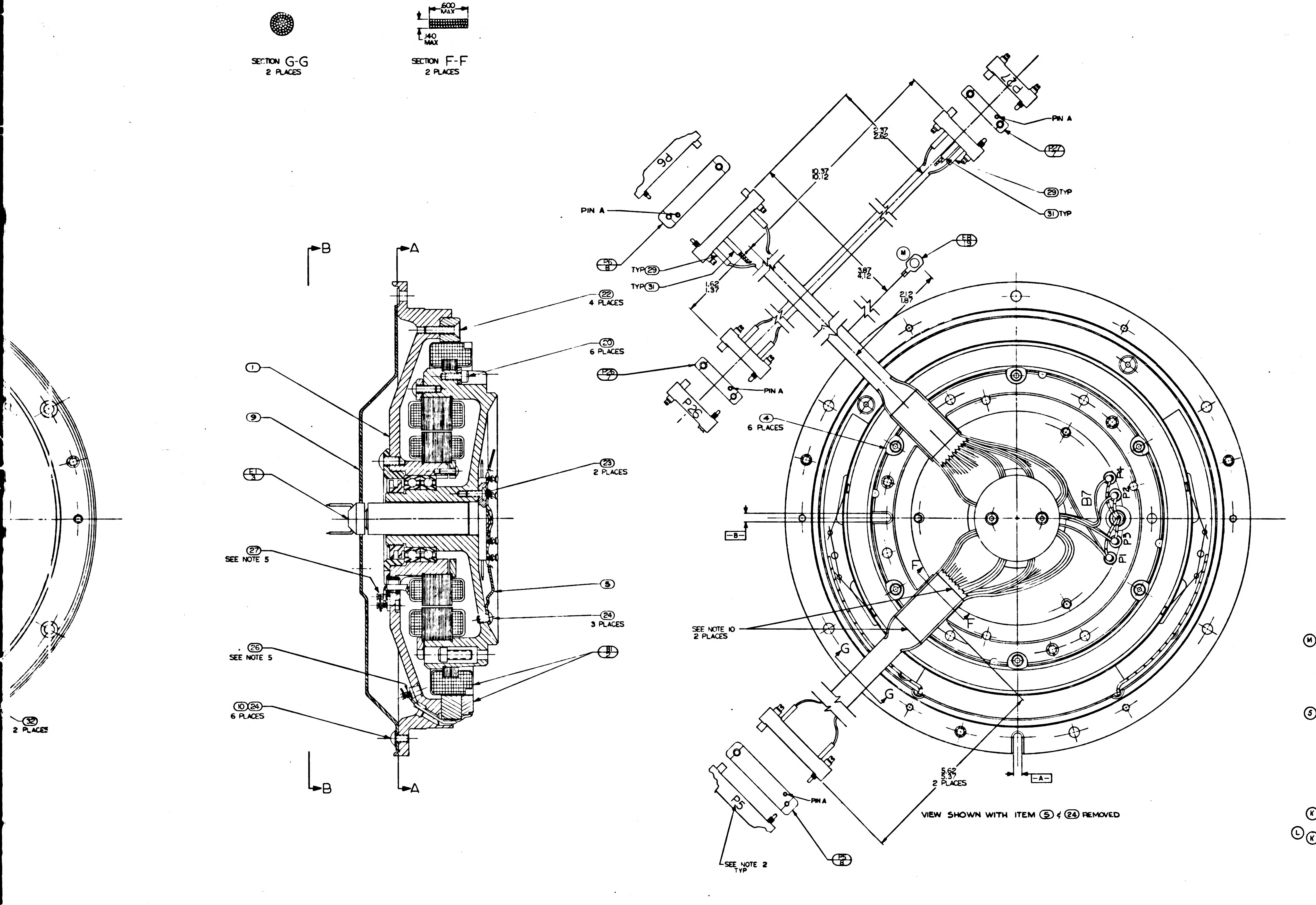
1000204

SHEET OF


SECTION G-G
2 PLACES
SECTION F-F
2 PLACES
.600 MAX
.140 MAX
B
A
22
4 PLACES
20
6 PLACES
1
9
E1 3
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
B1 2
10 24
6 PLACES
32
2 PLACES
P6
PIN A
P6 8
TYP 29
TYP 31
1.62
1.37
10.37
10.12
2.37
2.62
3.87
4.12
2.12
1.87
P27
PIN A
29 TYP
31 TYP
M
E8 13
P26 7
P26
PIN A
4
6 PLACES
B7
P4
P2
P3
P1
SEE NOTE 10
2 PLACES
F
G
P5
PIN A
P5 8
SEE NOTE 2
TYP
5.62
5.37
2 PLACES
VIEW SHOWN WITH ITEM 5 & 24 REMOVED

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
J	REPLACES REV H WITH CHANGES TDRR 02119	7/29/63	ags JH
K	TDRR 03183	9-13-63	AAH WK
L	TDRR 04558	11-12-63	AAH WK
M	TDRR 05172	11-19-63	AAH WK
N	TDRR 06237	18 Feb 64	AAH WK
P	TDRR 06236	18 Feb 64	AAH WK
R	REVISED PER TDRR 07947	26 MAY 64	JJJ AU
S	REVISED PER TDRR 07954	2 JUNE 64	JHB J.E.G.
T	REVISED PER TDRR 10812	17 JUL 64	JJJ MEM
U	REVISED PER TDRR 112 4	5 AUG 64	WF DAS
V	REVISED PER TDRR 12146	[illegible]	JWP CF
W	REVISED PER TDRR 13377	[illegible] 64	JWP [illegible]
Y	REVISED PER TDRR 13974	11-NOV-64	[illegible]
Z	REVISED PER TDRR 50 5	[illegible] 65	JJJ [illegible]
AA	REVISED PER TDRR 163 4	[illegible] 65	JMK [illegible]

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
A/R	TAPE, ADH, ELEC, PRESS. SENSITIVE	TYPE ACT	MIL-I-15126	1/2 WIDE SEE NOTE 13	43
2	SCREW, CAP, SOC. HD HEX.	MS1352C04-11			42
A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	41
1	WIRE, ELEC. TYPE E-28 GY	1010416-9	~~MIL-W-16878~~	60 TOTAL LG	40
1	WIRE, ELEC. TYPE E-28 VIO	-8	~~MIL-W-16878~~	68 TOTAL LG	39
1	WIRE, ELEC. TYPE E-28 BRN	-2	~~MIL-W-16878~~	60 TOTAL LG	38
1	WIRE, ELEC. TYPE E-28 BLU	-7	~~MIL-W-16878~~	14 TOTAL LG	37
1	WIRE, ELEC. TYPE E-28 YEL	-5	~~MIL-W-16878~~	14 TOTAL LG	36
1	WIRE, ELEC. TYPE E-28 RED	-3	~~MIL-W-16878~~	96 TOTAL LG	35
1	WIRE, ELEC. TYPE E-28 WHT	[illegible]	~~MIL-W-16878~~	14 TOTAL LG	34
1	WIRE, ELEC. TYPE E-28 BLK	-1	~~MIL-W-16878~~	48 TOTAL LG	33
2	INSULATION, SLEEVING, ELEC HEAT SHRINKABLE	1010490-180		3/4 LONG	32
6	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	31
3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
A/R	SOLDER	SN10WARP2	QQ-S-571		26
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
8	SCREW, CAP, SOC HD. HEX	1000110-1			21
6	SCREW, CAP SELF-LKG SOC HD. HEX	MS1352C04LLA			20
2	TERMINAL, LUG	1010717-1			19
1	CONN, ELECT, RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
2	CLAMP, CABLE	1000220-3		SEE NOTE 13	16
4	CLAMP, CABLE	1000220-5		SEE NOTE 13	15
6	WASHER, CABLE CLAMP	1000223			14
1	CLAMP, TRANSDUCER	1000256			13
1	BRACKET, TRANSDUCER	1000257			12
1	TRANSDUCER, ABS. PRESSURE	1000272			11
6	WASHER, FLAT, ROUND	1000254			10
1	GUIDE, WIRE, ASS'Y	1000156			9
2	CONNECTOR, ELEC, RECEP. 29 CONT.	1000116			8
2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221-1			7
1	PRECISION RESOLVER ALIGN ASS'Y.	1008283-011			6
1	GUIDE, WIRE, STUB SHAFT. O.A.	1000151			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16X RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN DMWHITE 8-7-62
APPROVED FOR MSC
W. J. Rhine
BY DIRECTION
8 NOV 62

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

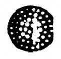
SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000205
SHEET 1

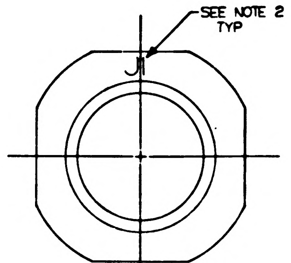
1000205 AA

1000205	REV	SHEET
	AA	1

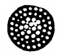
37 1000205



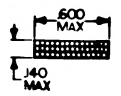
SECTION E-E
2 PLACES


SEE NOTE 2
TYP
J1

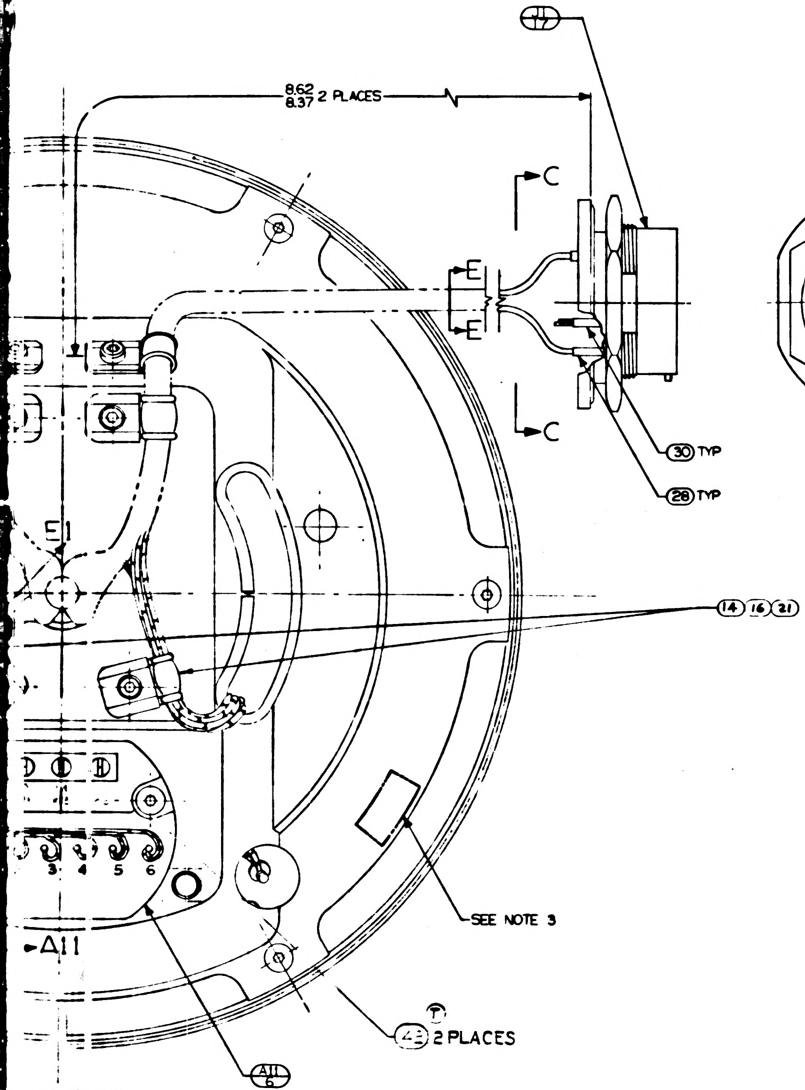
VIEW C-C



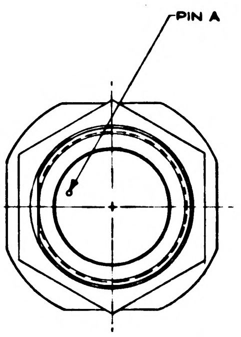
SECTION G-G
2 PLACES

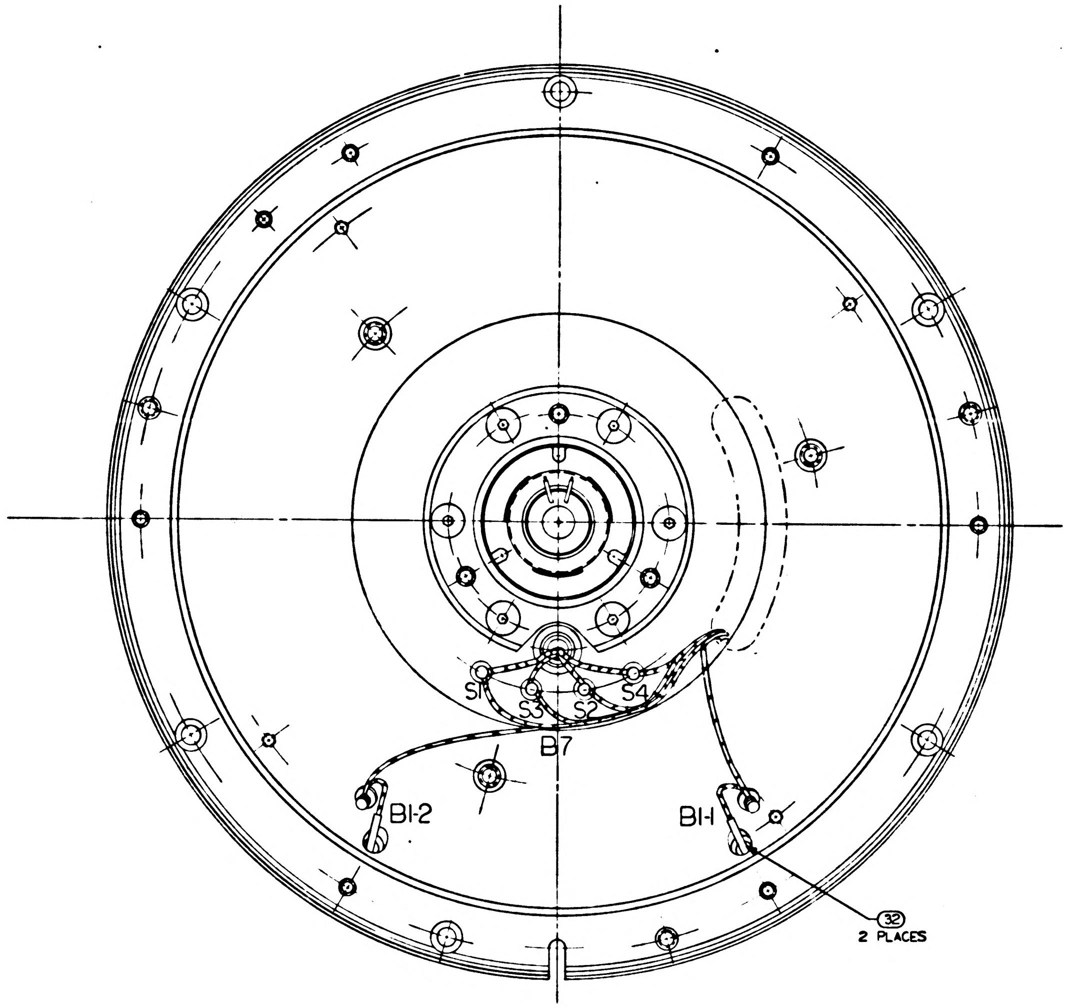

.600
MAX
.140
MAX

SECTION F-F
2 PLACES

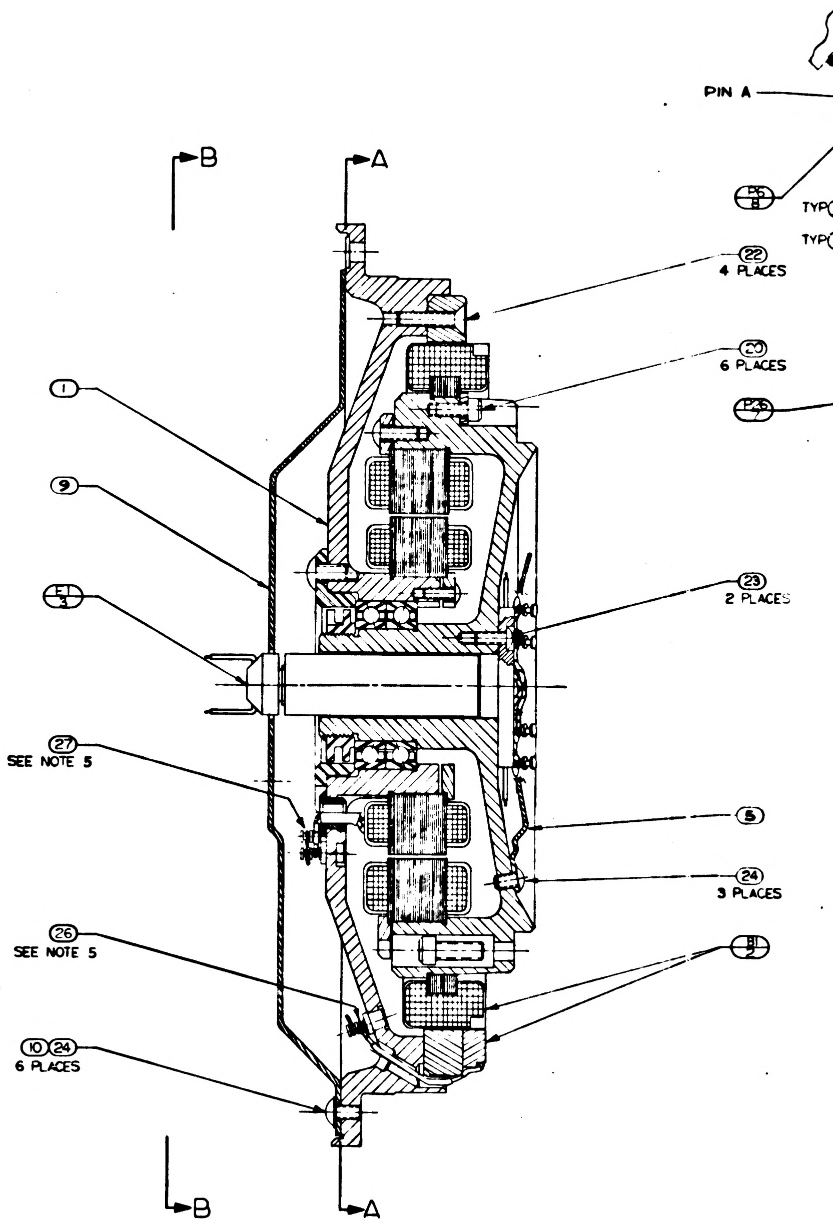

17
8.62
8.37 2 PLACES
C
C
E
E
30 TYP
28 TYP
E1
14 16 21
SEE NOTE 3
3 4 5 6
A11
A11
5
2 PLACES
2 PLACES

VIEW B-B




S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


PIN A
B
A
P3
TYP
TYP
22
4 PLACES
20
6 PLACES
P3
1
9
E1
3
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
8
10 24
6 PLACES
B
A

LLOWING

RNS MIN	NO OF FULL TURNS MAX.
	4
	3

1000205	REV AA	SHEET 1

2710000205

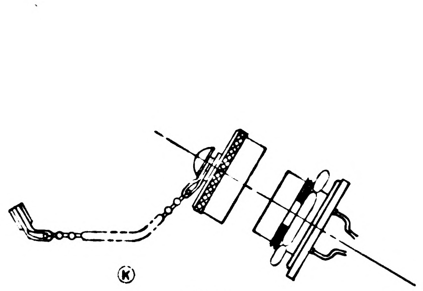
WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	
69-2	BRN	38	P26-B	P27-B	
[illegible]-4	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL I
71-1	WHT/RED/GY		P26-H	E1-40	
71-2	WHT/RED/VIO		P26-K	E1-39	
72-1	VIO	39	P26-K	P27-H	
72-2	GY	40	P26-J	P27-E	
74-2	VIO	39	B7-P4	P5-U	

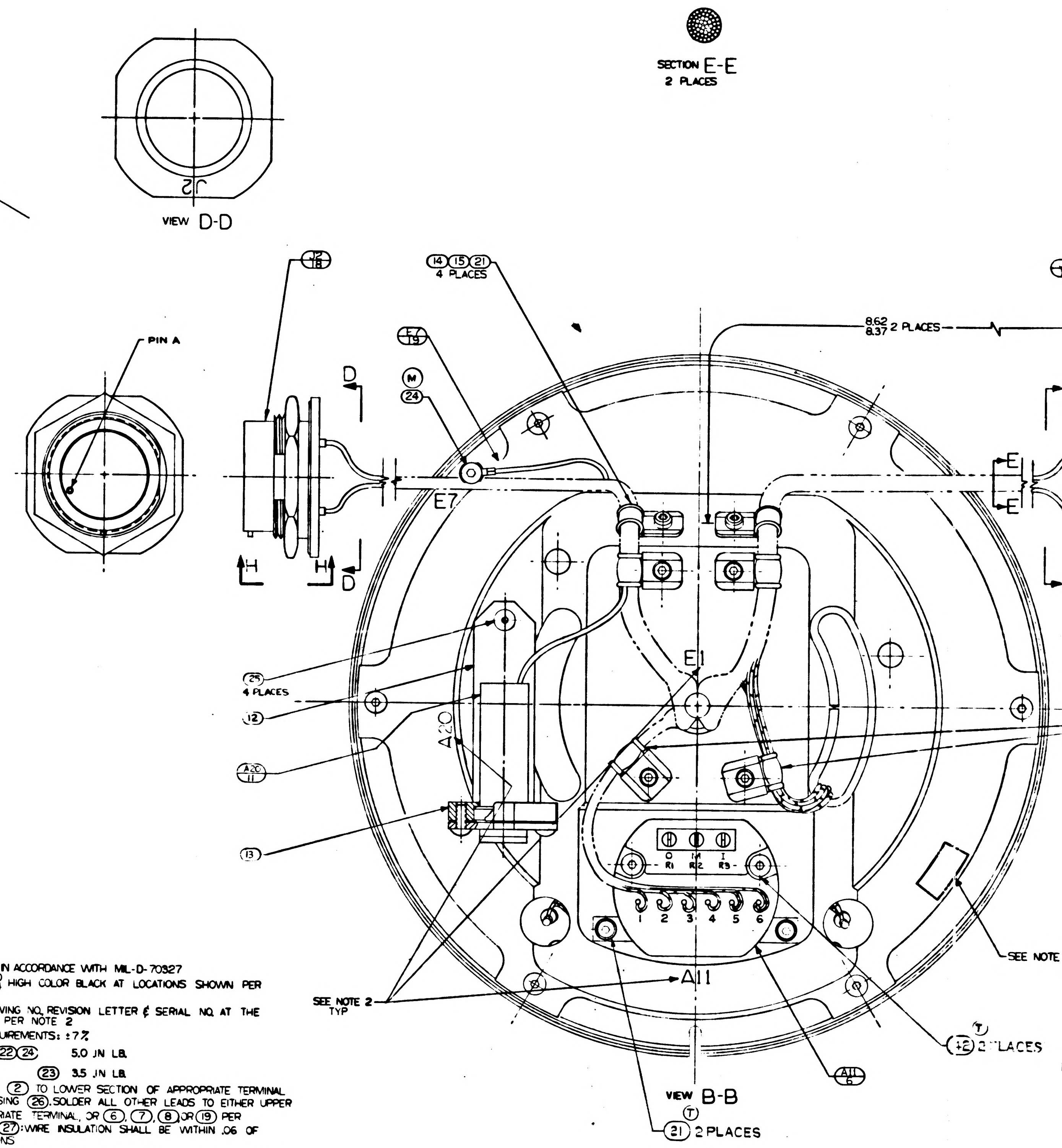
WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-V	E1-29	
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-[illegible]	E-7	
28-1	BLK	33	J2-H	B1-1	
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-3[illegible]	SEE DETAIL I
46-1	WHT/BRN/GRN		P5-M	E1-31	
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL I
52	WHT/BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL I
54-1	BLU		P6-R	E1-7	
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-$\bar{c}$	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	

Ⓜ



VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW B-B

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%

(20)(21)(22)(24) 5.0 IN LB.

(23) 3.5 IN LB.

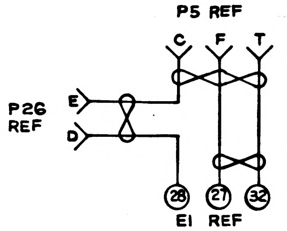
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (26). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR (6), (7), (8) OR (19) PER MIL-STD-440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (2) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (2)
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
Ⓚ 11. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

13. TAPE (43) SHALL BE USED AS REQUIRED TO RESTRICT MOVEMENT OF THE HARNESS IN THE CABLE CLAMPS.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

Ⓟ

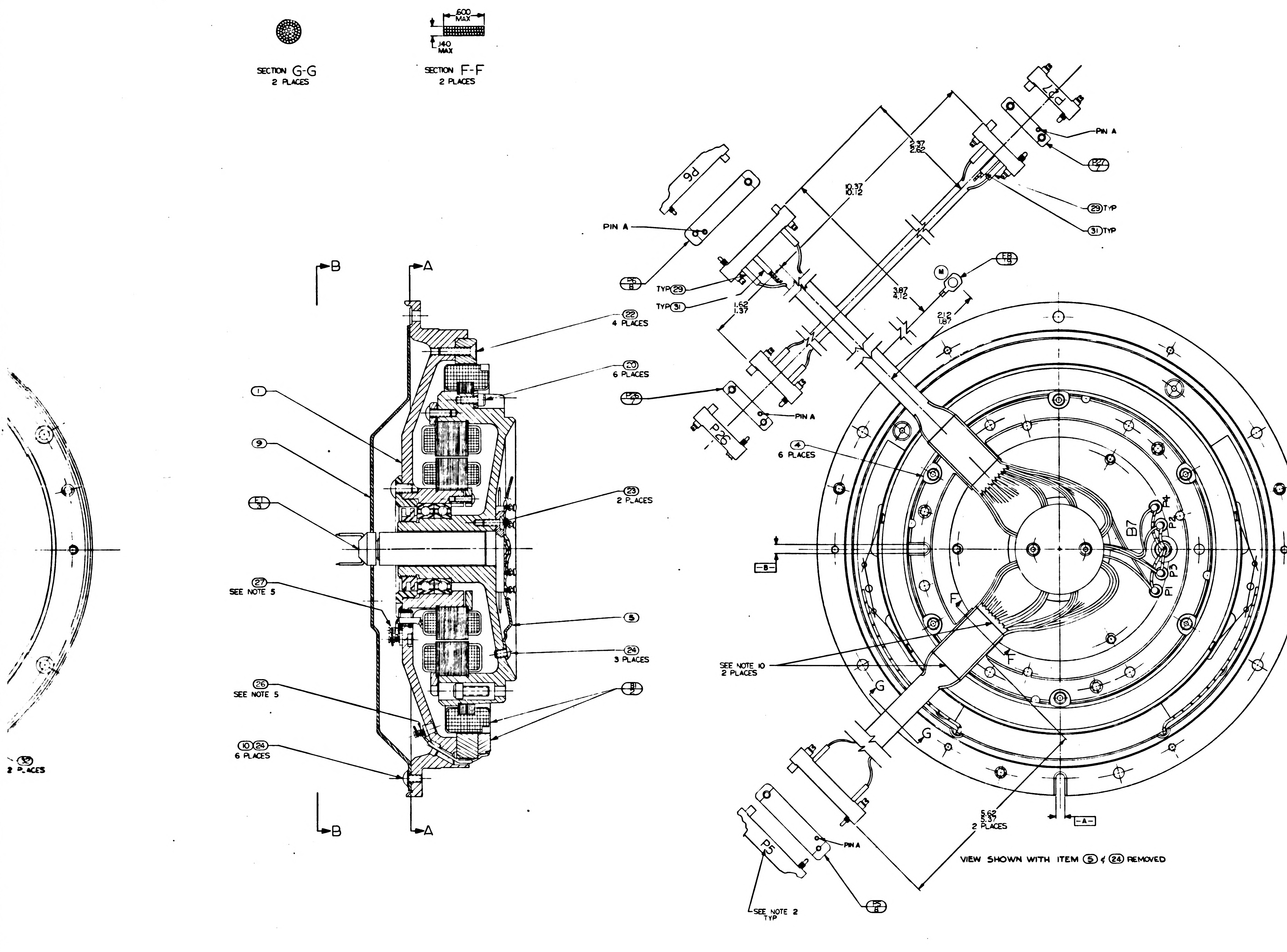
NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX.
2 OR 3	2	4
4 OR MORE	1	3



DETAIL 1

	REV	SHEET
1000205	AA	1

1/1000205


4
3
2
1
SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
B
A
PIN A
P6
P6/8
TYP 29
TYP 31
1.62
1.37
10.37
10.12
2.37
2.62
3.87
4.12
2.12
1.87
PIN A
P27/7
29 TYP
31 TYP
M
E8/9
22
4 PLACES
20
6 PLACES
P26/7
P26
PIN A
4
6 PLACES
1
9
E1/4
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
SEE NOTE 10
2 PLACES
26
SEE NOTE 5
B1/2
10 24
6 PLACES
32
2 PLACES
B7
P4
P2
P3
P1
F
F
G
G
-B-
-A-
5.62
5.37
2 PLACES
P5
PIN A
P5/8
SEE NOTE 2
TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED
D
C
B
A

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02119	7/24/63	a.g.s	[illegible]
K	TDRR 03183	9-13-63	AAH	WK
L	TDRR 04558	11-12-63	AAH	WK
M	TDRR 05172	11-19-63	AAH	WK
N	TDRR 06237	18 Feb 64	AAH	WK
P	TDRR 06236	18 Feb 64	AAH	WK
R	REVISED PER TDRR 07947	26 MAY 64	JJJ	AU
S	REVISED PER TDRR 07954	2 JUNE 64	JMB	J.E.G.
T	REVISED PER TDRR 10812	17 JUL 64	JJJ	MEM.
U	REVISED PER TDRR 11214	5 AUG 64	WF	SAS
V	REVISED PER TDRR 12146	[illegible]	WP	[illegible]
W	REVISED PER TDRR 13377	21 [illegible] 64	WP	[illegible]
Y	REVISED PER TDRR 13974	[illegible]	[illegible]	[illegible]
Z	REVISED PER TDRR 5015	4 JAN 65	[illegible]	[illegible]
AA	REVISED PER TDRR 163.4	[illegible] 65	[illegible]	[illegible]
AB	REVISED PER TDRR 18079	2 APR 65	[illegible]	EF

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	A/R	TAPE, ADH, ELEC, PRESS. SENSITIVE	TYPE ACT	MIL-I-15126	1/2 WIDE SEE NOTE 13	43
	2	SCREW, CAP, SOC. HD HEX.	MS1352C04-11			42
M	A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	41
	1	WIRE, ELEC. TYPE E-28 GY	1010416-9	~~MIL-W-16878~~	60 TOTAL LG	40
	1	WIRE, ELEC. TYPE E-28 VIO	-6	~~MIL-W-16878~~	60 TOTAL LG	39
	1	WIRE, ELEC. TYPE E-28 BRN	-2	~~MIL-W-16878~~	60 TOTAL LG	38
	1	WIRE, ELEC. TYPE E-28 BLU	-7	~~MIL-W-16878~~	14 TOTAL LG	37
	1	WIRE, ELEC. TYPE E-28 YEL	-5	~~MIL-W-16878~~	14 TOTAL LG	36
	1	WIRE, ELEC. TYPE E-28 RED	-3	~~MIL-W-16878~~	96 TOTAL LG	35
	1	WIRE, ELEC. TYPE E-28 WHT	-0	~~MIL-W-16878~~	14 TOTAL LG	34
	1	WIRE, ELEC. TYPE E-28 BLK	-	~~MIL-W-16878~~	48 TOTAL LG	33
S	2	INSULATION, SLEEVING, ELEC. HEAT SHRINKABLE	1010490-180		3/4 LONG	32
	6	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	31
	~~9~~	~~INSULATION, SLEEVING, ELEC.~~	~~1006776-16~~		~~1/8 LONG~~	30
	55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
	54	INSULATION, SLEEVING, ELEC.	1006776-14		3/8 LONG	28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	A/R	SOLDER	SN10WARP2	QQ-S-571		26
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
	10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
	2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
	4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
	8	SCREW, CAP, SOC HD. HEX	1000110-1			21
K	6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS1352C04LLA			20
	2	TERMINAL, LUG	1010717-1			19
L	1	CONN, ELECT, RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
K	1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
	2	CLAMP, CABLE	1000220-3		SEE NOTE 13	16
	4	CLAMP, CABLE	1000220-5		SEE NOTE 13	15
	6	WASHER, CABLE CLAMP	1000223			14
	1	CLAMP, TRANSDUCER	1000256			13
	1	BRACKET, TRANSDUCER	1000257			12
	1	TRANSDUCER, ABS. PRESSURE	1000272			11
	6	WASHER, FLAT, ROUND	1000254			10
	1	GUIDE, WIRE, ASS'Y	1000156			9
	2	CONNECTOR, ELEC, RECEP 29 CONT.	1000116			8
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V	1	PRECISION RESOLVER ALIGN ASS'Y	1008283-011			6
	1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
	6	CLAMP, TORQUE MOTOR	1000087			4
	1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
	1	16X RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

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NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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MATERIAL

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INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
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DRAWN D.M.WHITE 5-7-62
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W. J. Rhine
BY DIRECTION
8 NOV 63

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

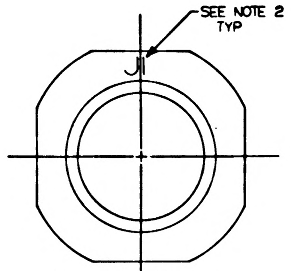
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000205
SHEET 1 OF 1

1000205 HB

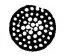
1000205	REV	SHEET
	B	1

3/1000205

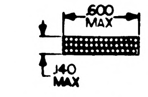
SECTION E-E
2 PLACES


SEE NOTE 2
TYP
J1

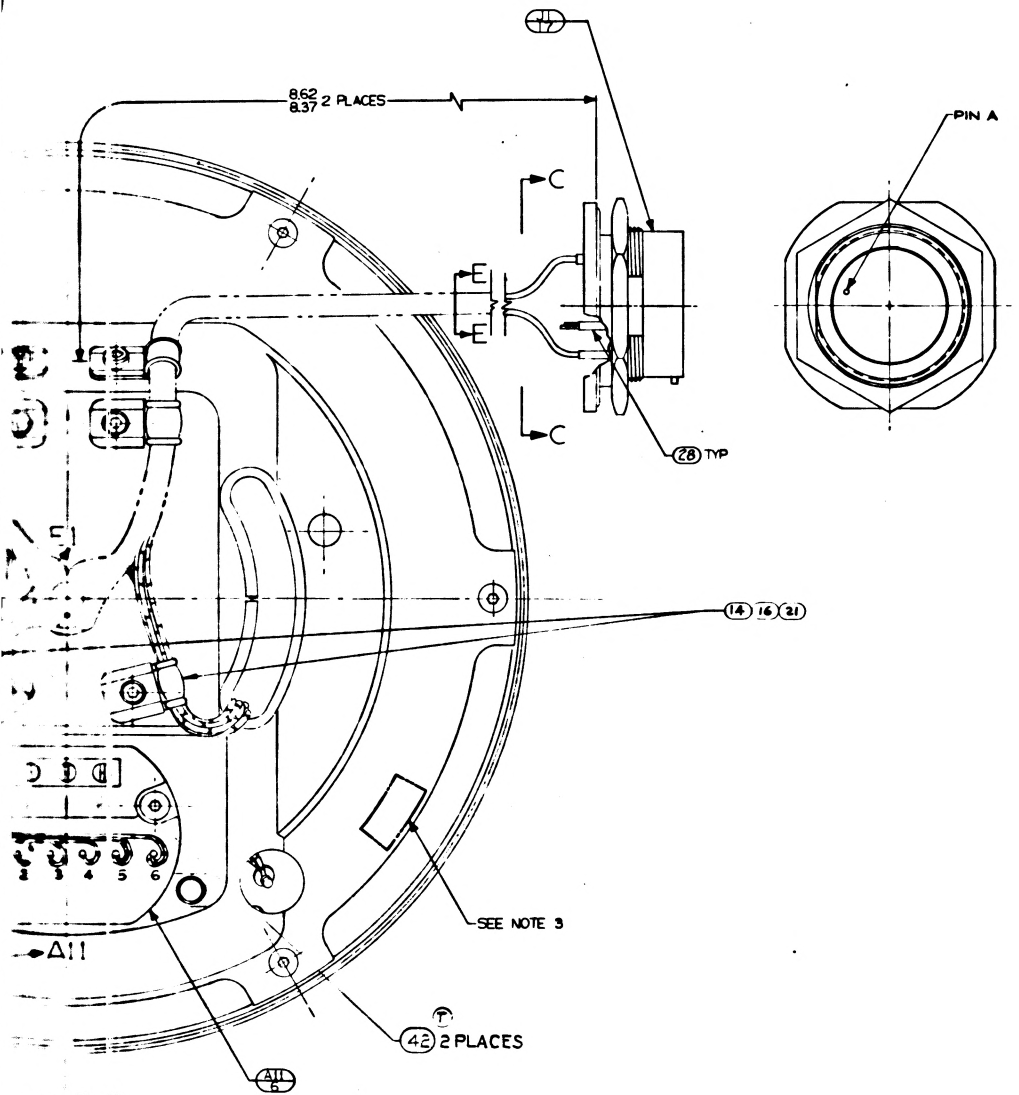
VIEW C-C



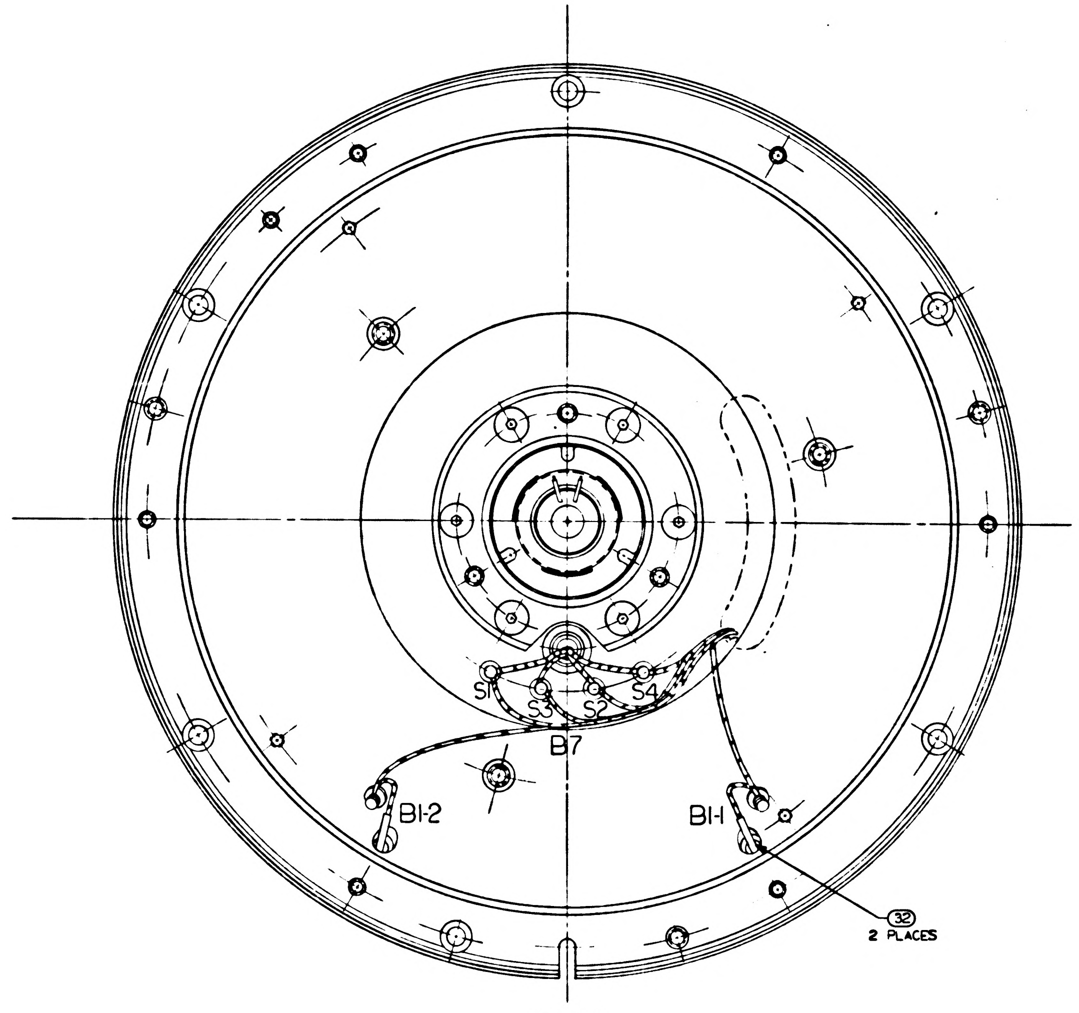
SECTION G-G
2 PLACES


.600 MAX
.140 MAX

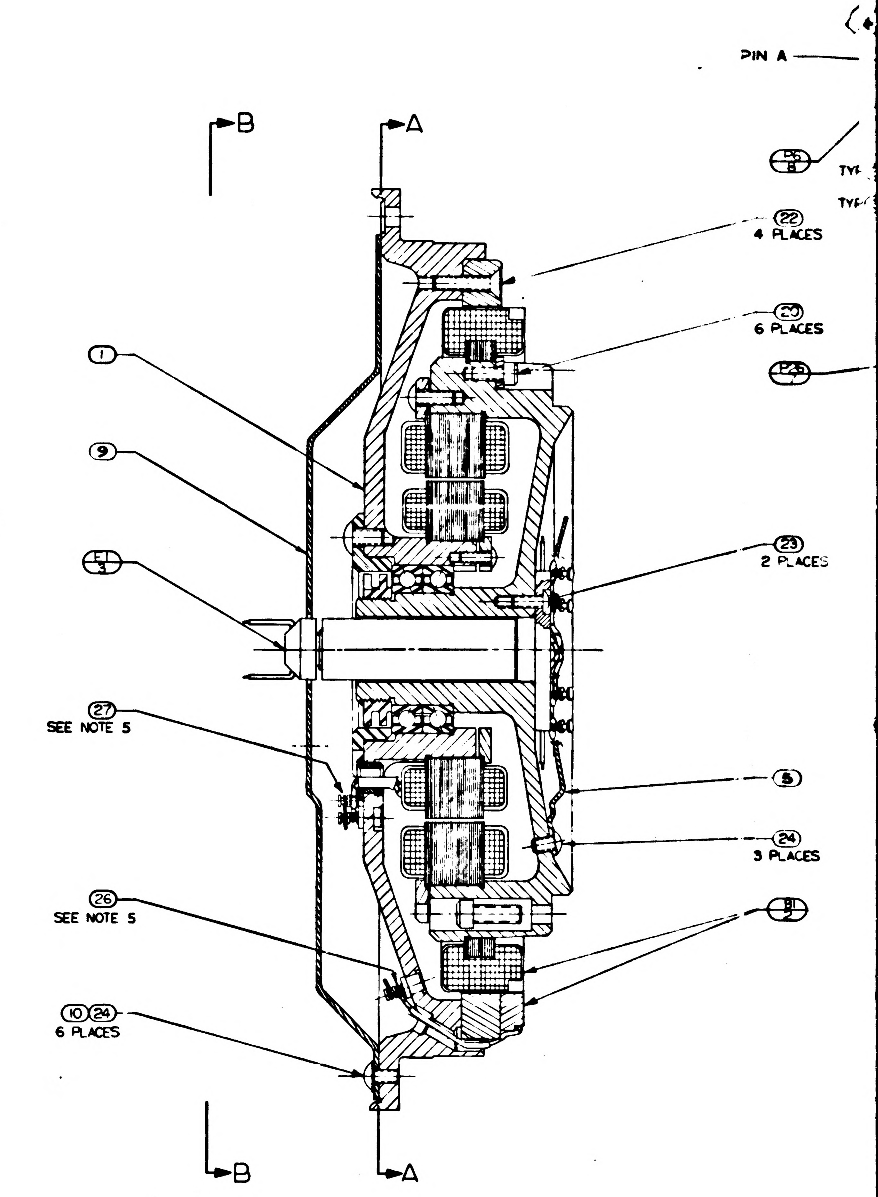
SECTION F-F
2 PLACES


17
8.62
8.37 2 PLACES
C
C
E
E
PIN A
28 TYP
14 16 21
E
SEE NOTE 3
A11
41
6
42 2 PLACES
2
3
4
5
6

VIEW B-B
2 PLACES


S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


PIN A
B
A
22
4 PLACES
20
6 PLACES
1
9
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
10 24
6 PLACES
B
A
TYP
TYP

LLOWING

NS MIN	NO OF FULL TURNS MAX.
	4
	3

1000205	REV	SHEET
	AB	1

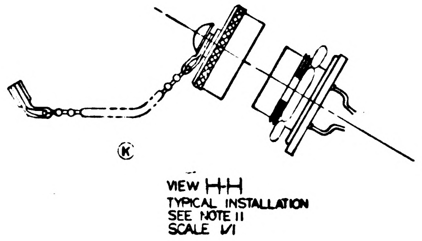
WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	
69-2	BRN	38	P26-B	P27-B	
[illegible]-4	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL 1
71-1	WHT/RED/GY		P26-H	E1-40	
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	
72-2	GY	40	P26-J	P27-E	
74-2	VIO	39	B7-P4	P5-U	

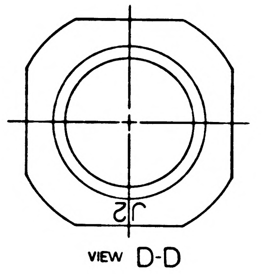
WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-V	E1-29	
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	
44-2	WHT/ORN/BLU		P5-W	E1-48	
45-1	WHT/BRN/BLU		P5-T	E1-32	SEE DETAIL 1
46-1	WHT/BRN/GRN		P5-M	E1-31	
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL 1
52	WHT/BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL 1
54-1	BLU		P6-R	E1-7	
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-c	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	

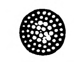
Ⓜ



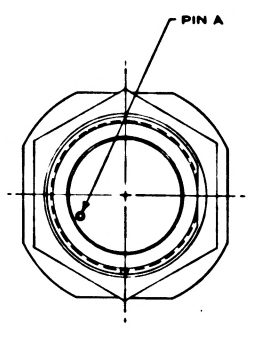
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1

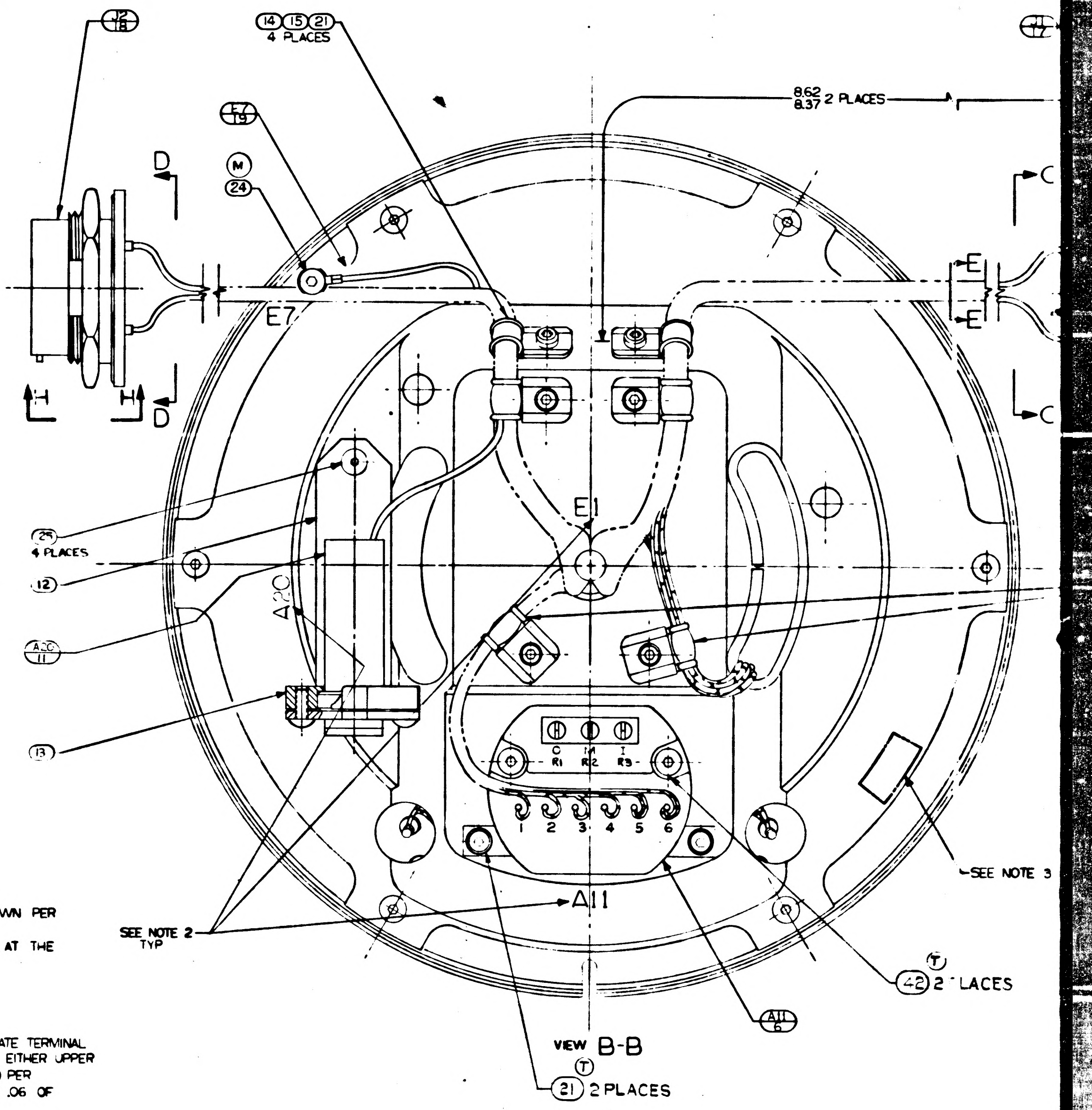


VIEW D-D



SECTION E-E
2 PLACES





VIEW B-B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%

   (20)(21)(22)(24) 5.0 IN LB.

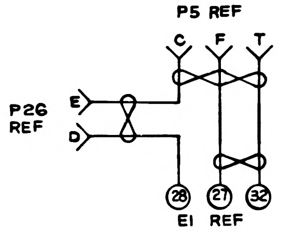
   (23) 3.5 IN LB.
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (26). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR (6), (7), (8) OR (19) PER MIL-STD-440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (2) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (2)
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
11. Ⓚ PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

13. TAPE (43) SHALL BE USED AS REQUIRED TO RESTRICT MOVEMENT OF THE HARNESS IN THE CABLE CLAMPS.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

Ⓟ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX.
2 OR 3	2	4
4 OR MORE	1	3



DETAIL 1

	REV	SHEET
1000205	AB	1

1000205

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00200	12/27/62	WK

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED A J Boyce 12/11/62
CHECKED
DRAWN
APPROVED FOR MSC
W J Rhine 12-12-62
MIT/IL APPROVAL DATE
12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET OF

1000205

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ	A	TDRR 00200	12/27/62	WK
	B	TDRR 00237	1/7/63	

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1
1000093-4	Scr But Hd Self lock Hex Soc	2
1000104-5	Scr F. H. Self lock Hex Soc	4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
WJ Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000205

SHEET OF

1000205

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
(M)	A	TDRR 00200	12/27/62	WK
(M)	B	TDRR 00237	1/7/63	
	C	TDRR 00267	1/16/63	

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1
1000093-4	Scr But Hd Self lock Hex Soc	2
1000104-5	Scr F. H. Self lock Hex Soc	4
1000156	Guide, Wire, Assembly Brg Hsg	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000205

SHEET OF

1000205

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDRR 00200	12/27/62		WK
M	B	TDRR 00237	1/7/63		
M	C	TDRR 00267	1/16/63		
	D	TDRR 00419	2/19/63		WK

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1
1000093-4	Scr But Hd Self lock Hex Soc	2
1000104-4	Scr F. H. Self lock Hex Soc	4
1000156	Guide, Wire, Assembly Brg Hsg	1
1000104-17	Scr. But Hd Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Soc Self Lock	6

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000205

SHEET OF

1000205

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
M	A	TDRR 00200	12/27/62	ajb WK
M	B	TDRR 00237	1/7/63	Bh
M	C	TDRR 00267	1/16/63	ajb
M	D	TDRR 00419	2/19/63	ajb WK
	E	TDRR 01061	5/1/63	ajb wk

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1
~~1000093-[illegible]~~	~~Scr But Hd Self lock Hex Soc~~	~~2~~
~~1000104-[illegible]~~	~~Scr F. H. Self lock Hex Soc~~	~~4~~
1000156	Guide, Wire, Assembly Brg Hsg	1
1000104-17	Scr. But Hd Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Soc Self Lock	6
1000250-2	Scr But Hd Self lock Spl Soc	2
1006776-15	Insulation Sleeving Elect	5 inches
1000257	Bracket, Transducer	1
1000256	Clamp, Transducer	1
1000254	Washer, Flat, Round	6
1000272	Transducer	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

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MATERIAL:

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INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
WJ Rhine 12-12-62

MIT/IL APPROVAL	DATE
W A Ragan	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

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SHEET OF

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1000205

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDRR 00200	12/27/62	ajb	WK
M	B	TDRR 00237	1/7/63		
M	C	TDRR 00267	1/16/63	ajb	
M	D	TDRR 00419	2/19/63	ajb	WK
M	E	TDRR 01061	5/1/63	ajb	WK
	F	TDRR 01152	5/8/63		

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1
~~[illegible]~~	~~Scr But Hd Self lock Hex Soc~~	~~2~~
~~[illegible]~~	~~Scr F. H. Self lock Hex Soc~~	~~4~~
1000156	Guide, Wire, Assembly Brg Hsg	1
1000104-17	Scr. But Hd Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Soc Self Lock	6
1000250-2	Scr But Hd Self lock Spl Soc	2
1006776-15	Insulation Sleeving Elect	5 inches
1000257	Bracket, Transducer	1
1000256	Clamp, Transducer	1
1000254	Washer, Flat, Round	6
1000272	Transducer	1
1007004	Precision Resolver Align.	1

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

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MATERIAL:

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CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

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ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00132			
M	A	TDRR 00200	12/27/62	AJB	WK
M	B	TDRR 00237	1/7/63	BK	
M	C	TDRR 00267	1/16/63	AJB	
M	D	TDRR 00419	2/19/63	AJB	WK
M	E	TDRR 01061	5/1/63	AJB	WK
M	F	TDRR 01152	5/8/63		WK
M	G	TDRR 01318	5/21/63	AJB	WK

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1
~~1000093[illegible]~~	~~Scr But Hd Self lock Hex Soc~~	~~2~~
~~1000104[illegible]~~	~~Scr F.H. Self lock Hex Soc~~	~~4~~
1000156	Guide, Wire, Assembly Brg Hsg	1
1000104-17	Scr. But Hd Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Soc Self Lock	6
1000250-2	Scr But Hd Self lock Spl Soc	2
1006776-15	Insulation Sleeving Elect	5 inches
1000257	Bracket, Transducer	1
1000256	Clamp, Transducer	1
1000254	Washer, Flat, Round	6
1000272	Transducer	1
1007004	Precision Resolver Align.	1
1000221	Connector, Electrical Receptacle 9 Contacts	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W A Kupfer	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00132					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M	A	TDRR 00200	12/27/62	ajb	WK
M	B	TDRR 00237	1/7/63	Bk	
M	C	TDRR 00267	1/16/63	ajb	
M	D	TDRR 00419	2/19/63	ajb	WK
M	E	TDRR 01061	5/1/63	ajb	WK
M	F	TDRR 01152	5/8/63		WK
M	G	TDRR 01318	5/21/63	ajb	WK
M	H	REPLACED BY REV J WITH CHANGES TDRR 02119	7/24/63	ajb	WK

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1
1000161	16X Resolver Assembly, OA	1
~~1000093-[illegible]~~	~~Scr But Hd Self lock Hex Soc~~	~~2~~
~~100010[illegible]~~	~~Scr F. H. Self lock Hex Soc~~	~~4~~
1000156	Guide, Wire, Assembly Brg Hsg	1
1000104-17	Scr. But Hd Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Soc Self Lock	6
1000250-2	Scr But Hd Self lock Spl Soc	2
1006776-15	Insulation Sleeving Elect	5 inches
1000257	Bracket, Transducer	1
1000256	Clamp, Transducer	1
1000254	Washer, Flat, Round	6
1000272	Transducer	1
1007004	Precision Resolver Align.	1
1000221	Connector, Electrical Receptacle 9 Contacts	2

REPLACED BY REV J WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

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NAS 9-153

		DATE
APPROVED	A. J. Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W. Kupfer	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

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INCHES
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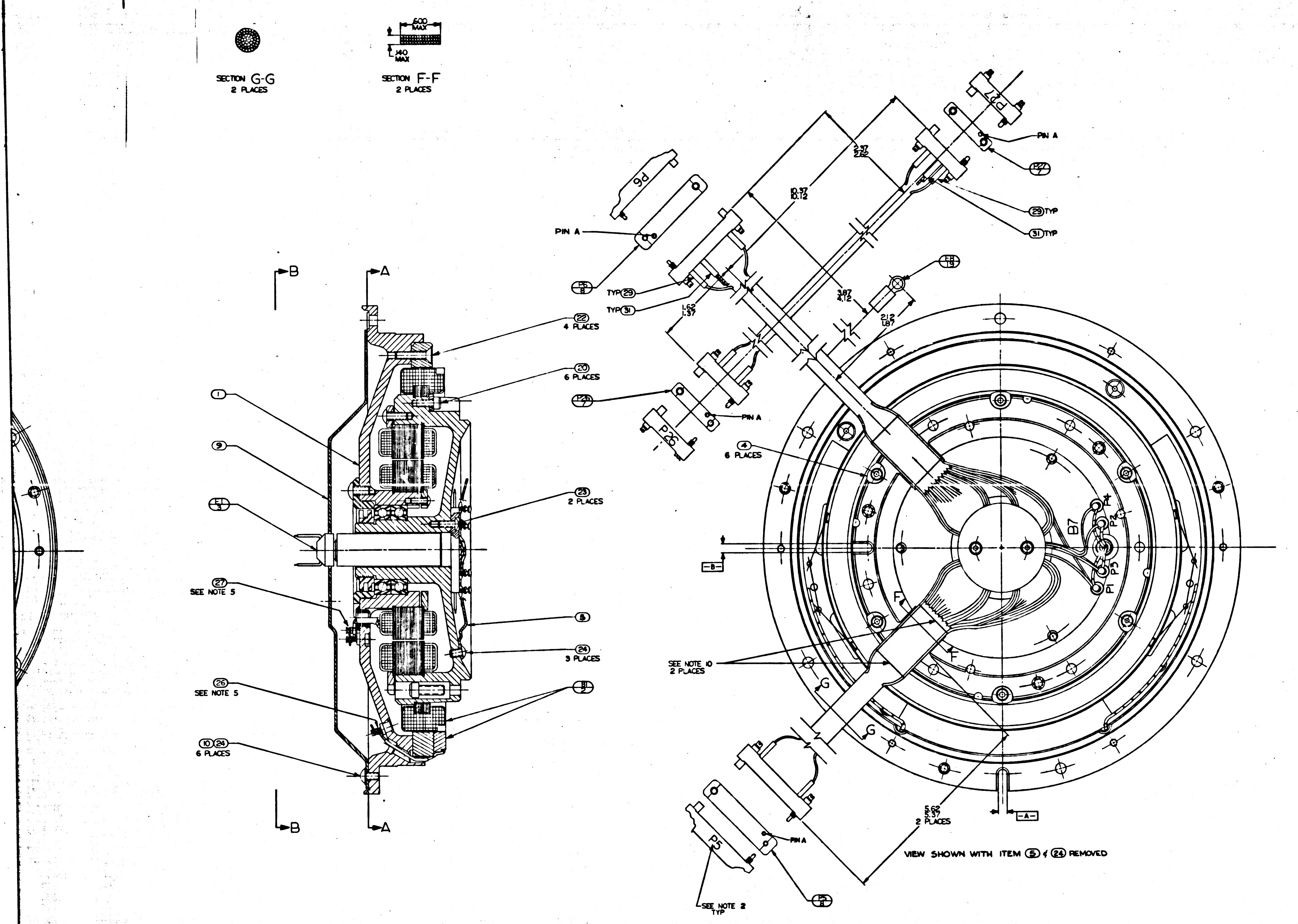
REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02119	7-24/63		



SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
B
A
1
9
51
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
22
4 PLACES
20
6 PLACES
23
2 PLACES
5
24
3 PLACES
B
2
P6
PIN A
P6
TYP 29
TYP 31
1.62
1.37
P26
P26
PIN A
10.37
10.12
2.37
2.32
P27
PIN A
P27
29 TYP
31 TYP
3.87
4.12
2.12
1.87
F8
19
4
6 PLACES
B7
P2
P4
P3
P1
F
F
G
G
SEE NOTE 10
2 PLACES
B
A
5.62
5.37
2 PLACES
P5
PIN A
P5
SEE NOTE 2
TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED

REPLACES REV H WITH CHANGES

QTY. REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	41
1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60" TOTAL LG	40
1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	60" TOTAL LG	39
1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60" TOTAL LG	38
1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14 TOTAL LG	37
1	WIRE, ELEC. TYPE E-28 YEL		MIL-W-16878	14 TOTAL LG	36
1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	14" TOTAL LG	35
1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
2	INSULATION, SLEEVING, ELEC.	1006776-15		3/4 LONG	32
6	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LONG	31
3	INSULATION, SLEEVING, ELEC.	1006776-16		5/8 LONG	30
55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
51	INSULATION, SLEEVING, ELEC.	1006776-18		5/8 LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
A/R	SOLDER	SN10WARP2	QQ-S-571		26
4	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-13			25
10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
6	SCREW, CAP, SOC. HD. HEX	1000110-1			21
6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS608C440LL4			20
2	TERMINAL, LUG	MS-25036-48			19
1	CONN, ELECT., RECEP., 32 PINS	1000118-2			18
1	CONN, ELECT, RECEP. 32 PINS	1000118-1			17
2	CLAMP, CABLE	1000220-3			16
4	CLAMP, CABLE	1000220-5			15
6	WASHER, CABLE CLAMP	1000223			14
1	CLAMP, TRANSDUCER	1000256			13
1	BRACKET, TRANSDUCER	1000257			12
1	TRANSDUCER, ABS. PRESSURE	1000272			11
6	WASHER, FLAT, ROUND	1000254			10
1	GUIDE, WIRE, ASS'Y	1000156			9
2	CONNECTOR, ELEC, RECEP 29 CONT	1000116			8
2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221			7
1	PRECISION RESOLVER ALIGN. ASS'Y.	1007004			6
1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 30 CONT	1000038			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16- RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000205-01	DL 1000801
NEXT ASSY	USED ON
APPLICATION	

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NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D.M.WHITE 5-7-62
APPROVED FOR MSC
7/30/63
BY DIRECTION MIT
W. Griffin 29 July 63

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET 1 OF 1

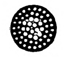
	REV	SHEET
0205	J	1

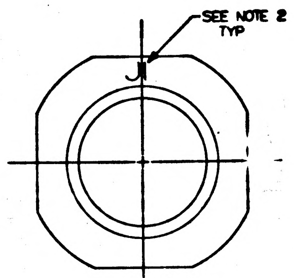
1000205 J

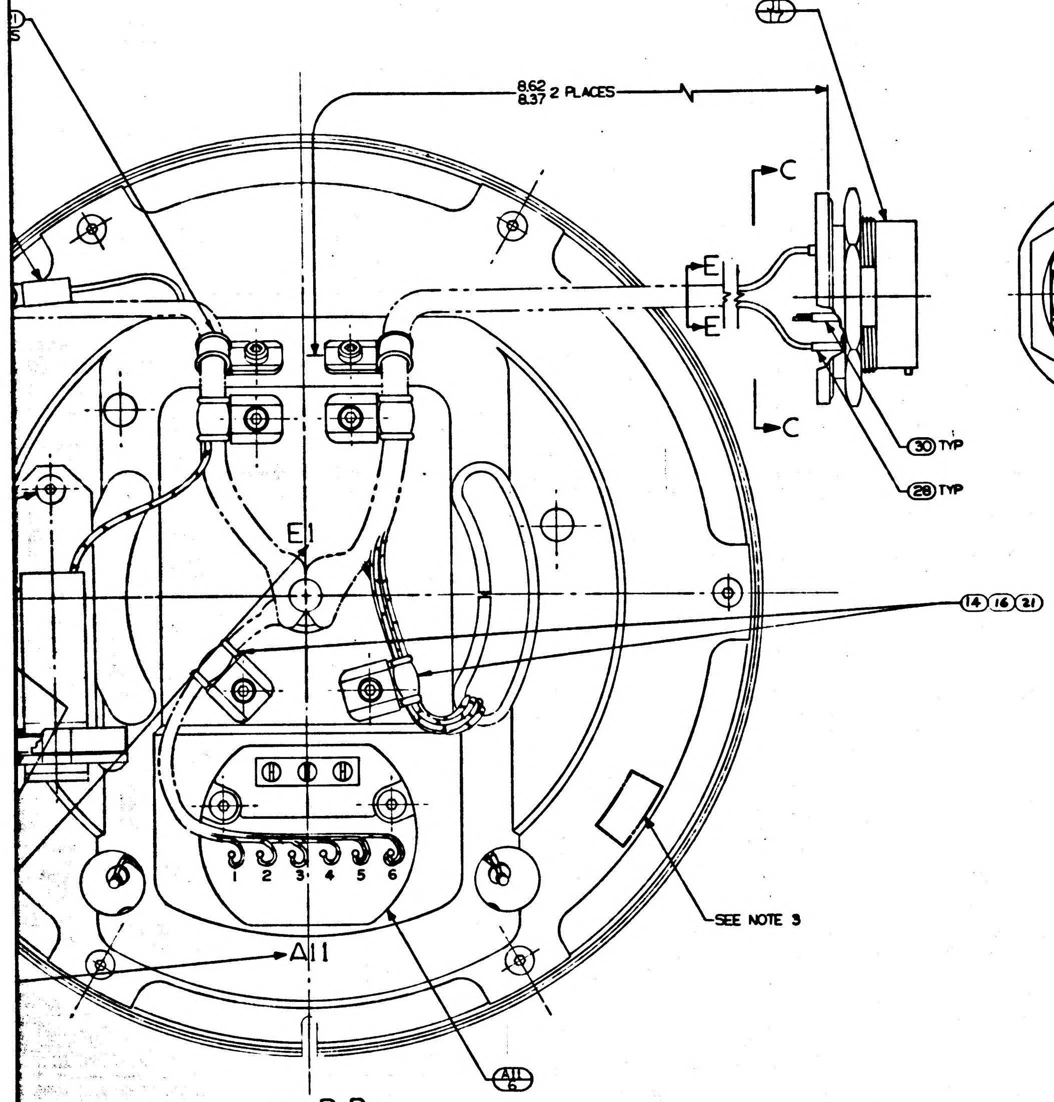
MASTER

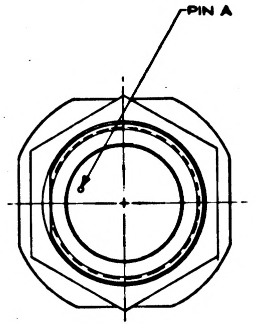
INCHES
PHOTOGRAPHIC SCALE ONLY

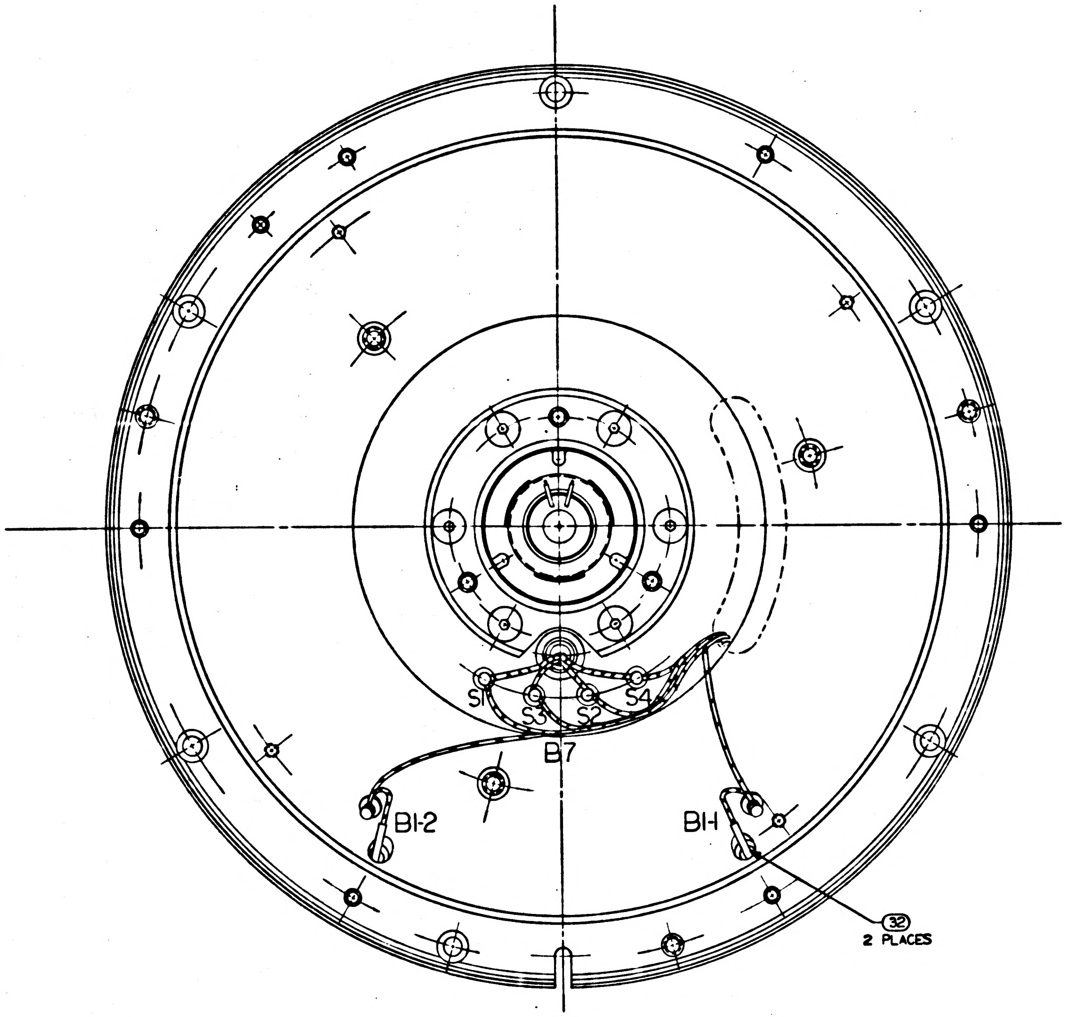
F3


SECTION E-E
2 PLACES

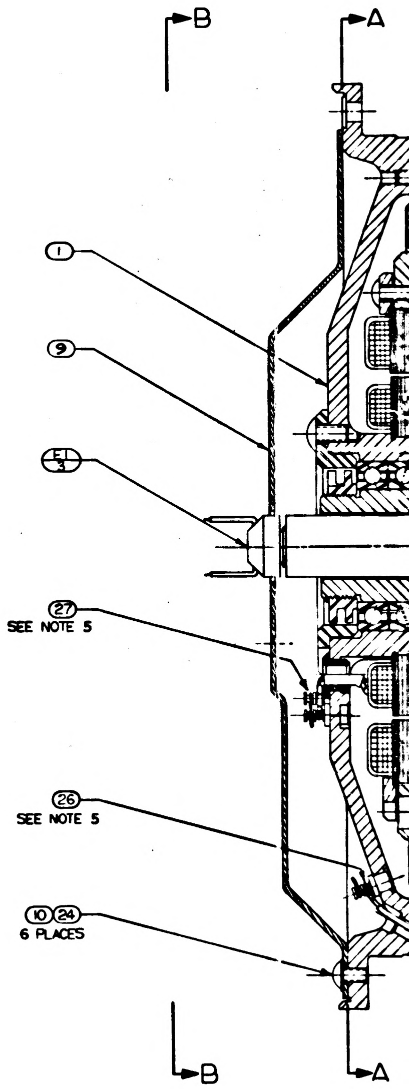

SEE NOTE 2
TYP
J1
VIEW C-C


8.62
8.37 2 PLACES
J1
17
C
C
E
E
30 TYP
28 TYP
E1
14 16 21
1 2 3 4 5 6
SEE NOTE 3
A11
A11
6
VIEW B-B




S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES
VIEW A-A

SECTION G-G
2 PLACES


B
A
1
9
E1
3
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
B
A

1000205	REV J	SHEET 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

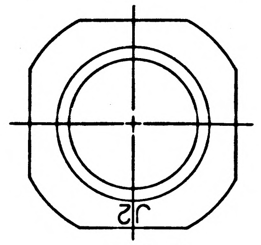
F2

WIRING LEGEND

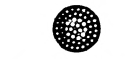
COND NO.	COLOR	FIND NO	FROM	TO	SEE NOTE 6
69-1	RED	35	P26-A	P27-A	8
69-2	BRN	38	P26-B	P27-B	
70	WHT/BRN/RED		P26-D	E1-28	
71-1	WHT/RED/GY		P26-H	E1-40	8
71-2	WHT/RED/VIO		P26-K	E1-39	
72	VIO	39	P26-K	P27-H	
73	GY	40	P26-J	P27-E	

WIRING LEGEND

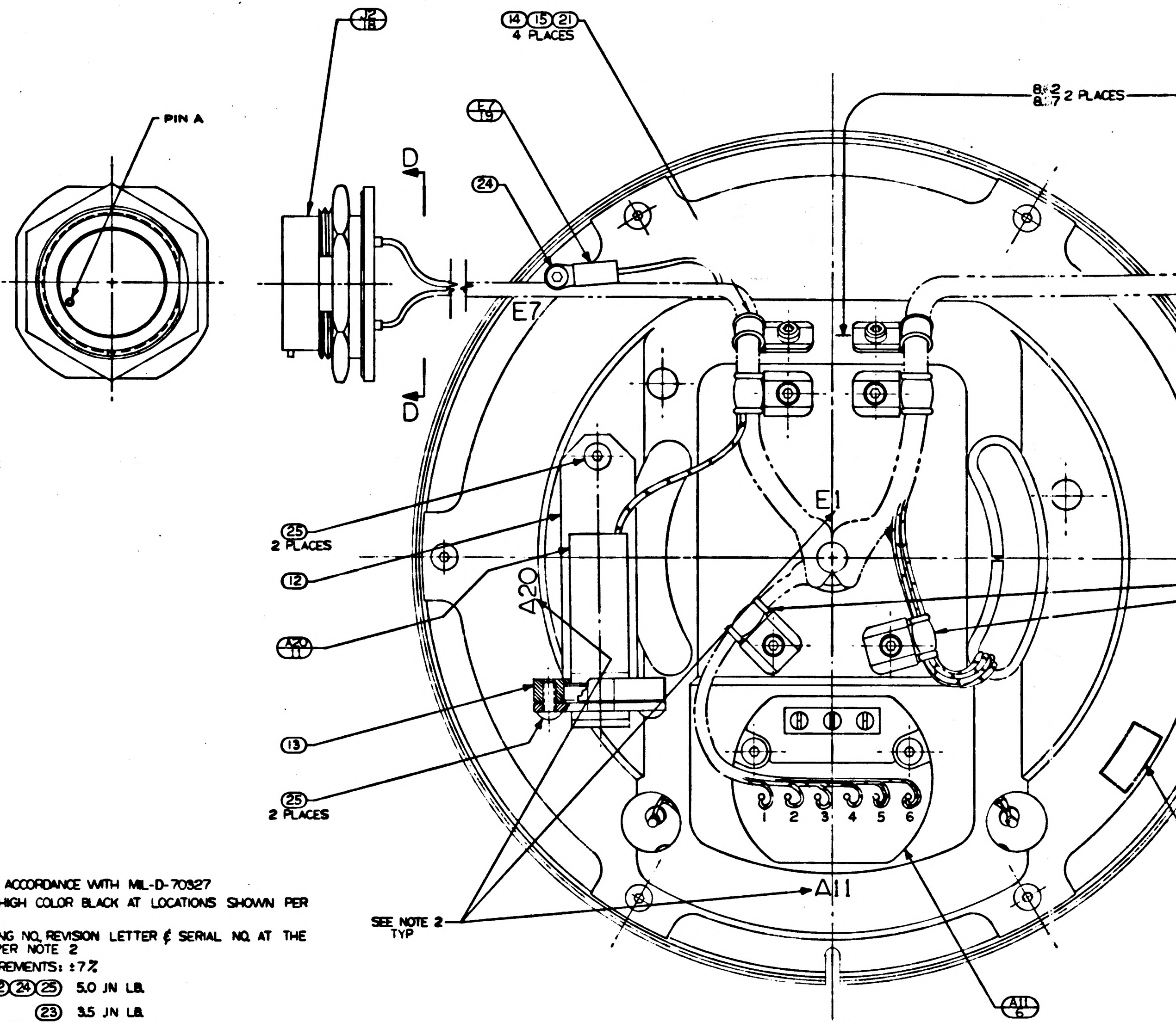
COND NO.	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/VIO		J1-e	E1-18	
2-1	WHT/GRN		J1-f	E1-16	8
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	8
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	8
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	8
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	8
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	8
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	8
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	8
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	8
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	8
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	8
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	8
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	8
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	8
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	8
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	8
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20-GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-Y	E1-29	8
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	8
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	8
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	8
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	8
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	8
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	8
33-2	WHT/BRN/GRN		J2-P	E1-31	
34	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	8
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	8
36-2	WHT/BRN/GY		E1-34	A11-2	
37-1	WHT/ORN/GY		E1-45	A11-5	8
37-2	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39-1	WHT/BRN/VIO		P5-U	E1-33	8
39-2	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	8
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	8
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	8
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	8
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	8
44-2	WHT/ORN/BLU		P5-W	E1-43	
45	WHT/BRN/BLU		P5-T	E1-32	
46-1	WHT/BRN/GRN		P5-M	E1-31	8
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	8
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	8
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	8
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	8
51	WHT/BLK/GY		P5-F	E1-27	
52	WHT/BRN/ORN		P5-A	E1-29	
53	RED	35	P5-C	P26-E	
54-1	BLU		P6-R	E1-7	8
54-2	VIO		P6-S	E1-8	
55	WHT/VIO		P6-T	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	38	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	8
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	8
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	8
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	8
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	8
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	8
63-2	RED	36	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	8
64-2	WHT/RED		E1-13	B7-P3	
65-1	WHT/ORN/GY		E1-45	B7-P2	8
65-2	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	8
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	8
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	8
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



VIEW D-D



SECTION E-E
2 PLACES



VIEW B-B

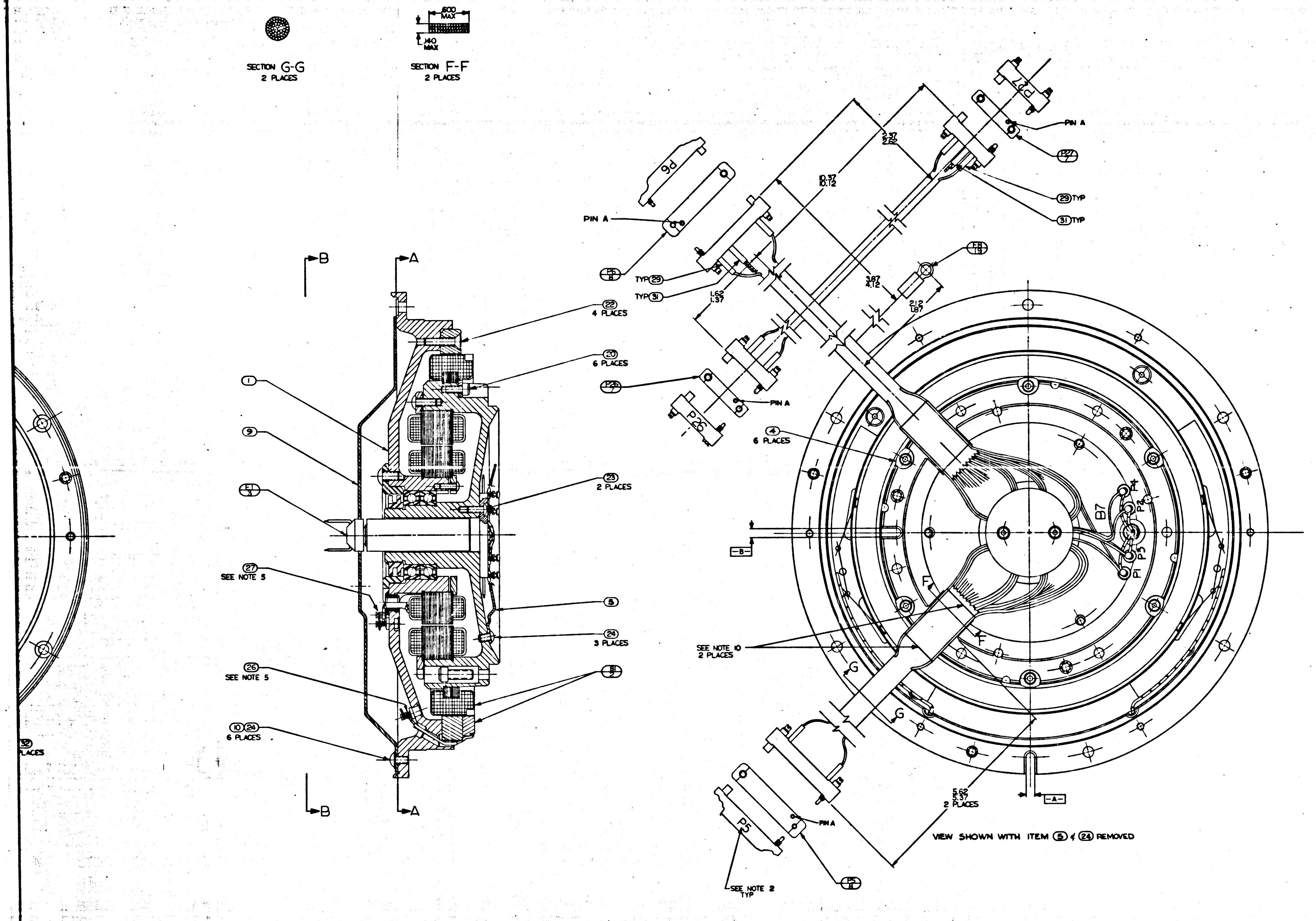
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{10}{14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER NO 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%
   ⑳㉑㉒㉔㉕ 5.0 IN LB.
   ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED

	REV	SHEET
1000205	J	1

INCHES
PHOTOGRAPHIC SCALE ONLY

E-1

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02113	7-24/63		
K	TDRR 03183	5-13-63		



SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
B
A
1
9
5
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
22
4 PLACES
20
6 PLACES
23
2 PLACES
5
24
3 PLACES
32
PLACES
P6
PIN A
P6 8
TYP 29
TYP 31
P27
PIN A
29 TYP
31 TYP
2.37
2.62
10.37
10.12
1.62
1.37
3.87
4.12
2.12
1.87
P8
P26
P26
PIN A
4
6 PLACES
B7
P4
P2
P3
P1
F
G
-B-
-A-
SEE NOTE 10
2 PLACES
5.62
5.37
2 PLACES
P5
PIN A
P5 8
SEE NOTE 2
TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED
D
C
B
A

REPLACES REV H WITH CHANGES

A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	41
1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60" TOTAL LG	40
1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	60" TOTAL LG	39
1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60" TOTAL LG	38
1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14 TOTAL LG	37
1	WIRE, ELEC. TYPE E-28 YEL		MIL-W-16878	14 TOTAL LG	36
1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	4" TOTAL LG	35
1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
2	INSULATION, SLEEVING, ELEC.	1006776-15		3/4 LONG	32
6	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LONG	31
3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
A/R	SOLDER	SN10WARP2	QQ-S-571		26
4	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-13			25
10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
6	SCREW, CAP, SOC. HD. HEX	1000110-1			21
6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS1352C04L4			20
2	TERMINAL, LUG	MS-25036-46			19
1	CONN, ELECT., RECEP., 32 PINS	1000118-2		SEE NOTE	18
1	CONN, ELECT, RECEP. 32 PINS	1000118-1		SEE NOTE	17
2	CLAMP, CABLE	1000220-3			16
4	CLAMP, CABLE	1000220-5			15
6	WASHER, CABLE CLAMP	1000223			14
1	CLAMP, TRANSDUCER	1000256			13
1	BRACKET, TRANSDUCER	1000257			12
1	TRANSDUCER, ABS. PRESSURE	1000272			11
6	WASHER, FLAT, ROUND	1000254			10
1	GUIDE, WIRE, ASS'Y	1000156			9
2	CONNECTOR, ELEC, RECEP 29 CONT.	1000116			8
2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221			7
1	PRECISION RESOLVER ALIGN. ASS'Y.	1007004			6
1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16x RSVR ASSY OUTER AXIS	1000161			1
QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL 1000801
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DRAWN D.M. WHITE 12-7-62
APPROVED FOR MSC 7/31/63
OF DIRECTION MIT

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

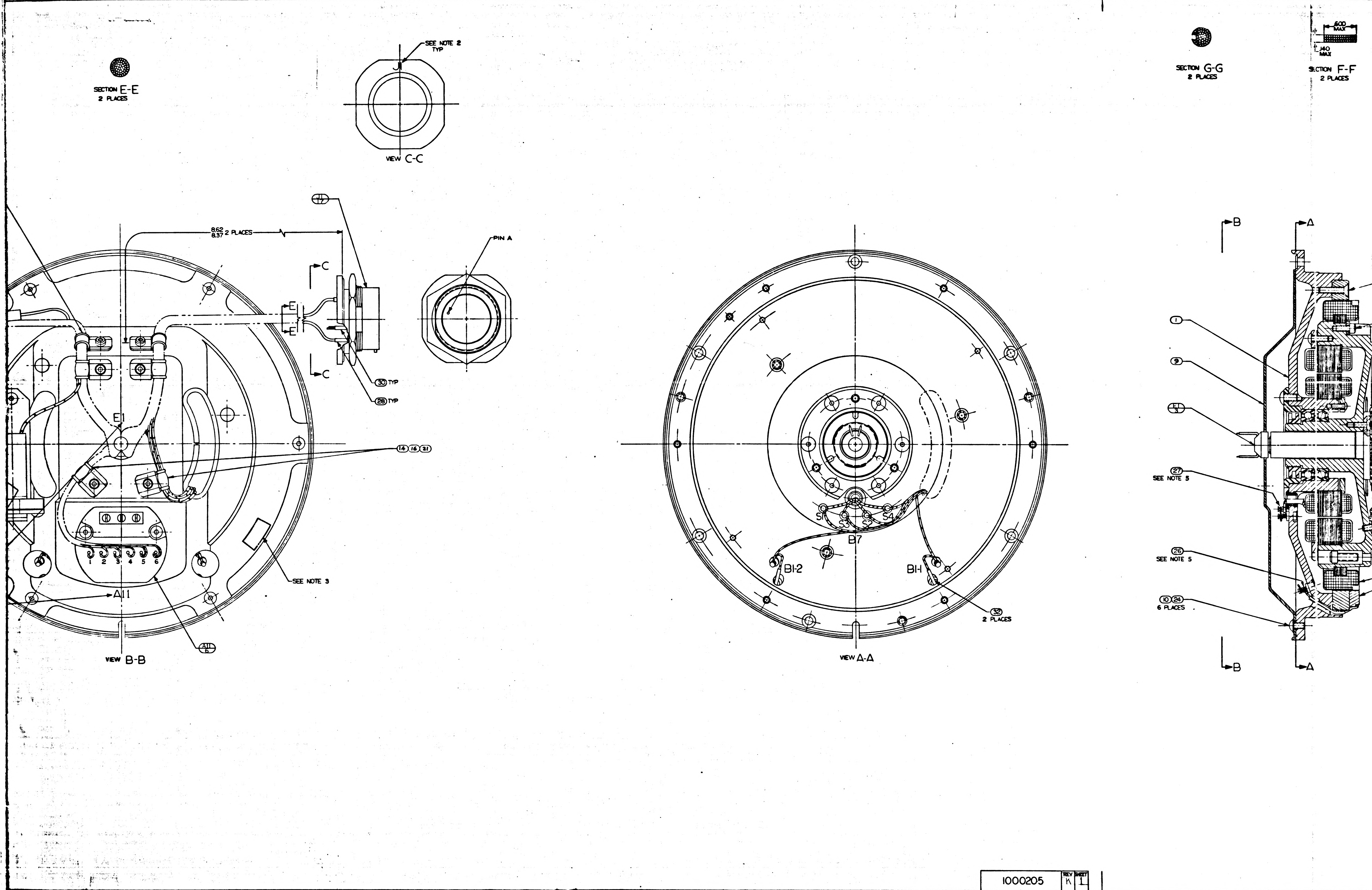
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET 1

	REV	SHEET
1000205	K	1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F3


8
7
6
5
4
SECTION E-E
2 PLACES
SEE NOTE 2
TYP
J1
VIEW C-C
SECTION G-G
2 PLACES
.600
MAX
.140
MAX
SECTION F-F
2 PLACES
8.62
8.37 2 PLACES
47
C
C
E
E
30 TYP
28 TYP
PIN A
E1
14 16 21
1 2 3 4 5 6
SEE NOTE 3
A11
A11
6
VIEW B-B
S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES
VIEW A-A
B
A
1
9
E1
3
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
B
A

1000205 REV K SHEET 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

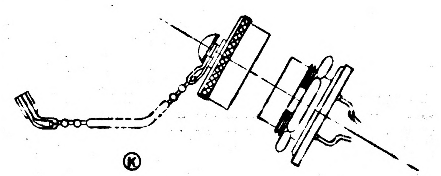
F-2

WIRING LEGEND

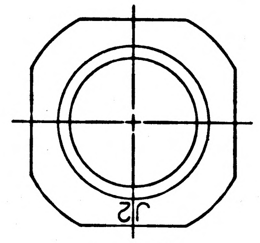
COND NO.	COLOR	FIND NO	FROM	TO	SEE NOTE 6
69-1	RED	35	P26-A	P27-A	8
69-2	BRN	38	P26-B	P27-B	
70	WHT/BRN/RED		P26-D	E1-28	
71-1	WHT/RED/GY		P26-H	E1-40	8
71-2	WHT/RED/VIO		P26-K	E1-39	
72	VIO	39	P26-K	P27-H	
73	GY	40	P26-J	P27-E	

WIRING LEGEND

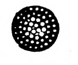
COND NO.	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/VIO		J1-Z	E1-18	
2-1	WHT/GRN		J1-f	E1-16	8
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	8
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	8
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	8
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	8
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	8
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	8
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	8
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	8
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	8
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	8
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	8
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	8
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	8
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	8
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	8
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20-GRN	
19	RED		J2-a	A20-RED	
20	BLK		J2-d	A20-BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-Y	E1-29	8
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	8
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	8
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	8
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	8
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	8
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	8
33-2	WHT/BRN/GRN		J2-P	E1-31	
34	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	8
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	8
36-2	WHT/BRN/GY		E1-34	A11-2	
37-1	WHT/ORN/GY		E1-45	A11-5	8
37-2	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39-1	WHT/BRN/VIO		P5-U	E1-33	8
39-2	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	8
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-c	E1-35	8
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	8
42-2	WHT/RED/GRN		P5-a	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	8
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	8
44-2	WHT/ORN/BLU		P5-W	E1-43	
45	WHT/BRN/BLU		P5-T	E1-32	
46-1	WHT/BRN/GRN		P5-M	E1-31	8
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	8
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	8
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	8
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	8
51	WHT/BLK/GY		P5-F	E1-27	
52	WHT/BRN/ORN		P5-A	E1-29	
53	RED	35	P5-C	P26-E	
54-1	BLU		P6-R	E1-7	8
54-2	VIO		P6-S	E1-8	
55	WHT/VIO		P6-T	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	38	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	8
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	8
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	8
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	8
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	8
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	8
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	8
64-2	WHT/RED		E1-13	B7-P3	
65-1	WHT/ORN/GY		E1-45	B7-P2	8
65-2	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	8
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	8
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	8
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



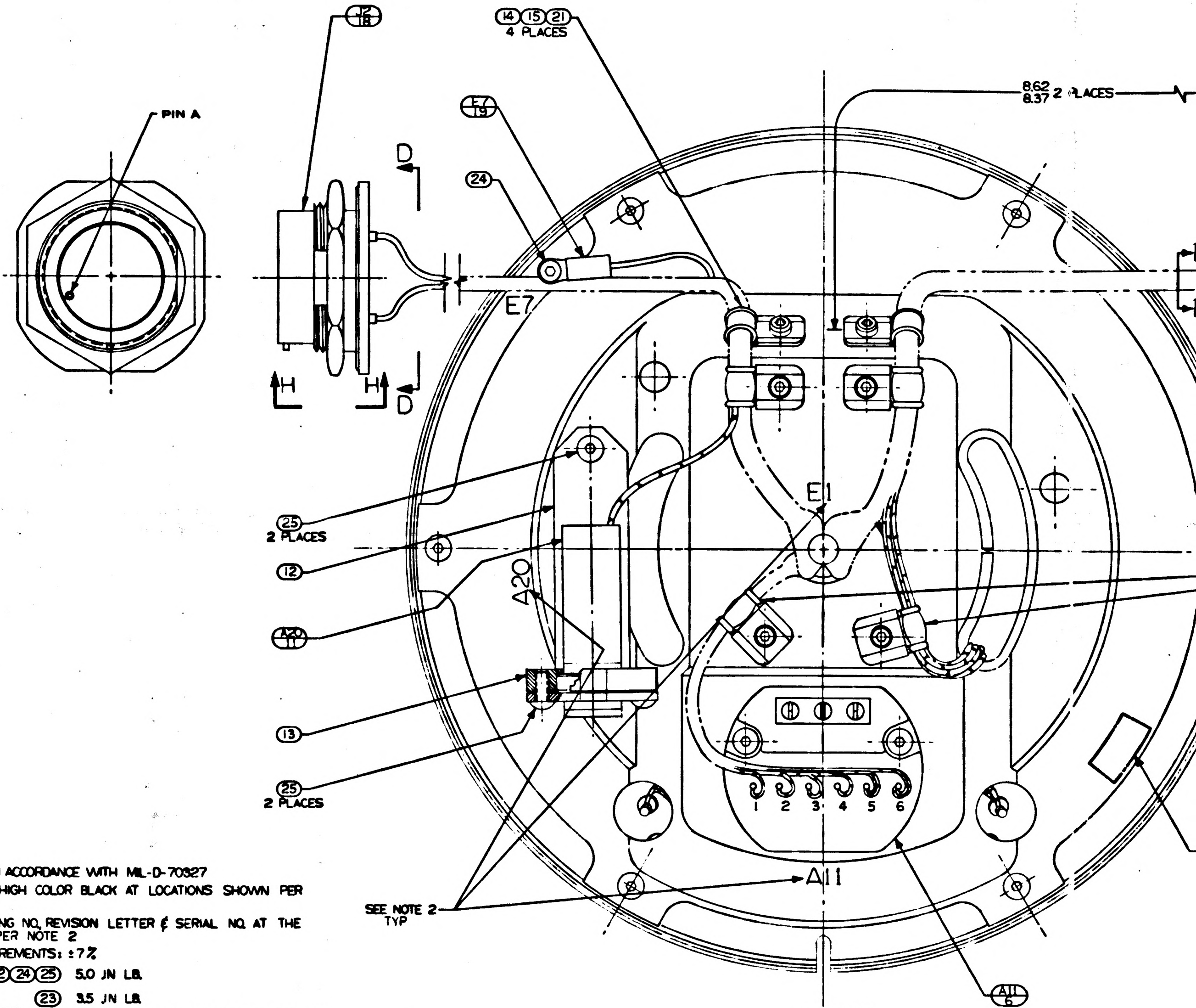
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW D-D



SECTION E-E
2 PLACES



VIEW B-B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%

   ⑳㉑㉒㉔㉕ 5.0 IN LB

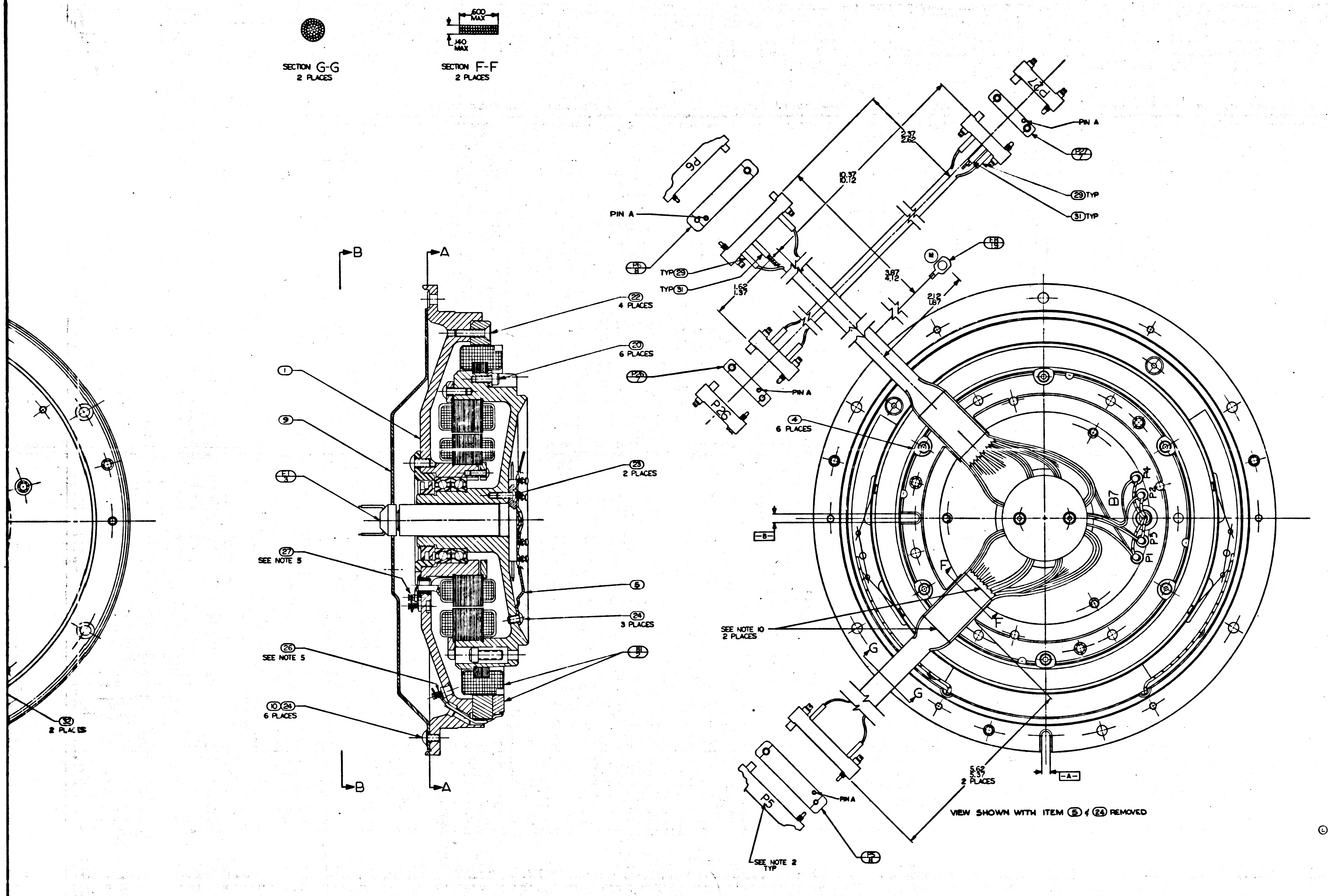
   ㉓ 3.5 IN LB
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧, OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
11. Ⓚ PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

1000205	REV	SHEET
	K	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F-1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
J	REPLACES REV H WITH CHANGES TDRR 02110	7/24/63	
K	TDRR 03183	9-13-63	
L	TDRR 04558	11-12-63	
M	TDRR 05172	11-19-63	


SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
B
A
1
9
E1
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
32
2 PLACES
22
4 PLACES
20
6 PLACES
23
2 PLACES
5
24
3 PLACES
B1
PIN A
P6
TYP 29
TYP 31
10.37
10.12
2.37
2.25
3.87
4.12
1.62
1.37
2.12
1.87
P27
29 TYP
31 TYP
M
E8
P26
P2
4
6 PLACES
B7
P4
P3
P1
F
G
-B-
-A-
SEE NOTE 10
2 PLACES
5.62
5.37
2 PLACES
P5
SEE NOTE 2
TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
M	A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE 1 CLASS 2	41
	1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60" TOTAL LG	40
	1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	60" TOTAL LG	39
	1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60" TOTAL LG	38
	1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14 TOTAL LG	37
	1	WIRE, ELEC. TYPE E-28 YEL		MIL-W-16878	14 TOTAL LG	36
	1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	14" TOTAL LG	35
	1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
	1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
	2	INSULATION, SLEEVING, ELEC.	1006776-15		3/4 LONG	32
	6	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LONG	31
	3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
	55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
	51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	A/R	SOLDER	SN10WARP2	QQ-S-571		26
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
	10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
	2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
	4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
	6	SCREW, CAP, SOC. HD. HEX	1000110-1			21
K	6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS:35200-4L14			20
	2	TERMINAL, LUG	[illegible]			19
L	1	CONN, ELECT., RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
K	1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
	2	CLAMP, CABLE	1000220-3			16
	4	CLAMP, CABLE	1000220-5			15
	6	WASHER, CABLE CLAMP	1000223			14
	1	CLAMP, TRANSDUCER	1000256			13
	1	BRACKET, TRANSDUCER	1000257			12
	1	TRANSDUCER, ABS. PRESSURE	1000272			11
	6	WASHER, FLAT, ROUND	1000254			10
	1	GUIDE, WIRE, ASS'Y	1000156			9
	2	CONNECTOR, ELEC, RECEP. 29 CONT.	1000116			8
	2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221			7
	1	PRECISION RESOLVER ALIGN. ASS'Y.	1007004			6
	1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
	6	CLAMP, TORQUE MOTOR	1000087			4
	1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
	1	16- RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DRAWN D.M.WHITE
APPROVED FOR MSC W. J. Kline
BY [illegible] 8 NOV 63

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

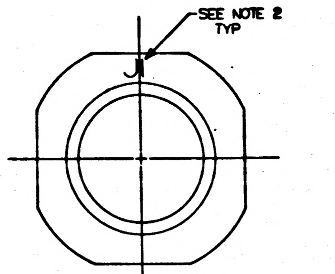
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205

1000205 M

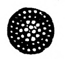
1000205 REV M SHEET L

MASTER

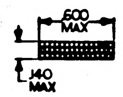
INCHES
PHOTOGRAPHIC SCALE ONLY


SEE NOTE 2
TYP
J

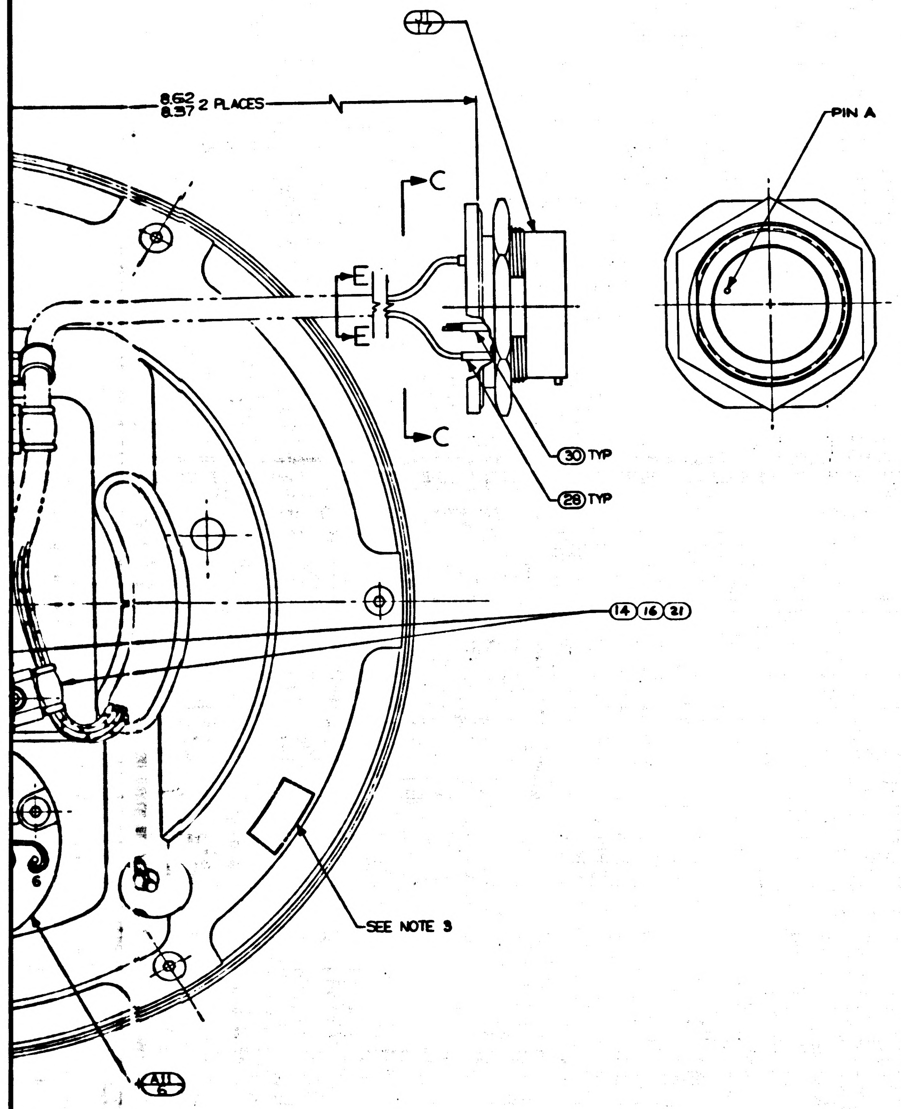
VIEW C-C

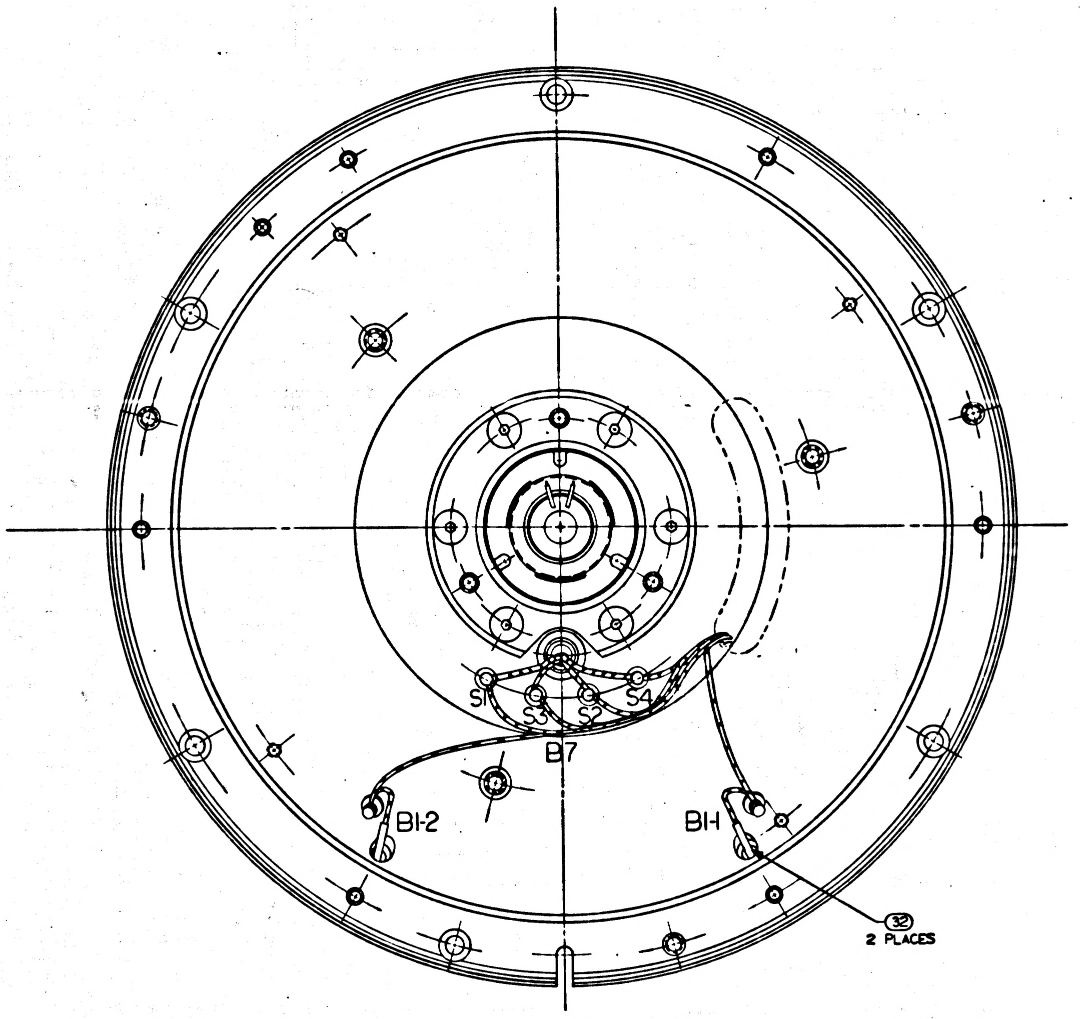


SECTION G-G
2 PLACES

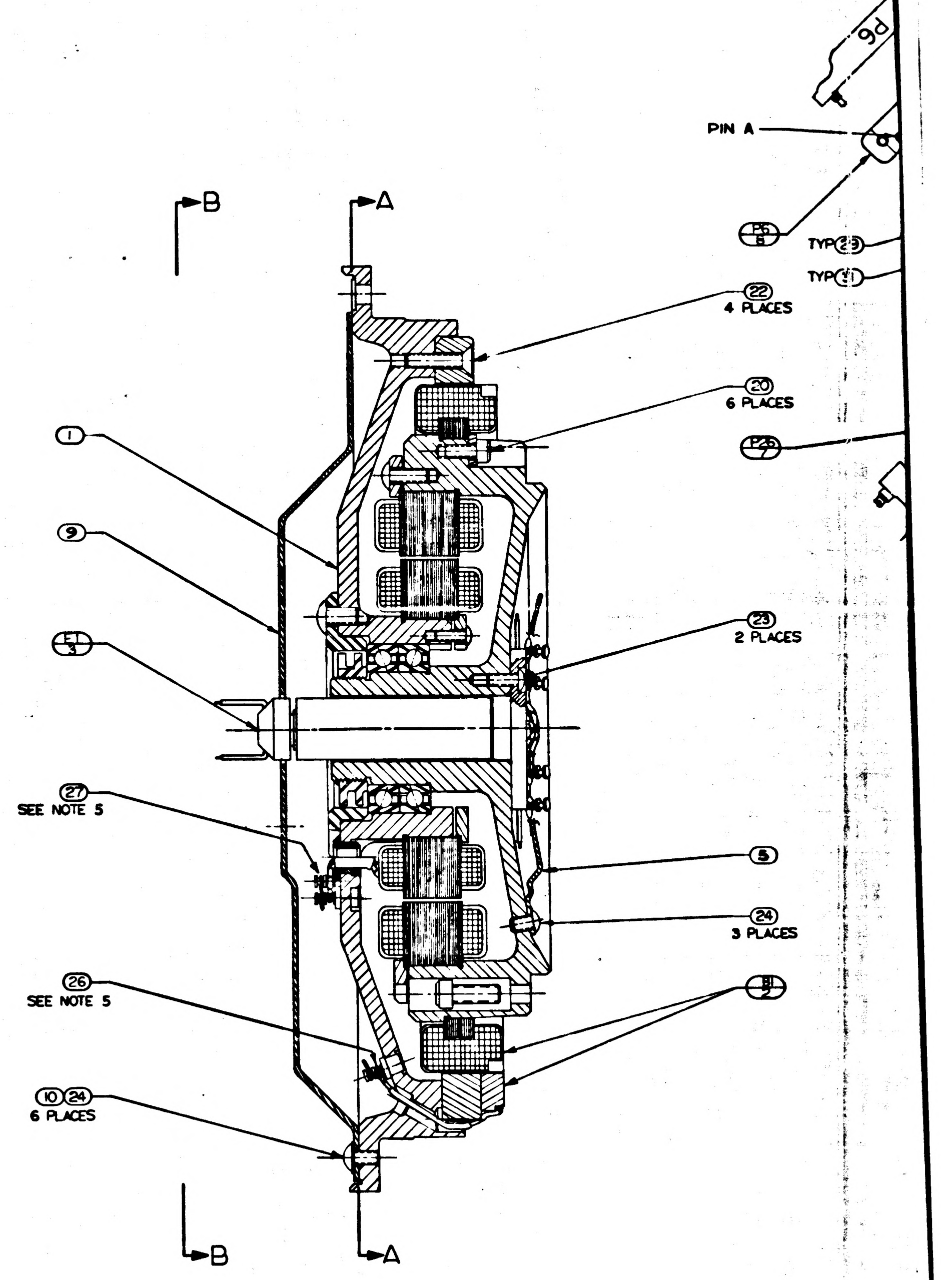

.600
MAX
.140
MAX

SECTION F-F
2 PLACES


J1
17
8.62
8.37 2 PLACES
C
C
E
E
PIN A
30 TYP
28 TYP
14 16 21
6
SEE NOTE 3
A11
6


S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


P6
PIN A
P6
8
TYP 29
TYP 31
B
A
22
4 PLACES
20
6 PLACES
P26
7
1
9
E1
3
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
B1
2
10 24
6 PLACES
B
A

1000205	REV	SHEET
	M	1

INCHES
0 1
PHOTOGRAPHIC SCALE ONLY

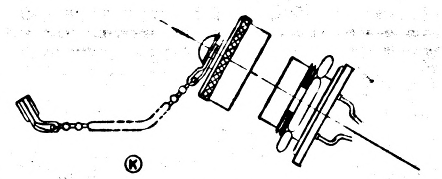
F-2

WIRING LEGEND

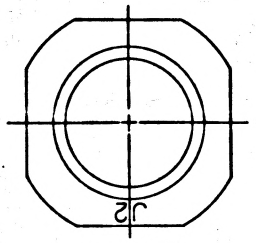
COND NO.	COLOR	FIND NO	FROM	TO	SEE NOTE 6
69-1	RED	35	P26-A	P27-A	8
69-2	BRN	38	P26-B	P27-B	
70	WHT/BRN/RED		P26-D	E1-28	
71-1	WHT/RED/GY		P26-H	E1-40	8
71-2	WHT/RED/VIO		P26-K	E1-39	
72	VIO	39	P26-K	P27-H	
73	GY	40	P26-J	P27-E	

WIRING LEGEND

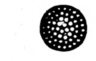
COND NO.	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/VIO		J1-c	E1-18	
2-1	WHT/GRN		J1-f	E1-16	8
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	8
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	8
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	8
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	8
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	8
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	8
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	8
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	8
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	8
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	8
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	8
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	8
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	8
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	8
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	8
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20-GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20-BLK	
21	WHT		J2-e	A20-WHT	
Ⓜ 22-1	WHT/BRN/ORN		J2-V	E1-29	8
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	8
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	8
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	8
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	8
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	8
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	8
33-2	WHT/BRN/GRN		J2-P	E1-31	
34	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	8
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	8
36-2	WHT/BRN/GY		E1-34	A11-2	
37-1	WHT/ORN/GY		E1-45	A11-5	8
37-2	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39-1	WHT/BRN/VIO		P5-U	E1-33	8
39-2	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	8
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	8
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	8
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	8
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	8
44-2	WHT/ORN/BLU		P5-W	E1-43	
45	WHT/BRN/BLU		P5-T	E1-32	
46-1	WHT/BRN/GRN		P5-M	E1-31	8
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	8
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	8
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	8
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	8
51	WHT/BLK/GY		P5-F	E1-27	
52	WHT/BRN/ORN		P5-A	E1-29	
53	RED	35	P5-C	P26-E	
54-1	BLU		P6-R	E1-7	8
54-2	VIO		P6-S	E1-8	
55	WHT/VIO		P6-T	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	8
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	8
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	8
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	8
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	8
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	8
63-2	RED	36	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	8
64-2	WHT/RED		E1-13	B7-P3	
65-1	WHT/ORN/GY		E1-45	B7-P2	8
65-2	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	8
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	8
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	8
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



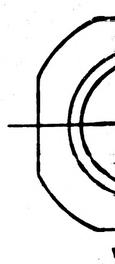
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1

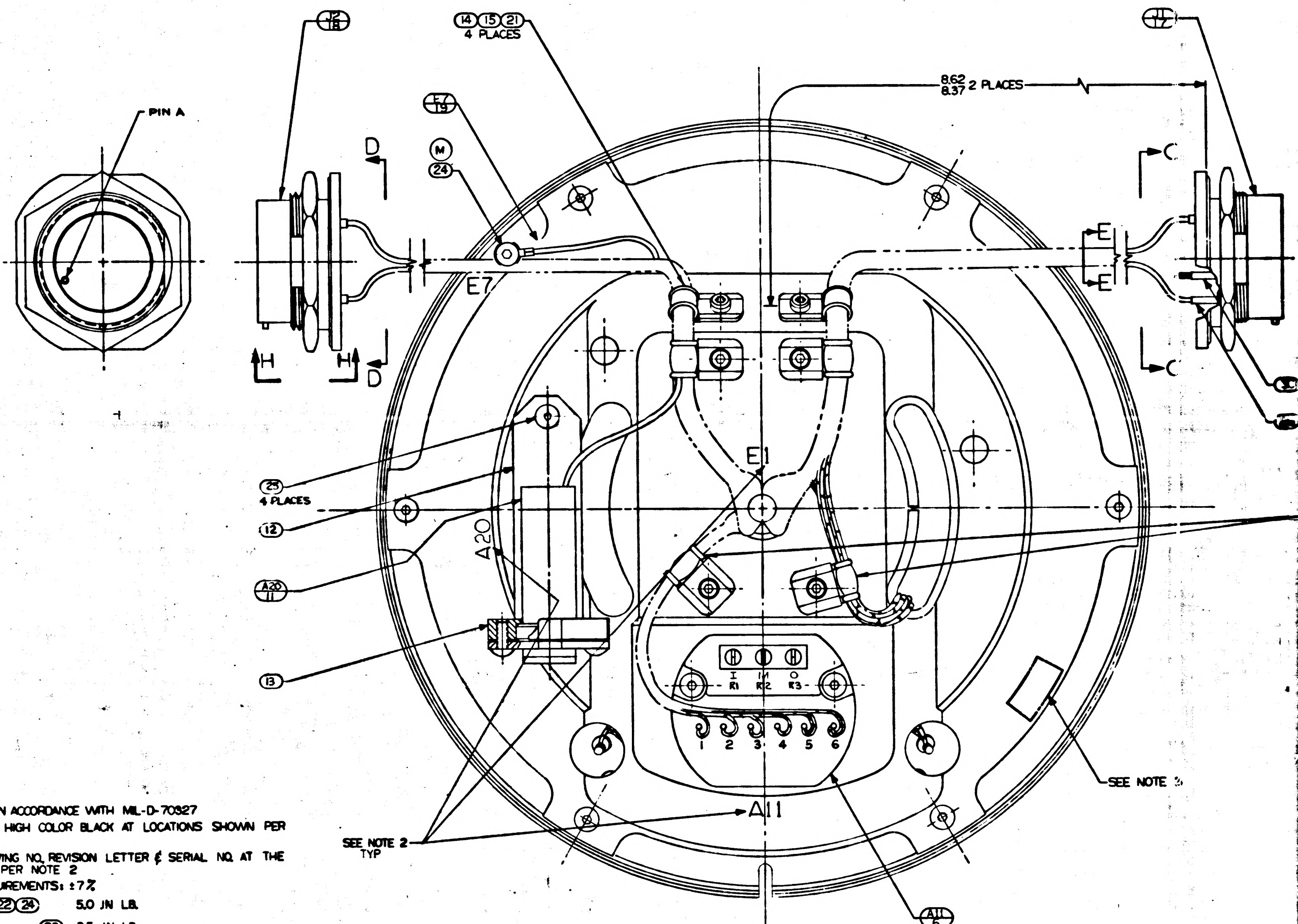


VIEW D-D



SECTION E-E
2 PLACES





VIEW B-B

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%

⑳㉑㉒㉔ 5.0 IN LB.

㉓ 3.5 IN LB.

5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~

7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED

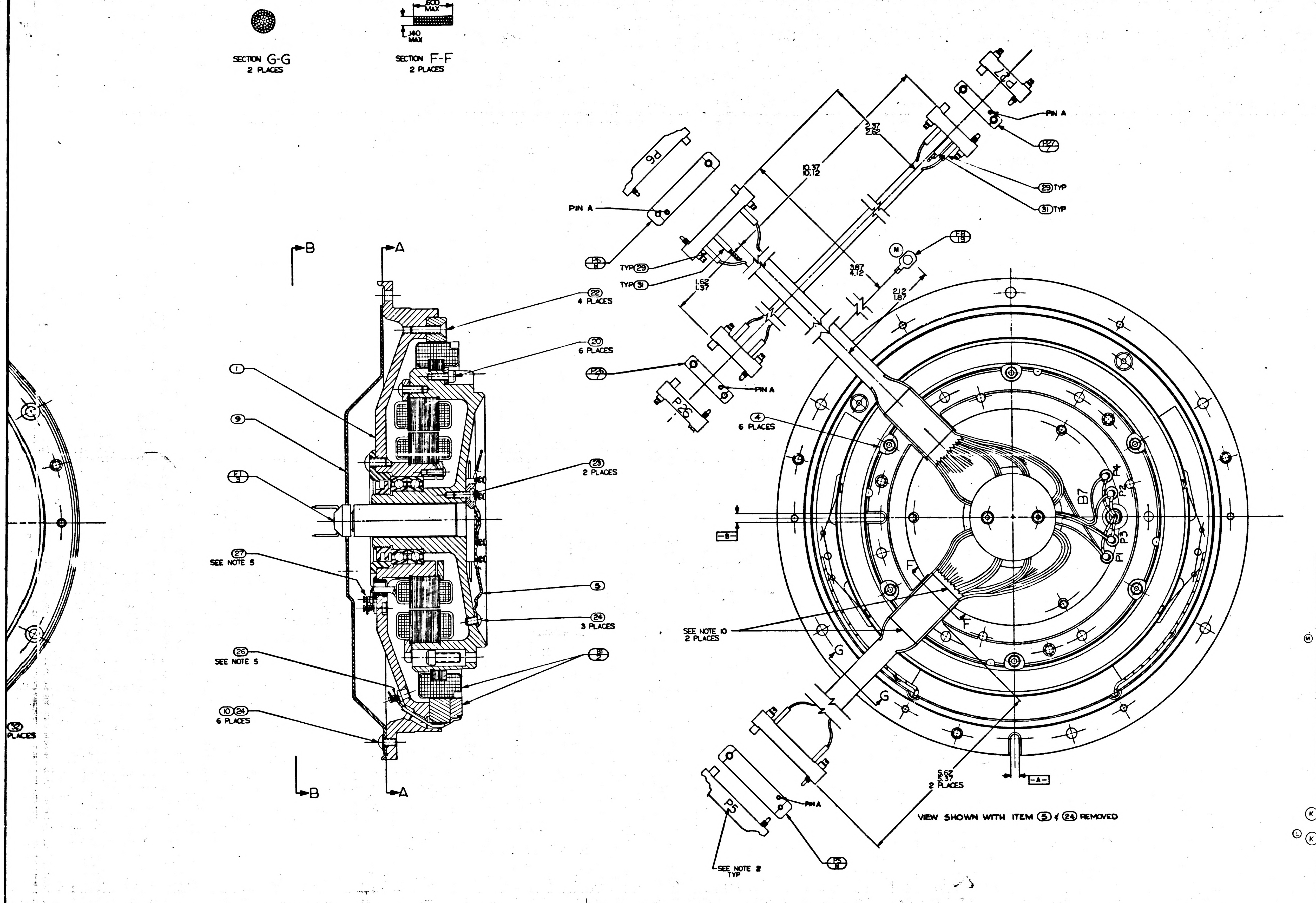
Ⓚ 11. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH MINIMUM

NO. OF LEADS	NO. OF TURNS
2	4
3	3

	REV	SHEET
1000205	M	1

SYM	DESCRIPTION	DATE	APPROVAL	
REVISIONS				
J	REPLACES REV H WITH CHANGES TDRR 02110	7/24/63		
K	TDRR 03183	9-13-63		
L	TDRR 04558	11-12-63		
M	TDRR 05172	11-19-63		
N	TDRR 06237	3 Feb 64		
P	TDRR 06236	6 Feb 64		



SECTION G-G
2 PLACES
SECTION F-F
2 PLACES
.600 MAX
.140 MAX
B
A
PIN A
P6
P6 8
TYP 29
TYP 31
P27 7
29 TYP
31 TYP
P28 7
P26
PIN A
10.37
10.12
2.37
2.62
3.87
4.12
1.62
1.37
2.12
1.87
M
FB 19
22
4 PLACES
20
6 PLACES
1
9
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
10 24
6 PLACES
32
PLACES
4
6 PLACES
B7
P4
P2
P3
P1
F
F
G
G
B
A
SEE NOTE 10
2 PLACES
5.62
5.37
2 PLACES
P5
PIN A
P5 8
SEE NOTE 2
TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED

	QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
M	A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	41
	1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60" TOTAL LG	40
	1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	60" TOTAL LG	39
	1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60" TOTAL LG	38
	1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14 TOTAL LG	37
	1	WIRE, ELEC. TYPE E-28 YEL		MIL-W-16878	14 TOTAL LG	36
	1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	14" TOTAL LG	35
	1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
	1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
	2	INSULATION, SLEEVING, ELEC.	1006776-15		3/4 LONG	32
	6	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LONG	31
	3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
	55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
	51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
	A/R	SOLDER	SN60WRAP2	QQ-S-571		27
	A/R	SOLDER	SN10WRAP2	QQ-S-571		26
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
	10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
	2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
	4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
	6	SCREW, CAP, SOC. HD. HEX	1000110-1			21
K	6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS1352C04LL4			20
	2	TERMINAL, LUG	1010717-1			19
L	1	CONN, ELECT., RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
K	1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
	2	CLAMP, CABLE	1000220-3			16
	4	CLAMP, CABLE	1000220-5			15
	6	WASHER, CABLE CLAMP	1000223			14
	1	CLAMP, TRANSDUCER	1000256			13
	1	BRACKET, TRANSDUCER	1000257			12
	1	TRANSDUCER, ABS. PRESSURE	1000272			11
	6	WASHER, FLAT, ROUND	1000254			10
	1	GUIDE, WIRE, ASS'Y	1000156			9
	2	CONNECTOR, ELEC, RECEP 29 CONT.	1000116			8
P	2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221			7
	1	PRECISION RESOLVER ALIGN. ASS'Y.	1007004			6
	1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
	6	CLAMP, TORQUE MOTOR	1000087			4
	1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
	1	16x RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN DIMMITE
APPROVED FOR MSC
W.J. Rhine
BY DIRECTION

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET 1 OF 1

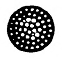
1000205 REV P SHEET 1

1000205 P

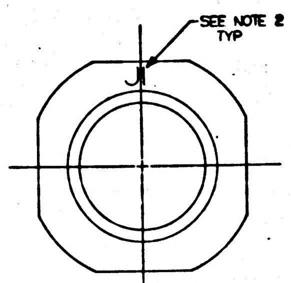
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

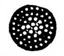
F3



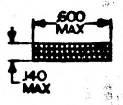
SECTION E-E
2 PLACES


SEE NOTE 2
TYP

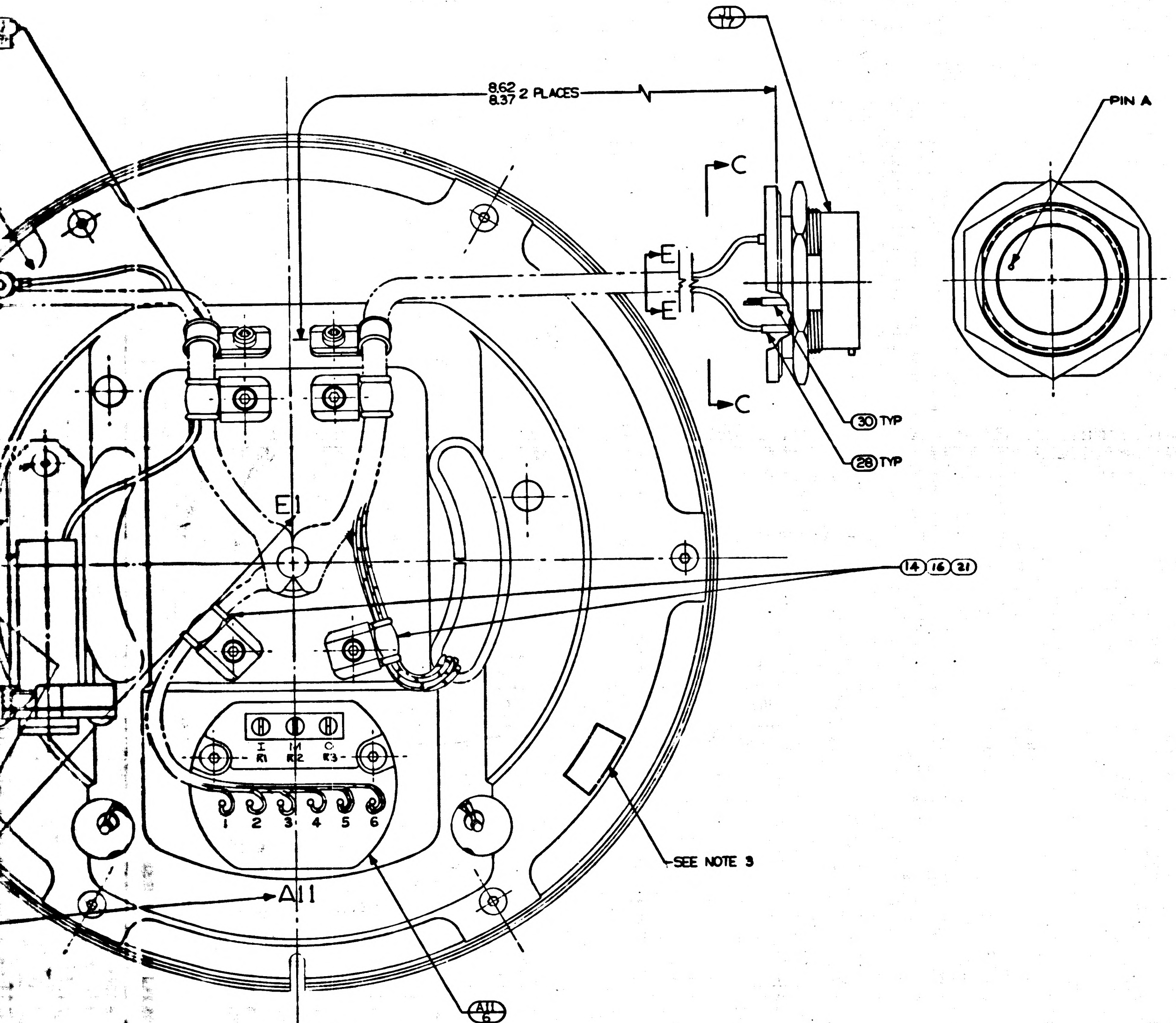
VIEW C-C



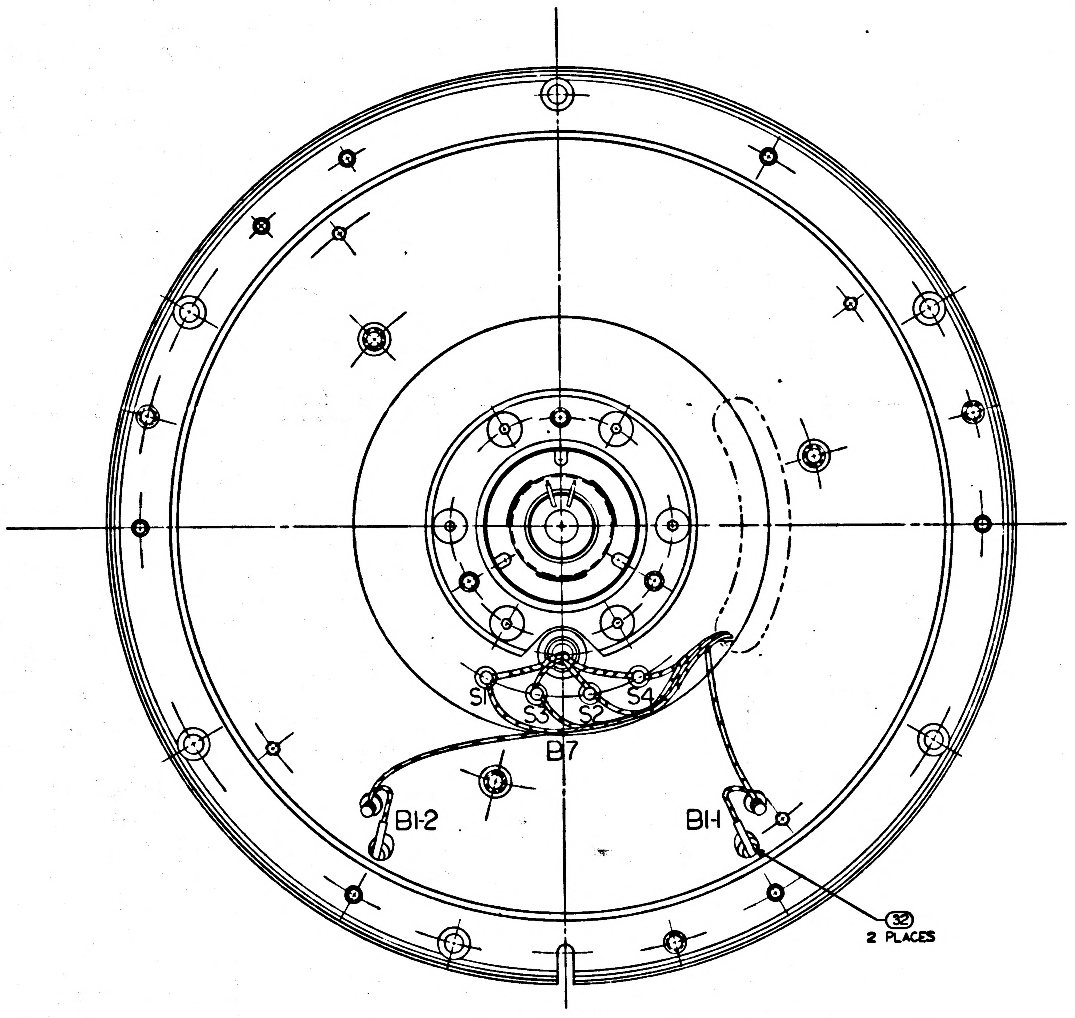
SECTION G-G
2 PLACES


.600
MAX
.140
MAX

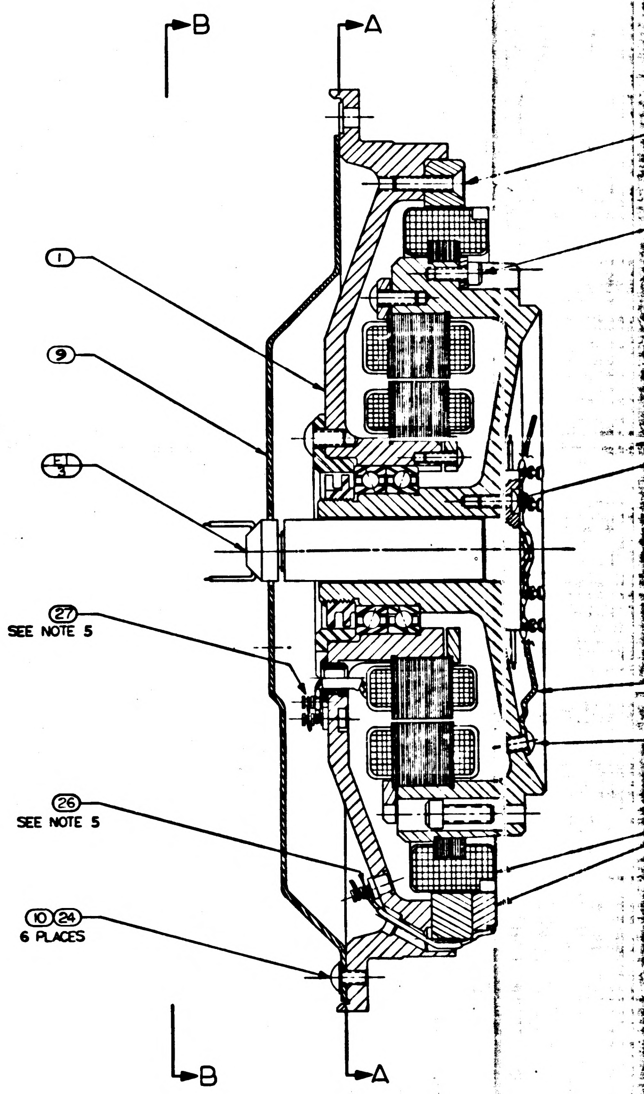
SECTION F-F
2 PLACES


8.62
8.37 2 PLACES
17
C
C
E
E
30 TYP
28 TYP
PIN A
E1
14 16 21
R1
R2
R3
1 2 3 4 5 6
SEE NOTE 3
A11
A11
6

VIEW B-B


S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


B
A
1
9
E1
3
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
B
A

TWISTING TO [illegible] THE FOLLOWING
NO. OF TURNS PER [illegible]

[illegible] TYPE	NO OF FULL TURNS MIN	NO OF FULL TURNS MAX
2 [illegible]	2	4
4 [illegible]		3

1000205	REV F	SHEET 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

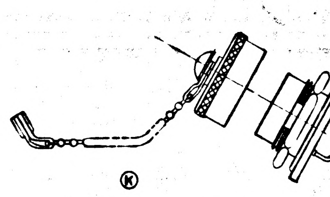
F-2

WIRING LEGEND

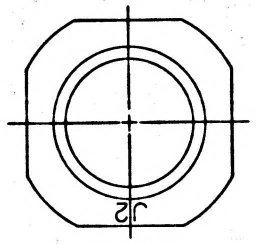
COND NO.	COLOR	FIND NO	FROM	TO	SEE CHART 6
69-1	RED	35	P26-A	P27-A	8
69-2	BRN	38	P26-B	P27-B	
70	WHT/BRN/RED		P26-D	E1-28	
71-1	WHT/RED/GY		P26-H	E1-40	8
71-2	WHT/RED/VIO		P26-K	E1-39	
72	VIO	39	P26-K	P27-H	
73	GY	40	P26-J	P27-E	

WIRING LEGEND

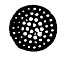
COND NO.	COLOR	FIND NO	FROM	TO	SEE CHART 6
1	WHT/VIO		J1-Z	E1-18	
2-1	WHT/GRN		J1-f	E1-16	8
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	8
3-2	WHT/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	8
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	8
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	8
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	8
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	8
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-S3	8
9-2	RED	35	J1-D	B7-S1	
10-1	YEL	36	J1-E	B7-S2	8
10-2	BLU	37	J1-F	B7-S4	
11-1	WHT/ORN/YEL		J1-G	E1-41	8
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	8
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	8
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	8
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	8
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	8
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	8
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20-GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20-BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-V	E1-29	8
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	8
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	8
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	8
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-[illegible]	E-7	
28-1	BLK	33	J2-H	B1-1	8
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	8
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	8
33-2	WHT/BRN/GRN		J2-P	E1-31	
34	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	8
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	8
36-2	WHT/BRN/GY		E1-34	A11-2	
37-1	WHT/ORN/GY		E1-45	A11-5	8
37-2	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39-1	WHT/BRN/VIO		P5-U	E1-33	8
39-2	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	8
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	8
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	8
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	8
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	8
44-2	WHT/ORN/BLU		P5-W	E1-43	
45	WHT/BRN/BLU		P5-T	E1-32	
46-1	WHT/BRN/GRN		P5-M	E1-31	8
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	8
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	8
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	8
49-2	VIO	39	P6-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	8
51	WHT/BLK/GY		P5-F	E1-27	
52	WHT/BRN/ORN		P5-A	E1-29	
53	RED	35	P5-C	P26-E	
54-1	BLU		P6-R	E1-7	8
54-2	VIO		P6-S	E1-8	
55	WHT/VIO		P6-T	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	8
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	8
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	8
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	8
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	8
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	8
63-2	RED	36	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	8
64-2	WHT/RED		E1-13	B7-P3	
65-1	WHT/ORN/GY		E1-45	B7-P4	8
65-2	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	8
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	8
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	8
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



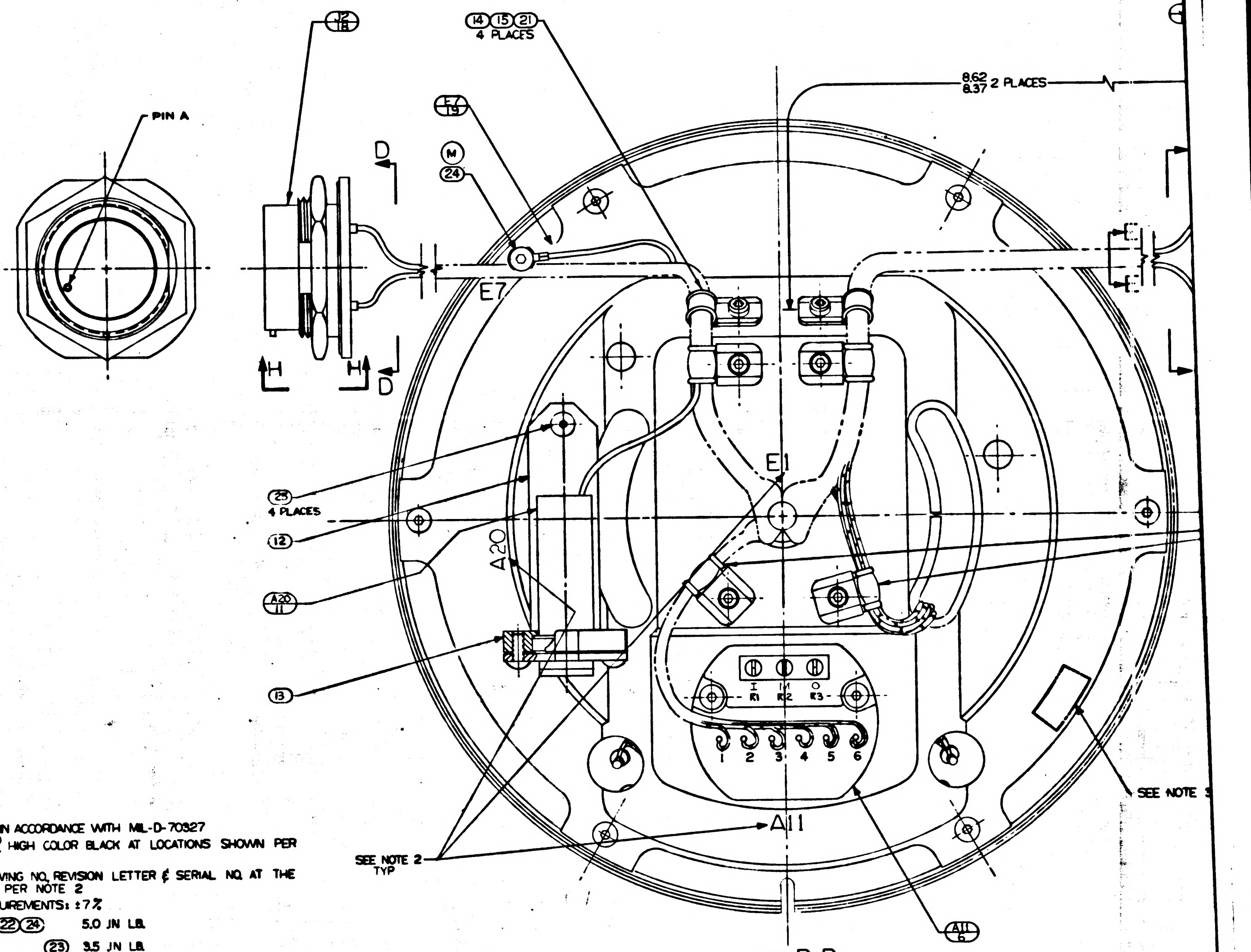
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW D-D



SECTION E-E
2 PLACES



VIEW B-B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%

   ⑳㉑㉒㉔ 5.0 IN LB.

   ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS

~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~

7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
11. Ⓚ PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH

Ⓟ

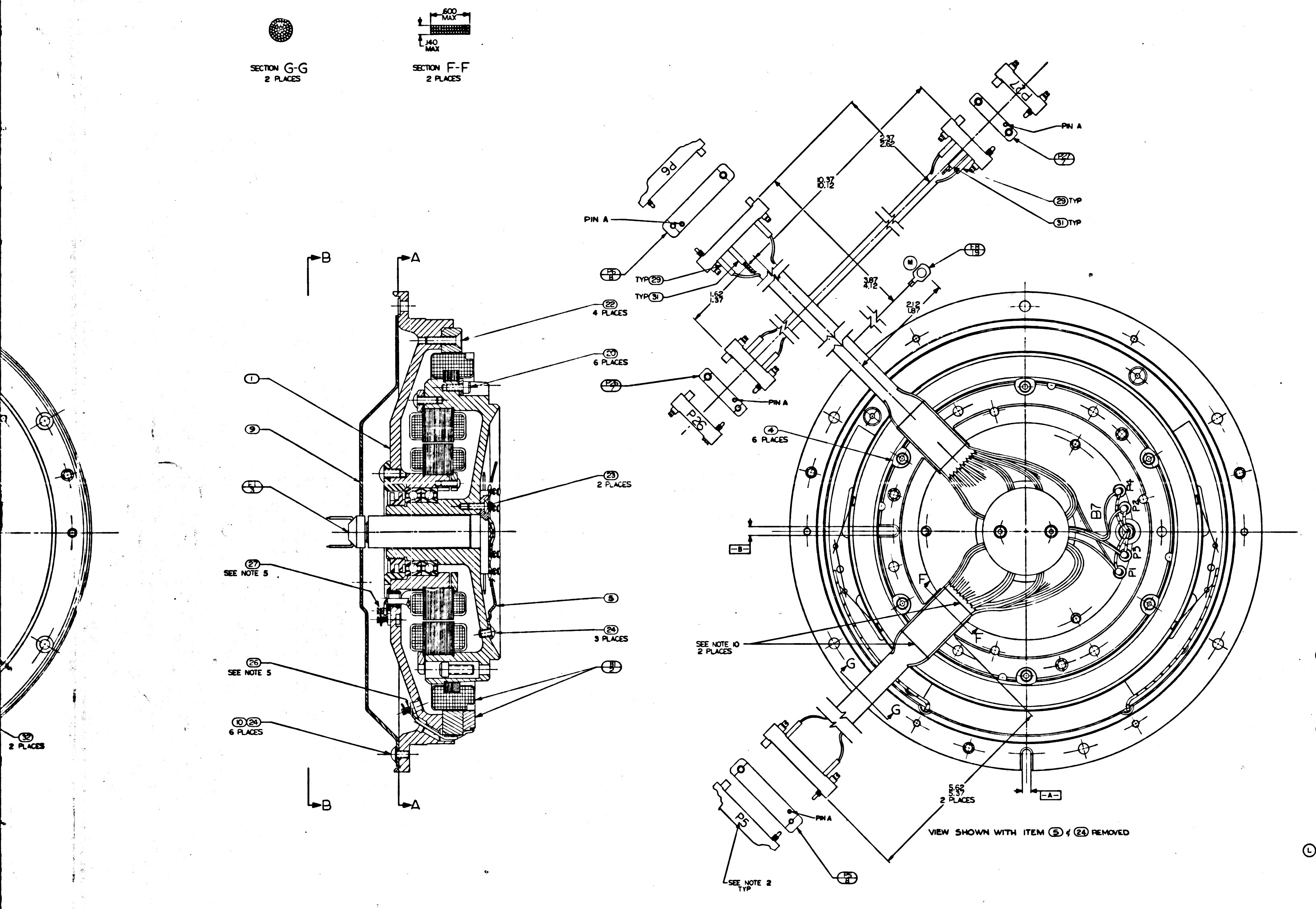
NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX
2 OR 3	2	-
4 OR MORE	1	3

	REV	SHEET
1000205	F	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F-1

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02119	1/24/63		
K	TDRR 03183	9-13-63		
L	TDRR 04558	11-12-63		
M	TDRR 05172	11-19-63		
N	TDRR 06237	18 Feb 64		
P	TDRR 06236	18 Feb 64		
R	REVISED PER TDRR 07947	26 MAY 64	JJJ	AU
S	REVISED PER TDRR 07954	2 JUNE 64		



SECTION G-G
2 PLACES
SECTION F-F
2 PLACES
.600 MAX
.140 MAX
PIN A
P6
P27
29 TYP
31 TYP
10.37
10.12
2.37
2.62
3.87
4.12
2.12
1.87
1.62
1.37
TYP 29
TYP 31
B
A
22
4 PLACES
20
6 PLACES
23
2 PLACES
5
24
3 PLACES
1
9
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
32
2 PLACES
4
6 PLACES
P26
B7
P1
P2
P3
P4
F
G
-B-
-A-
SEE NOTE 10
2 PLACES
5.62
5.37
2 PLACES
VIEW SHOWN WITH ITEM 5 & 24 REMOVED
P5
SEE NOTE 2
TYP

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
(M)	A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	41
	1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60" TOTAL LG	40
	1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	60" TOTAL LG	39
	1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60" TOTAL LG	38
	1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14 TOTAL LG	37
	1	WIRE, ELEC. TYPE E-28 YEL		MIL-W-16878	14 TOTAL LG	36
	1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	36" TOTAL LG	35
	1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
	1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
(S)	2	INSULATION, SLEEVING, ELEC. HEAT SHRINKABLE	1010490-180		¾ LONG	32
	6	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LONG	31
	3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
	55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
	51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	A/R	SOLDER	SN10WARP2	QQ-S-571		26
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
	10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
	2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
	4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
	6	SCREW, CAP, SOC. HD. HEX	1000110-1			21
(K)	6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS1362C04LLA			20
	2	TERMINAL, LUG	1010717-1			19
(L)	1	CONN, ELECT, RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
(K)	1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
	2	CLAMP, CABLE	1000220-3			16
	4	CLAMP, CABLE	1000220-5			15
	6	WASHER, CABLE CLAMP	1000223			14
	1	CLAMP, TRANSDUCER	1000256			13
	1	BRACKET, TRANSDUCER	1000257			12
	1	TRANSDUCER, ABS. PRESSURE	1000272			11
	6	WASHER, FLAT, ROUND	1000254			10
	1	GUIDE, WIRE, ASS'Y	1000156			9
	2	CONNECTOR, ELEC, RECEP. 29 CONT.	1000116			8
(P)	2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221-1			7
	1	PRECISION RESOLVER ALIGN. ASS'Y.	1007004			6
	1	GUIDE, WIRE, STUB SHAFT. O.A.	1000151			5
	6	CLAMP, TORQUE MOTOR	1000087			4
	1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
	1	16- RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN D.M. WHITE
APPROVED FOR MSC
W. J. Klein
BY DIRECTION
Kupfer 8 Nov 63

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

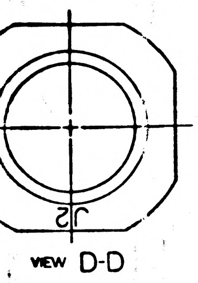
SCALE 2/1
UNIT WT.
CODE IDENT

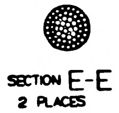
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET 1 OF 1

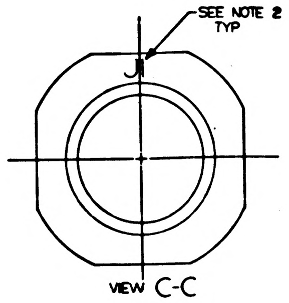
1000205 REV S SHEET 1

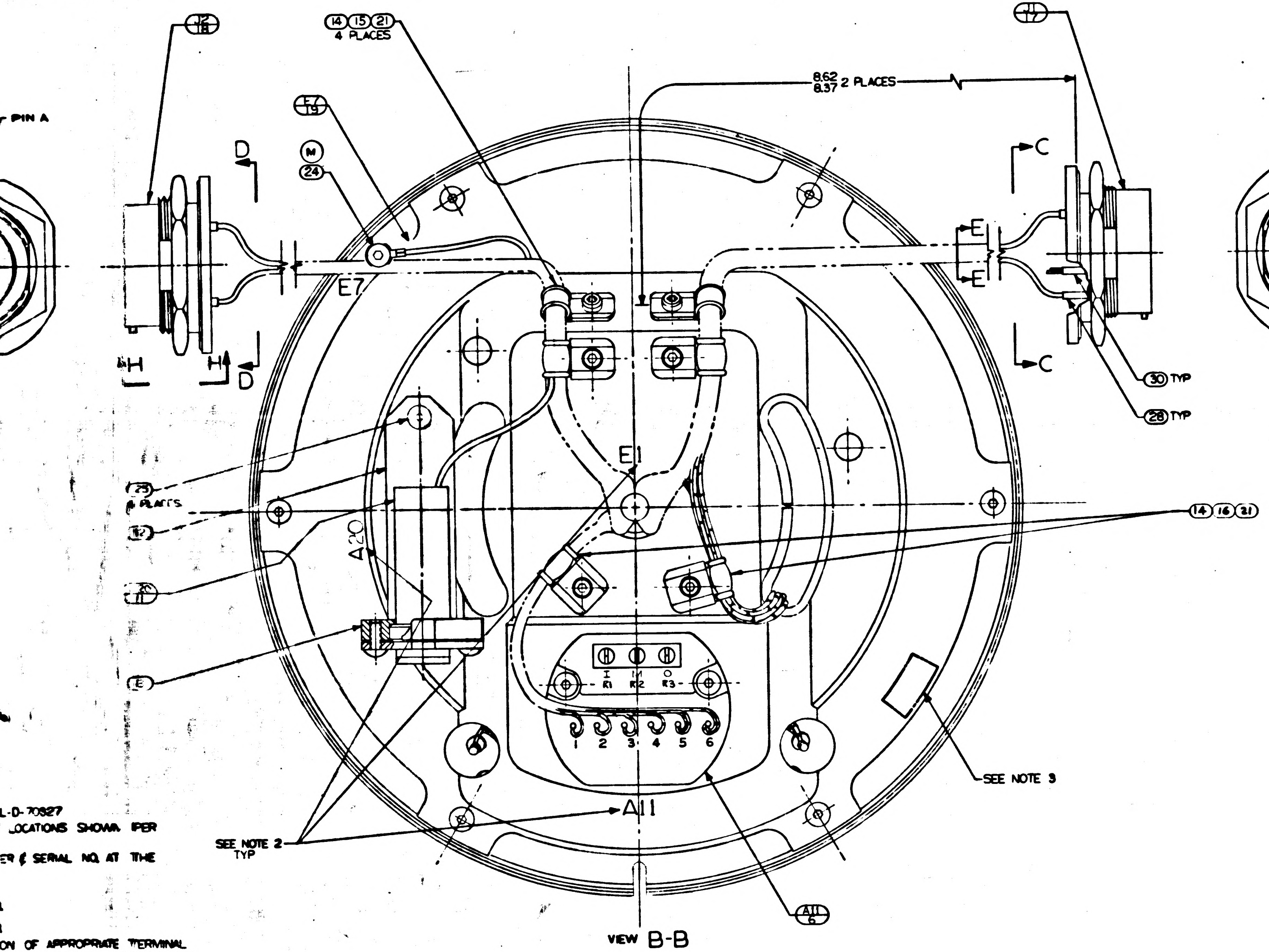
MASTER

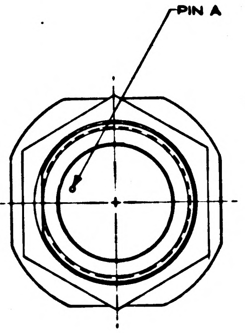
37 1000205

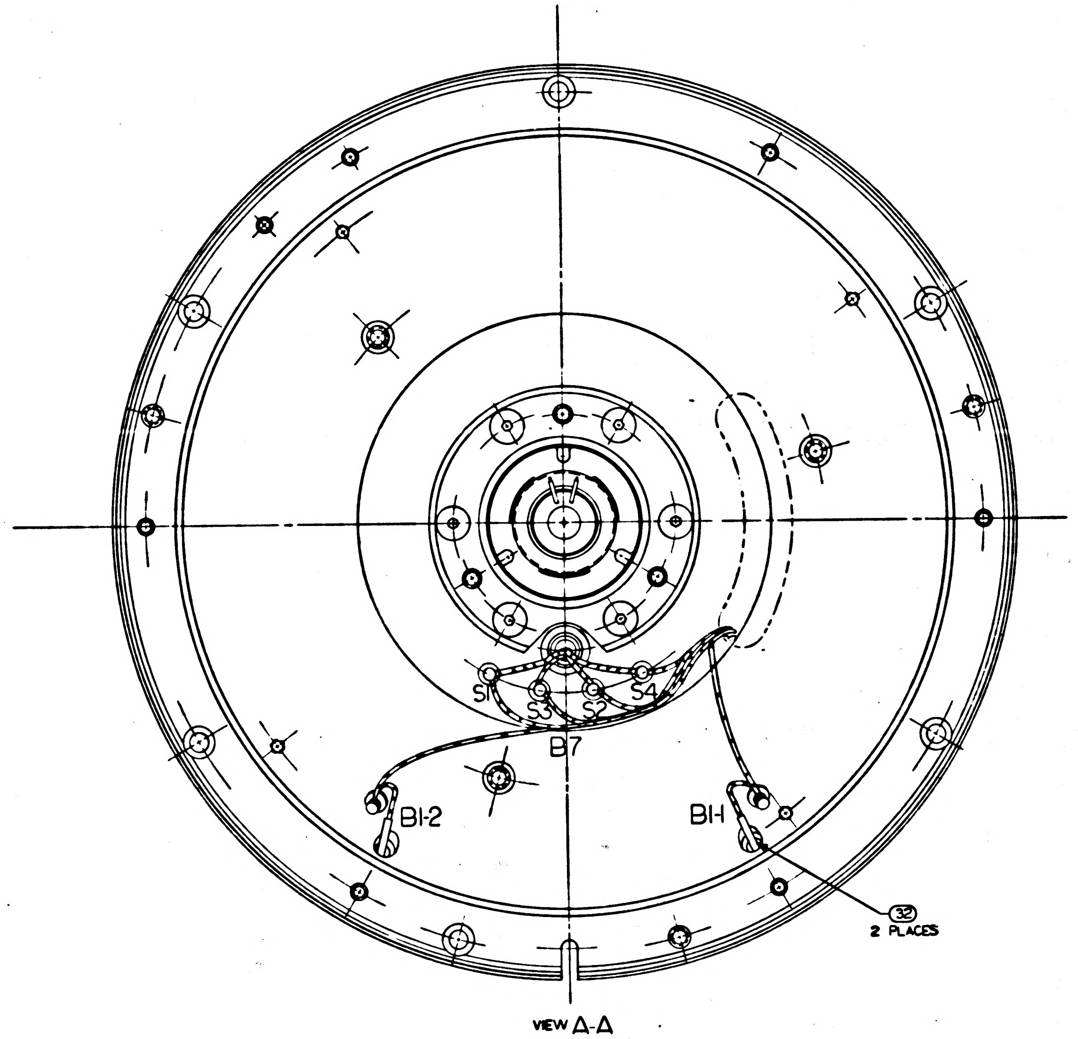


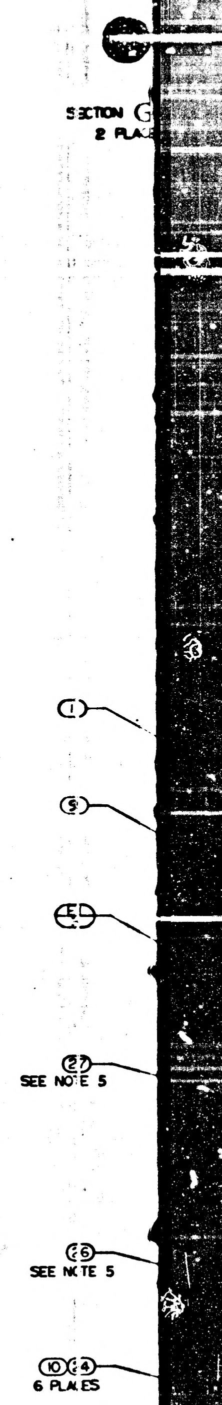

SECTION E-E
2 PLACES


SEE NOTE 2
TYP
J1
VIEW C-C


PIN A
12
18
14 15 21
4 PLACES
8.62
8.37 2 PLACES
17
17
19
M
24
D
D
H
H
E7
C
C
E
E
30 TYP
28 TYP
E1
23
6 PLACES
22
11
E
A20
14 16 21
R1 R2 R3
1 2 3 4 5 6
SEE NOTE 3
SEE NOTE 2
TYP
A11
A11
6
VIEW B-B




S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES
VIEW A-A


SECTION G
2 PLACES
1
5
ED
27
SEE NOTE 5
26
SEE NOTE 5
10 4
6 PLACES

L-D-70327
LOCATIONS SHOWN PER

ER & SERIAL NO. AT THE

ON OF APPROPRIATE TERMINAL
OTHER LEADS TO EITHER UPPER
7, 8 OR 19 PER
SHALL BE WITHIN .C6 OF

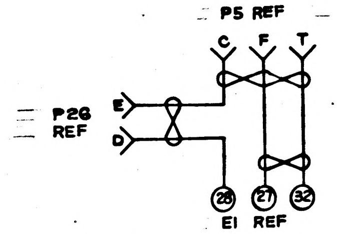
LL ~~TURNS PER INCH MINIMUM~~
OM BEARING HOUSING OR
T ASSEMBLING KEEPER TO

OF ATP 1000205
ATED
T. ~~[illegible]~~

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH

Ⓟ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX.
2 OR 3	2	4
4 OR MORE	1	3


P5 REF
C F T
P26
REF
E
D
28
27
32
E1 REF

DETAIL 1

	REV	SHEET
1000205	S	1

	REV	SHEET
1000205	S	1

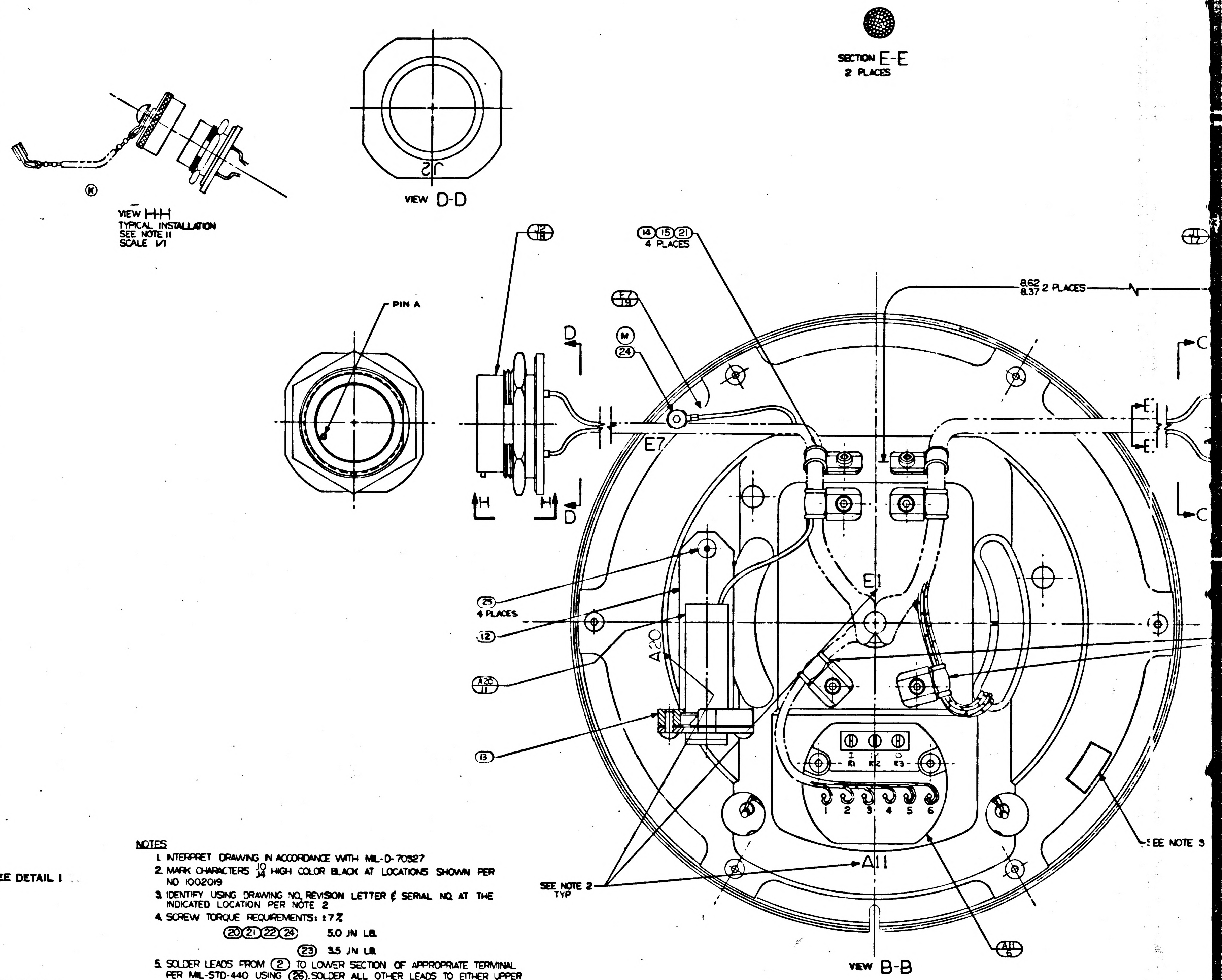
WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	
69-2	BRN	38	P26-B	P27-B	
4 4	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL 1
71-1	WHT/RED/GY		P26-H	E1-40	
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	
72-2	GY	40	P26-J	P27-E	
[illegible]	VIO	33	B7-P4	P5-U	

WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-S3	
9-2	RED	35	J1-D	B7-S1	
10-1	YEL	36	J1-E	B7-S2	
10-2	BLU	37	J1-F	B7-S4	
11-1	WHT/ORN/YEL		J1-G	E1-41	
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-V	E1-29	
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-32	SEE DETAIL 1
46-1	WHT/BRN/GRN		P5-M	E1-31	
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL 1
52	WHT/BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL 1
54-1	BLU		P6-R	E1-7	
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-Z	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	38	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	

Ⓜ



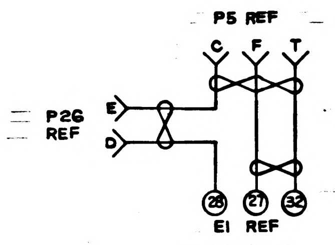
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%
   - ⑳㉑㉒㉔ 5.0 IN LB.
   - ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
11. Ⓚ PROTECTIVE CAP, NASA DWG NO 100495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

Ⓟ

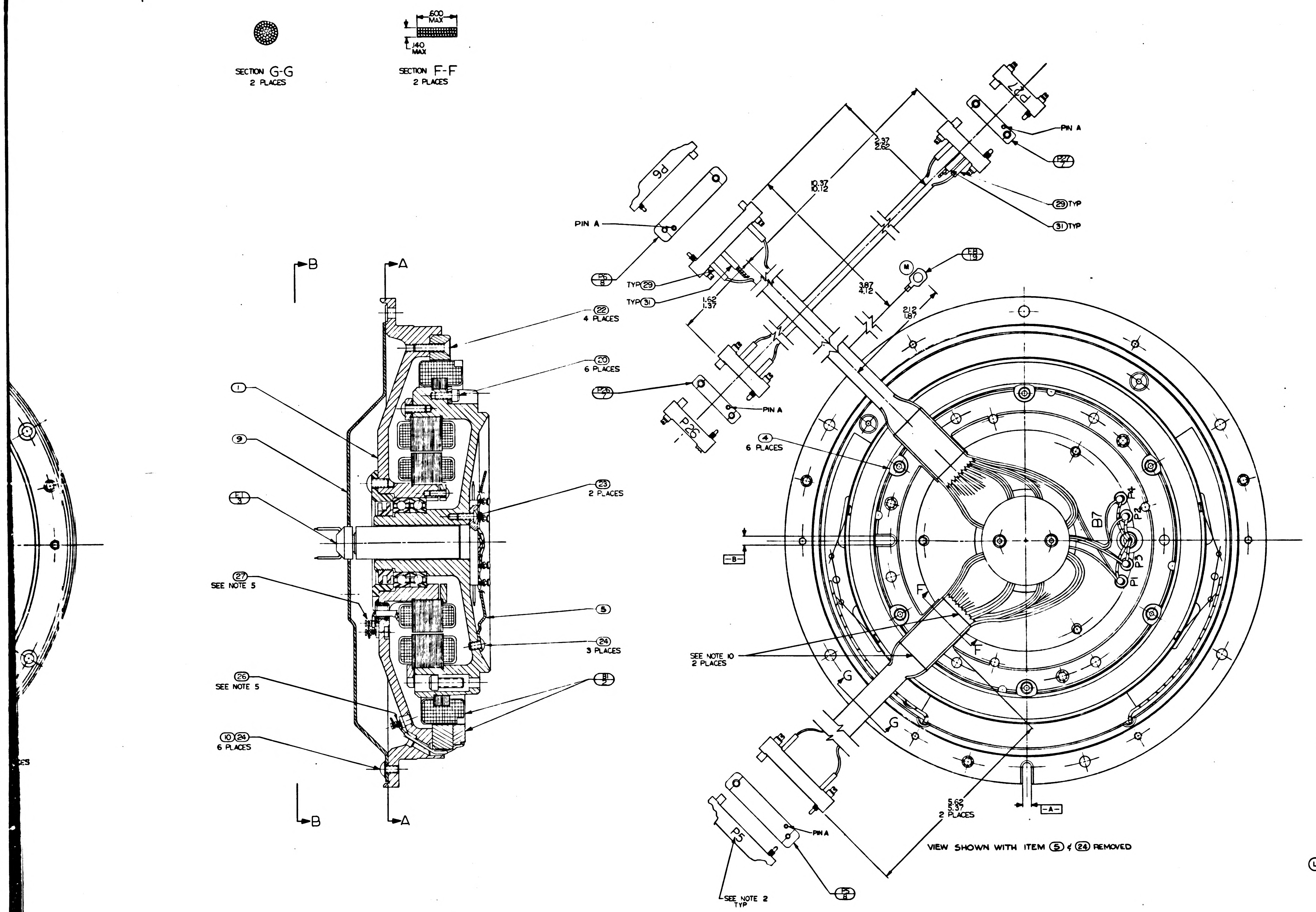
NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX.
2 OR 3	2	4
4 OR MORE	1	3



DETAIL 1

1000205	REV S	SHEET 1

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02119	7/24/63		JH
K	TDRR 03183	9-13-63		WK
L	TDRR 04558	11-12-63		WK
M	TDRR 05172	11-19-63		WK
N	TDRR 06237	18 Feb 64		WK
P	TDRR 06236	18 Feb 64		WK
R	REVISED PER TDRR 07947	26 MAY 64	JJJ	AU
S	REVISED PER TDRR 07954	JUNE 64	JHR	J.E.G.
T	REVISED PER TDRR 10812	17 JUL 64	JJJ	M.E.M.


SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
B
A
PIN A
P6
P5
TYP 29
TYP 31
22
4 PLACES
20
6 PLACES
1
9
E1
3
27
SEE NOTE 5
23
2 PLACES
5
24
3 PLACES
26
SEE NOTE 5
B1
10 24
6 PLACES
2.37
2.62
10.37
10.12
1.62
1.37
3.87
4.12
2.12
1.87
P27
29 TYP
31 TYP
M
E8
19
P28
P26
4
6 PLACES
B7
P1
P2
P3
P4
F
G
SEE NOTE 10
2 PLACES
5.62
5.37
2 PLACES
-B-
-A-
VIEW SHOWN WITH ITEM 5 & 24 REMOVED
SEE NOTE 2
TYP
D
C
B
A
4
3
2
1

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	SCREW, CAP, SOC. HD. HEX.	MS1352C04-11			42
Ⓜ A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE I CLASS I	41
1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60" TOTAL LG	40
1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	60" TOTAL LG	39
1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60" TOTAL LG	38
1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14 TOTAL LG	37
1	WIRE, ELEC. TYPE E-28 YEL		MIL-W-16878	14 TOTAL LG	36
1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	96" TOTAL LG	35
1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
Ⓢ 2	INSULATION, SLEEVING, ELEC. HEAT SHRINKABLE	1010490-180		3/4 LONG	32
6	INSULATION, SLEEVING, ELEC.	1006776-16		5/16 LONG	31
3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
A/R	SOLDER	SN60WRAP2	QQ-S-571		27
A/R	SOLDER	SN10WRAP2	QQ-S-571		26
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
8	SCREW, CAP, SOC. HD. HEX	1000110-1			21
Ⓚ 6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS1352C04LL4			20
2	TERMINAL, LUG	1010717-1			19
Ⓛ 1	CONN, ELECT, RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
Ⓚ 1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
2	CLAMP, CABLE	1000220-3			16
4	CLAMP, CABLE	1000220-5			15
6	WASHER, CABLE CLAMP	1000223			14
1	CLAMP, TRANSDUCER	1000256			13
1	BRACKET, TRANSDUCER	1000257			12
1	TRANSDUCER, ABS. PRESSURE	1000272			11
6	WASHER, FLAT, ROUND	1000254			10
1	GUIDE, WIRE, ASS'Y	1000156			9
2	CONNECTOR, ELEC, RECEP. 29 CONT.	1000116			8
Ⓟ 2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221			7
1	PRECISION RESOLVER ALIGN ASS'Y.	1015782			6
1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 30 CONT	1000038			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16X RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN DMWHITE 5-2-62
APPROVED FOR MSC
W. J. Rhine
BY DIRECTION
8 NOV 63

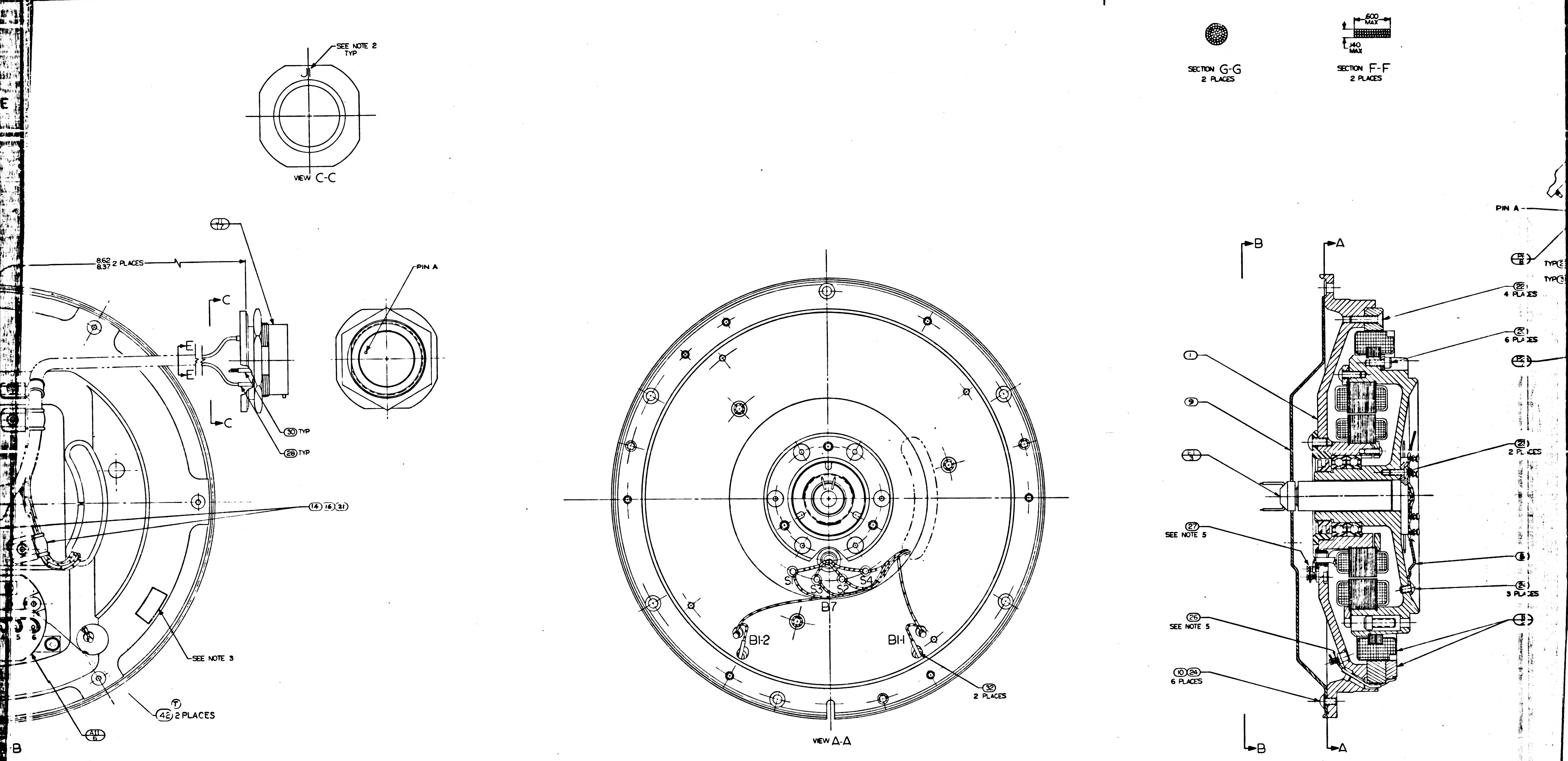
INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET 1 OF 1

1000205 | REV T | SHEET 1

3/1000205


7
6
5
4
SEE NOTE 2
TYP
J1
VIEW C-C
SECTION G-G
2 PLACES
.600
MAX
.140
MAX
SECTION F-F
2 PLACES
PIN A
J1
17
8.62
8.37 2 PLACES
C
C
E
E
30 TYP
28 TYP
PIN A
14 16 21
5
6
SEE NOTE 3
T
42 2 PLACES
A11
6
B
S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES
VIEW A-A
B
A
1
9
E1
3
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
B
A
22
4 PLACES
20
6 PLACES
23
2 PLACES
24
3 PLACES
TYP
TYP

	No OF FULL TURNS MAX.
	4
	3

1000205	REV	SHEET 1

7
6
5
4

2/1000205

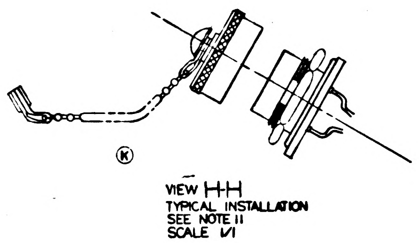
WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	8
69-2	BRN	38	P26-B	P27-B	
45-4	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL I
71-1	WHT/RED/GY		P26-H	E1-40	8
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	8
72-2	GY	40	P26-J	P27-E	
74-2	VIO	39	B7-P4	P5-U	

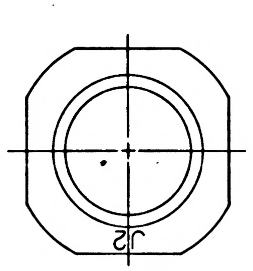
WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	8
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	8
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	8
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	8
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	8
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	8
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	8
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	8
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	8
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	8
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	8
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	8
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	8
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	8
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	8
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-a	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-V	E1-29	8
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	8
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	8
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	8
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	8
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	8
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	8
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	8
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	8
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	8
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	8
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	8
42-2	WHT/RED/GRN		P5-a	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	8
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	8
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-32	SEE DETAIL I
46-1	WHT/BRN/GRN		P5-M	E1-31	8
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	8
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	8
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	8
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL I
52	WHT, BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL I
54-1	BLU		P6-R	E1-7	8
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-$\overline{C}$	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	8
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	8
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	8
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	8
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	8
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	8
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	8
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	8
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	8
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	8
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	

Ⓜ

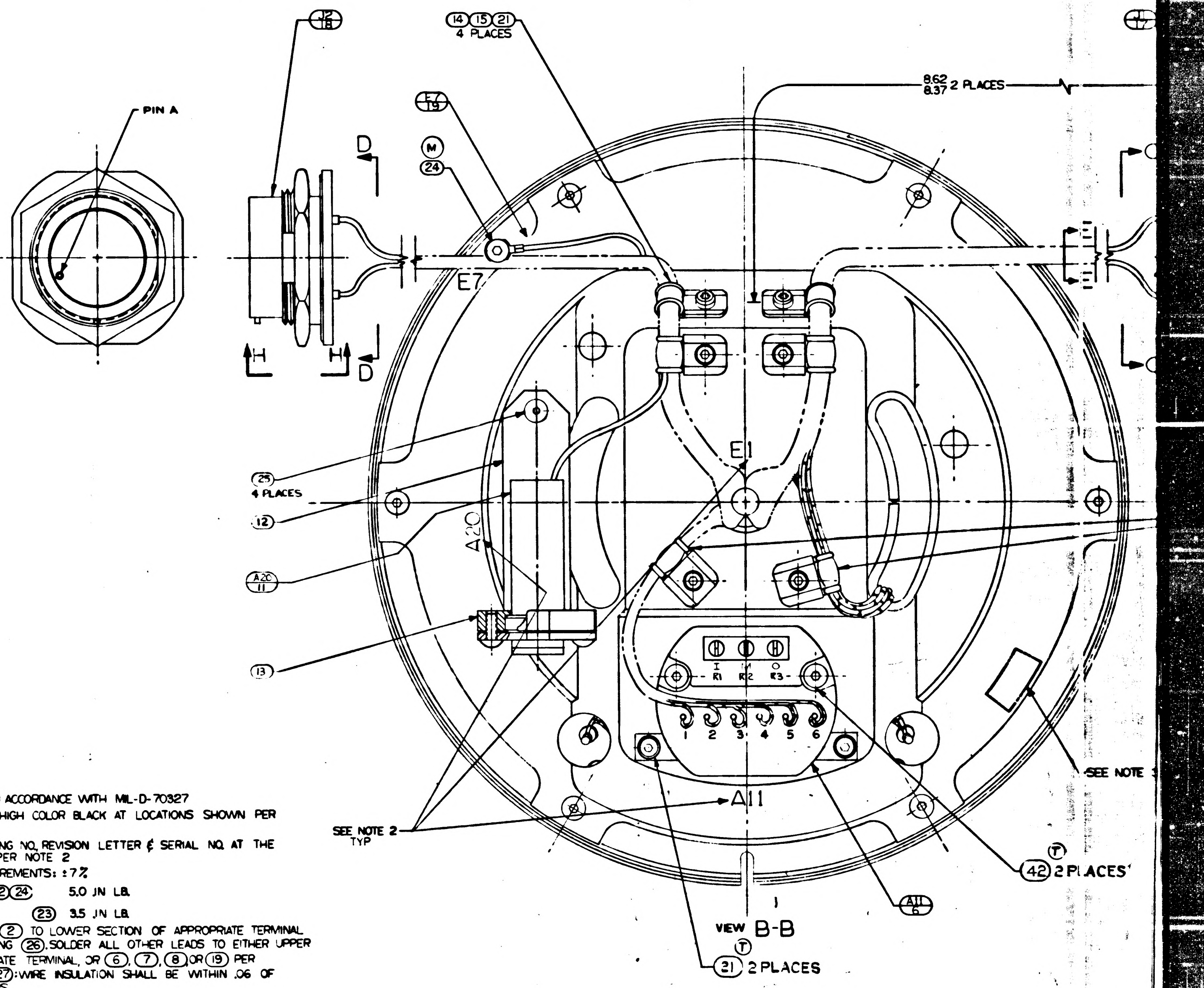


VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW D-D

SECTION E-E
2 PLACES



VIEW B-B

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%

(20)(21)(22)(24) 5.0 IN LB.

(23) 3.5 IN LB.

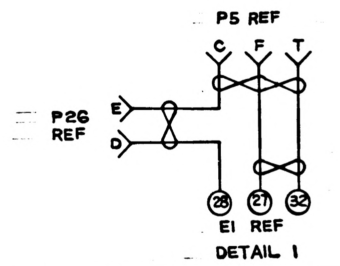
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (26). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING (27): WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED

Ⓚ 11. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH

Ⓟ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX.
2 OR 3	2	4
4 OR MORE	1	3

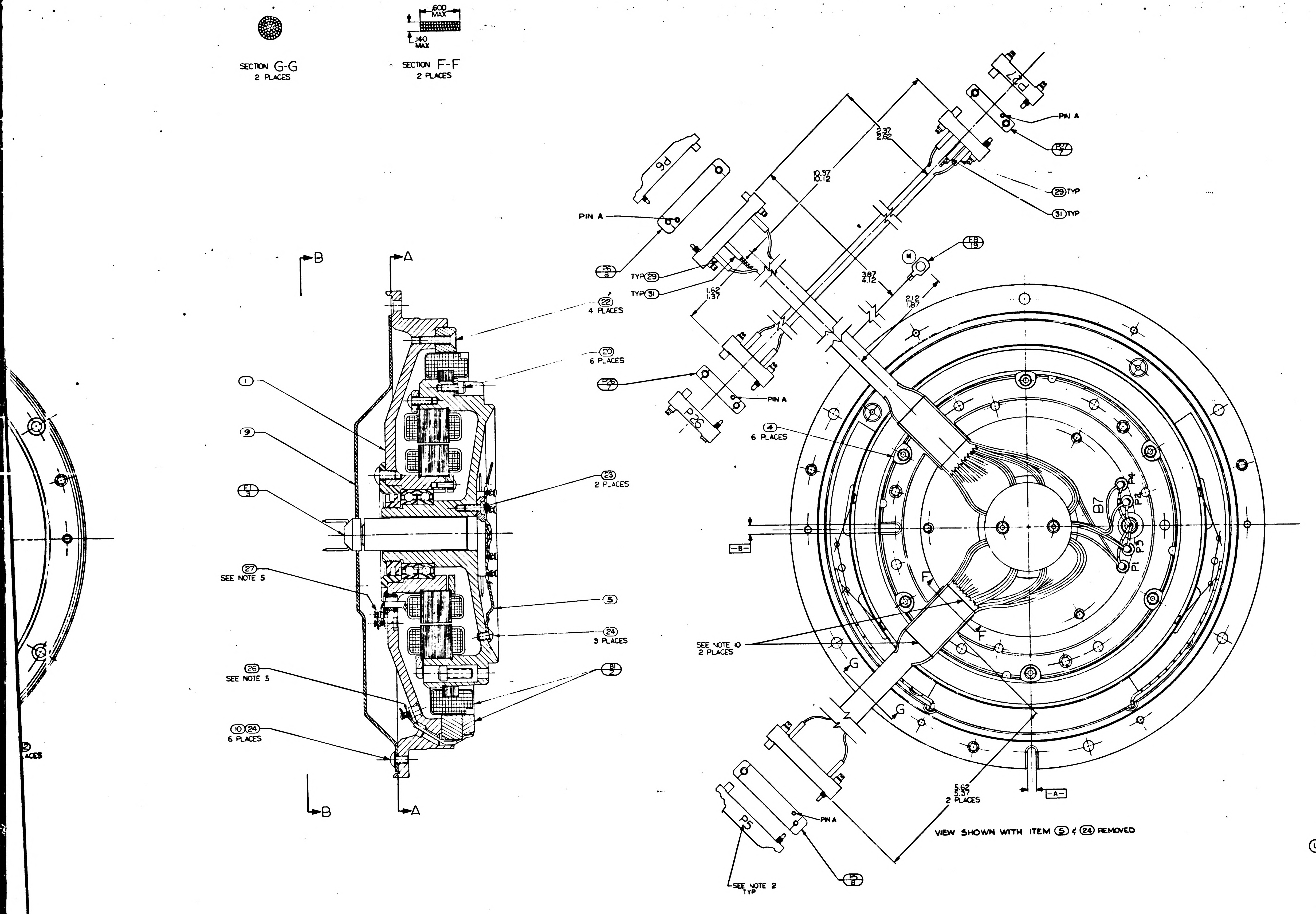


DETAIL I

1000205	REV	SHEET 1

17100 0205

	REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02119	1/24/63		JH
K	TDRR 03183	9-13-63		WK
L	TDRR 04558	11-12-63		WK
M	TDRR 05172	11-19-63		WK
N	TDRR 06237	18 FEB 64		WK
P	TDRR 06236	18 FEB 64		WK
R	REVISED PER TDRR 07947	26 MAY 64	JJJ	AU
S	REVISED PER TDRR 07954	64	JH	
T	REVISED PER TDRR 10812	17 JUL 64	JJJ	MEM.
U	REVISED PER TDRR [illegible]2.4	[illegible] 64		JAS


SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
PIN A
P6
P27
29 TYP
31 TYP
2.37
2.62
10.37
10.12
3.87
4.12
1.62
1.37
2.12
1.87
TYP 29
TYP 31
22
4 PLACES
20
6 PLACES
P26
PIN A
4
6 PLACES
M
18
19
B
A
1
9
E1
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
10 24
6 PLACES
B1
B7
P1
P2
P3
P4
F
G
SEE NOTE 10
2 PLACES
5.62
5.37
2 PLACES
VIEW SHOWN WITH ITEM 5 & 24 REMOVED
P5
SEE NOTE 2
TYP
4
3
2
1

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	2	SCREW, CAP, SOC. HD. HEX.	NAS1352C04-11			42
M	A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE I CLASS 2	41
	1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60" TOTAL LG	40
	1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	68" TOTAL LG	39
	1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60" TOTAL LG	38
	1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14" TOTAL LG	37
	1	WIRE, ELEC. TYPE E-28 YEL		MIL-W-16878	14" TOTAL LG	36
	1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	96" TOTAL LG	35
	1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
	1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
S	2	INSULATION, SLEEVING, ELEC. HEAT SHRINKABLE	1010490-180		3/4 LONG	32
	6	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	31
	3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
	55	INSULATION, SLEEVING, ELEC.	1006776-18		3/16 LONG	29
	51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	A/R	SOLDER	SN10WARP2	QQ-S-571		26
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
	10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
	2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
	4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
	8	SCREW, CAP, SOC HD. HEX	1000110-1			21
K	6	SCREW, CAP SELF-LKG SOC. HD. HEX	NAS1352C04LL4			20
	2	TERMINAL, LUG	1010717-1			19
L	1	CONN, ELECT., RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
K	1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
	2	CLAMP, CABLE	1000220-3			16
	4	CLAMP, CABLE	1000220-5			15
	6	WASHER, CABLE CLAMP	1000223			14
	1	CLAMP, TRANSDUCER	1000256			13
	1	BRACKET, TRANSDUCER	1000257			12
	1	TRANSDUCER, ABS. PRESSURE	1000272			11
	6	WASHER, FLAT, ROUND	1000254			10
	1	GUIDE, WIRE, ASS'Y	1000156			9
	2	CONNECTOR, ELEC, RECEP 29 CONT	1000116			8
P	2	CONNECTOR, ELEC, RECEP. 9 CONT.	1000221			7
	1	PRECISION RESOLVER ALIGN. ASS'Y.	1015782			6
	1	GUIDE, WIRE, STUB SHAFT. 2.A.	1000151			5
	6	CLAMP, TORQUE MOTOR	1000087			4
	1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
	1	16X RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN DMWHITE
APPROVED FOR MSC
W. J. Rhine
BY DIRECTION

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

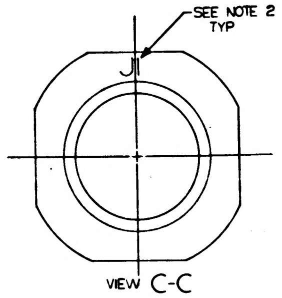
SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET 1

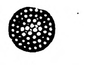
1000205 U

00205 REV U SHEET 1

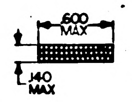
371000205


SEE NOTE 2
TYP
J1

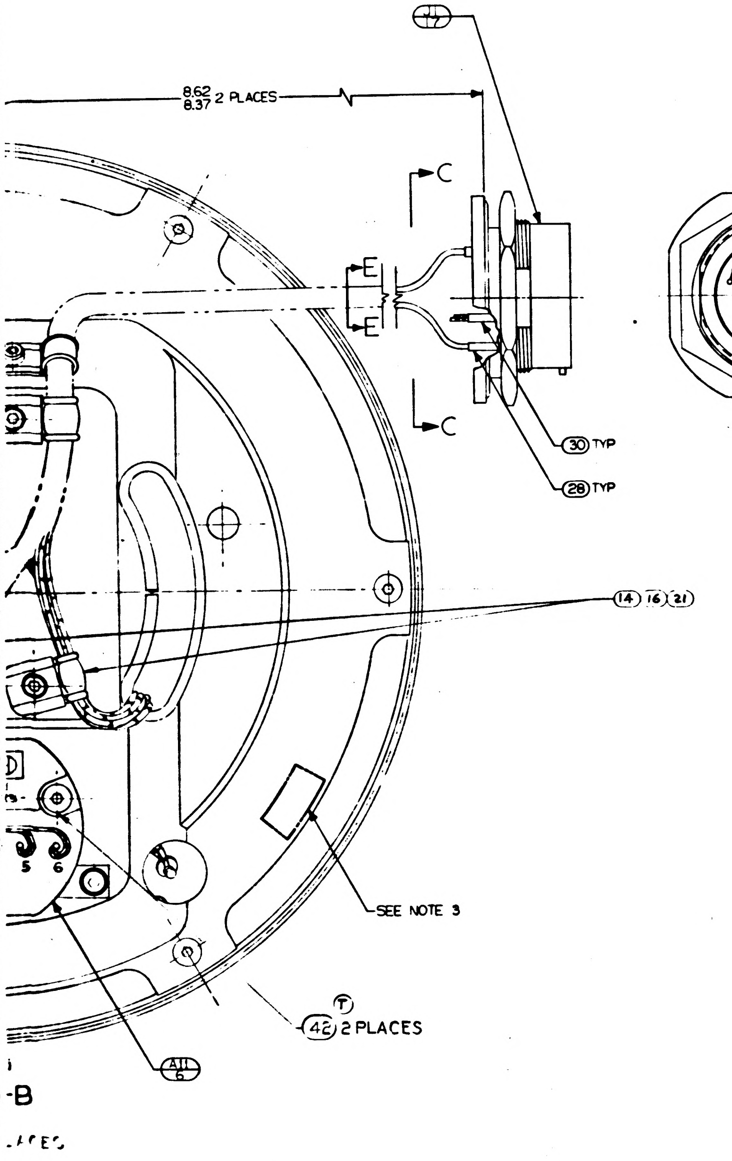
VIEW C-C

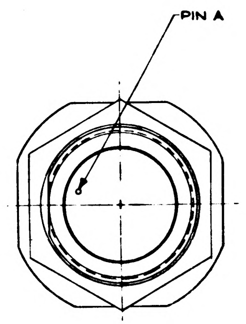


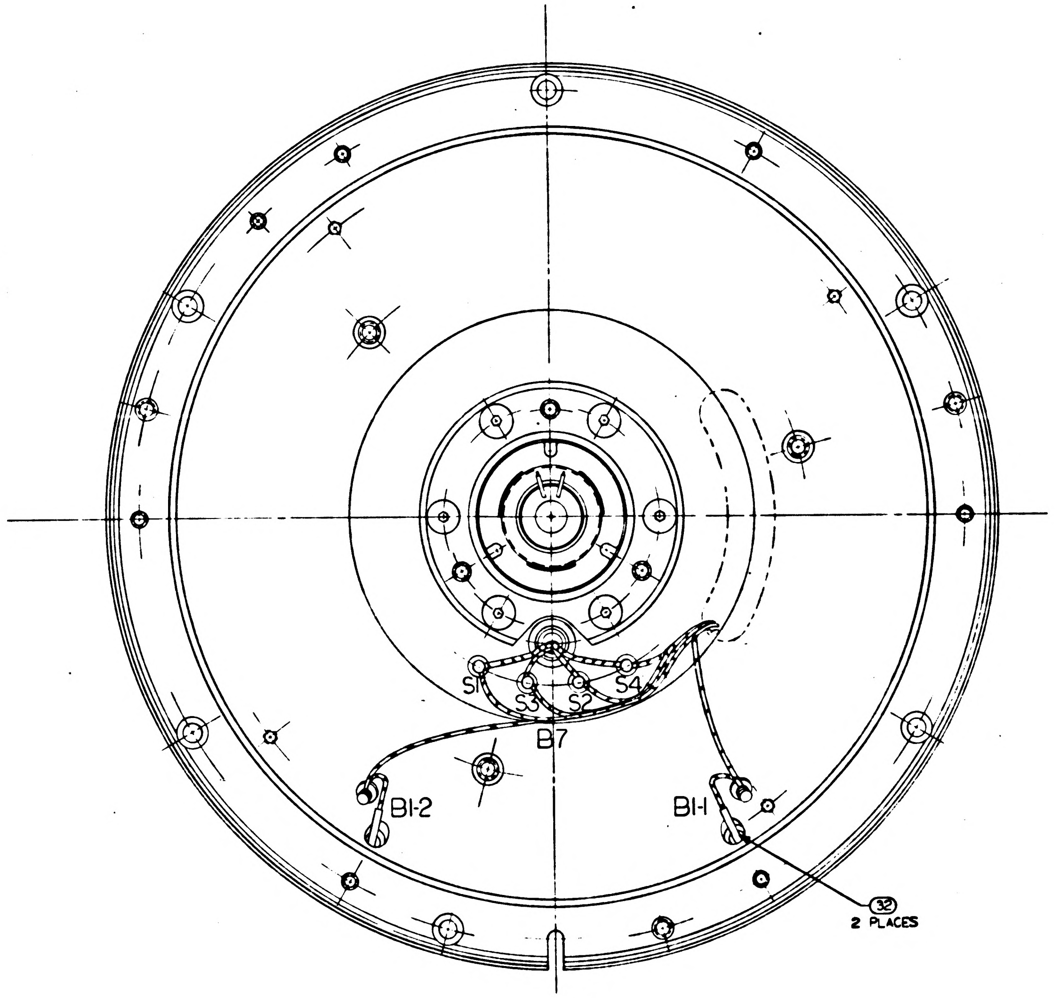
SECTION G-G
2 PLACES


.600
MAX
.140
MAX

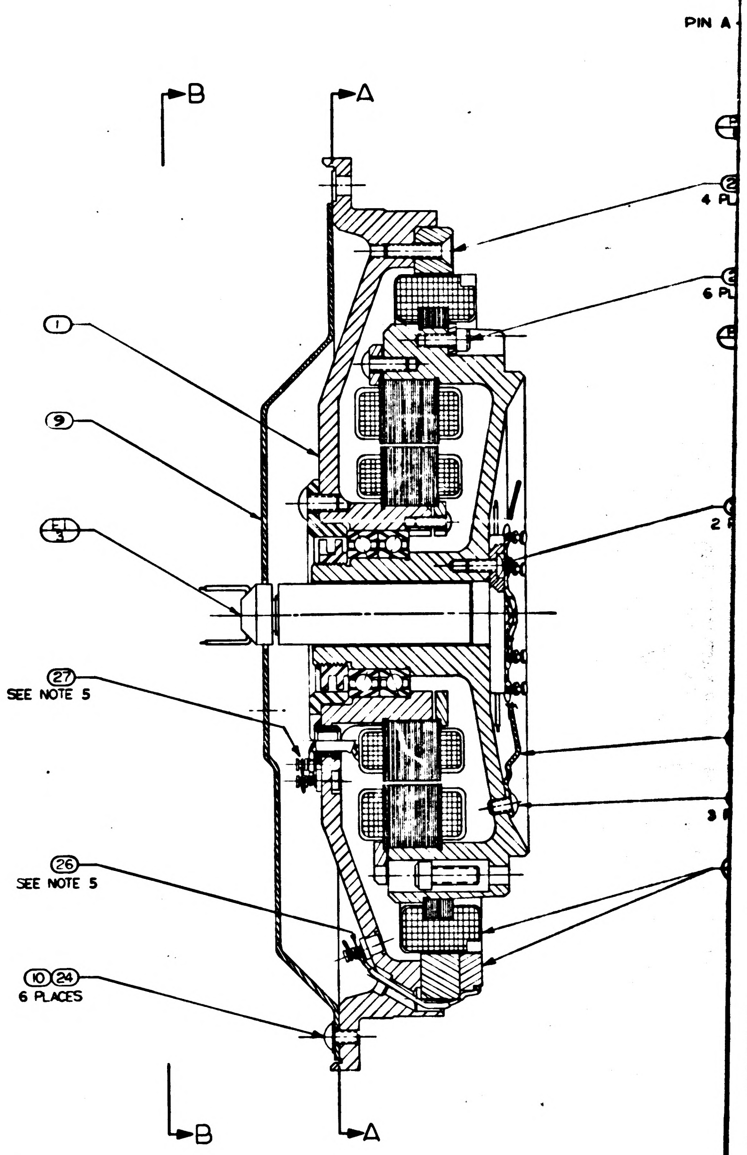
SECTION F-F
2 PLACES


J1
17
8.62
8.37 2 PLACES
C
C
E
E
30 TYP
28 TYP
14 16 21
SEE NOTE 3
5
6
T
42 2 PLACES
A11
6
-B
LACES




S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


PIN A
B
A
1
9
E1
3
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
4 PL
6 PL
2
3
B
A

NO OF FULL TURNS MAX.
4
3

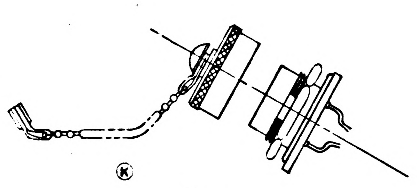
1000205	REV	SHEET
	U	1

WIRING LEGEND

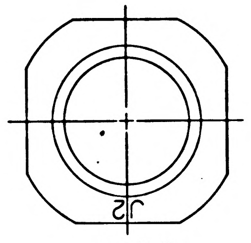
COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	
69-2	BRN	38	P26-B	P27-B	
[illegible]	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL 1
71-1	WHT/RED/GY		P26-H	E1-40	
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	
72-2	GY	40	P26-J	P27-E	
74-2	[illegible]	39	B7-P4	P5-U	

WIRING LEGEND

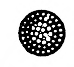
COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	
6-2	BLU		J1-T	E1-7	
7-1	WHT RED		J1-A	E1-13	
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
Ⓜ 22-1	WHT/BRN/ORN		J2-V	E1-29	
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-32	SEE DETAIL 1
46-1	WHT/BRN/GRN		P5-M	E1-31	
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL 1
52	WHT/BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL 1
54-1	BLU		P6-R	E1-7	
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-$\overline{C}$	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



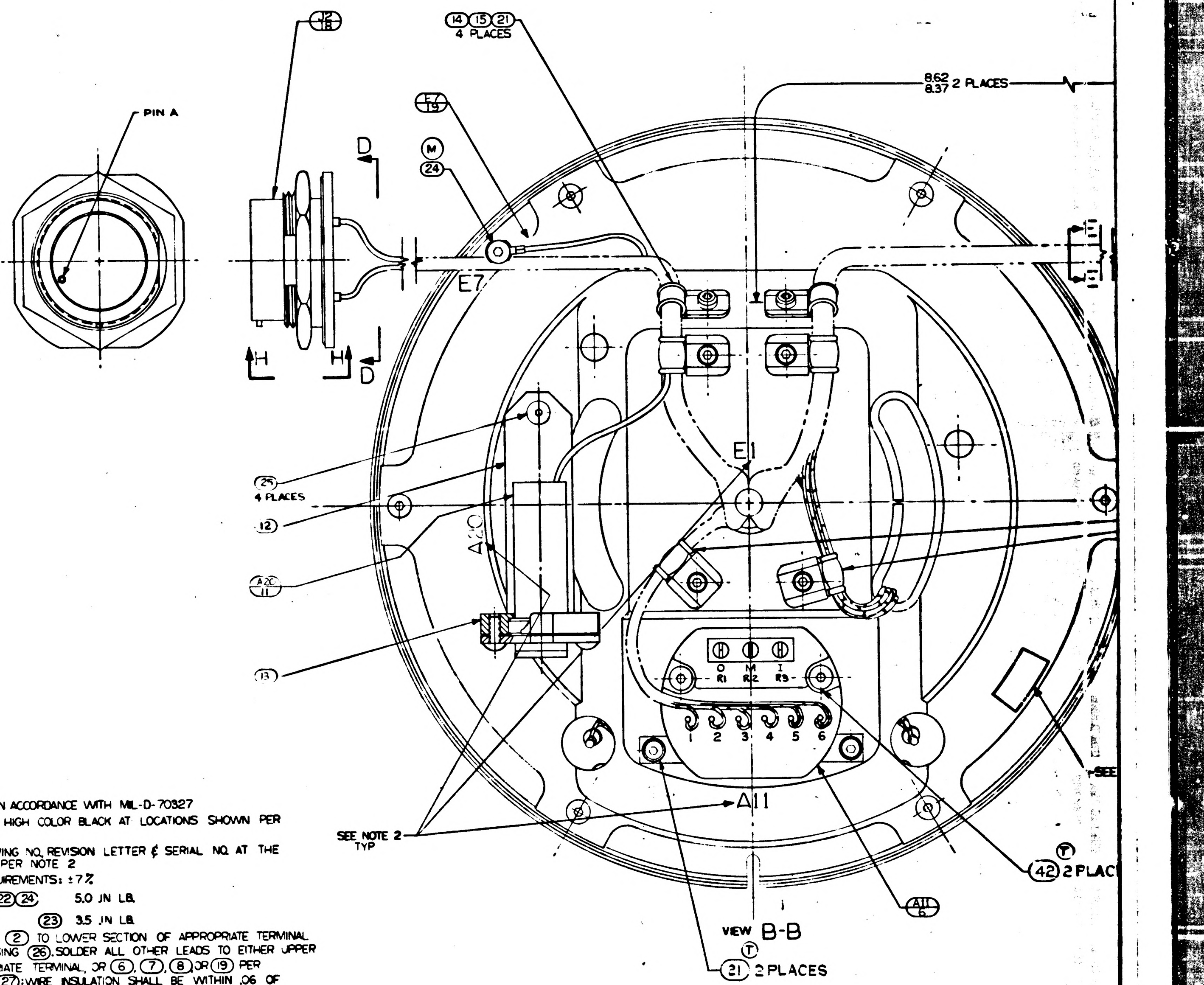
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW D-D



SECTION E-E
2 PLACES



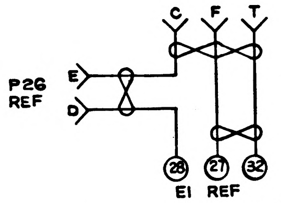
VIEW B-B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%
   - ⑳㉑㉒㉔ 5.0 IN LB.
   - ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
11. Ⓚ PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH
Ⓟ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX.
2 OR 3	2	4
4 OR MORE	1	3

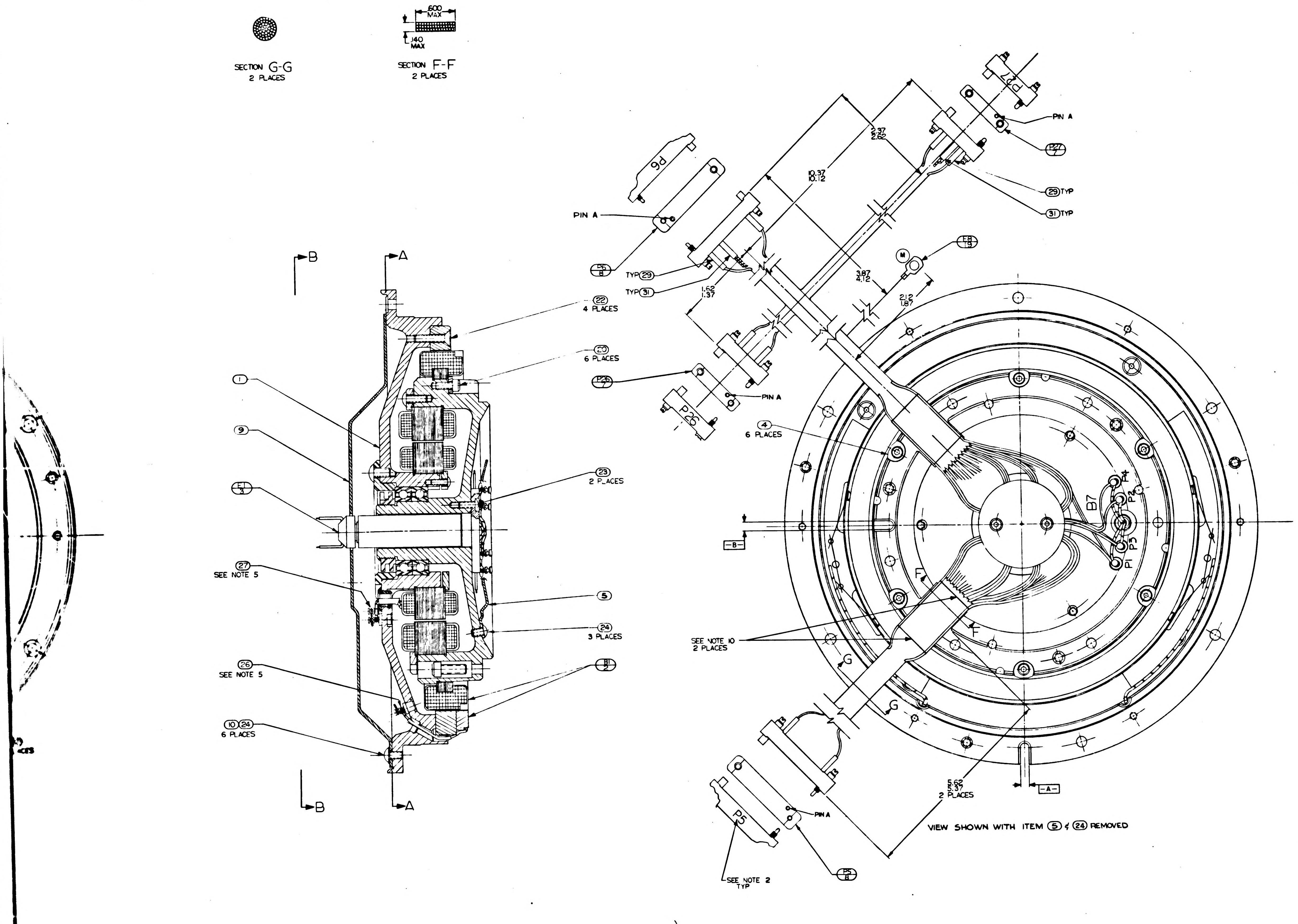


DETAIL 1

1000205 REV U SHEET 1

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
J	REPLACES REV H WITH CHANGES TDRR 02119	7/24	[illegible]
K	TDRR 03183	9-13-63	JK
L	TDRR 04558	11-2-64	wk
M	TDRR 05172	11-9-63	wk
N	TDRR 06237	[illegible]	wk
P	TDRR 06236	[illegible]	wk
R	REVISED PER TDRR 07947	26 [illegible] 64	JJJ AU
S	REVISED PER TDRR 07954	[illegible] 64	JHR J.E.G.
T	REVISED PER TDRR 10812	17 JUL 64	JJJ MEM.
U	REVISED PER TDRR [illegible]	[illegible]	SAS
V	REVISED PER TDRR [illegible]	[illegible]	[illegible]


SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
2.37
2.62
10.37
10.12
P6
PIN A
P27
PIN A
29 TYP
31 TYP
18
19
M
3.87
4.12
2.12
1.87
1.52
1.37
TYP 29
TYP 31
P6
B
22
4 PLACES
20
6 PLACES
P26
7
PIN A
P26
4
6 PLACES
B
A
1
9
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
10 24
6 PLACES
B
A
SEE NOTE 10
2 PLACES
G
G
F
F
P4
P2
B7
P3
P1
-B-
-A-
5.62
5.37
2 PLACES
VIEW SHOWN WITH ITEM 5 & 24 REMOVED
PIN A
P5
SEE NOTE 2
TYP
P5
8

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	SCREW, CAP, SOC. HD. HEX.	NAS1352C04-11			42
A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	41
1	WIRE, ELEC. TYPE E-28 GY		MIL-W-16878	60 TOTAL LG	40
1	WIRE, ELEC. TYPE E-28 VIO		MIL-W-16878	68 TOTAL LG	39
1	WIRE, ELEC. TYPE E-28 BRN		MIL-W-16878	60 TOTAL LG	38
1	WIRE, ELEC. TYPE E-28 BLU		MIL-W-16878	14 TOTAL LG	37
1	WIRE ELEC. TYPE E-28 YEL		MIL-W-16878	14 TOTAL LG	36
1	WIRE, ELEC. TYPE E-28 RED		MIL-W-16878	96" TOTAL LG	35
1	WIRE, ELEC. TYPE E-28 WHT		MIL-W-16878	14" TOTAL LG	34
1	WIRE, ELEC. TYPE E-28 BLK		MIL-W-16878	48" TOTAL LG	33
2	INSULATION, SLEEVING, ELEC. HEAT SHRINKABLE	1010490-180		3/4 LONG	32
6	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	31
3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
A/R	SOLDER	SN10WARP2	QQ-S-571		26
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
8	SCREW, CAP, SOC. HD. HEX	1000110-1			21
6	SCREW, CAP SELF-LKG SOC. HD. HEX	NAS1352C04LL4			20
2	TERMINAL, LUG	1010717-1			19
1	CONN, ELECT. RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
2	CLAMP, CABLE	1000220-3			16
4	CLAMP, CABLE	1000220-5			15
6	WASHER, CABLE CLAMP	1000223			14
1	CLAMP, TRANSDUCER	1000256			13
1	BRACKET, TRANSDUCER	1000257			12
1	TRANSDUCER, ABS. PRESSURE	1000272			11
6	WASHER, FLAT, ROUND	1000254			10
1	GUIDE, WIRE, ASS'Y	1000156			9
2	CONNECTOR, ELEC, RECEP 29 CONT	1000116			8
2	CONNECTOR, ELEC, RECEP 9 CONT	1000221			7
1	PRECISION RESOLVER ALIGN ASS'Y	1007216-011			6
1	GUIDE, WIRE, STUB SHAFT. O.A.	1000151			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16x RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN DMWHITE 8-7-62
APPROVED FOR MSC
W. J. [illegible]
BY DIRECTION
[illegible] 8 Nov 63

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

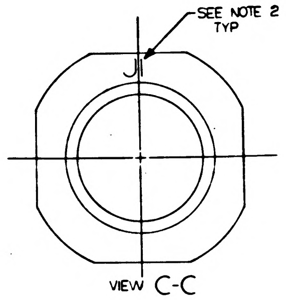
SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000205
SHEET 1 OF 1

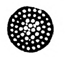
V
1000205

1000205 REV SHEET 1

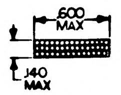
3/1000205


SEE NOTE 2
TYP
J1

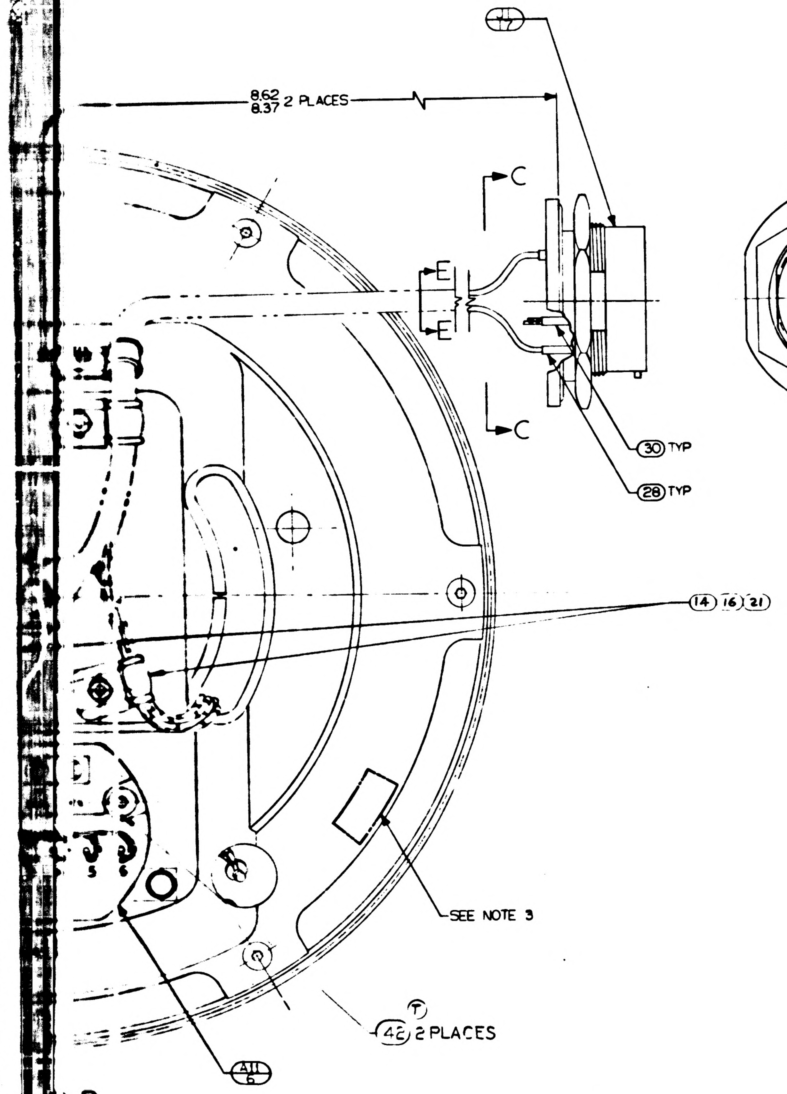
VIEW C-C

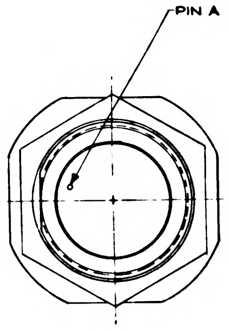


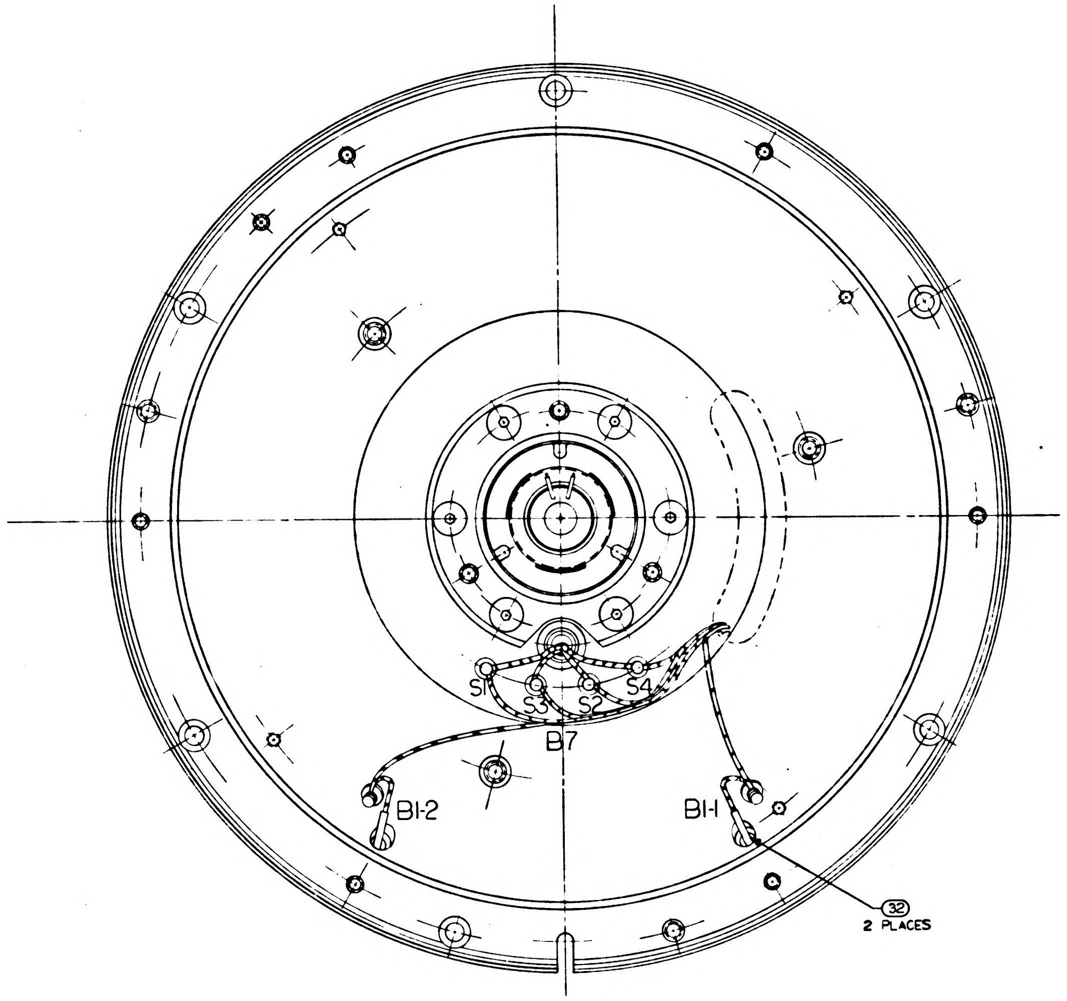
SECTION G-G
2 PLACES


.600
MAX
.140
MAX

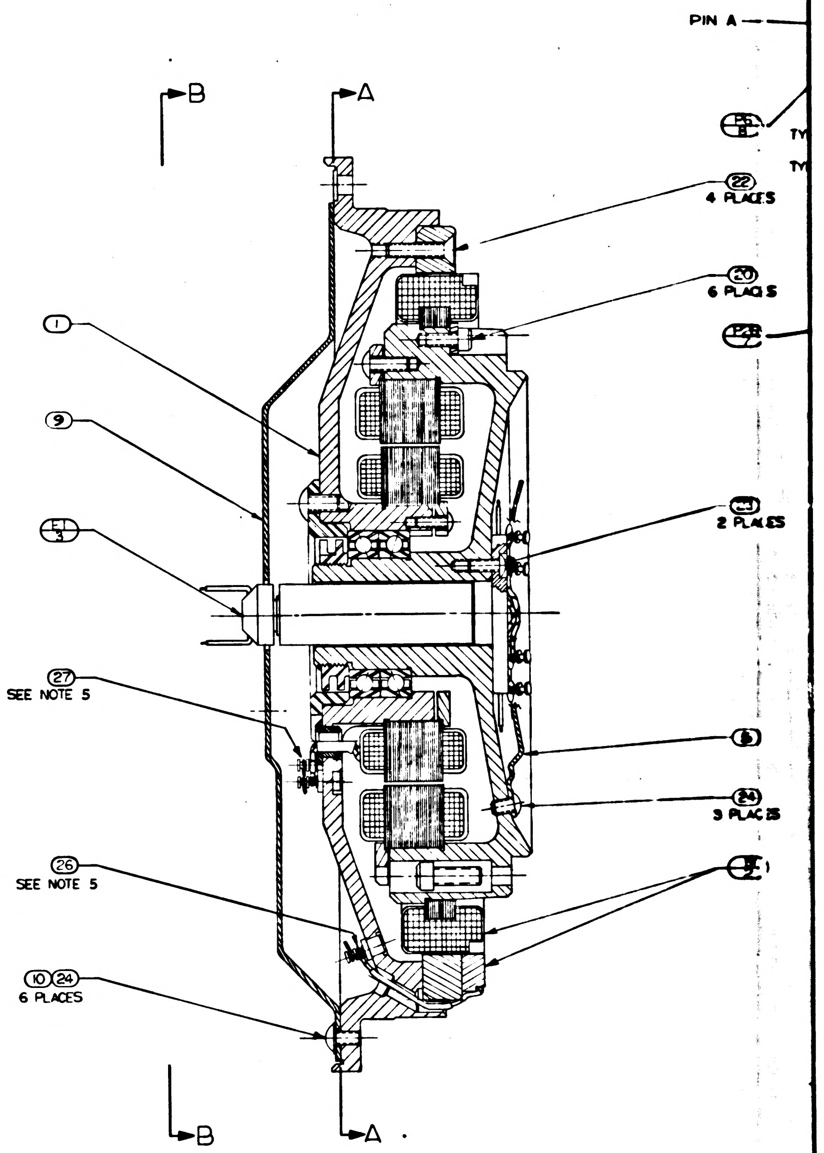
SECTION F-F
2 PLACES


8.62
8.37 2 PLACES
C
C
E
30 TYP
28 TYP
14 16 21
SEE NOTE 3
42 2 PLACES
A11
6




S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


PIN A
B
A
22
4 PLACES
20
6 PLACES
1
9
2 PLACES
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
24
3 PLACES
B
A

-B

NO OF FULL TURNS MAX
4
3

	REV	SHEET
1000205	U	1

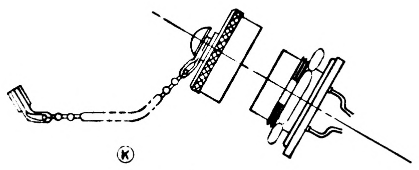
2/1000205

WIRING LEGEND

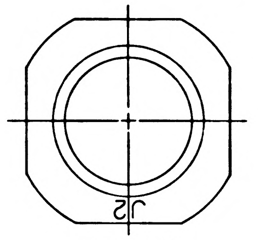
COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	
69-2	BRN	38	P26-B	P27-B	
[illegible]	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL 1
71-1	WHT/RED/GY		P26-H	E1-40	
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	
72-2	GY	40	P26-J	P27-E	
74-2	[illegible]	39	B7-P4	P5-U	

WIRING LEGEND

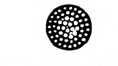
COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
ⓜ 22-1	WHT/BRN/ORN		J2-V	E1-29	
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-[illegible]	E-7	
28-1	BLK	33	J2-H	B1-1	
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-32	SEE DETAIL 1
46-1	WHT/BRN/GRN		P5-M	E1-31	
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL 1
52	WHT BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL 1
54-1	BLU		P6-R	E1-7	
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-$\bar{c}$	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



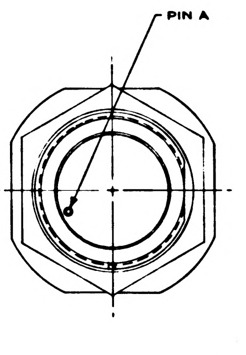
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1

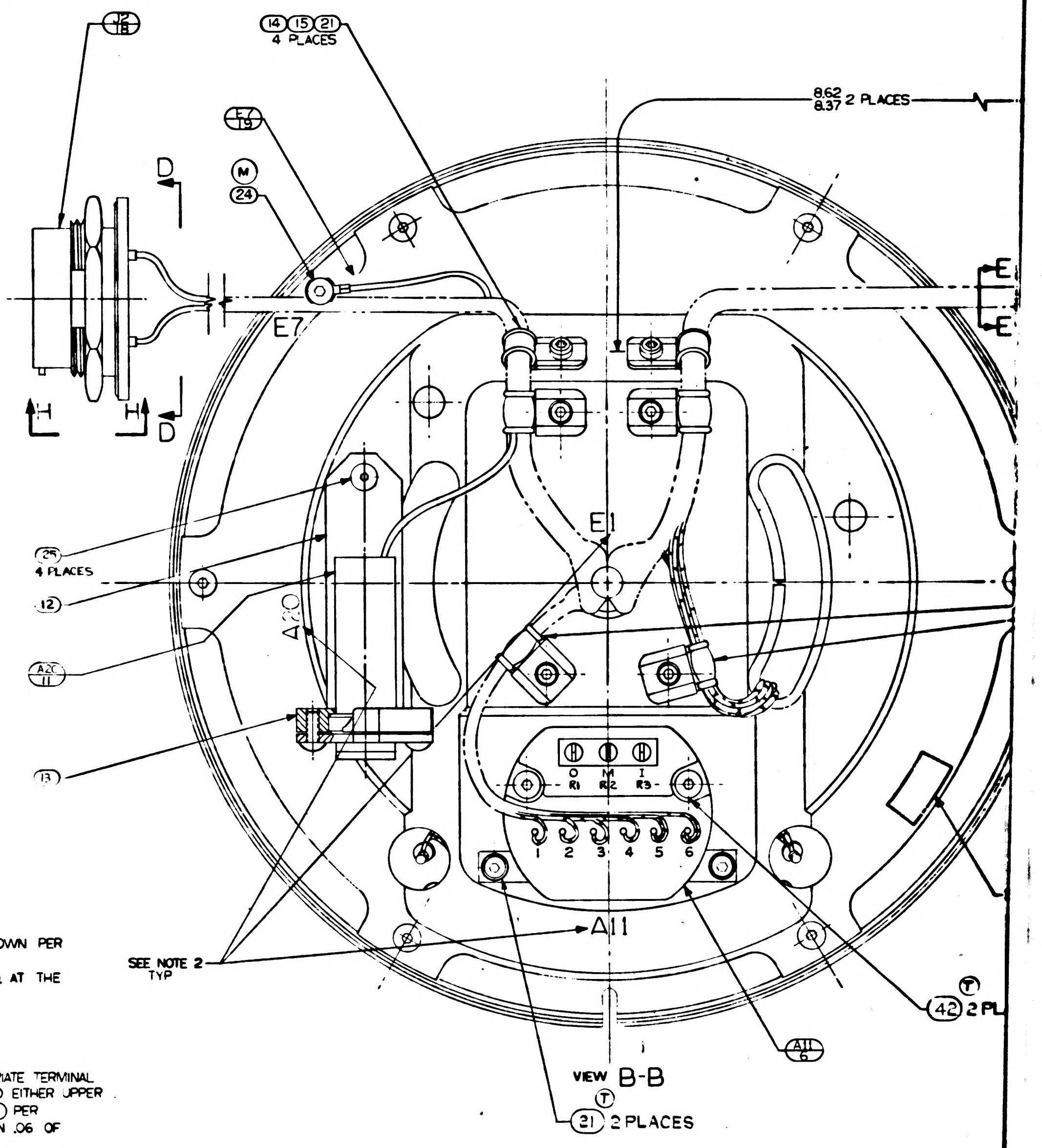


VIEW D-D



SECTION E-E
2 PLACES



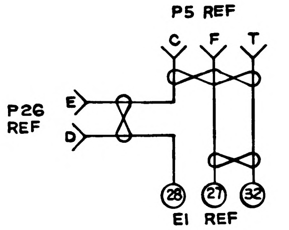


VIEW B-B

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%
   - ⑳㉑㉒㉔ 5.0 IN LB.
   - ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
Ⓚ 11. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING
Ⓟ NO. OF TURNS PER INCH

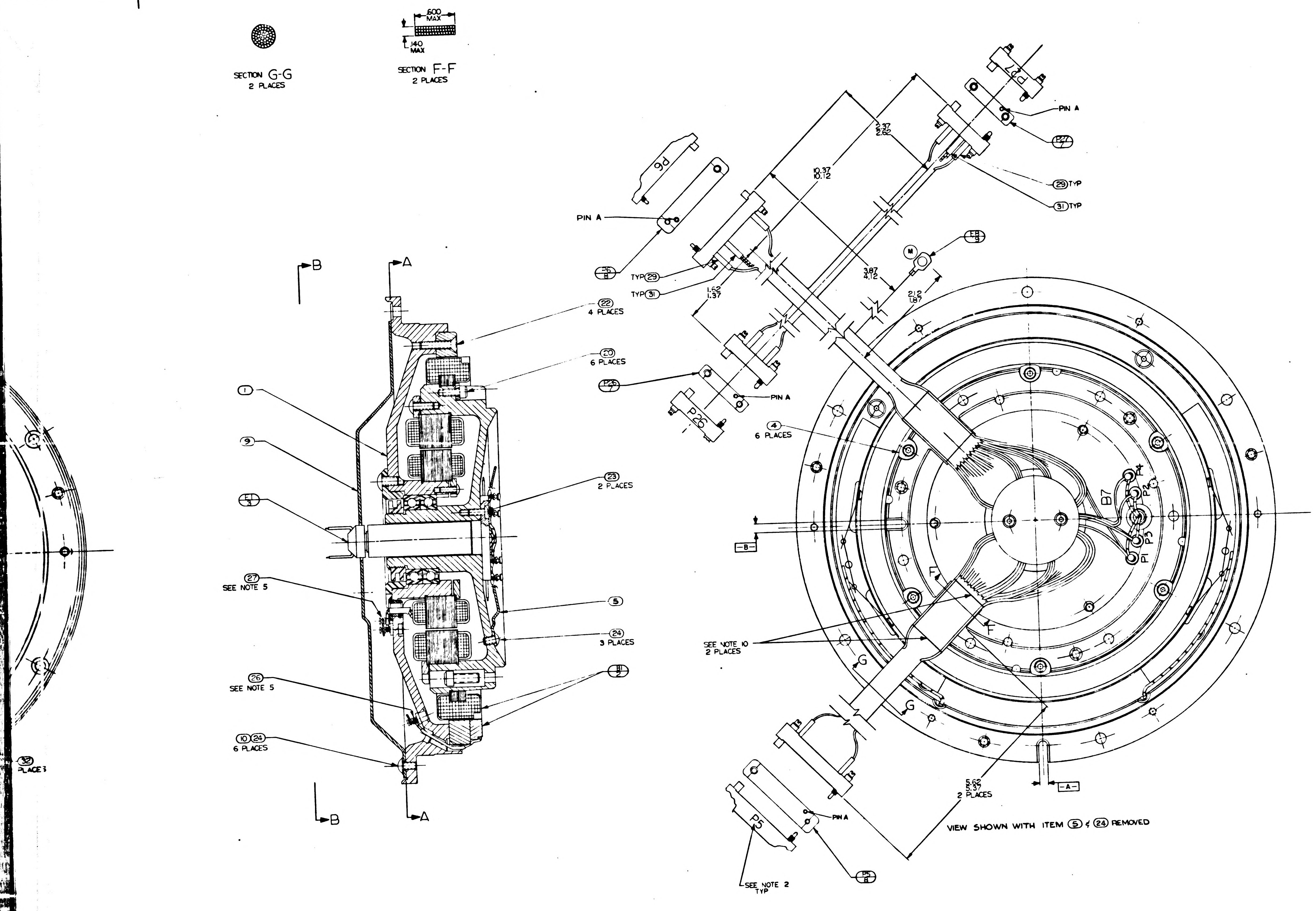
NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3



DETAIL 1

1000205	REV U	SHEET 1

	SYM	DESCRIPTION	DATE	APPROVAL	
	J	REPLACES REV H WITH CHANGES TDRR 02119	7/24/63	a.g.S	
	K	TDRR 03183	9-13-63		WK
	L	TDRR 04558	11-12-63		WK
ⓟ	M	TDRR C5172	11-19-63		WK
	N	TDRR 06237	18 FEB 64		WK
ⓟ	P	TDRR 06236	18 FEB 64		WK
	R	REVISED PER TDRR 07947	26 MAY 64	JJJ	AU
Ⓜ	S	REVISED PER TDRR 07954	JUNE 64	JHR	J.E.G.
Ⓜ	T	REVISED PER TDRR 10812	17 JUL 64	JJJ	M.E.M.
Ⓥ	U	REVISED PER TDRR 2[illegible]	[illegible]		DAS
Ⓜ	V	REVISED PER TDRR 246[illegible]	[illegible]		
	W	REVISED PER TDRR 3377	[illegible]		


SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
B
A
1
9
E1 3
27 SEE NOTE 5
26 SEE NOTE 5
10 24 6 PLACES
32 PLACES
22 4 PLACES
20 6 PLACES
23 2 PLACES
5
24 3 PLACES
B1 2
P6
PIN A
P6 8
TYP 29
TYP 31
1.62
1.37
10.37
10.12
2.37
2.62
3.87
4.12
2.12
1.87
P27
PIN A
29 TYP
31 TYP
P4 9
M
P25 7
PIN A
P26
4 6 PLACES
B7
P4
P2
P3
P1
-B-
F
F
G
G
SEE NOTE 10 2 PLACES
5.62
5.37
2 PLACES
-A-
P5
PIN A
P5 8
SEE NOTE 2 TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
						42
	2	SCREW, CAP, SOC. HD. HEX.	MAS1352C04-11			41
Ⓜ	A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	40
	1	WIRE, ELEC. TYPE E-28 GY	1010416-9	MIL-W-16878	60 TOTAL LG	39
	1	WIRE, ELEC. TYPE E-28 VIO	-8	MIL-W-16878	68 TOTAL LG	38
	1	WIRE, ELEC. TYPE E-28 BRN	-2	MIL-W-16878	60 TOTAL LG	37
	1	WIRE, ELEC. TYPE E-28 BLU	-7	MIL-W-16878	14 TOTAL LG	36
	1	WIRE, ELEC. TYPE E-28 YEL	-5	MIL-W-16878	14 TOTAL LG	35
	1	WIRE, ELEC. TYPE E-28 RED	-3	MIL-W-16878	96 TOTAL LG	34
	1	WIRE, ELEC. TYPE E-28 WHT	-1[illegible]	MIL-W-16878	14 TOTAL LG	33
	1	WIRE, ELEC. TYPE E-28 BLK	-1	MIL-W-16878	48" TOTAL LG	32
Ⓢ	2	INSULATION, SLEEVING, ELEC HEAT SHRINKABLE	1010490-180		3/4 LONG	31
	6	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	30
	3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	29
	55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	28
	51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	27
	A/R	SOLDER	SN60WARP2	QQ-S-571		26
	A/R	SOLDER	SN10WARP2	QQ-S-571		25
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			24
	10	SCREW, BUT. HD. SELF-LKG SPL SOC.	1000250-12			23
	2	SCREW, BUT. HD. SELF-LKG SPL SOC.	1000250-2			22
	4	SCREW, FT. HD SELF-LKG HEX SOC.	1000104-17			21
	8	SCREW, CAP, SOC HD HEX	1000110-1			20
Ⓚ	6	SCREW, CAP SELF-LKG SOC HD HEX	MS1352C04LL4			19
	2	TERMINAL, LUG	1010717-1			18
Ⓛ	1	CONN, ELECT, RECEP., 32 PINS	1001492-2		SEE NOTE 11	17
Ⓚ	1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	16
	2	CLAMP, CABLE	1000220-3			15
	4	CLAMP, CABLE	1000220-5			14
	6	WASHER, CABLE CLAMP	1000223			13
	1	CLAMP, TRANSDUCER	1000256			12
	1	BRACKET, TRANSDUCER	1000257			11
	1	TRANSDUCER, ABS. PRESSURE	1000272			10
	6	WASHER, FLAT, ROUND	1000254			9
	1	GUIDE, WIRE, ASS'Y	1000156			8
	2	CONNECTOR, ELEC, RECEP 29 CONT.	1000116			7
Ⓟ	2	CONNECTOR, ELEC, RECEP 9 CONT.	1000221			6
Ⓥ	1	PRECISION RESOLVER ALIGN ASS'Y	1007216-011			5
	1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			4
	6	CLAMP, TORQUE MOTOR	1000087			3
	1	SLIP RING ASSY, ELEC, 50 CONT	1000038			2
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			1
	1	16X RSVR ASSY OUTER AXIS	1000161			

LIST OF PARTS AND MATERIALS

1000205 V

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

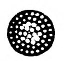
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

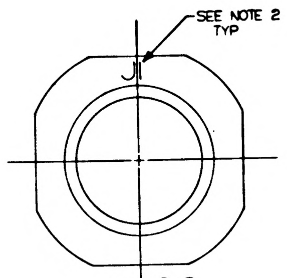
MIT INSTRUMENTATION LAB CONTRACT NAS 9 153
APPROVED
CHECKED
DRAWN D.M.WHITE 9-7-62
APPROVED FOR MSC
BY DIRECTION
8 NOV 63

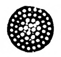
INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

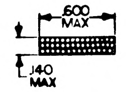
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000205
SCALE 2/1
UNIT WT
CODE IDENT
SHEET 1 OF 1

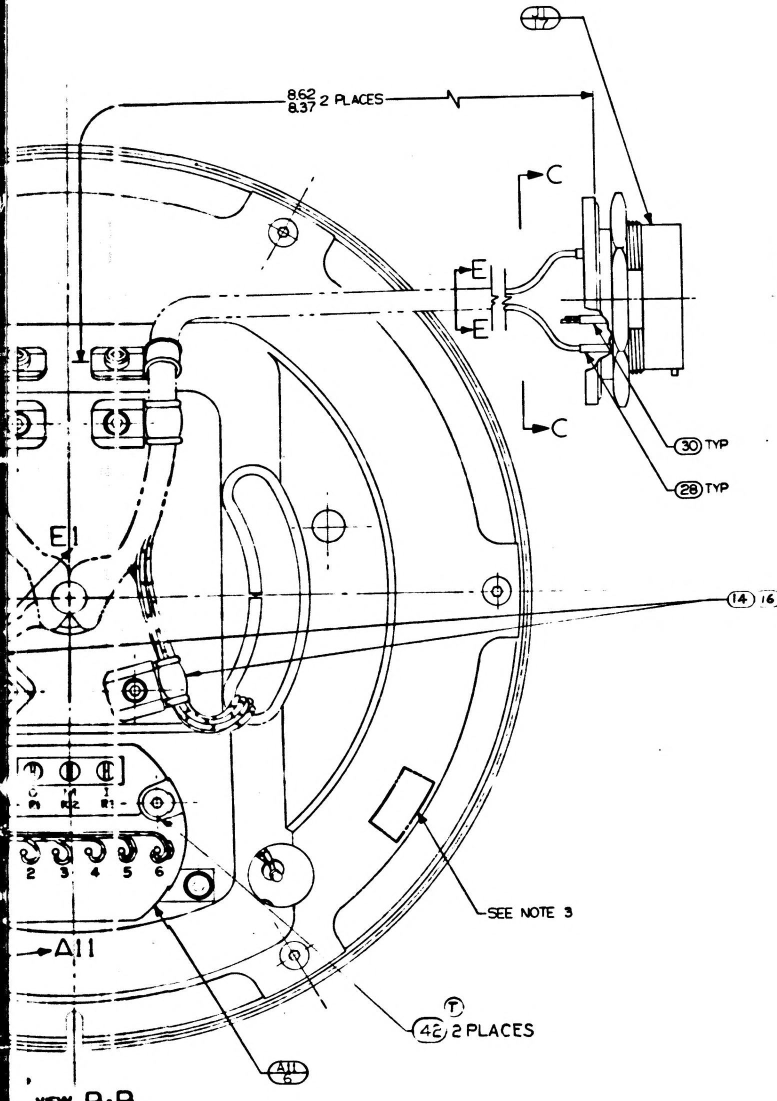
1000502

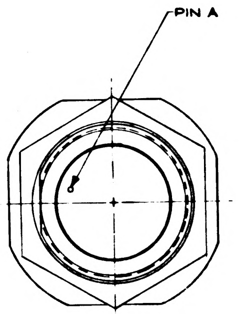

SECTION E-E
2 PLACES

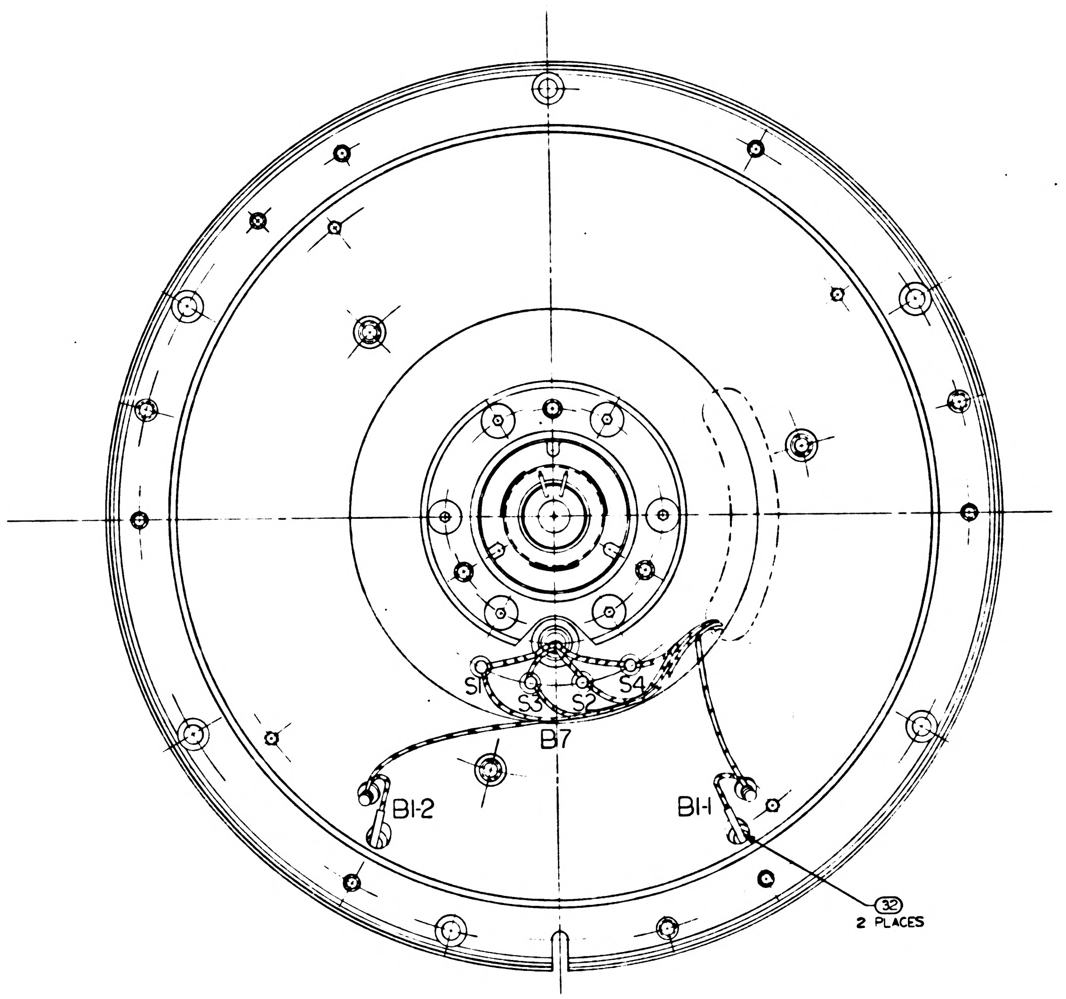

SEE NOTE 2
TYP
J1
VIEW C-C

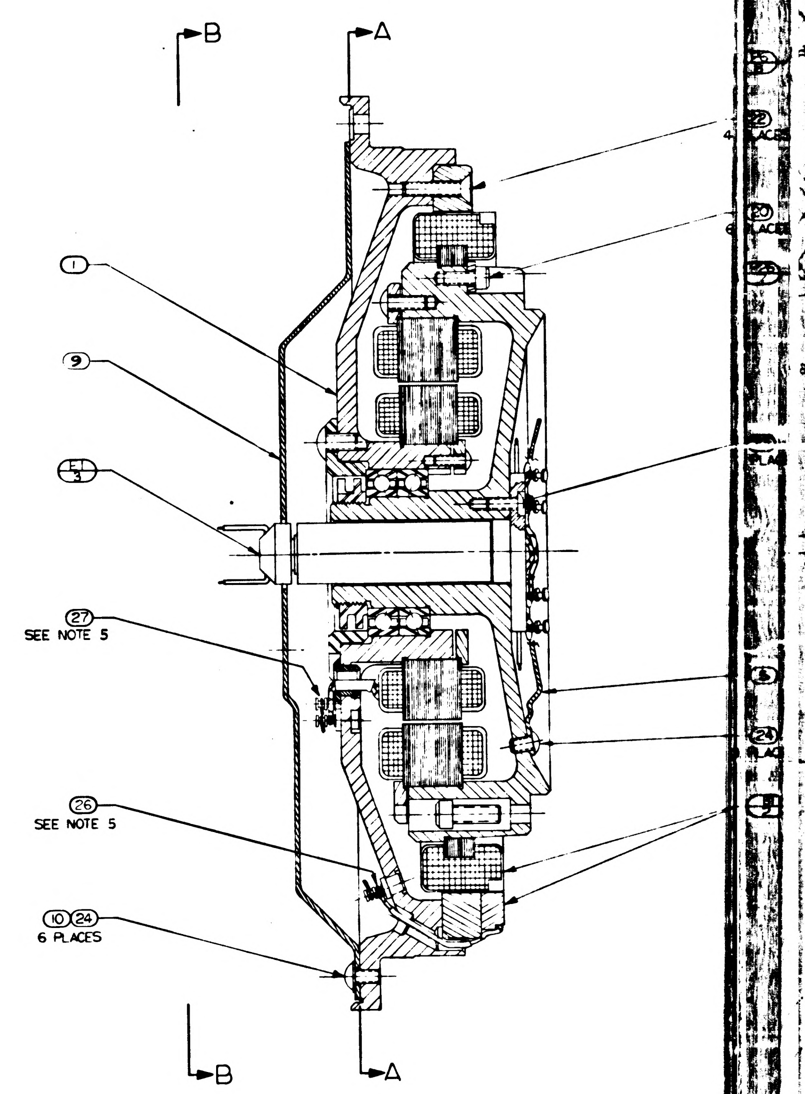

SECTION G-G
2 PLACES


.600
MAX
.140
MAX
SECTION F-F
2 PLACES


8.62
8.37 2 PLACES
C
C
E
E
30 TYP
28 TYP
E1
14 16 21
P1
R2
R1
2
3
4
5
6
SEE NOTE 3
A11
T
42 2 PLACES
A11
6
VIEW B-B
T
21 2 PLACES




S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES
VIEW A-A


PIN
B
A
1
9
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
B
A

FOLLOWING

TURNS MIN	NO OF FULL TURNS MAX
	4
	3

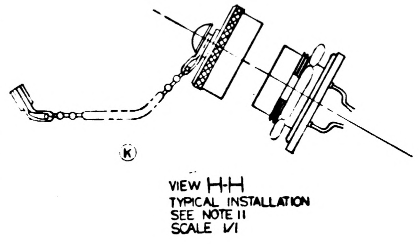
1000205	REV W	SHEET 1

WIRING LEGEND

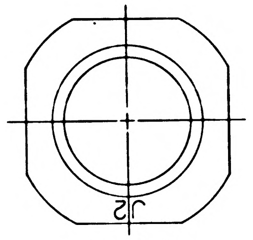
COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	
69-2	BRN	38	P26-B	P27-B	
[illegible]4	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL 1
71-1	WHT/RED/GY		P26-H	E1-40	
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	
[illegible]2-2	GY	40	P26-J	P27-E	
[illegible]-2	VIO	39	B7-P4	P5-U	

WIRING LEGEND

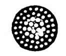
COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-S3	
9-2	RED	35	J1-D	B7-S1	
10-1	YEL	36	J1-E	B7-S2	
10-2	BLU	37	J1-F	B7-S4	
11-1	WHT/ORN/YEL		J1-G	E1-41	
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
Ⓜ 22-1	WHT/BRN/ORN		J2-V	E1-29	
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	
42-2	WHT/RED/GRN		P5-a	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-Z	E1-44	
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-32	SEE DETAIL 1
46-1	WHT/BRN/GRN		P5-M	E1-31	
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL 1
52	WHT BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL 1
54-1	BLU		P6-R	E1-7	
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-R	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT/YEL		P6-J	E1-15	
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/GRN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



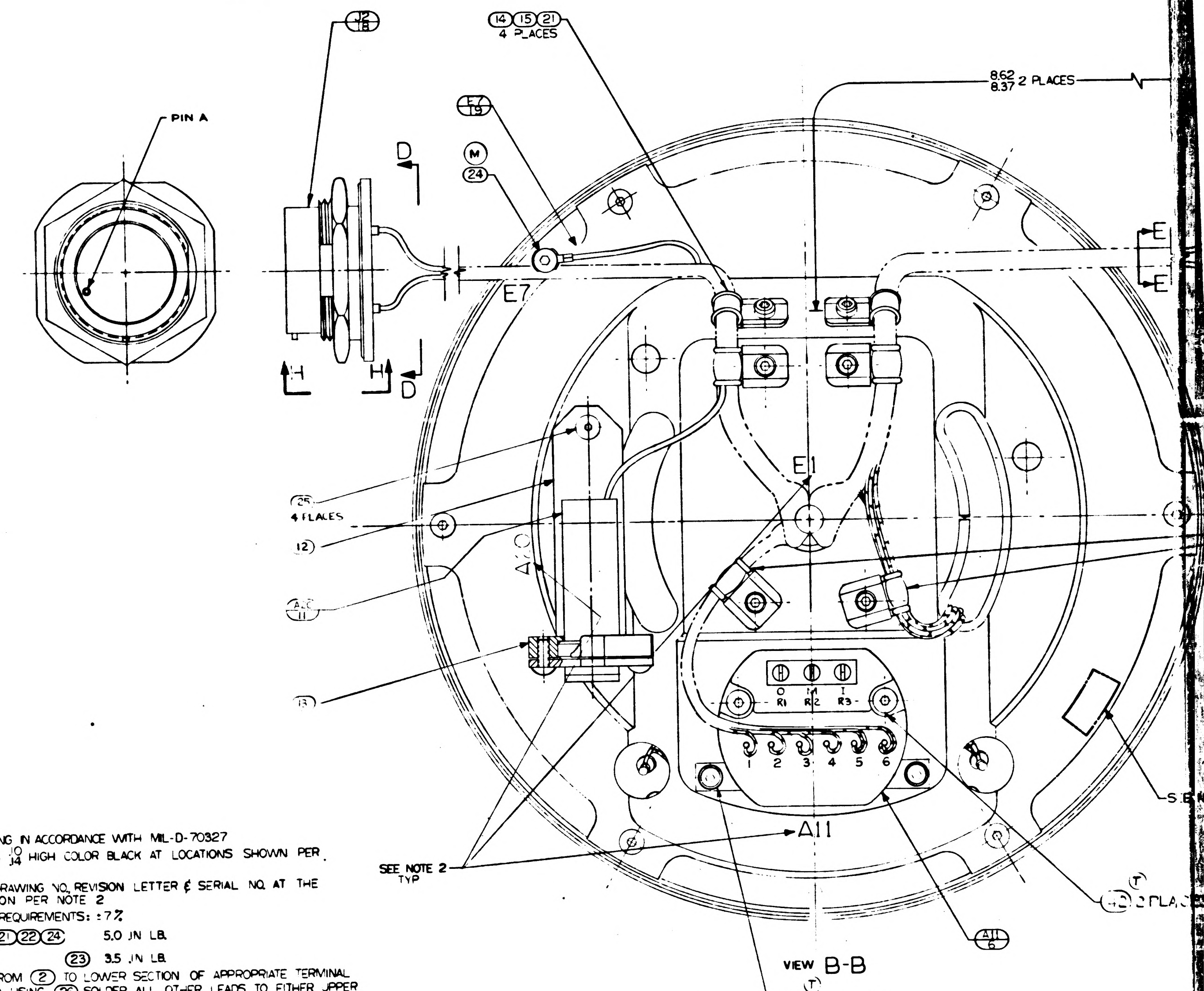
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW D-D



SECTION E-E
2 PLACES



VIEW B-B

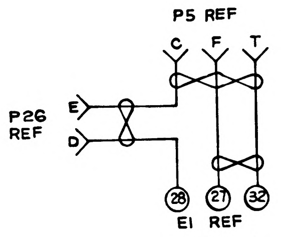
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO., REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%
   ⑳㉑㉒㉔ 5.0 IN LB.
   ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 5 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
Ⓚ 11. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

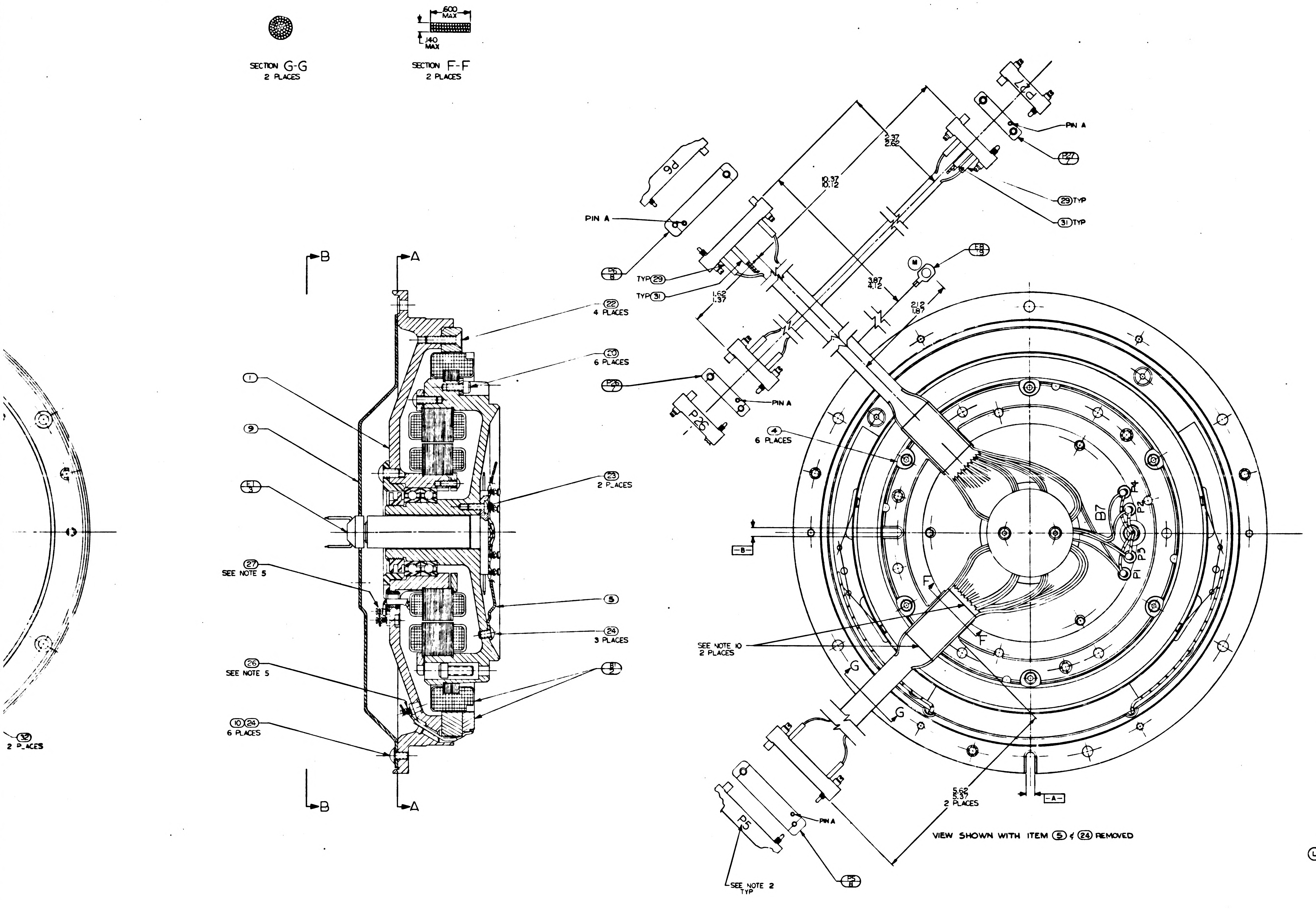
Ⓜ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

Ⓟ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3



DETAIL 1


SECTION G-G
2 PLACES
.600 MAX
.140 MAX
SECTION F-F
2 PLACES
B
A
1
9
E1
27 SEE NOTE 5
26 SEE NOTE 5
10 24 6 PLACES
32 2 PLACES
22 4 PLACES
20 6 PLACES
23 2 PLACES
5
24 3 PLACES
B
PIN A
P6
P6 8
TYP 29
TYP 31
1.62 1.37
10.37 10.12
2.37 2.62
3.87 4.12
2.12 1.87
P27
PIN A
29 TYP
31 TYP
M
E8 9
P26
P26
PIN A
4 6 PLACES
B7
P4
P2
P3
P1
F
F
G
G
-B-
-A-
SEE NOTE 10 2 PLACES
5.62 5.37 2 PLACES
P5
PIN A
P5 8
SEE NOTE 2 TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED

SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02119	7/24/63	[illegible]	[illegible]
K	TDRR 03183	9-13-63	[illegible]	WK
L	TDRR 04558	11-12-63	[illegible]	WK
M	TDRR 05172	11-19-63	[illegible]	WK
N	TDRR 06237	18 Feb 64	[illegible]	WK
P	TDRR 06236	18 Feb 64	[illegible]	WK
R	REVISED PER TDRR 07947	26 MAY 64	JJJ	AU
S	REVISED PER TDRR 07954	JUNE 64	JHR	J.E.G.
T	REVISED PER TDRR 10812	17 JUL 64	JJJ	MEM.
U	REVISED PER TDRR 1124	5 AUG [illegible]	[illegible]	SAS
V	REVISED PER TDRR 12146	[illegible]	[illegible]	[illegible]
W	REVISED PER TDRR 3377	[illegible] 64	[illegible]	[illegible]
Y	REVISED PER TDRR 3974	[illegible]	[illegible]	[illegible]

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
	2	SCREW, CAP, SOC. HD. HEX.	MS1352C04-11			42
M	A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	41
	1	WIRE, ELEC. TYPE E-28 GY	[illegible]-16-9	MIL-W-16878	60 TOTAL LG	40
	1	WIRE, ELEC. TYPE E-28 VIO	-8	MIL-W-16878	60 TOTAL LG	39
	1	WIRE, ELEC. TYPE E-28 BRN	-2	MIL-W-16878	60 TOTAL LG	38
	1	WIRE, ELEC. TYPE E-28 BLU	-7	MIL-W-16878	14 TOTAL LG	37
	1	WIRE, ELEC. TYPE E-28 YEL	-5	MIL-W-16878	14 TOTAL LG	36
	1	WIRE, ELEC. TYPE E-28 RED	-3	MIL-W-16878	96 TOTAL LG	35
	1	WIRE, ELEC. TYPE E-28 WHT	-1[illegible]	MIL-W-16878	14 TOTAL LG	34
	1	WIRE, ELEC. TYPE E-28 BLK	-	MIL-W-16878	48" TOTAL LG	33
S	2	INSULATION, SLEEVING, ELEC HEAT SHRINKABLE	1010490-180		3/4 LONG	32
	6	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	31
	3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
	55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
	51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
	A/R	SOLDER	SN60WARP2	QQ-S-571		27
	A/R	SOLDER	SN10WARP2	QQ-S-571		26
	4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
	10	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-12			24
	2	SCREW, BUT. HD. SELF-LKG. SPL. SOC.	1000250-2			23
	4	SCREW, FT. HD. SELF-LKG HEX SOC.	1000104-17			22
	8	SCREW, CAP, SOC HD. HEX	1000110-1			21
K	6	SCREW, CAP SELF-LKG SOC. HD. HEX	MS1352C04LL4			20
	2	TERMINAL, LUG	1010717-1			19
L	1	CONN, ELECT. RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
K	1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
	2	CLAMP, CABLE	1000220-3			16
	4	CLAMP, CABLE	1000220-5			15
	6	WASHER, CABLE CLAMP	1000223			14
	1	CLAMP, TRANSDUCER	1000256			13
	1	BRACKET, TRANSDUCER	1000257			12
	1	TRANSDUCER, ABS. PRESSURE	1000272			11
	6	WASHER, FLAT, ROUND	1000254			10
	1	GUIDE, WIRE, ASS'Y	1000156			9
	2	CONNECTOR, ELEC, RECEP 29 CONT	1000116			8
P	2	CONNECTOR, ELEC, RECEP 9 CONT.	1000221-1			7
V	1	PRECISION RESOLVER ALIGN ASS'Y	1007216-011			6
	1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
	6	CLAMP, TORQUE MOTOR	1000087			4
	1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
	1	16X RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN DM WHITE 8-7-62
APPROVED FOR MSC
W. J. [illegible]
BY DIRECTION
[illegible] 8 [illegible] 63

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

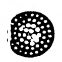
SCALE 2/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000205
SHEET 1 OF 1

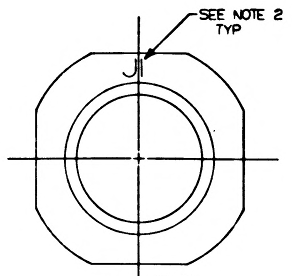
1000205 Y

1000205 REV Y SHEET 1

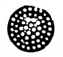
371000205



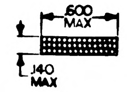
SECTION E-E
2 PLACES


SEE NOTE 2
TYP
J1

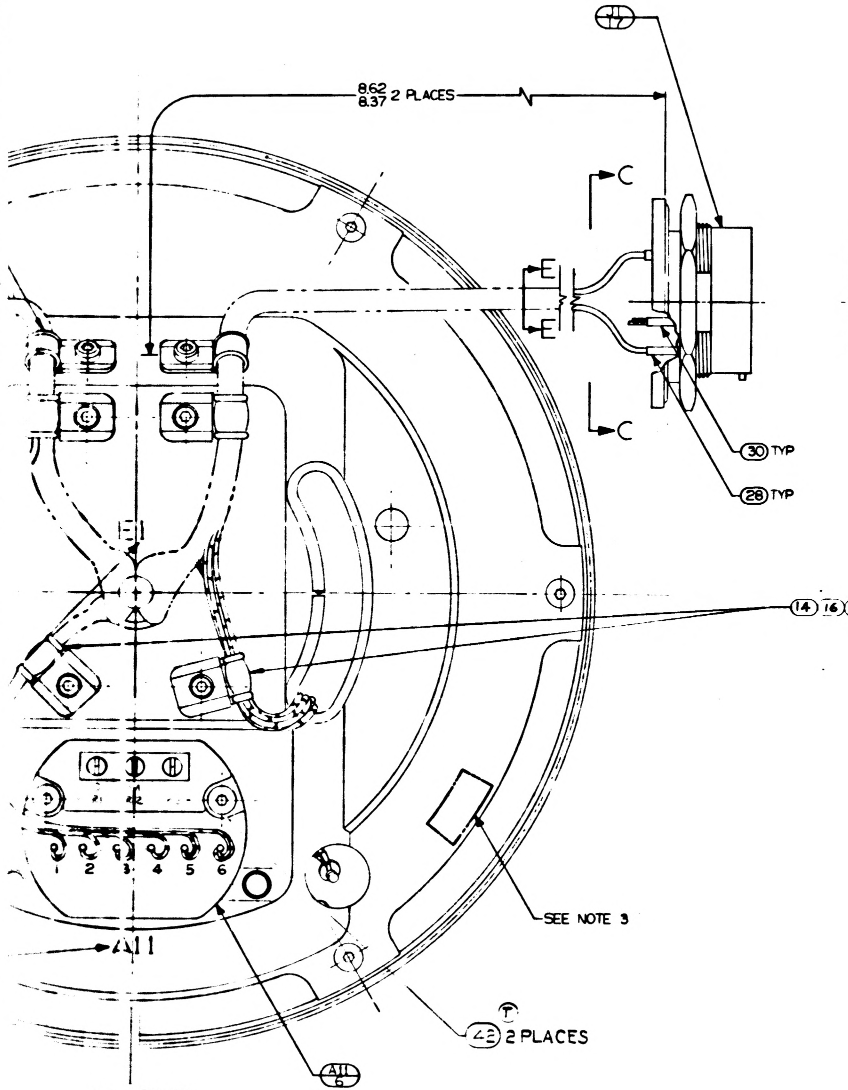
VIEW C-C



SECTION G-G
2 PLACES

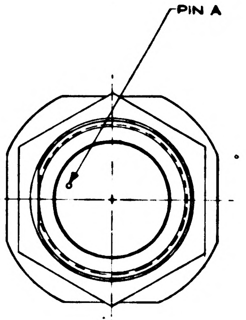

.600
MAX
.140
MAX

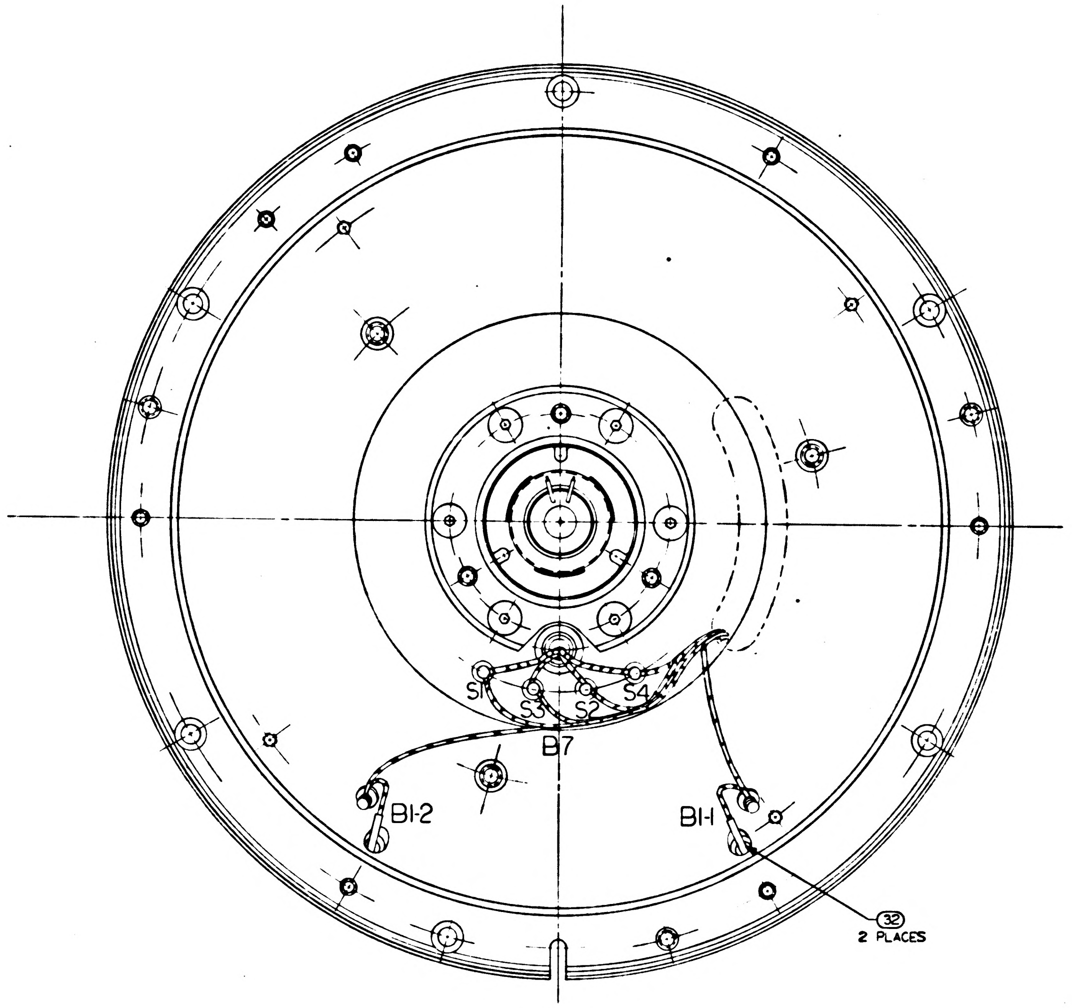
SECTION F-F
2 PLACES


8.62
8.37 2 PLACES
C
C
E
E
30 TYP
28 TYP
E1
14 16 21
1 2 3 4 5 6
A11
SEE NOTE 3
2 PLACES
A11
6

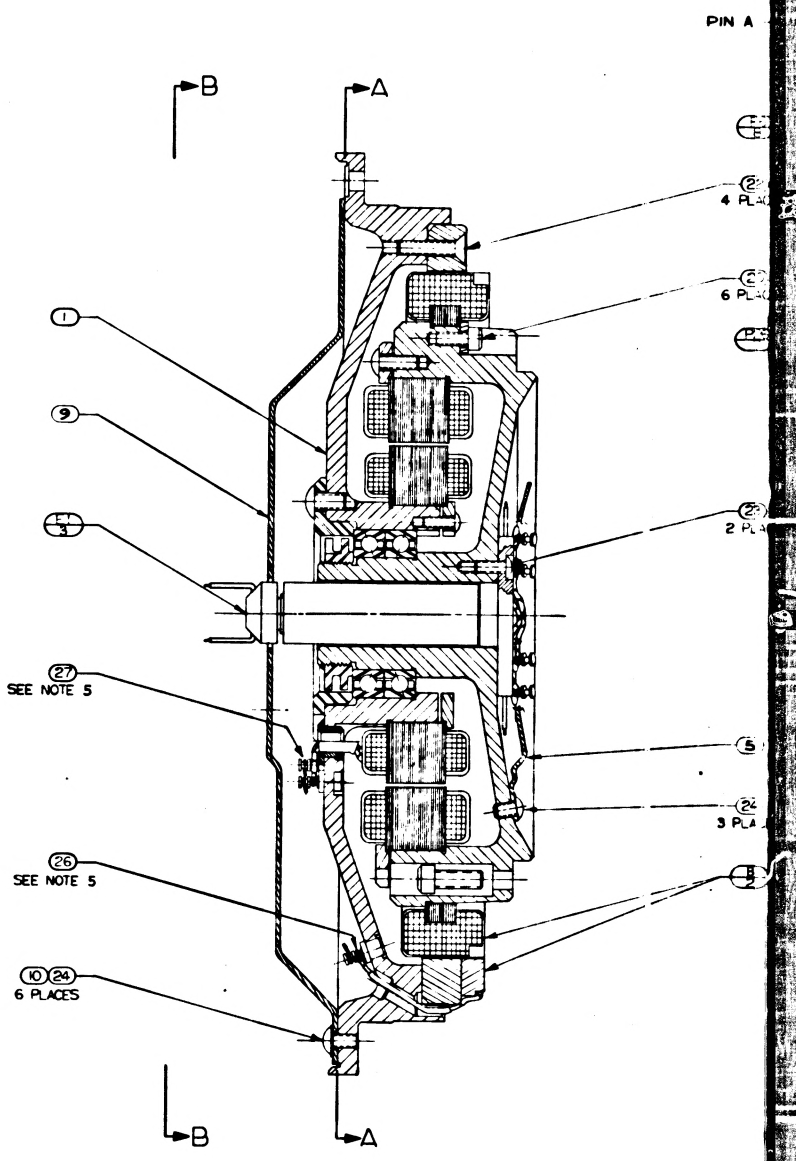
VIEW B-B

21 2 PLACES



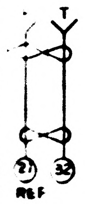

S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


PIN A
B
A
1
9
3
27
SEE NOTE 5
26
SEE NOTE 5
10 24
6 PLACES
4 PL
6 PL
2 PL
5
24
3 PLA
B
A

THE FOLLOWING

TURNS MIN	NO OF FULL TURNS MAX.
	4
	3


T
21
32
REF
AIL 1

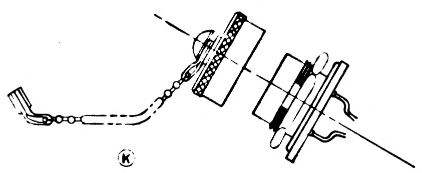
1000205	REV Y	SHEET 1

WIRING LEGEND

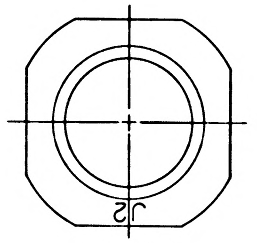
COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	
69-2	BRN	38	P26-B	P27-B	
[illegible]	WHT/BRN/RED		P26-D	E1-28	SEE DETAIL 1
71-1	WHT/RED/GY		P26-H	E1-40	
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	
72-2	GY	40	P26-J	P27-E	
74-2	VIO	39	B7-P4	P5-U	

WIRING LEGEND

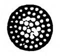
COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-52	
10-2	BLU	37	J1-F	B7-54	
11-1	WHT/ORN/YEL		J1-G	E1-41	
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-a	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
Ⓜ 22-1	WHT/BRN/ORN		J2-V	E1-29	
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT/BRN/RED		J2-X	E1-28	
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-[illegible]	E-7	
28-1	BLK	33	J2-H	B1-1	
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	
42-2	WHT/RED/GRN		P5-a	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-[illegible]	E1-44	
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-32	SEE DETAIL 1
46-1	WHT/BRN/GRN		P5-M	E1-31	
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	SEE DETAIL 1
52	WHT BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	SEE DETAIL 1
54-1	BLU		P6-R	E1-7	
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-T	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT YEL		P6-J	E1-15	
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	



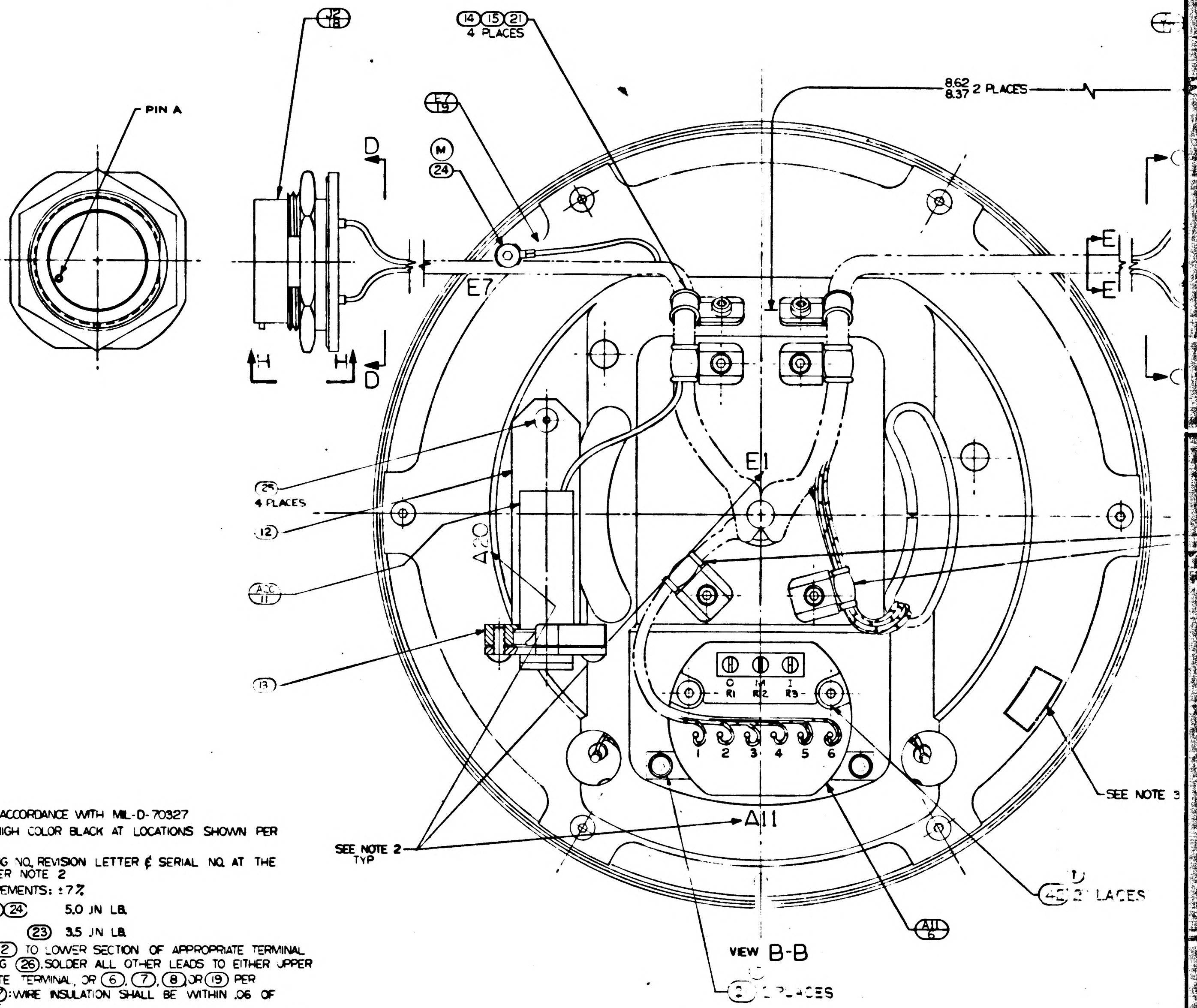
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW D-D



SECTION E-E
2 PLACES



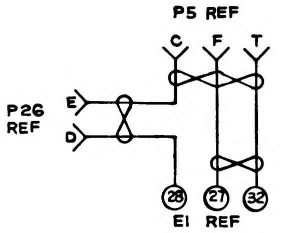
VIEW B-B

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\frac{10}{14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO, REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%
   - ⑳㉑㉒㉔ 5.0 IN LB.
   - ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED
11. Ⓚ PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

Ⓜ TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH

Ⓟ

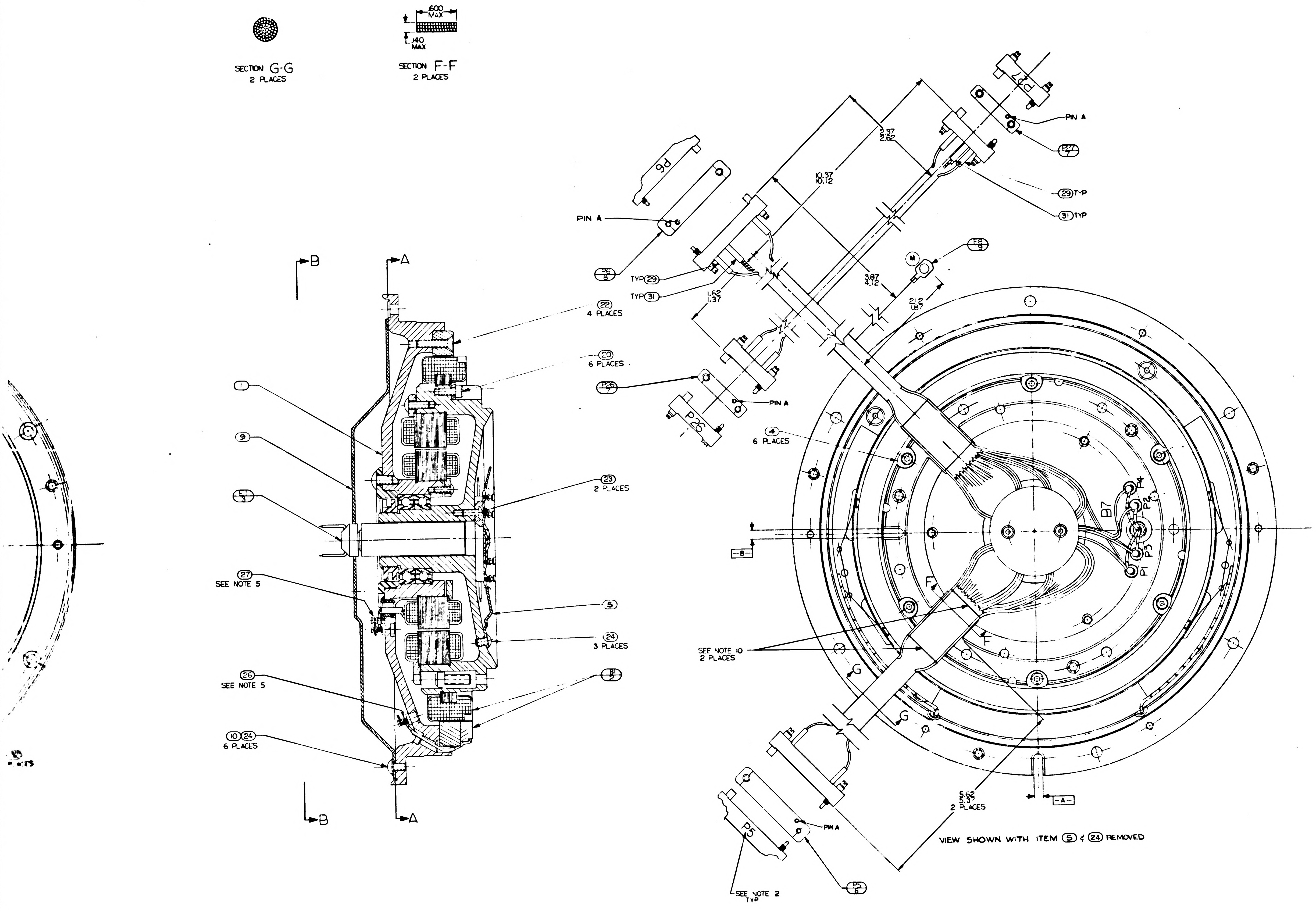
NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX.
2 OR 3	2	4
4 OR MORE	1	3



DETAIL 1

	REV	SHEET
1000205	Y	1

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
J	REPLACES REV H WITH CHANGES TDRR 02119	7/24/63	[illegible]	[illegible]
K	TDRR 03183	9-13-63	[illegible]	WK
L	TDRR 04558	11-12-63	[illegible]	WK
M	TDRR 05172	11-19-63	[illegible]	WK
N	TDRR 06237	18 FEB 64	[illegible]	WK
P	TDRR 06236	18 FEB 64	[illegible]	WK
R	REVISED PER TDRR 07947	26 MAY 64	JJJ	AU
S	REVISED PER TDRR 07954	[illegible] 64	JHR	J.E.G.
T	REVISED PER TDRR 10812	17 JUL 64	JJJ	MEM
U	REVISED PER TDRR 2 4	[illegible]	[illegible]	DAS
V	REVISED PER TDRR 2 46	[illegible]	JF	[illegible]
W	REVISED PER TDRR 3377	[illegible] 64	[illegible]	[illegible]
Y	REVISED PER TDRR 3074	[illegible]	[illegible]	[illegible]
Z	REVISED PER TDRR 30 5	[illegible] 65	[illegible]	[illegible]



4
3
2
1
D
C
B
A
SECTION G-G
2 PLACES
SECTION F-F
2 PLACES
.600 MAX
.140 MAX
B
A
PIN A
P6
PIN A
P6 / 8
TYP 29
TYP 31
22
4 PLACES
20
6 PLACES
P3 / 7
PIN A
P2 / 6
4
6 PLACES
10.37
10.12
2.37
2.62
1.62
1.37
3.87
4.12
2.12
1.87
P7 / 7
29 TYP
31 TYP
M
P8 / 9
1
9
23
2 PLACES
B
5
27
SEE NOTE 5
24
3 PLACES
26
SEE NOTE 5
21
10 24
6 PLACES
B
A
SEE NOTE 10
2 PLACES
F
F
G
G
B7
P4
P2
P3
P1
5.62
5.37
2 PLACES
A
PIN A
P5
P5 / 8
SEE NOTE 2
TYP
VIEW SHOWN WITH ITEM 5 & 24 REMOVED

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	SCREW, CAP, SOC. HD HEX.	NAS1352C04-11			42
A/R	TAPE, NYLON, WAXED		MIL-T-713	TYPE P CLASS 2	41
1	WIRE, ELEC TYPE E-28 GY	1010416-9	MIL-W-16878	60 TOTAL LG	40
1	WIRE, ELEC TYPE E-28 VIO	-8	MIL-W-16878	68 TOTAL LG	39
1	WIRE, ELEC TYPE E-28 BRN	-2	MIL-W-16878	60 TOTAL LG	38
1	WIRE, ELEC TYPE E-28 BLU	-7	MIL-W-16878	14 TOTAL LG	37
1	WIRE, ELEC TYPE E-28 YEL	-5	MIL-W-16878	14 TOTAL LG	36
1	WIRE, ELEC TYPE E-28 RED	-3	MIL-W-16878	96 TOTAL LG	35
1	WIRE, ELEC TYPE E-28 WHT	-10	MIL-W-16878	14 TOTAL LG	34
1	WIRE, ELEC TYPE E-28 BLK	-1	MIL-W-16878	48" TOTAL LG	33
2	INSULATION, SLEEVING, ELEC HEAT SHRINKABLE	1010490-180		3/4 LONG	32
6	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	31
3	INSULATION, SLEEVING, ELEC.	1006776-16		3/8 LONG	30
55	INSULATION, SLEEVING, ELEC.	1006776-18		5/16 LONG	29
51	INSULATION, SLEEVING, ELEC.	1006776-18		3/8 LONG	28
A/R	SOLDER	SN60WARP2	QQ-S-571		27
A/R	SOLDER	SN10WARP2	QQ-S-571		26
4	SCREW, BUT HD SELF LKG SPL SOC	1000250-13			25
10	SCREW, BUT. HD. SELF-LKG. SPL. SOC	1000250-12			24
2	SCREW, BUT. HD. SELF-LKG SPL SOC.	1000250-2			23
4	SCREW, FT. HD. SELF-LKG HEX SOC	1000104-17			22
2	SCREW, CAP, SOC HD HEX	1000110-1			21
6	SCREW, CAP SELF-LKG SOC HD HEX	NAS1352C04LL4			20
2	TERMINAL, LUG	1010717-1			19
1	CONN, ELECT. RECEP., 32 PINS	1001492-2		SEE NOTE 11	18
1	CONN, ELECT, RECEP. 32 PINS	1001492-1		SEE NOTE 11	17
2	CLAMP, CABLE	1000220-3			16
4	CLAMP, CABLE	1000220-5			15
6	WASHER CABLE CLAMP	1000223			14
1	CLAMP, TRANSDUCER	1000256			13
1	BRACKET, TRANSDUCER	1000257			12
1	TRANSDUCER, ABS. PRESSURE	1000272			
6	WASHER, FLAT, ROUND	1000254			10
1	GUIDE, WIRE, ASS'Y	1000156			9
2	CONNECTOR, ELEC, RECEP 29 CONT	1000116			8
2	CONNECTOR, ELEC, RECEP 9 CONT	1000221-			7
1	PRECISION RESOLVER ALIGN ASS'Y	1008283-011			6
1	GUIDE, WIRE, STUB SHAFT O.A.	1000151			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 50 CONT	1000038			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16X RSVR ASSY OUTER AXIS	1000161			1

LIST OF PARTS AND MATERIALS

1000201	DL1000201	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED
CHECKED
DRAWN D.M. WHITE 9-7-62
APPROVED FOR MSC
BY DIRECTION

INTER-GIMBAL SUB-ASSEMBLY
16 SPEED OUTER AXIS

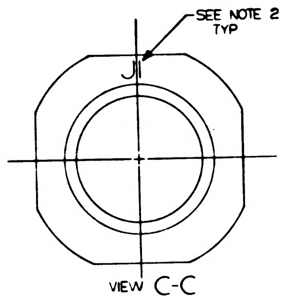
SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000205
SHEET 1 OF 1

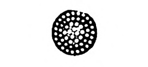
1000205 Z

1000205	REV Z	SHEET 1

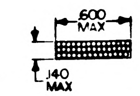
3/1000205


SEE NOTE 2
TYP
J1

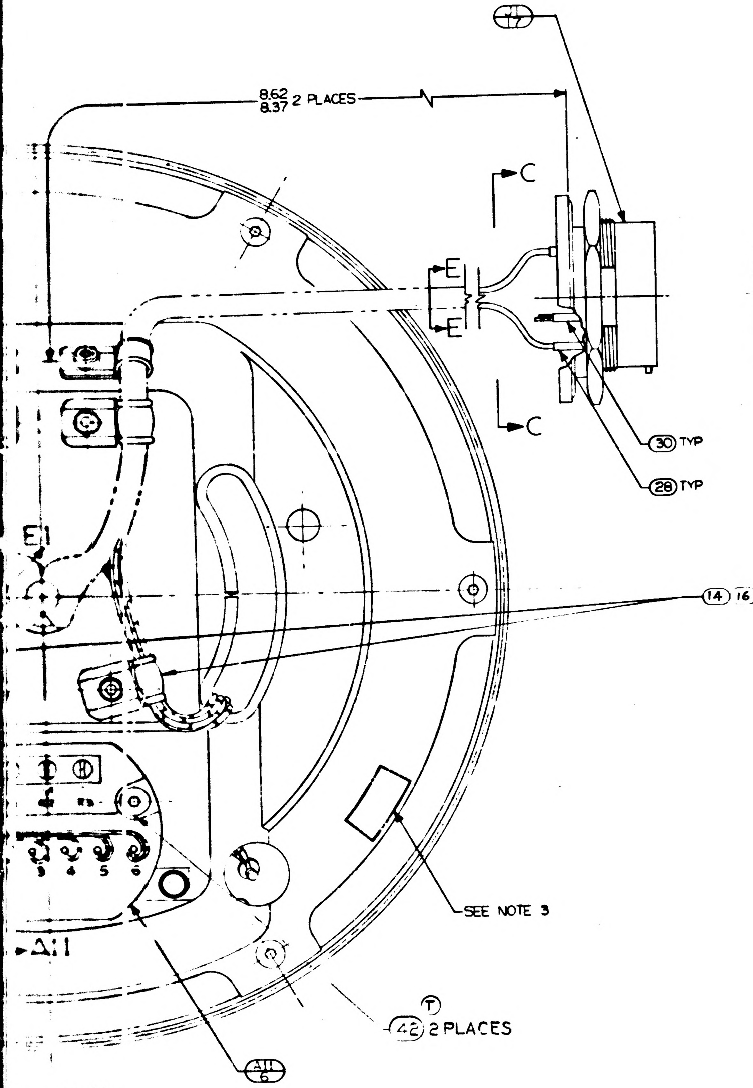
VIEW C-C



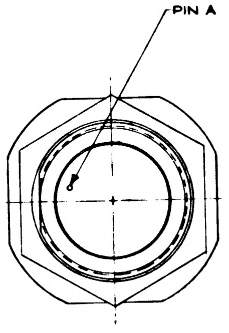
SECTION G-G
2 PLACES

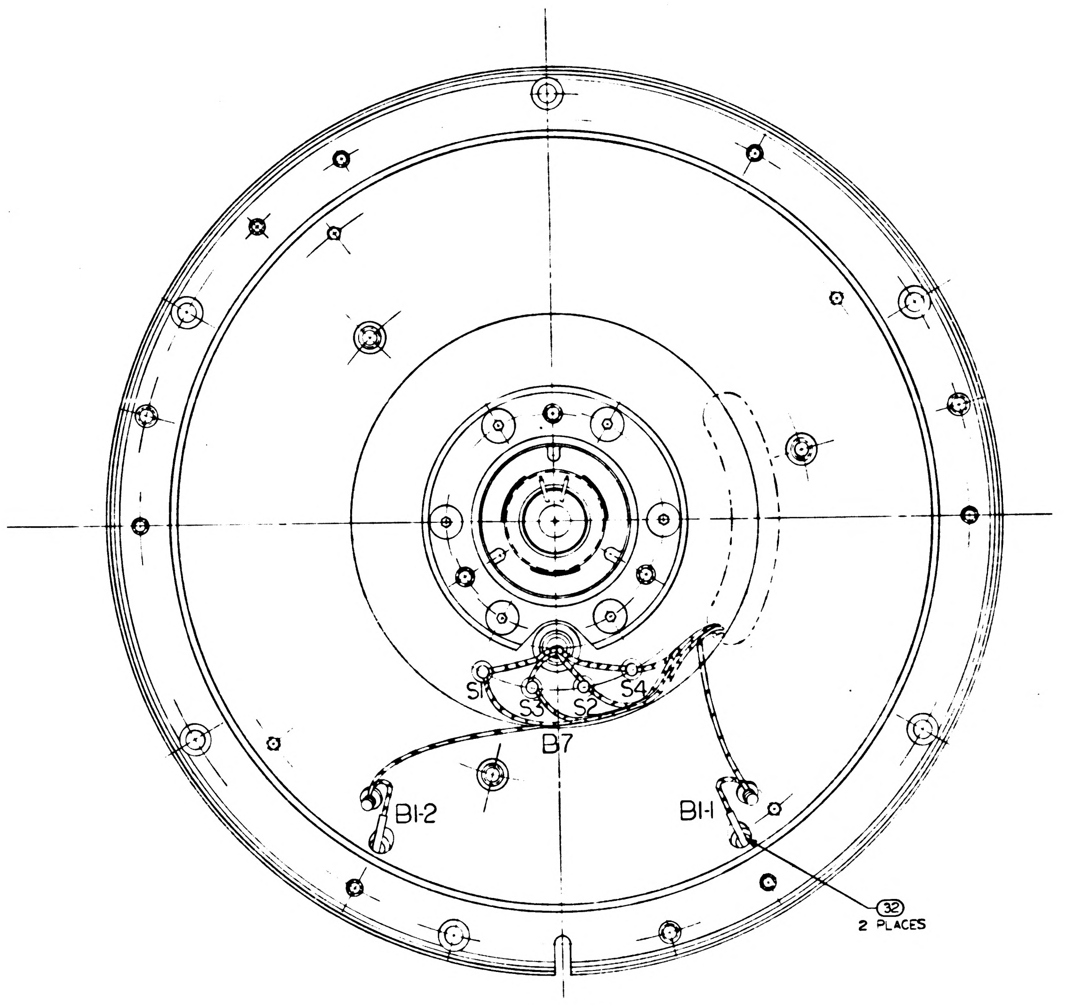

.600
MAX
.140
MAX

SECTION F-F
2 PLACES

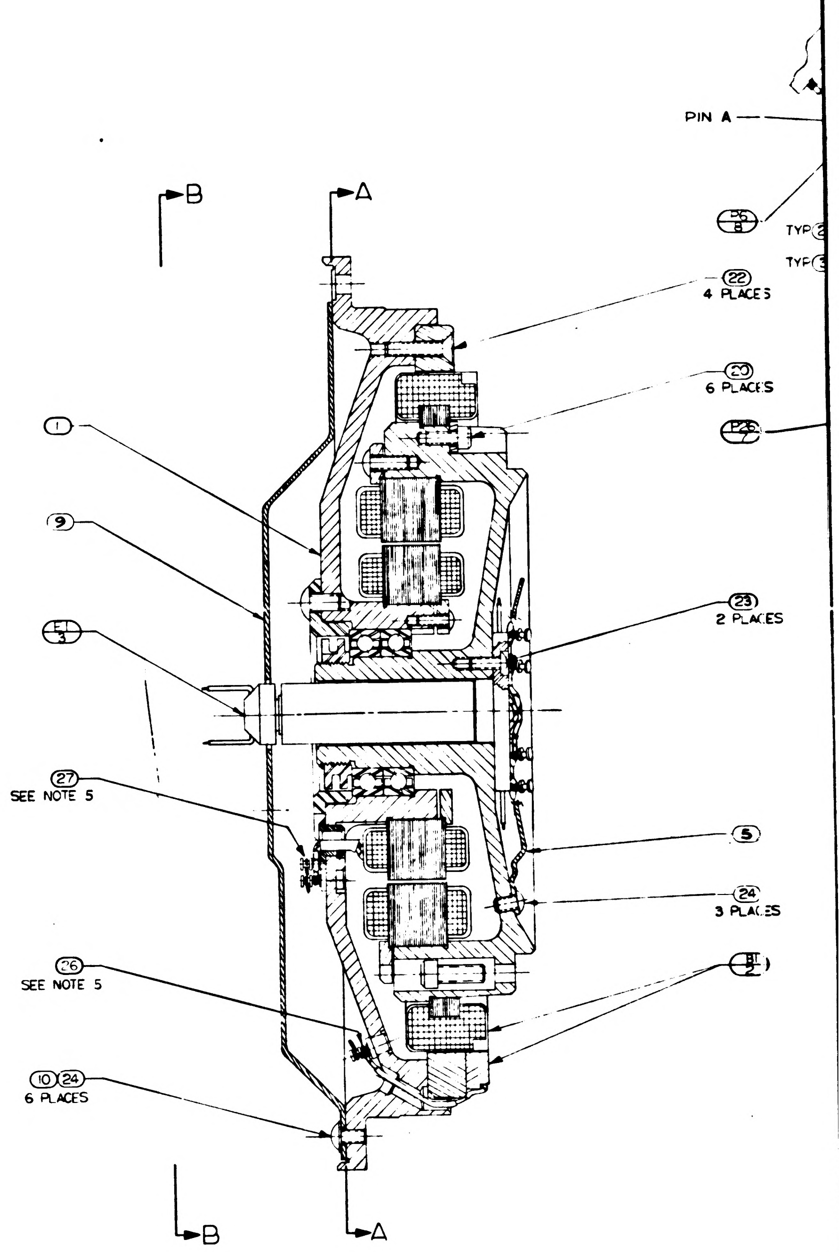

8.62
8.37 2 PLACES
17
C
C
E
E
E1
30 TYP
28 TYP
14 16 21
SEE NOTE 3
T
42 2 PLACES
11
6
A1

VIEW B-B
T
2 PLACES




S1
S3
S2
S4
B7
B1-2
B1-1
32
2 PLACES

VIEW A-A


PIN A
B
A
TYP
TYP
22
4 PLACES
29
6 PLACES
1
9
23
2 PLACES
27
SEE NOTE 5
5
24
3 PLACES
26
SEE NOTE 5
10 24
6 PLACES
B
A

LOWING

MIN	NO OF FULL TURNS MAX.
	4
	3

1000205	REV	SHEET
	Z	1

WIRING LEGEND

COND NO.	COLOR	FIND NO	FROM	TO	
69-1	RED	35	P26-A	P27-A	8
69-2	BRN	38	P26-B	P27-B	
[illegible]	WHT/BRN/RED		P26-D	E1-28	
71-1	WHT/RED/GY		P26-H	E1-40	8
71-2	WHT/RED/VIO		P26-K	E1-39	
72-	VIO	39	P26-K	P27-H	8
72-2	GY	40	P26-J	P27-E	
74-2	VIO	39	B7-P4	P5-U	

SEE DETAIL 1

WIRING LEGEND

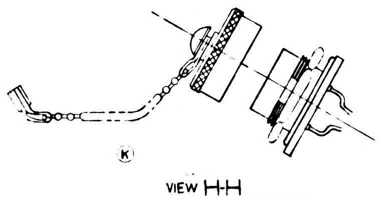
COND NO.	COLOR	FIND NO	FROM	TO	
15-3	WHT/VIO		J1-R	E1-18	
2-1	WHT/GRN		J1-f	E1-16	8
2-2	WHT/BLU		J1-g	E1-17	
3-1	WHT/ORN		J1-a	E1-14	8
3-2	WHT-/YEL		J1-b	E1-15	
4-1	WHT/RED/BLU		J1-Z	E1-38	8
4-2	WHT/RED/GRN		J1-Y	E1-37	
5-1	WHT/RED/YEL		J1-X	E1-36	8
5-2	WHT/RED/ORN		J1-W	E1-35	
6-1	VIO		J1-U	E1-8	8
6-2	BLU		J1-T	E1-7	
7-1	WHT/RED		J1-A	E1-13	8
7-2	WHT/BRN		J1-B	E1-12	
8-1	RED	35	J1-A	A11-4	8
8-2	BRN	38	J1-B	A11-5	
9-1	BLK	33	J1-C	B7-53	8
9-2	RED	35	J1-D	B7-51	
10-1	YEL	36	J1-E	B7-32	8
10-2	BLU	37	J1-F	B7-34	
11-1	WHT/ORN/YEL		J1-G	E1-41	8
11-2	WHT/ORN/GRN		J1-H	E1-42	
12-1	WHT/ORN/BLU		J1-J	E1-43	8
12-2	WHT/ORN/VIO		J1-K	E1-44	
13-1	WHT/YEL/BLU		J1-L	E1-47	8
13-2	WHT/YEL/VIO		J1-M	E1-48	
14-1	WHT/YEL/GRY		J1-N	E1-49	8
14-2	WHT/GRN/BLU		J1-P	E1-50	
15-1	YEL		J1-R	E1-5	8
15-2	GRN		J1-S	E1-6	
16-1	WHT/RED/GY		J2-f	E1-40	8
16-2	WHT/RED/VIO		J2-g	E1-39	
17-1	WHT/BLK/ORN		J2-a	E1-22	8
17-2	WHT/BLK/RED		J2-Z	E1-21	
18	GRN		J2-b	A20 GRN	
19	RED		J2-c	A20-RED	
20	BLK		J2-d	A20 BLK	
21	WHT		J2-e	A20-WHT	
22-1	WHT/BRN/ORN		J2-V	E1-29	8
22-2	WHT/BLK/VIO		J2-W	E1-26	
23-1	WHT BRN/RED		J2-X	E1-28	8
23-2	WHT/BLK/GY		J2-Y	E1-27	
24-1	GY		J2-A	E1-9	8
24-2	WHT/BLK		J2-B	E1-11	
24-3	WHT		J2-C	E1-10	
25-1	RED		J2-D	E1-3	8
25-2	BRN		J2-E	E1-2	
25-3	ORN		J2-F	E1-4	
26	BLK		J2-G	E1-1	
27	BLK	33	J2-G	E-7	
28-1	BLK	33	J2-H	B1-1	8
28-2	WHT	34	J2-J	B1-2	
29	BLK		B1-BLK	B1-1	
30	WHT		B1-WHT	B1-2	
31	WHT/BLK/BLU		J2-K	E1-25	
32-1	WHT/BLK/YEL		J2-L	E1-23	8
32-2	WHT/BLK/GRN		J2-M	E1-24	
33-1	WHT/BRN/YEL		J2-N	E1-30	8
33-2	WHT/BRN/GRN		J2-P	E1-31	
23-3	WHT/BRN/BLU		J2-R	E1-32	
35-1	WHT/GY		E1-19	A11-6	8
35-2	WHT/BLK/BRN		E1-20	A11-3	
36-1	WHT/BRN/VIO		E1-33	A11-6	8
36-2	WHT/BRN/GY		E1-34	A11-2	
15-4	WHT/ORN/GY		E1-45	J1-S	
36-3	WHT/YEL/GRN		E1-46	A11-1	
38	WHT/BLK/BLU		P5-R	E1-25	
39	WHT/BRN/VIO		B7-P4	E1-33	
74-1	WHT/BRN/GY		P5-V	E1-34	
40-1	WHT/GY		P5-X	E1-19	8
40-2	WHT/BLK/BRN		P5-Y	E1-20	
41-1	WHT/RED/ORN		P5-a	E1-35	8
41-2	WHT/RED/YEL		P5-b	E1-36	
42-1	WHT/RED/BLU		P5-d	E1-38	8
42-2	WHT/RED/GRN		P5-c	E1-37	
43-1	WHT/ORN/YEL		P5-e	E1-41	8
43-2	WHT/ORN/GRN		P5-h	E1-42	
44-1	WHT/ORN/VIO		P5-[illegible]	E1-44	8
44-2	WHT/ORN/BLU		P5-W	E1-43	
45-1	WHT/BRN/BLU		P5-T	E1-32	
46-1	WHT/BRN/GRN		P5-M	E1-31	8
46-2	WHT/BRN/YEL		P5-L	E1-30	
47-1	WHT/BLK/ORN		P5-J	E1-22	8
47-2	WHT/BLK/RED		P5-H	E1-21	
48-1	WHT/BLK/YEL		P5-S	E1-23	8
48-2	WHT/BLK/GRN		P5-N	E1-24	
49-1	GY	40	P5-E	P27-D	8
49-2	VIO	39	P5-D	P27-C	
50	WHT/BLK/VIO		P5-B	E1-26	
45-2	WHT/BLK/GY		P5-F	E1-27	
52	WHT BRN/ORN		P5-A	E1-29	
45-3	RED	35	P5-C	P26-E	
54-1	BLU		P6-R	E1-7	8
54-2	VIO		P6-S	E1-8	
60-3	WHT/VIO		P6-c̄	E1-18	
56	BLK		P6-V	E1-1	
57	BLK	33	P6-V	E8	
58-1	WHT/YEL/GY		P6-W	E1-49	8
58-2	WHT/GRN/BLU		P6-Z	E1-50	
59-1	WHT/YEL/BLU		P6-a	E1-47	8
59-2	WHT/YEL/VIO		P6-b	E1-48	
60-1	YEL		P6-c	E1-5	8
60-2	GRN		P6-d	E1-6	
61-1	WHT/BLU		P6-M	E1-17	8
61-2	WHT/GRN		P6-L	E1-16	
62-1	WHT YEL		P6-J	E1-15	8
62-2	WHT/ORN		P6-H	E1-14	
63-1	BRN	38	P6-N	B7-P1	8
63-2	RED	35	P6-K	B7-P3	
64-1	WHT/BRN		E1-12	B7-P1	8
64-2	WHT/RED		E1-13	B7-P3	
60-4	WHT/ORN/GY		E1-45	P6-d	
65	WHT/YEL/GRN		E1-46	B7-P2	
66-1	BRN		P6-E	E1-2	8
66-2	RED		P6-D	E1-3	
66-3	ORN		P6-F	E1-4	
67-1	BRN	38	P6-E	P27-B	8
67-2	RED	35	P6-D	P27-A	
68-1	WHT		P6-B	E1-10	8
68-2	GY		P6-A	E1-9	
68-3	WHT/BLK		P6-C	E1-11	

Ⓜ

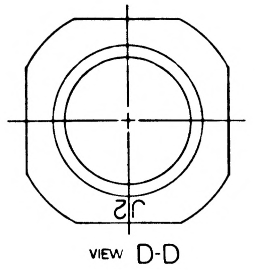
SEE DETAIL 1

SEE DETAIL 1

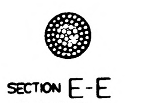
SEE DETAIL 1



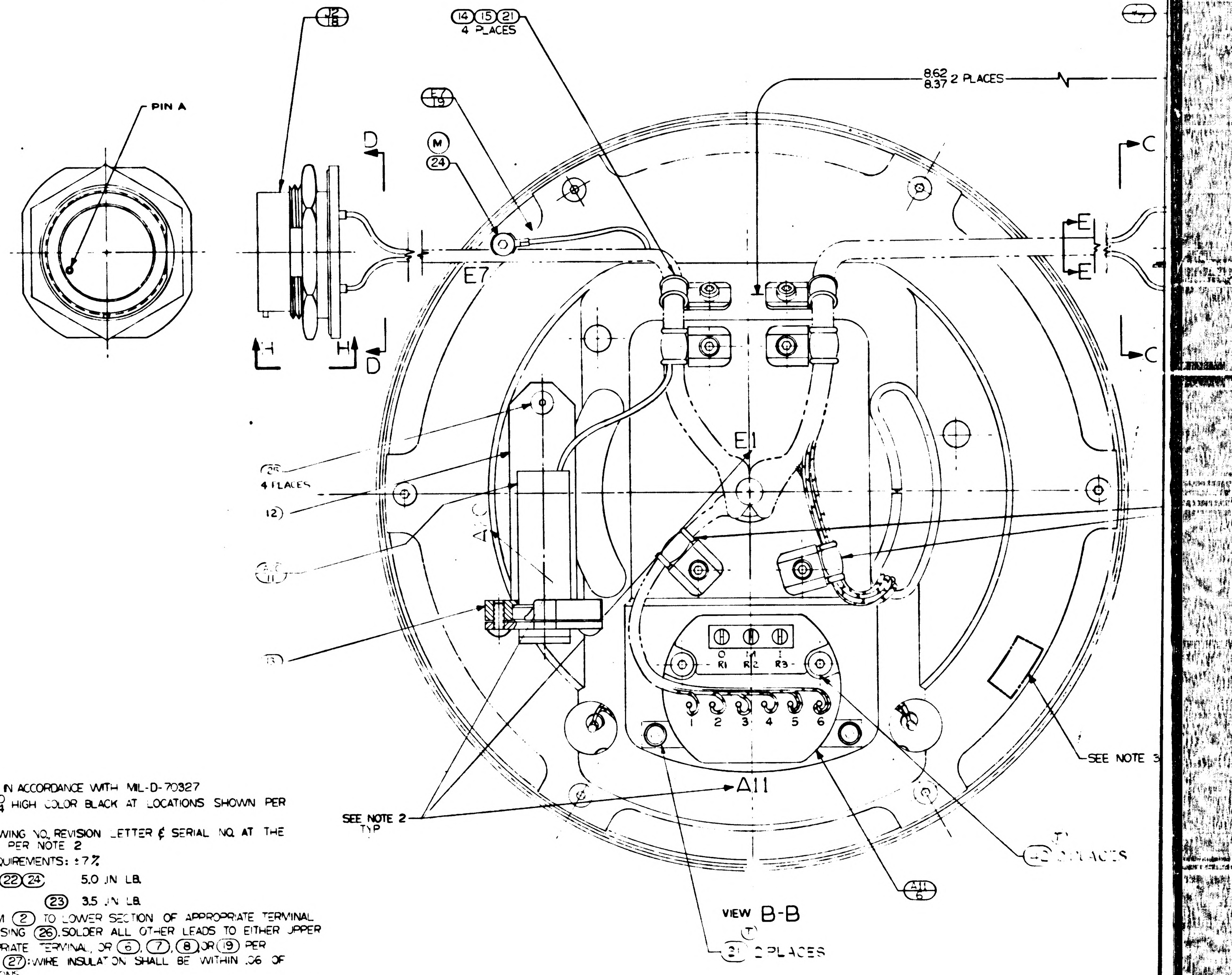
VIEW H-H
TYPICAL INSTALLATION
SEE NOTE 11
SCALE 1/1



VIEW D-D



SECTION E-E
2 PLACES



VIEW B-B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MARK CHARACTERS $\overset{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019
3. IDENTIFY USING DRAWING NO., REVISION LETTER & SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2
4. SCREW TORQUE REQUIREMENTS: ±7%

   ⑳㉑㉒㉔ 5.0 IN LB.

   ㉓ 3.5 IN LB.
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉖. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, OR ⑥, ⑦, ⑧ OR ⑲ PER MIL-STD-440 USING ㉗: WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
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9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000205
10. USE CHICAGO STITCH LACING IN AREAS INDICATED

(K) 11. PROTECTIVE CAP, NASA DWG NO 1001495, TO BE REMOVED ONLY AS NECESSARY FOR TEST & INSPECTION.

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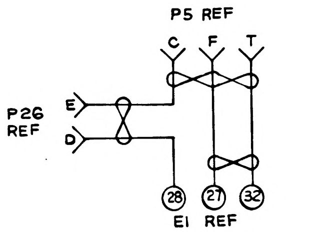
Ⓟ

NO. OF LEADS	NO. OF FULL TURNS MIN	NO OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3



DETAIL 1

	REV	SHEET
1000205	Z	1

1/1000205

1000205

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQ'D
1000038	Slip Ring Assy, Electrical, 50 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept. 29 Contacts	2
1000118-1	Connector, Elect, Plug 32 Contacts	1
1000118-2	Connector, Elect, Plug 32 Contacts	1
1000151	Wire guide Stub Shaft	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000202	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/12/62

INTERGIMBAL SUB_ASSEMBLY,
16 SPEED
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.

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CAMBRIDGE, MASS.

DWG. NO.

MANNED
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HOUSTON TEXAS

NASA DRAWING NO.
1000205

SHEET OF

1000206

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00202	12/27/62	ajb WK.

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2
1000112	Wire Guide Bearing Mt	1
1000152	Wire Guide Stub Shaft	1
1000162	16X Resolver Assembly, IA & MA	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201

APPLICATION

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
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APPROVED FOR MSC
W J Kline 12-12-62

MIT/IL APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE UNIT WT. CODE IDENT.

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1000206

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
(M)	A	TDRR 00202	12/27/62	WK.
	B	TDRR 00238	1/7/62	

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2
1000112	Wire Guide Bearing Mt	1
1000152	Wire Guide Stub Shaft	1
1000162	16X Resolver Assembly, IA & MA	1
1000093-4	Scr, But Hd, Self lock Hex Soc	2
1000104-5	Scr, F. H. Self lock Hex Soc	4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

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MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/ /62

INTERGIMBAL SUB -ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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1000206

SHEET OF

1000206

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ	A	TDRR 00202	12/27/62	WK
Ⓜ	B	TDRR 00238	1/7/62	
	C	TDRR 00420	2/19/63	

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2
1000112	Wire Guide Bearing Mt	1
1000152	Wire Guide Stub Shaft	1
1000162	16X Resolver Assembly, IA & MA	1
1000093-4	Scr, But Hd, Self lock Hex Soc	2
1000104-4	Scr, F. H. Self lock Hex Soc	4
1000104-17	Scr F. H. Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Cap. Self lock	6

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL	DATE
	12/2/62

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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NASA DRAWING NO.
1000206

SHEET OF

1000206

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 00202	12/27/62	ajB	WK
Ⓜ	B	TDRR 00238	1/7/62		
Ⓞ	C	TDRR 00420	2/19/63	ajB	
	D	TDRR 00763	4/10/63	ajB	WK

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2
1000112	Wire Guide Bearing Mt	1
1000152	Wire Guide Stub Shaft	1
1000162	16X Resolver Assembly, IA & MA	1
1000093-4	Scr, But Hd, Self lock Hex Soc	2
1000104-4	Scr, F. H. Self lock Hex Soc	4
1000104-17	Scr F. H. Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Cap. Self lock	6
1000125	Bracket, Connector	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL 1000201

APPLICATION

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
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APPROVED FOR MSC
12-12-62

MIT/IL APPROVAL DATE
12/12/62

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE
UNIT WT.
CODE IDENT.

MIT
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INCHES
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REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
M	A	TDRR 00202	12/27/62	ajB WK
M	B	TDRR 00238	1/7/62	WK
M	C	TDRR 00420	2/19/63	ajB WK
M	D	TDRR 00763	4/10/63	ajB WK
	E	TDRR 01060	4/30/63	ajB WK

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2
1000112	Wire Guide Bearing Mt	1
1000152	Wire Guide Stub Shaft	1
1000162	16X Resolver Assembly, IA & MA	1
~~1000093-4~~	~~Scr, But Hd, Self lock Hex Soc~~	~~2~~
~~1000104-8~~	~~Scr, F. H. Self lock Hex Soc~~	~~4~~
1000104-17	Scr F. H. Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Cap. Self lock	6
1000125	Bracket, Connector	2
1000250-12	Scr, But Hd, Self lkg Spl Soc	7
1000250-2	Scr, But Hd, Self lkg Spl Soc	2
1006776-18	Insulation Sleeving, Elect	30 inches
1006776-15	Insulation Sleeving Elect	5 inches
1000254	Washer, Flat, Round	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

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CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
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DRAWN		

APPROVED FOR MSC
W J Klein 12-12-62

MIT/IL APPROVAL	DATE
W Koffer	12/12/62

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00132			
Ⓜ	A	TDRR 00202	12/27/62	ajB	WK
Ⓜ	B	TDRR 00238	1/7/62		WK
Ⓜ	C	TDRR 00420	2/19/63	ajB	WK
Ⓜ	D	TDRR 00763	4/10/63	ajB	WK
	E	TDRR 01060	4/30/63	ajB	WK
Ⓜ	F	REPLACED BY REV G WITH CHANGES TDRR 01697	6-13-63	ajB	

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2
1000112	Wire Guide Bearing Mt	1
1000152	Wire Guide Stub Shaft	1
1000162	16X Resolver Assembly, IA & MA	1
~~1000093-4~~	~~Scr, But Hd, Self lock Hex Soc~~	~~2~~
~~1000104-4~~	~~Scr, F. H. Self lock Hex Soc~~	~~4~~
1000104-17	Scr F. H. Self lock Hex Soc	4
NAS608C440LL4	Scr. Soc Hd Cap. Self lock	6
1000125	Bracket, Connector	2
1000250-12	Scr, But Hd, Self lkg Spl Soc	7
1000250-2	Scr, But Hd, Self lkg Spl Soc	2
1006776-18	Insulation Sleeving, Elect	30 inches
1006776-15	Insulation Sleeving Elect	5 inches
1000254	Washer, Flat, Round	4

REPLACED BY REV G WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201	
NEXT ASSY	USED ON	
APPLICATION		

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		DATE
APPROVED	AJ Boyce	12/11/62
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DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W. Hoffer	12/12/62

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

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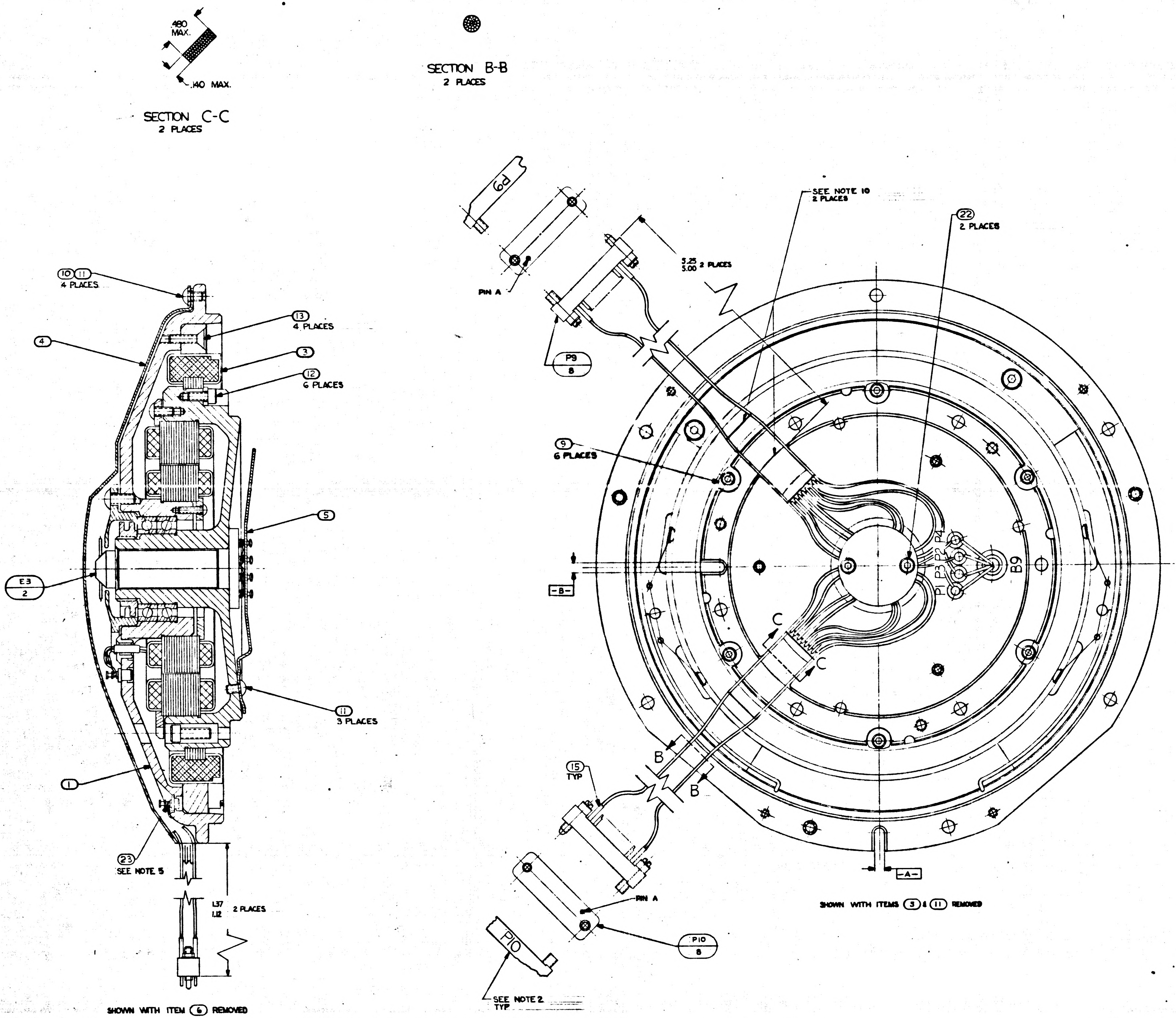
REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	G	REPLACES REV F WITH CHANGES TDRR 01687	4-29-63	4/16



.480 MAX.
.140 MAX.
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
10 11
4 PLACES
13
4 PLACES
4
3
12
6 PLACES
5
E3
2
11
3 PLACES
1
23
SEE NOTE 5
L37
L12
2 PLACES
SHOWN WITH ITEM 6 REMOVED
SEE NOTE 8
TYP
PIN A
P9
PIN A
P9
8
SEE NOTE 10
2 PLACES
3.25
3.00 2 PLACES
22
2 PLACES
9
6 PLACES
-B-
P1
P2
P3
P4
B9
C
C
B
B
15
TYP
PIN A
P10
8
P10
SEE NOTE 2
TYP
-A-
SHOWN WITH ITEMS 3 & 11 REMOVED

REPLACES REV F WITH CHANGES

A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	24
A/R	SOLDER	SNIOWARP 2	QQ-S-571		23
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	8" TOTAL LG	20
1	WIRE, ELEC TYPE E-28 RED		MIL-W-16878	16" TOTAL LG	19
1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30" TOTAL LG	17
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LG	16
86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
A/R	SOLDER	SN60 WARP2	QQ-S-571		14
4	SCR, FLT HD, SELF LKG, HEX SOC	1000104-17			13
6	SCR, CAP, SELF LKG, HEX SOC	NAS608C440LL4			12
7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
6	CLAMP, TORQUE MOTOR	1000087			9
2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
2	BRACKET, CONNECTOR, ELEC	1000125			6
1	GUIDE, WIRE, STUB SHAFT MA	1000152			5
1	GUIDE, WIRE, BEARING HSG MA	1000092			4
1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
1	SLIP RING ASSY, ELEC, 40 CONT	1000057			2
1	16 X RESOLVER ASSY IA & MA	1000162			1
QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000206 G

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1000203	DL1000201
NEXT ASSY	USED ON
APPLICATION	

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W.J. Rhine 6-26-63
NASA/R. APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

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1000206
SHEET 1 OF 1

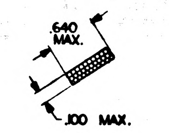
INCHES
PHOTOGRAPHIC SCALE ONLY
F-2

WIRING LEGEND

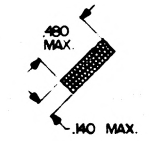
COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J5-R	E3-25	
2-1	WHT/BRN/VIO		J5-U	E3-33	8
2-2	WHT/BRN/GY		J5-V	E3-34	
3-1	WHT/GY		J5-X	E3-19	8
3-2	WHT/BLK/BRN		J5-Y	E3-20	
4	WHT/BRN/BLU		J5-T	E3-32	
5-1	YEL	20	J5-W	B9-S2	8
5-2	BLU	21	J5-Z	B9-S4	
6-1	WHT/RED/ORN		J5-a	E3-35	8
6-2	WHT/RED/YEL		J5-b	E3-36	
7-1	WHT/RED/BLU		J5-d	E3-38	8
7-2	WHT/RED/GRN		J5-z	E3-37	
8-1	BLK	17	J5-e	B9-S3	8
8-2	RED	19	J5-h	B9-S1	
9-1	WHT/BRN/GRN		J5-M	E3-31	8
9-2	WHT/BRN/YEL		J5-L	E3-30	
10-1	WHT/BLK/ORN		J5-J	E3-22	8
10-2	WHT/BLK/RED		J5-H	E3-21	
11-1	WHT/BLK/YEL		J5-S	E3-23	8
11-2	WHT/BLK/GRN		J5-N	E3-24	
12-1	WHT/RED/GY		J5-E	E3-40	8
12-2	WHT/RED/VIO		J5-D	E3-39	
13-1	WHT/BLK/VIO		J5-B	E3-26	8
13-2	WHT/BRN/ORN		J5-A	E3-29	
14-1	WHT/BLK/GY		J5-F	E3-27	8
14-2	WHT/BRN/RED		J5-C	E3-28	
15	WHT/BLK		J7-R	E3-11	
16	WHT/ORN		J7-U	E3-14	
17	WHT/BLU		J7-X	E3-17	
18	WHT		J7-P	E3-10	
19	WHT/BRN		J7-S	E3-12	
20	WHT/RED		J7-T	E3-13	
21	WHT/YEL		J7-V	E3-15	
22	WHT/GRN		J7-W	E3-16	
23	WHT/VIO		J7-Y	E3-18	
24-1	BLK	17	J7-z	B3-1	8
24-2	WHT	18	J7-e	B3-2	
25	BLK		B3-BLK	B3-1	
26	WHT		B3-WHT	B3-2	
27	GY		J7-M	E3-9	
28	VIO		J7-J	E3-8	
29	YEL		J7-E	E3-5	
30	BRN		J7-B	E3-2	
31	BLU		J7-H	E3-7	
32	ORN		J7-D	E3-4	
33	GRN		J7-F	E3-6	
34	BLK		J7-A	E3-1	
35	RED		J7-C	E3-3	
36	WHT/BLK		P9-R	E3-11	
37	WHT/RED		P9-T	E3-13	
38	WHT/ORN		P9-U	E3-14	
39	WHT/BLU		P9-X	E3-17	
40	WHT/YEL		P9-V	E3-15	
41	WHT/GRN		P9-W	E3-16	
42	WHT/VIO		P9-Y	E3-18	
43	WHT/BRN		P9-S	E3-12	
44	WHT		P9-P	E3-10	
45	GY		P9-M	E3-9	
46	VIO		P9-J	E3-8	
47	YEL		P9-E	E3-5	
48	BRN		P9-B	E3-2	
49-1	RED	19	P9-N	B9-P1	8
49-2	BLK	17	P9-K	B9-P3	
50	BLU		P9-H	E3-7	
51	GRN		P9-F	E3-6	
52	ORN		P9-D	E3-4	
53	RED		P9-C	E3-3	
54	BLK		P9-A	E3-1	
55	WHT/BLK/BLU		P10-R	E3-25	
56	WHT/BRN/BLU		P10-T	E3-32	
57-1	WHT/BLK/BRN		P10-Y	E3-20	8
57-2	WHT/GY		P10-X	E3-19	
58-1	WHT/RED/ORN		P10-a	E3-35	8
58-2	WHT/RED/YEL		P10-b	E3-36	
59-1	WHT/RED/BLU		P10-d	E3-38	8
59-2	WHT/RED/GRN		P10-z	E3-37	
60-1	WHT/RED/GY		P10-Z	E3-40	8
60-2	WHT/RED/VIO		P10-f	E3-39	
61-1	WHT/BRN/GRN		P10-M	E3-31	8
61-2	WHT/BRN/YEL		P10-L	E3-30	
62-1	WHT/BLK/ORN		P10-J	E3-22	8
62-2	WHT/BLK/RED		P10-H	E3-21	
63-1	WHT/BLK/YEL		P10-S	E3-23	8
63-2	WHT/BLK/GRN		P10-N	E3-24	
64-1	WHT/BLK/VIO		P10-B	E3-26	8
64-2	WHT/BRN/ORN		P10-A	E3-29	
65-1	WHT/BLK/GY		P10-F	E3-27	8
65-2	WHT/BRN/RED		P10-C	E3-28	
66-1	WHT/BRN/GY		B9-P2	E3-34	8
66-2	WHT/BRN/VIO		B9-P4	E3-33	

NOTES:

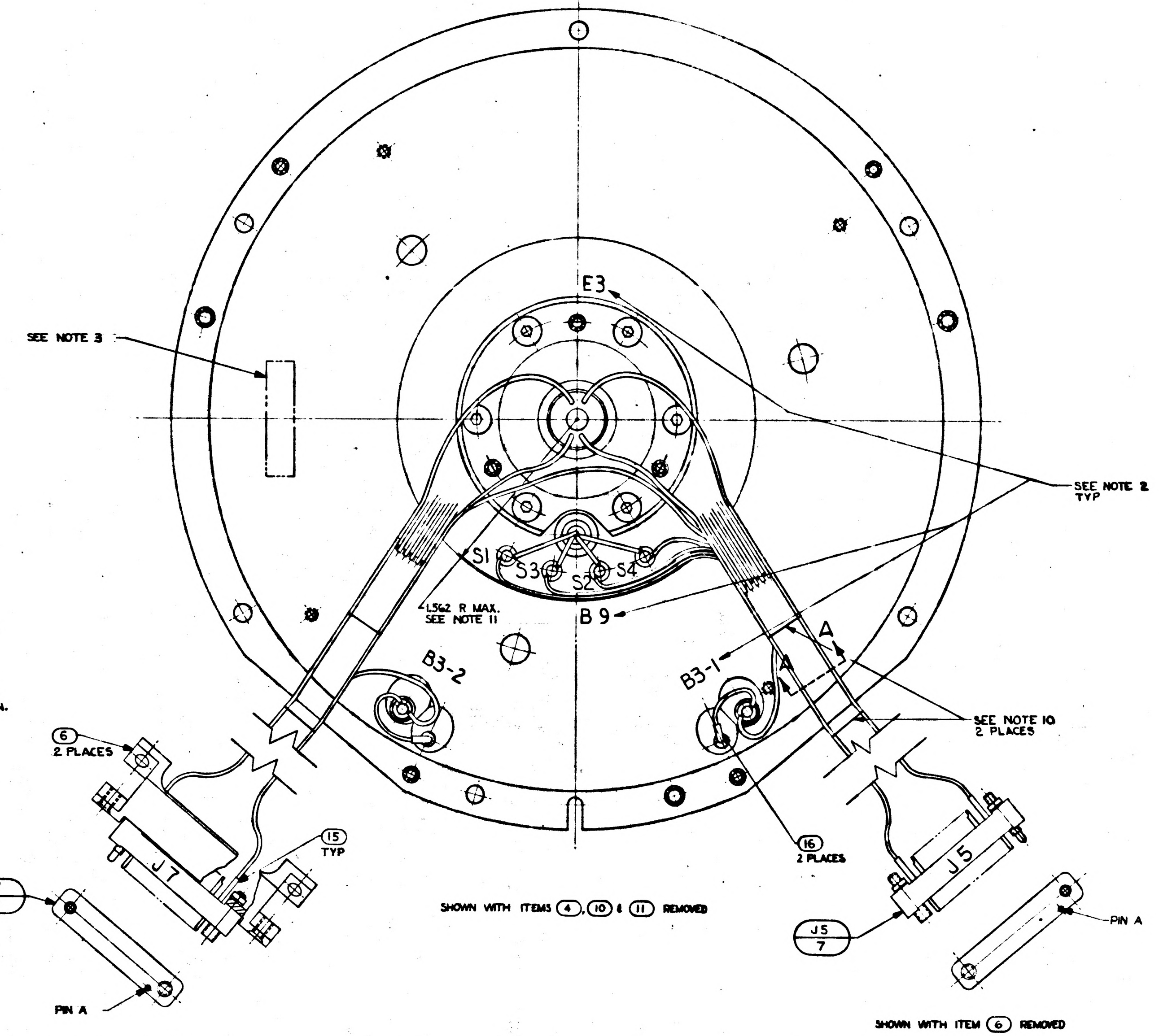
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   (11)(12)(13) 5 IN-LB
   (22) 3.5 IN-LB
5. SOLDER LEADS FROM (3) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (23). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL, (7) OR (8) PER MIL-STD-440 USING (14). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (3) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (3).
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.



SECTION A-A
2 PLACES

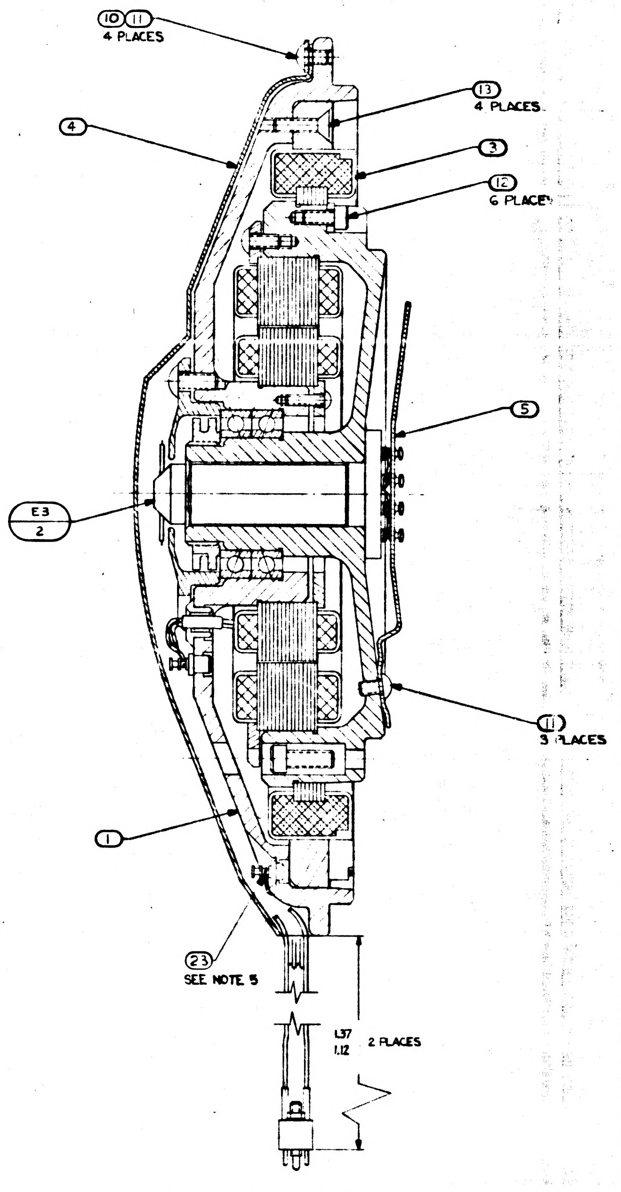


SECTION C-C
2 PLACES



SHOWN WITH ITEMS (4), (10) & (11) REMOVED

SHOWN WITH ITEM (6) REMOVED

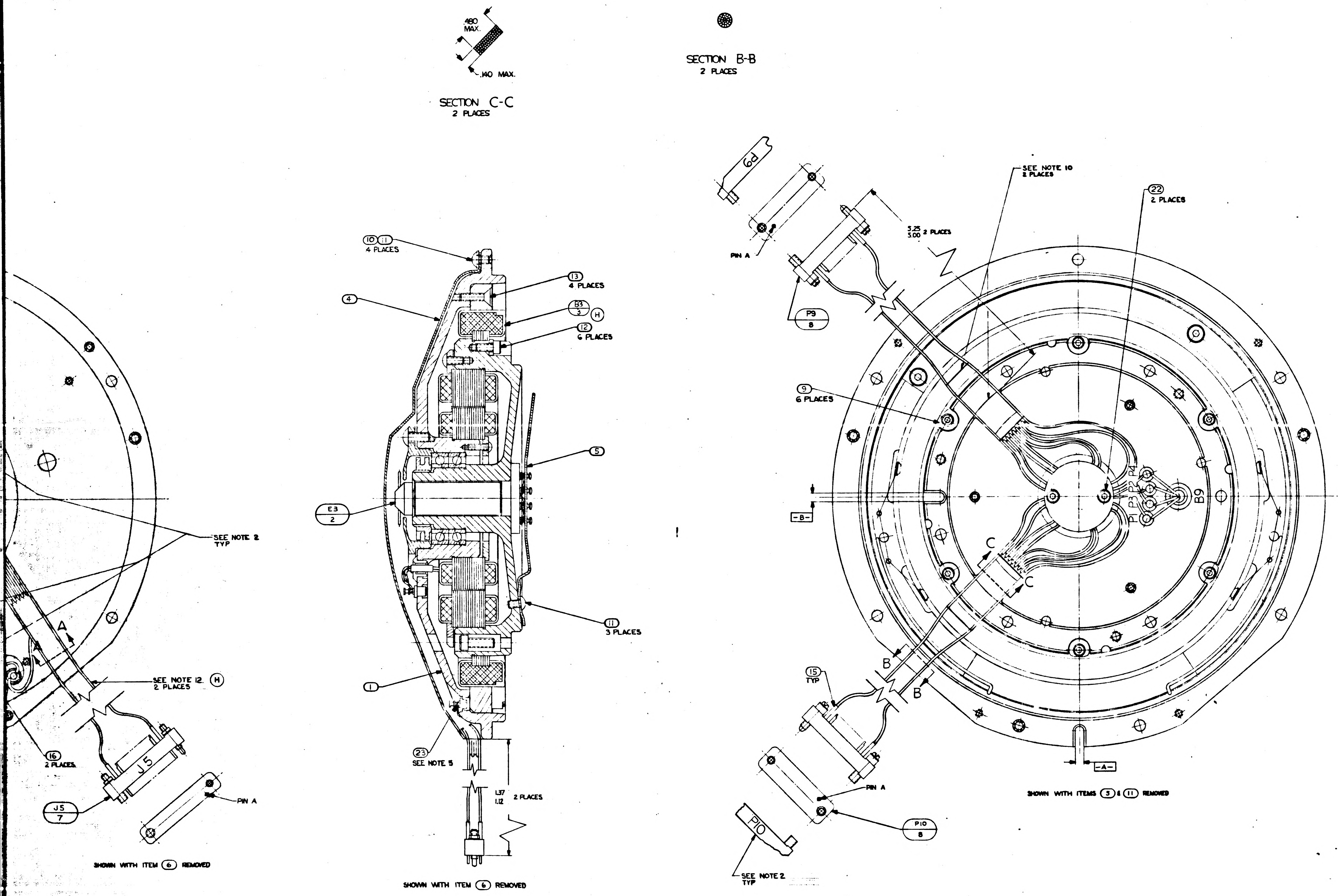


SHOWN WITH ITEM (6) REMOVED

1000206	REV G	SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
REVISIONS					
	G	REPLACES REV F WITH CHANGES TDRR 01687	4-29-63	ajb	RAB
	H	TDRR 01986	7-16-63	ajb	WK



.480 MAX.
.140 MAX.
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
10 11
4 PLACES
4
13
4 PLACES
B3
3
H
12
6 PLACES
5
E3
2
11
3 PLACES
1
23
SEE NOTE 5
L37
L12
2 PLACES
SHOWN WITH ITEM 6 REMOVED
SEE NOTE 2
TYP
SEE NOTE 12 H
2 PLACES
16
2 PLACES
J5
7
J5
PIN A
SHOWN WITH ITEM 6 REMOVED
P9
PIN A
3.25
3.00 2 PLACES
SEE NOTE 10
2 PLACES
22
2 PLACES
P9
8
9
6 PLACES
-B-
P4
P2
P3
P1
B9
C
C
B
B
15
TYP
PIN A
P10
8
P10
SEE NOTE 2
TYP
-A-
SHOWN WITH ITEMS 3 & 11 REMOVED

REPLACES REV F WITH CHANGES

MASTER

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	24
A/R	SOLDER	SN10WARP 2	QQ-S-571		23
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	8" TOTAL LG	20
1	WIRE, ELEC TYPE E-28 RED		MIL-W-16878	16" TOTAL LG	19
1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30" TOTAL LG	17
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LG	16
86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
A/R	SOLDER	SN60 WARP2	QQ-S-571		14
4	SCR, FLT HD, SELF LKG, HEX SOC	1000104-17			13
6	SCR, CAP, SELF LKG, HEX SOC	NAS608C440LL4			12
7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
6	CLAMP, TORQUE MOTOR	1000087			9
2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
2	BRACKET, CONNECTOR, ELEC	1000125			6
1	GUIDE, WIRE, STUB SHAFT MA	1000152			5
1	GUIDE, WIRE, BEARING HSG MA	1000092			4
1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
1	SLIP RING ASSY, ELEC, 40 CONT	1000057			2
1	16 X RESOLVER ASSY IA & MA	1000162			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000203	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN PALERMO 4-2-62
APPROVED FOR MSC W J Rhine 6-26-63
MIT/IL APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT INSTRUMENTATION LABORATORY Cambridge, Mass.
DWG NO
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO 1000206
SHEET 1 OF 1

1000206	REV	SHEET
	H	1

1000206 H

INCHES
PHOTOGRAPHIC SCALE ONLY

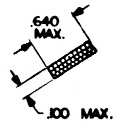
F-2

WIRING LEGEND

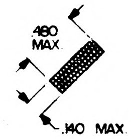
COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J5-R	E3-25	
2-1	WHT/BRN/VIO		J5-U	E3-33	8
2-2	WHT/BRN/GY		J5-V	E3-34	
3-1	WHT/GY		J5-X	E3-19	8
3-2	WHT/BLK/BRN		J5-Y	E3-20	
4	WHT/BRN/BLU		J5-T	E3-32	
5-1	YEL	20	J5-W	B9-S2	8
5-2	BLU	21	J5-Z	B9-S4	
6-1	WHT/RED/ORN		J5-a	E3-35	8
6-2	WHT/RED/YEL		J5-b	E3-36	
7-1	WHT/RED/BLU		J5-d	E3-38	8
7-2	WHT/RED/GRN		J5-z	E3-37	
8-1	BLK	17	J5-e	B9-S3	8
8-2	RED	19	J5-h	B9-S1	
9-1	WHT/BRN/GRN		J5-M	E3-31	8
9-2	WHT/BRN/YEL		J5-L	E3-30	
10-1	WHT/BLK/ORN		J5-J	E3-22	8
10-2	WHT/BLK/RED		J5-H	E3-21	
11-1	WHT/BLK/YEL		J5-S	E3-23	8
11-2	WHT/BLK/GRN		J5-N	E3-24	
12-1	WHT/RED/GY		J5-E	E3-40	8
12-2	WHT/RED/VIO		J5-D	E3-39	
13-1	WHT/BLK/VIO		J5-B	E3-26	8
13-2	WHT/BRN/ORN		J5-A	E3-29	
14-1	WHT/BLK/GY		J5-F	E3-27	8
14-2	WHT/BRN/RED		J5-C	E3-28	
15	WHT/BLK		J7-R	E3-11	
16	WHT/ORN		J7-U	E3-14	
17	WHT/BLU		J7-X	E3-17	
18	WHT		J7-P	E3-10	
19	WHT/BRN		J7-S	E3-12	
20	WHT/RED		J7-T	E3-13	
21	WHT/YEL		J7-V	E3-15	
22	WHT/GRN		J7-W	E3-16	
23	WHT/VIO		J7-Y	E3-18	
24-1	BLK	17	J7-z	B3-1	8
24-2	WHT	18	J7-e	B3-2	
25	BLK		B3-BLK	B3-1	
26	WHT		B3-WHT	B3-2	
27	GY		J7-M	E3-9	
28	VIO		J7-J	E3-8	
29	YEL		J7-E	E3-5	
30	BRN		J7-B	E3-2	
31	BLU		J7-H	E3-7	
32	ORN		J7-D	E3-4	
33	GRN		J7-F	E3-6	
34	BLK		J7-A	E3-1	
35	RED		J7-C	E3-3	
36	WHT/BLK		P9-R	E3-11	
37	WHT/RED		P9-T	E3-13	
38	WHT/ORN		P9-U	E3-14	
39	WHT/BLU		P9-X	E3-17	
40	WHT/YEL		P9-V	E3-15	
41	WHT/GRN		P9-W	E3-16	
42	WHT/VIO		P9-Y	E3-18	
43	WHT/BRN		P9-S	E3-12	
44	WHT		P9-P	E3-10	
45	GY		P9-M	E3-9	
46	VIO		P9-J	E3-8	
47	YEL		P9-E	E3-5	
48	BRN		P9-B	E3-2	
49-1	RED	19	P9-N	B9-P1	8
49-2	BLK	17	P9-K	B9-P3	
50	BLU		P9-H	E3-7	
51	GRN		P9-F	E3-6	
52	ORN		P9-D	E3-4	
53	RED		P9-C	E3-3	
54	BL		P9-A	E3-1	
55	WHT/BLK/BLU		P10-R	E3-25	
56	WHT/BRN/BLU		P10-T	E3-32	
57-1	WHT/BLK/BRN		P10-Y	E3-20	8
57-2	WHT/GY		P10-X	E3-19	
58-1	WHT/RED/ORN		P10-a	E3-35	8
58-2	WHT/RED/YEL		P10-b	E3-36	
59-1	WHT/RED/BLU		P10-d	E3-38	8
59-2	WHT/RED/GRN		P10-z	E3-37	
60-1	WHT/RED/GY		P10-Z	E3-40	8
60-2	WHT/RED/VIO		P10-f	E3-39	
61-1	WHT/BRN/GRN		P10-M	E3-31	8
61-2	WHT/BRN/YEL		P10-L	E3-30	
62-1	WHT/BLK/ORN		P10-J	E3-22	8
62-2	WHT/BLK/RED		P10-H	E3-21	
63-1	WHT/BLK/YEL		P10-S	E3-23	8
63-2	WHT/BLK/GRN		P10-N	E3-24	
64-1	WHT/BLK/VIO		P10-B	E3-26	8
64-2	WHT/BRN/ORN		P10-A	E3-29	
65-1	WHT/BLK/GY		P10-F	E3-27	8
65-2	WHT/BRN/RED		P10-C	E3-28	
66-1	WHT/BRN/GY		B9-P2	E3-34	8
66-2	WHT/BRN/VIO		B9-P4	E3-33	

NOTES:

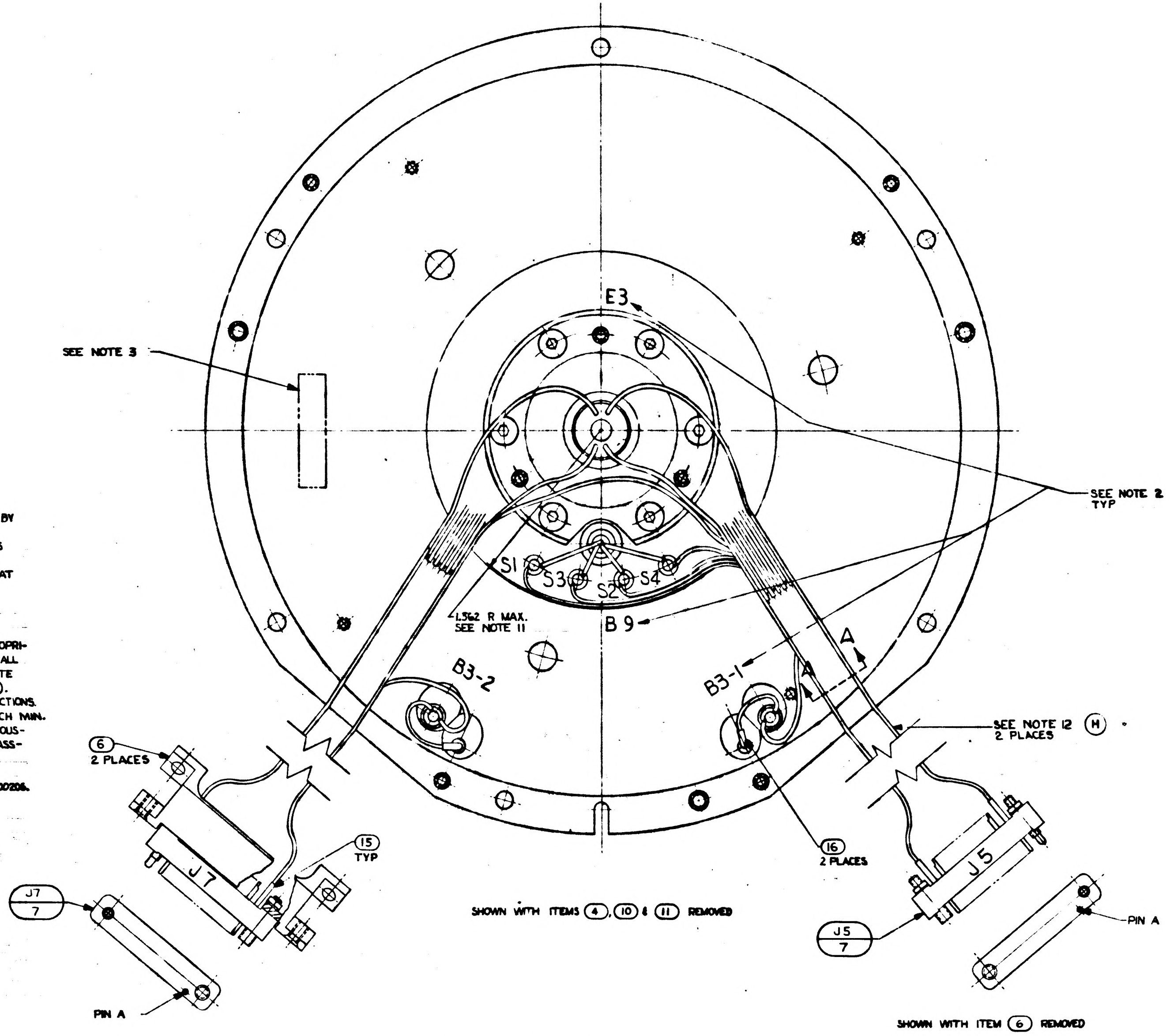
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS $^{.10}_{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   (11) (12) (13) 5 IN-LB
   (22) 3.5 IN-LB
5. SOLDER LEADS FROM (3) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (23). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (7) & (8) PER MIL-STD-440 USING (14). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (3) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (3).
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
12. (H) USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED



SECTION A-A
2 PLACES

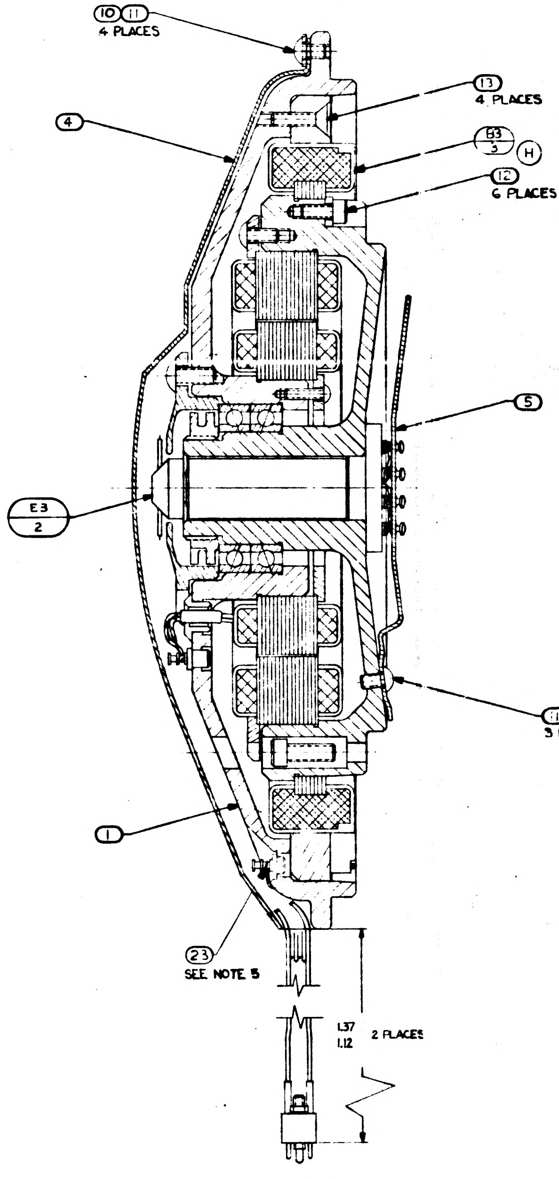


SECTION C-C
2 PLACES



SHOWN WITH ITEMS (4), (10) & (11) REMOVED

SHOWN WITH ITEM (6) REMOVED

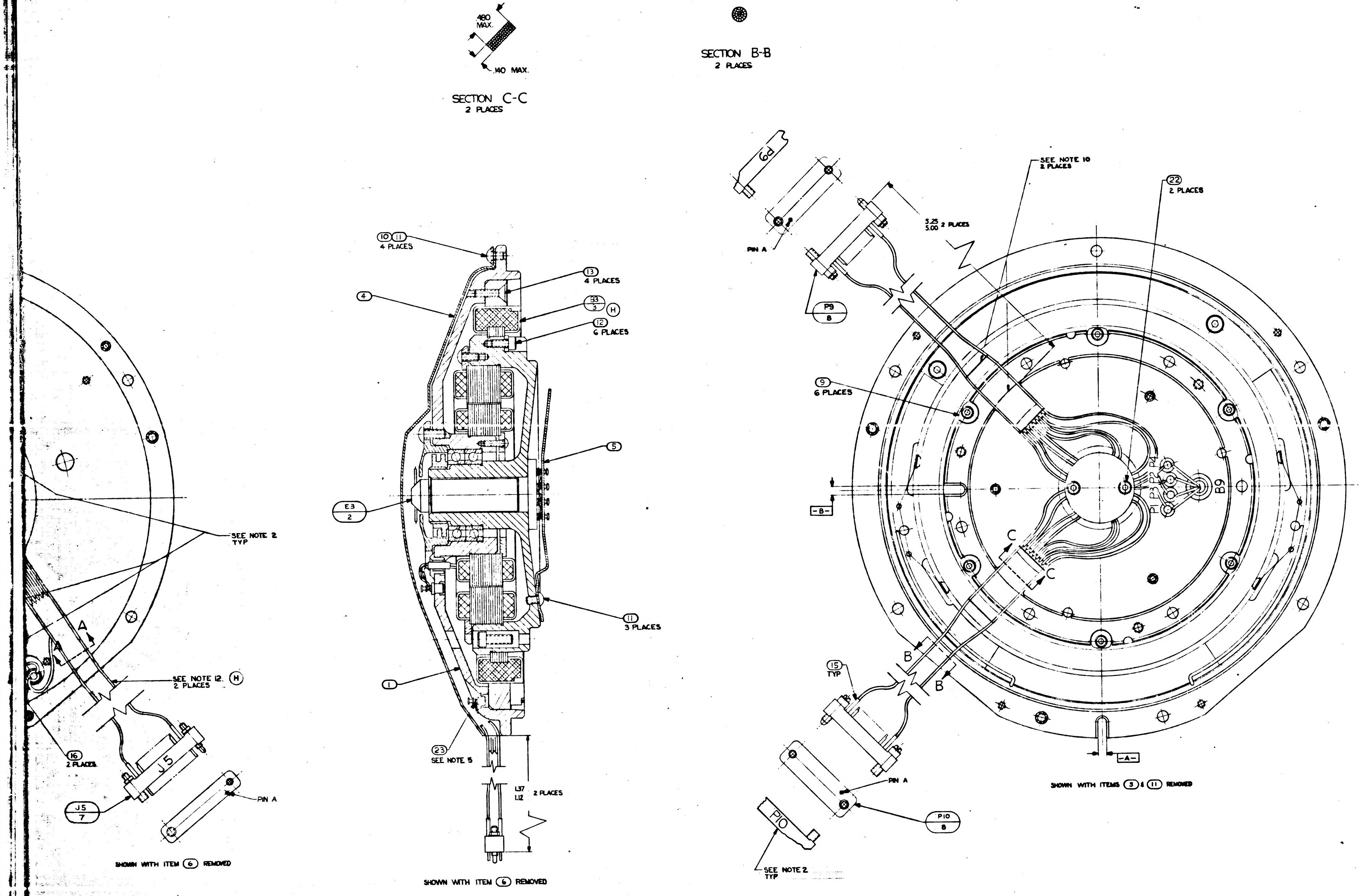


SHOWN WITH ITEM (6) REMOVED

	REV	SHEET
1000206	H	1

INCHES
PHOTOGRAPHIC SCALE ONLY

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
			REVISIONS			
ⓗ		G	REPLACES REV F WITH CHANGES TDRR 01687	4-29-63	ajb	RKB
ⓗ		H	TDRR 01986	7-16-63	ajb	WK
		J	TDRR 03188	9-17-63		WK



.480 MAX.
.140 MAX.
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
10 11
4 PLACES
4
13
4 PLACES
33
3
H
12
6 PLACES
5
E3
2
11
3 PLACES
1
23
SEE NOTE 5
L37
L12
2 PLACES
SHOWN WITH ITEM 6 REMOVED
SEE NOTE 2
TYP
A
A
SEE NOTE 12. H
2 PLACES
16
2 PLACES
J5
J5
7
PIN A
SHOWN WITH ITEM 6 REMOVED
P9
PIN A
P9
8
3.25
5.00 2 PLACES
SEE NOTE 10
2 PLACES
22
2 PLACES
9
6 PLACES
P1 P2 P3 P4
B9
-B-
C
C
B
B
15
TYP
-A-
PIN A
P10
P10
8
SEE NOTE 2
TYP
SHOWN WITH ITEMS 5 & 11 REMOVED

REPLACES REV F WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	24
A/R	SOLDER	SN10WARP 2	QQ-S-571		23
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	8" TOTAL LG	20
1	WIRE, ELEC TYPE E-28 RED		MIL-W-16878	16" TOTAL LG	19
1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30" TOTAL LG	17
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LG	16
86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
A/R	SOLDER	SN60 WARP2	QQ-S-571		14
4	SCR, FLT HD, SELF LKG, HEX SOC	1000104-17			13
Ⓙ 6	SCR, CAP, SELF LKG, HEX SOC	NAS1352C04L4			12
7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
6	CLAMP, TORQUE MOTOR	1000087			9
2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
2	BRACKET, CONNECTOR, ELEC	1000125			6
1	GUIDE, WIRE, STUB SHAFT MA	1000152			5
1	GUIDE, WIRE, BEARING HSG MA	1000092			4
1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
1	SLIP RING ASSY, ELEC, 40 CONT	1000057			2
1	16 X RESOLVER ASSY IA & MA	1000162			1

LIST OF PARTS AND MATERIALS

MASTER

1000205	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED J. Bayne
CHECKED
DRAWN PALERMO 4-12-63
APPROVED FOR MSC W. J. Rhine 6-26-63
NASA APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000206
SHEET 1 OF 1

1000206 J

	REV	SHEET
1000206	J	1

INCHES
PHOTOGRAPHIC SCALE ONLY

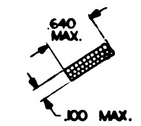
F2

WIRING LEGEND

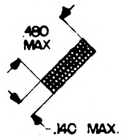
COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J5-R	E3-25	
2-1	WHT/BRN/VIO		J5-U	E3-33	8
2-2	WHT/BRN/GY		J5-V	E3-34	
3-1	WHT/GY		J5-X	E3-19	8
3-2	WHT/BLK/BRN		J5-Y	E3-20	
4	WHT/BRN/BLU		J5-T	E3-32	
5-1	YEL	20	J5-W	B9-S2	8
5-2	BLU	21	J5-Z	B9-S4	
6-1	WHT/RED/ORN		J5-a	E3-35	8
6-2	WHT/RED/YEL		J5-b	E3-36	
7-1	WHT/RED/BLU		J5-d	E3-38	8
7-2	WHT/RED/GRN		J5-c	E3-37	
8-1	BLK	17	J5-e	B9-S3	8
8-2	RED	19	J5-h	B9-S1	
9-1	WHT/BRN/GRN		J5-M	E3-31	8
9-2	WHT/BRN/YEL		J5-L	E3-30	
10-1	WHT/BLK/ORN		J5-J	E3-22	8
10-2	WHT/BLK/RED		J5-H	E3-21	
11-1	WHT/BLK/YEL		J5-S	E3-23	8
11-2	WHT/BLK/GRN		J5-N	E3-24	
12-1	WHT/RED/GY		J5-E	E3-40	8
12-2	WHT/RED/VIO		J5-D	E3-39	
13-1	WHT/BLK/VIO		J5-B	E3-26	8
13-2	WHT/BRN/ORN		J5-A	E3-29	
14-1	WHT/BLK/GY		J5-F	E3-27	8
14-2	WHT/BRN/RED		J5-C	E3-28	
15	WHT/BLK		J7-R	E3-11	
16	WHT/ORN		J7-U	E3-14	
17	WHT/BLU		J7-X	E3-17	
18	WHT		J7-P	E3-10	
19	WHT/BRN		J7-S	E3-12	
20	WHT/RED		J7-T	E3-13	
21	WHT/YEL		J7-V	E3-15	
22	WHT/GRN		J7-W	E3-16	
23	WHT/VIO		J7-Y	E3-18	
24-1	BLK	17	J7-z	B3-1	8
24-2	WHT	18	J7-e	B3-2	
25	BLK		33-BLK	B3-1	
26	WHT		B3-WHT	B3-2	
27	GY		J7-M	E3-9	
28	VIO		J7-J	E3-8	
29	YEL		J7-E	E3-5	
30	BRN		J7-B	E3-2	
31	BLU		J7-H	E3-7	
32	ORN		J7-D	E3-4	
33	GRN		J7-F	E3-6	
34	BLK		J7-A	E3-1	
35	RED		J7-C	E3-3	
36	WHT/BLK		P9-R	E3-11	
37	WHT/RED		P9-T	E3-13	
38	WHT/ORN		P9-U	E3-14	
39	WHT/BLU		P9-X	E3-17	
40	WHT/YEL		P9-V	E3-15	
41	WHT/GRN		P9-W	E3-16	
42	WHT/VIO		P9-Y	E3-18	
43	WHT/BRN		P9-S	E3-12	
44	WHT		P9-P	E3-10	
45	GY		P9-M	E3-9	
46	VIO		P9-J	E3-8	
47	YEL		P9-E	E3-5	
48	BRN		P9-B	E3-2	
49-1	RED	19	P9-N	B9-P1	8
49-2	BLK	17	P9-K	B9-P3	
50	BLU		P9-H	E3-7	
51	GRN		P9-F	E3-6	
52	ORN		P9-D	E3-4	
53	RED		P9-C	E3-3	
54	BLK		P9-A	E3-1	
55	WHT/BLK/BLU		P10-R	E3-25	
56	WHT/BRN/BLU		P10-T	E3-32	
57-1	WHT/BLK/BRN		P10-Y	E3-20	8
57-2	WHT/GY		P10-X	E3-19	
58-1	WHT/RED/ORN		P10-a	E3-35	8
58-2	WHT/RED/YEL		P10-b	E3-36	
59-1	WHT/RED/BLU		P10-d	E3-38	8
59-2	WHT/RED/GRN		P10-c	E3-37	
60-1	WHT/RED/GY		P10-Z	E3-40	8
60-2	WHT/RED/VIO		P10-f	E3-39	
61-1	WHT/BRN/GRN		P10-M	E3-31	8
61-2	WHT/BRN/YEL		P10-L	E3-30	
62-1	WHT/BLK/ORN		P10-J	E3-22	8
62-2	WHT/BLK/RED		P10-H	E3-21	
63-1	WHT/BLK/YEL		P10-S	E3-23	8
63-2	WHT/BLK/GRN		P10-N	E3-24	
64-1	WHT/BLK/VIO		P10-B	E3-26	8
64-2	WHT/BRN/ORN		P10-A	E3-29	
65-1	WHT/BLK/GY		P10-F	E3-27	8
65-2	WHT/BRN/RED		P10-C	E3-28	
66-1	WHT/BRN/GY		B9-P2	E3-34	8
66-2	WHT/BRN/VIO		B9-P4	E3-33	

NOTES:

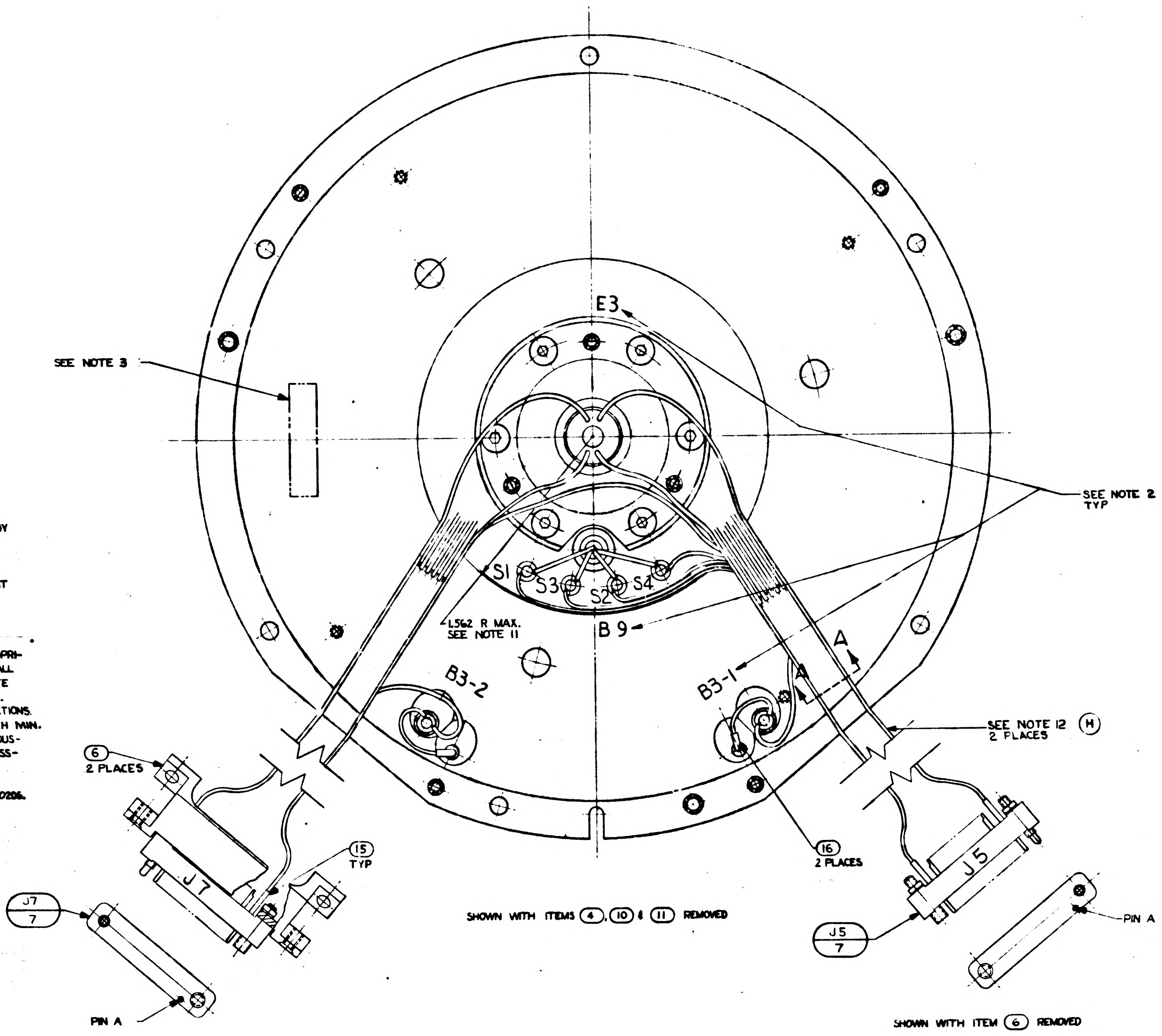
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   (11) (12) (13) 5 IN-LB
   (22) 3.5 IN-LB
5. (H) SOLDER LEADS FROM (3) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (23). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (7) & (8) PER MIL-STD-440 USING (14). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (3) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (3).
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
12. (H) USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED



SECTION A-A
2 PLACES

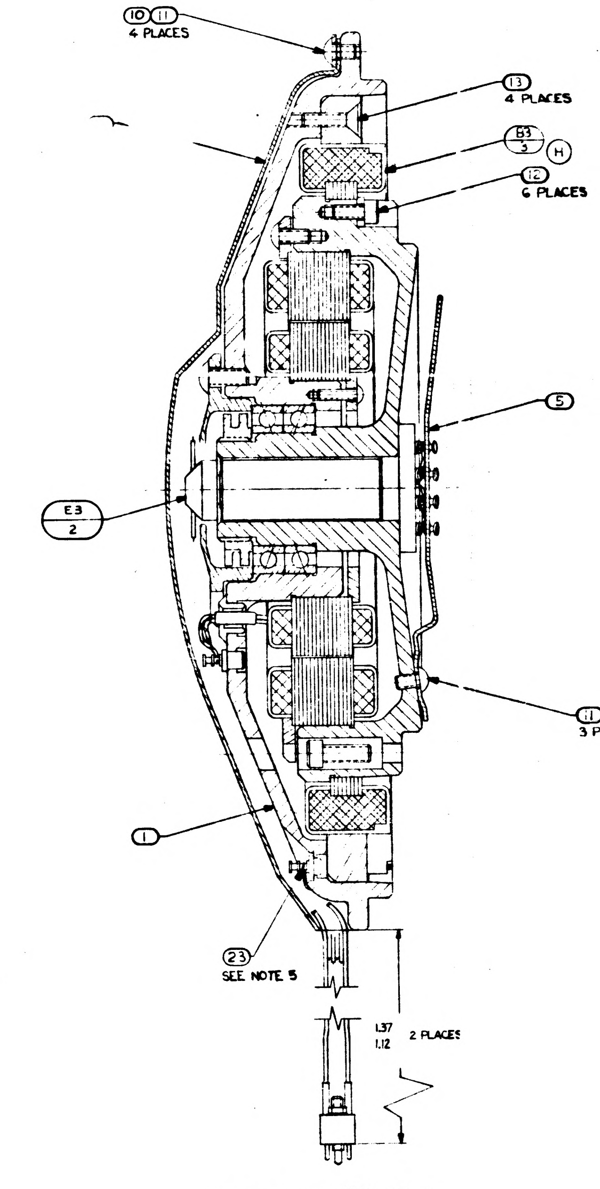


SECTION C-C
2 PLACES



SHOWN WITH ITEMS (4), (10) & (11) REMOVED

SHOWN WITH ITEM (6) REMOVED



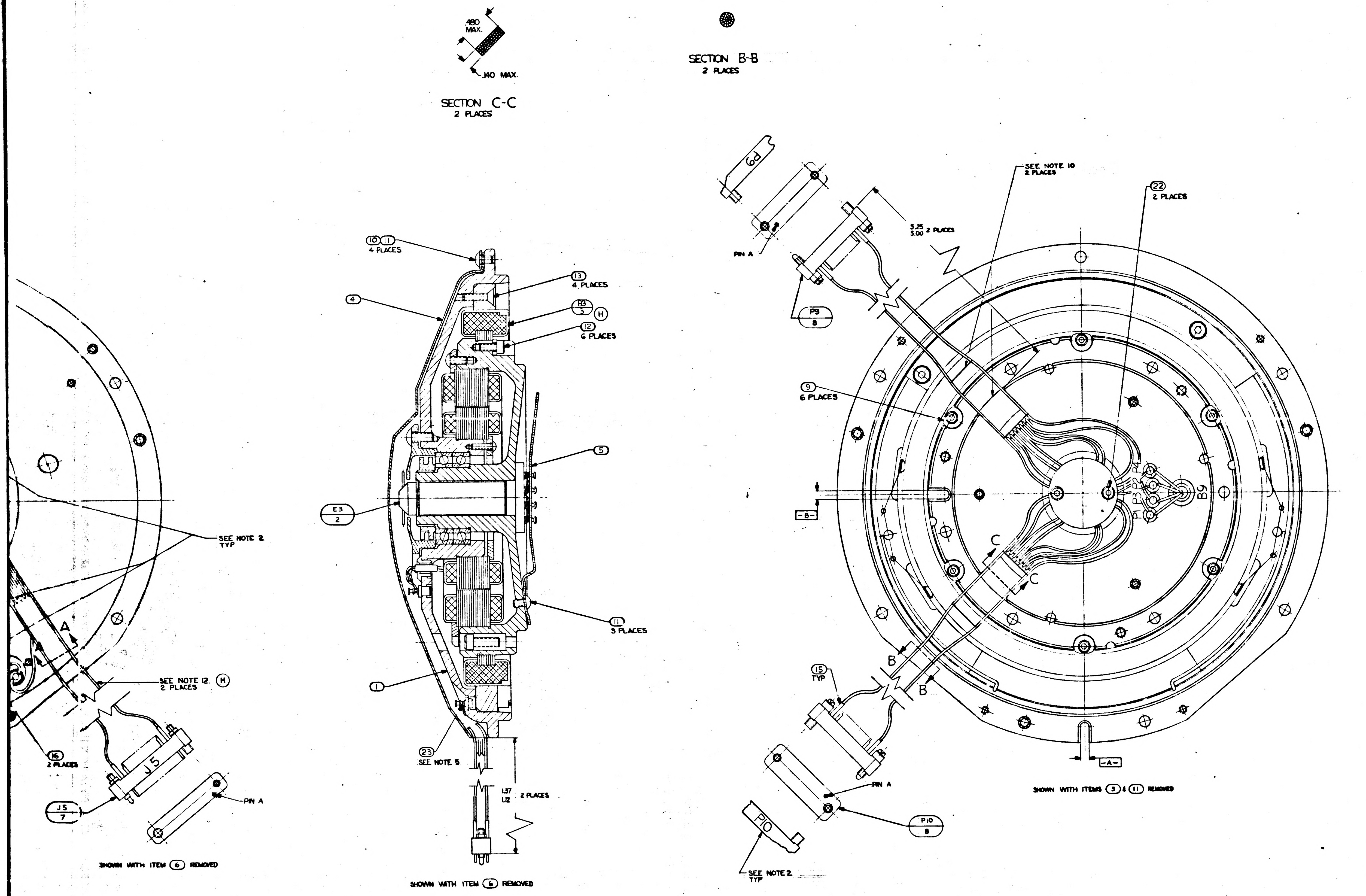
SHOWN WITH ITEM (6) REMOVED

	REV	SHEET
1000206	J	1

INCHES
PHOTOGRAPHIC SCALE ONLY

F-1

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	G	REPLACES REV F WITH CHANGES TDRR 01687	4-29-63		
	H	TDRR 01986	7-16-63		WK
	J	TDRR 03188	9-17-63		WK
	K	TDRR 04052	10-23-63		W



4
3
2
1
D
C
B
A
.480 MAX.
.140 MAX.
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
SEE NOTE 10
2 PLACES
22
2 PLACES
P9
PIN A
P9
8
3.25
5.00
2 PLACES
10 11
4 PLACES
4
13
4 PLACES
B3
3
H
12
6 PLACES
5
E3
2
11
3 PLACES
1
23
SEE NOTE 5
1.37
1.12
2 PLACES
SHOWN WITH ITEM 6 REMOVED
9
6 PLACES
B
-B-
C
C
P4
P3
P2
P1
B9
15
TYP
B
B
-A-
PIN A
P10
8
P10
SEE NOTE 2
TYP
SHOWN WITH ITEMS 3 & 11 REMOVED
SEE NOTE 2
TYP
A
SEE NOTE 12 H
2 PLACES
16
2 PLACES
J5
J5
7
PIN A
SHOWN WITH ITEM 6 REMOVED

REPLACES REV F WITH CHANGES

A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	24
A/R	SOLDER	SN60WARP 2	QQ-S-571		23
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	8" TOTAL LG	20
1	WIRE, ELEC TYPE E-28 RED		MIL-W-16878	16" TOTAL LG	19
1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30" TOTAL LG	17
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LG	16
86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
A/R	SOLDER	SN60 WRP2	QQ-S-571		14
4	SCR, FLT HD, SELF LKG, HEX SOC	1000104-17			13
(J) 6	SCR, CAP, SELF LKG, HEX SOC	NAS1352C04L4			12
7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
6	CLAMP, TORQUE MOTOR	1000087			9
2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
2	BRACKET, CONNECTOR, ELEC	1000125			6
1	GUIDE, WIRE, STUB SHAFT MA	1000152			5
1	GUIDE, WIRE, BEARING HSG MA	1000092			4
1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
1	SLIP RING ASSY, ELEC, 40 CONT	1000057			2
1	16 X RESOLVER ASSY IA & MA	1000162			1
QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000206 K

MASTER

1000203	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN PALERMO 4-24
APPROVED FOR MSC
W J Rhine 6-26-63
FINAL APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
Cambridge, Mass
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000206
SHEET 1 OF 1

1000206 REV K SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

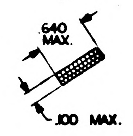
F-2

WIRING LEGEND

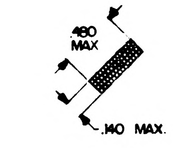
COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J5-R	E3-25	
2-1	WHT/BRN/VIO		J5-U	E3-33	8
2-2	WHT/BRN/GY		J5-V	E3-34	
3-1	WHT/GY		J5-X	E3-19	8
3-2	WHT/BLK/BRN		J5-Y	E3-20	
4	WHT/BRN/BLU		J5-T	E3-32	
5-1	YEL	20	J5-W	B9-S2	8
5-2	BLU	21	J5-Z	B9-S4	
6-1	WHT/RED/ORN		J5-a	E3-35	8
6-2	WHT/RED/YEL		J5-b	E3-36	
7-1	WHT/RED/BLU		J5-d	E3-38	8
7-2	WHT/RED/GRN		J5-z	E3-37	
8-1	BLK	17	J5-e	B9-S3	8
8-2	RED	19	J5-h	B9-S1	
9-1	WHT/BRN/GRN		J5-M	E3-31	8
9-2	WHT/BRN/YEL		J5-L	E3-30	
10-1	WHT/BLK/ORN		J5-J	E3-22	8
10-2	WHT/BLK/RED		J5-H	E3-21	
11-1	WHT/BLK/YEL		J5-S	E3-23	8
11-2	WHT/BLK/GRN		J5-N	E3-24	
12-1	WHT/RED/GY		J5-E	E3-40	8
12-2	WHT/RED/VIO		J5-D	E3-39	
13-1	WHT/BLK/VIO		J5-B	E3-26	8
13-2	WHT/BRN/ORN		J5-A	E3-29	
14-1	WHT/BLK/GY		J5-F	E3-27	8
14-2	WHT/BRN/RED		J5-C	E3-28	
15	WHT/BLK		J7-R	E3-11	
16	WHT/ORN		J7-U	E3-14	
17	WHT/BLU		J7-X	E3-17	
18	WHT		J7-P	E3-10	
19	WHT/BRN		J7-S	E3-12	
20	WHT/RED		J7-T	E3-13	
21	WHT/YEL		J7-V	E3-15	
22	WHT/GRN		J7-W	E3-16	
23	WHT/VIO		J7-Y	E3-18	
24-1	BLK	17	J7-z	B3-1	8
24-2	WHT	18	J7-e	B3-2	
25	BLK		B3-BLK	B3-1	
26	WHT		B3-WHT	B3-2	
27	GY		J7-M	E3-9	
28	VIO		J7-J	E3-8	
29	YEL		J7-E	E3-5	
30	BRN		J7-B	E3-2	
31	BLU		J7-H	E3-7	
32	ORN		J7-D	E3-4	
33	GRN		J7-F	E3-6	
34	BLK		J7-A	E3-1	
35	RED		J7-C	E3-3	
36	WHT/BLK		P9-R	E3-11	
37	WHT/RED		P9-T	E3-13	
38	WHT/ORN		P9-U	E3-14	
39	WHT/BLU		P9-X	E3-17	
40	WHT/YEL		P9-V	E3-15	
41	WHT/GRN		P9-W	E3-16	
42	WHT/VIO		P9-Y	E3-18	
43	WHT/BRN		P9-S	E3-12	
44	WHT		P9-P	E3-10	
45	GY		P9-M	E3-9	
46	VIO		P9-J	E3-8	
47	YEL		P9-E	E3-5	
48	BRN		P9-B	E3-2	
49-1	RED	19	P9-N	B9-P1	8
49-2	BLK	17	P9-K	B9-P3	
50	BLU		P9-H	E3-7	
51	GRN		P9-F	E3-6	
52	ORN		P9-D	E3-4	
53	RED		P9-C	E3-3	
54	BLK		P9-A	E3-1	
55	WHT/BLK/BLU		P10-R	E3-25	
56	WHT/BRN/BLU		P10-T	E3-32	
57-1	WHT/BLK/BRN		P10-Y	E3-20	8
57-2	WHT/GY		P10-X	E3-19	
58-1	WHT/RED/ORN		P10-a	E3-35	8
58-2	WHT/RED/YEL		P10-b	E3-36	
59-1	WHT/RED/BLU		P10-d	E3-38	8
59-2	WHT/RED/GRN		P10-z	E3-37	
60-1	WHT/RED/GY		P10-Z	E3-40	8
60-2	WHT/RED/VIO		P10-f	E3-39	
61-1	WHT/BRN/GRN		P10-M	E3-31	8
61-2	WHT/BRN/YEL		P10-L	E3-30	
62-1	WHT/BLK/ORN		P10-J	E3-22	8
62-2	WHT/BLK/RED		P10-H	E3-21	
63-1	WHT/BLK/YEL		P10-S	E3-23	8
63-2	WHT/BLK/GRN		P10-N	E3-24	
64-1	WHT/BLK/VIO		P10-B	E3-26	8
64-2	WHT/BRN/ORN		P10-A	E3-29	
65-1	WHT/BLK/GY		P10-F	E3-27	8
65-2	WHT/BRN/RED		P10-C	E3-28	
66-1	WHT/BRN/GY		B9-P2	E3-34	8
66-2	WHT/BRN/VIO		B9-P4	E3-33	

NOTES:

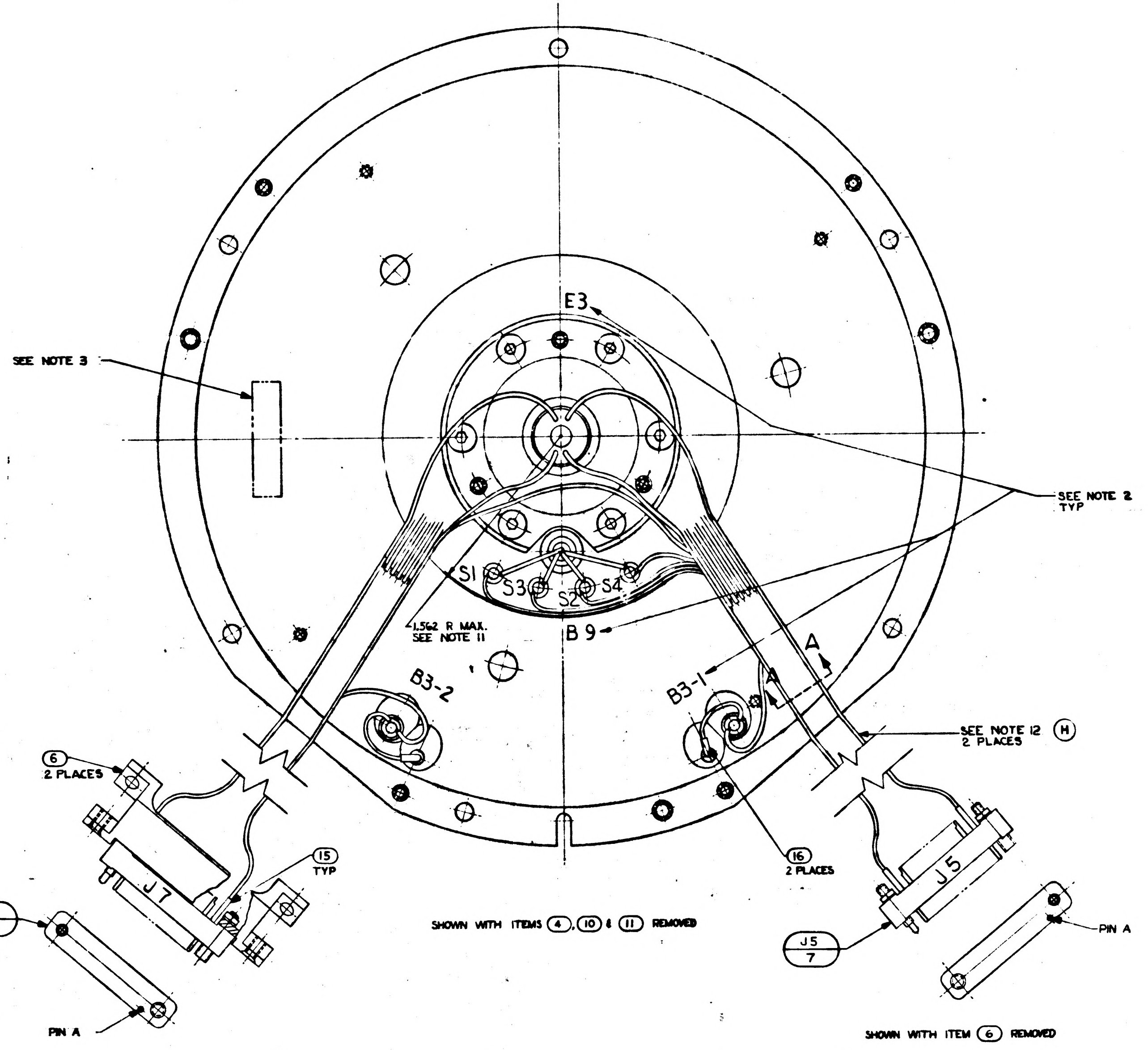
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   ⑪⑫⑬ 5 IN-LB
   ㉒ 3.5 IN-LB
5. Ⓗ SOLDER LEADS FROM ③ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉓. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑦ & ⑧ PER MIL-STD-440 USING ⑭. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ③ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ③.
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
12. Ⓗ USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED



SECTION A-A
2 PLACES

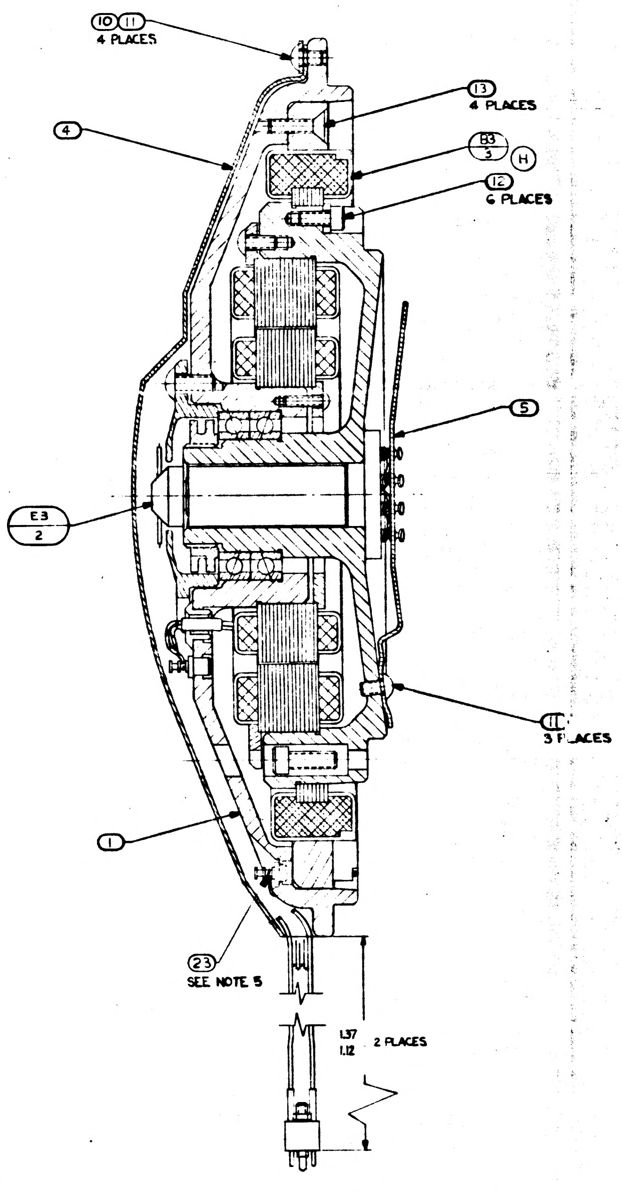


SECTION C-C
2 PLACES



SHOWN WITH ITEMS ④, ⑩ & ⑪ REMOVED

SHOWN WITH ITEM ⑥ REMOVED

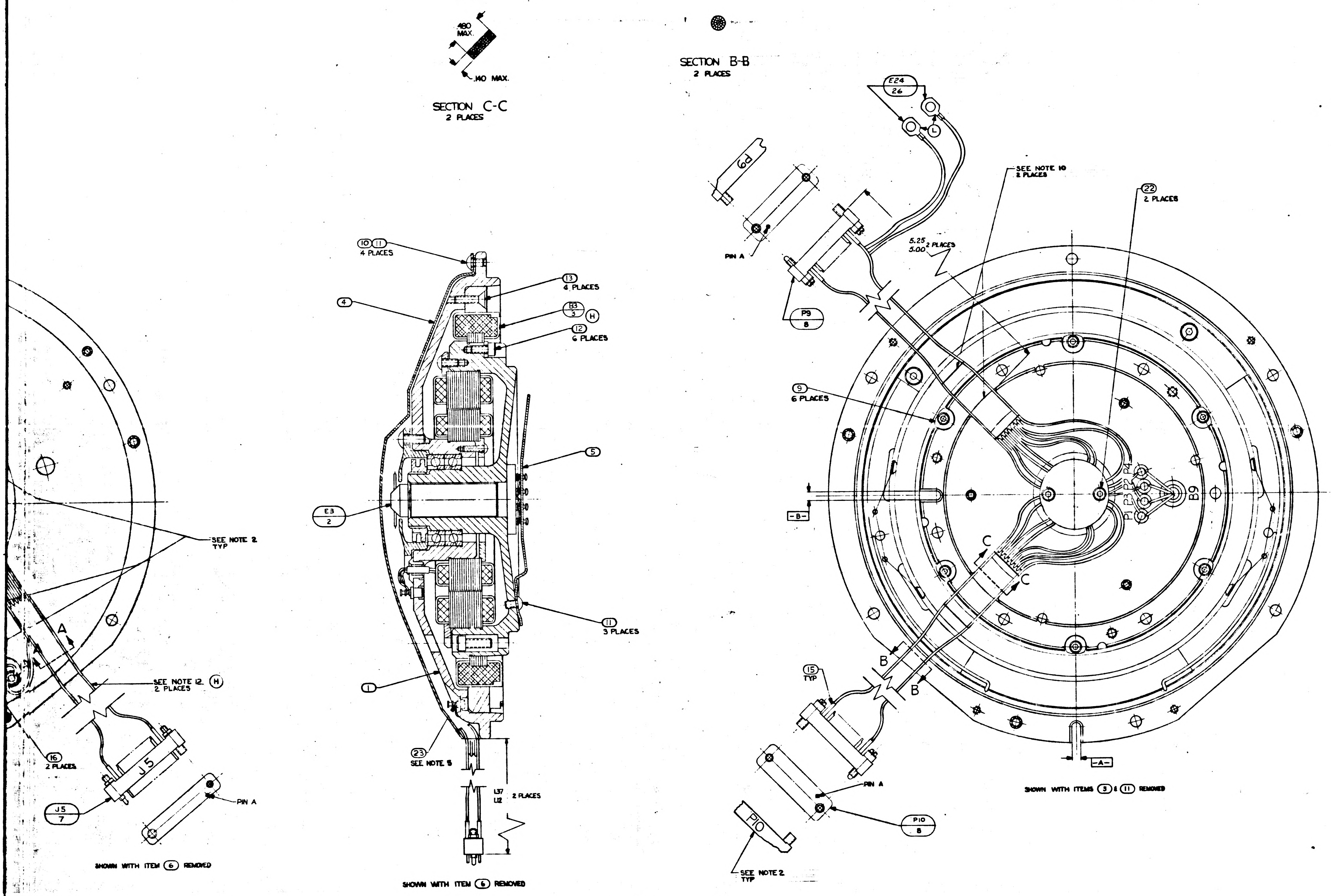


SHOWN WITH ITEM ⑥ REMOVED

	REV	SHEET
1000206	K	1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	G	REPLACES REV F WITH CHANGES TDRR 01687	4-23-63	ajb	RLB
	H	TDRR 01986	7-16-63	ajb	WK
	J	TDRR 03188	9-17-63		WK
	K	TDRR 04052	10-23-63		WK
	L	TDRR 05167	1-6-64		WK


.480 MAX.
.140 MAX.
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
E24
26
L
P9
PIN A
P9
8
SEE NOTE 10
2 PLACES
22
2 PLACES
5.25
5.00
2 PLACES
10 11
4 PLACES
13
4 PLACES
B3
3
H
12
6 PLACES
4
5
E3
2
11
3 PLACES
1
23
SEE NOTE 5
L37
L12
2 PLACES
SHOWN WITH ITEM 6 REMOVED
9
6 PLACES
-B-
B9
C
C
SEE NOTE 2
TYP
A
A
SEE NOTE 12 H
2 PLACES
16
2 PLACES
J5
J5
7
PIN A
SHOWN WITH ITEM 6 REMOVED
15
TYP
B
B
PIN A
P10
P10
8
-A-
SEE NOTE 2
TYP
SHOWN WITH ITEMS 3 & 11 REMOVED

REPLACES REV F WITH CHANGES

MASTER

QTY. REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	SHIELD & GROUND ASSEMBLY	1000020-2			26
2	SHIELD & GROUND ASSEMBLY	1000020-1			25
A/R	TAPE ,NYLON, WAXED, BLK		MIL-T-713	CLASS 2 TYPE P	24
A/R	SOLDER	SN10WARP 2	QQ-S-571		23
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	8" TOTAL LG	20
1	WIRE ELEC TYPE E-28 RED		MIL-W-16878	16" TOTAL LG	19
1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30" TOTAL LG	17
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LG	16
86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
A/R	SOLDER	SN60 WARP2	QQ-S-571		14
4	SCR, FL HD, SELF LKG, HEX SOC	1000104-17			13
6	SCR, CAP, SELF LKG, HEX SOC	NAS1352C04LL4			12
7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
6	CLAMP, TORQUE MOTOR	1000087			9
2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
2	BRACKET, CONNECTOR, ELEC	1000125			6
1	GUIDE, WIRE, STUB SHAFT MA	1000152			5
1	GUIDE, WIRE, BEARING HSG MA	1000092			4
1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
1	SLIP RING ASSY, ELEC, 40 CONT	1000057			2
1	16 X RESOLVER ASSY IA & MA	1000162			1

LIST OF PARTS AND MATERIALS

1000206 L

1000203	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN PALERMO
APPROVED FOR MSC W J Rhine 6-26-63
NASA APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000206
SHEET 1 OF 1

1000206	REV L	SHEET 1

INCHES
PHOTOGRAPHIC SCALE ONLY

E2

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J5-R	E3-25	
2-1	WHT/BRN/VIO		J5-U	E3-33	
2-2	WHT/BRN/GY		J5-V	E3-34	
3-1	WHT/GY		J5-X	E3-19	
3-2	WHT/BLK/BRN		J5-Y	E3-20	
4	WHT/BRN/BLU		J5-T	E3-32	
5-1	YEL	20	J5-W	B9-S2	
5-2	BLU	21	J5-Z	B9-S4	
6-1	WHT/RED/ORN		J5-a	E3-35	
6-2	WHT/RED/YEL		J5-b	E3-36	
7-1	WHT/RED/BLU		J5-d	E3-38	
7-2	WHT/RED/GRN		J5-z	E3-37	
8-1	BLK	17	J5-e	B9-S3	
8-2	RED	19	J5-h	B9-S1	
9-1	WHT/BRN/GRN		J5-M	E3-31	
9-2	WHT/BRN/YEL		J5-L	E3-30	
10-1	WHT/BLK/ORN		J5-J	E3-22	
10-2	WHT/BLK/RED		J5-H	E3-21	
11-1	WHT/BLK/YEL		J5-S	E3-23	
11-2	WHT/BLK/GRN		J5-N	E3-24	
12-1	WHT/RED/GY		J5-E	E3-40	
12-2	WHT/RED/VIO		J5-D	E3-39	
13-1	WHT/BLK/VIO		J5-B	E3-26	
13-2	WHT/BRN/ORN		J5-A	E3-29	
14-1	WHT/BLK/GY		J5-F	E3-27	
14-2	WHT/BRN/RED		J5-C	E3-28	
15-1	WHT/BLK		J7-R	E3-11	
16-1	WHT/ORN		J7-U	E3-14	
17	WHT/BLU		J7-X	E3-17	
18-1	WHT		J7-P	E3-10	
15-2	WHT/BRN		J7-S	E3-12	
16-2	WHT/RED		J7-T	E3-13	
16-3	WHT/YEL		J7-V	E3-15	
19	WHT/GRN		J7-W	E3-16	
20	WHT/VIO		J7-Y	E3-18	
21-1	BLK	17	J7-z	B3-1	
21-2	WHT	18	J7-e	B3-2	
22	BLK		B3-BLK	B3-1	
23	WHT		B3-WHT	B3-2	
18-2	GY		J7-M	E3-9	
24-1	VIO		J7-J	E3-8	
25	YEL		J7-E	E3-5	
26-1	BRN		J7-B	E3-2	
24-2	BLU		J7-H	E3-7	
27	ORN		J7-D	E3-4	
28	GRN		J7-F	E3-6	
26-2	BLK		J7-A	E3-1	
26-3	RED		J7-C	E3-3	
29-1	WHT/BLK		P9-R	E3-11	
30-1	WHT/RED		P9-T	E3-13	
30-2	WHT/ORN		P9-U	E3-14	
31	WHT/BLU		P9-X	E3-17	
30-3	WHT/YEL		P9-V	E3-15	
32	WHT/GRN		P9-W	E3-16	
33	WHT/VIO		P9-Y	E3-18	
29-2	WHT/BRN		P9-S	E3-12	
34-1	WHT		P9-P	E3-10	
34-2	GY		P9-M	E3-9	
35-1	VIO		P9-J	E3-8	
36	YEL		P9-E	E3-5	
37-1	BRN		P9-B	E3-2	
38-1	RED	19	P9-N	B9-P1	
38-2	BLK	17	P9-K	B9-P3	
35-2	BLU		P9-H	E3-7	
39	GRN		P9-F	E3-6	
40	ORN		P9-D	E3-4	
37-2	RED		P9-C	E3-3	
37-3	BLK		P9-A	E3-1	
41	WHT/BLK/BLU		P10-R	E3-25	
42	WHT/BRN/BLU		P10-T	E3-32	
43-1	WHT/BLK/BRN		P10-Y	E3-20	
43-2	WHT/GY		P10-X	E3-19	
44-1	WHT/RED/ORN		P10-a	E3-35	
44-2	WHT/RED/YEL		P10-b	E3-36	
45-1	WHT/RED/BLU		P10-d	E3-38	
45-2	WHT/RED/GRN		P10-z	E3-37	
46-1	WHT/RED/GY		P10-Z	E3-40	
46-2	WHT/RED/VIO		P10-f	E3-39	
47-1	WHT/BRN/GRN		P10-M	E3-31	
47-2	WHT/BRN/YEL		P10-L	E3-30	
48-1	WHT/BLK/ORN		P10-J	E3-22	
48-2	WHT/BLK/RED		P10-H	E3-21	
49-1	WHT/BLK/YEL		P10-S	E3-23	
49-2	WHT/BLK/GRN		P10-N	E3-24	
50-1	WHT/BLK/VIO		P10-B	E3-26	
50-2	WHT/BRN/ORN		P10-A	E3-29	
51-1	WHT/BLK/GY		P10-F	E3-27	
51-2	WHT/BRN/RED		P10-C	E3-28	
52-1	WHT/BRN/GY		B9-P2	E3-34	
52-2	WHT/BRN/VIO		B9-P4	E3-33	
16-A	BLK		SHIELD 16	E23	
26-A	BLK		SHIELD 26	E23	
30-A	BLK		SHIELD 30	E24	
37-A	BLK		SHIELD 37	E24	

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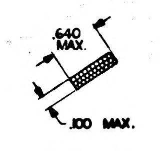
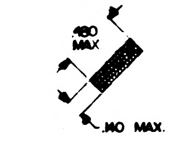
NOTES:

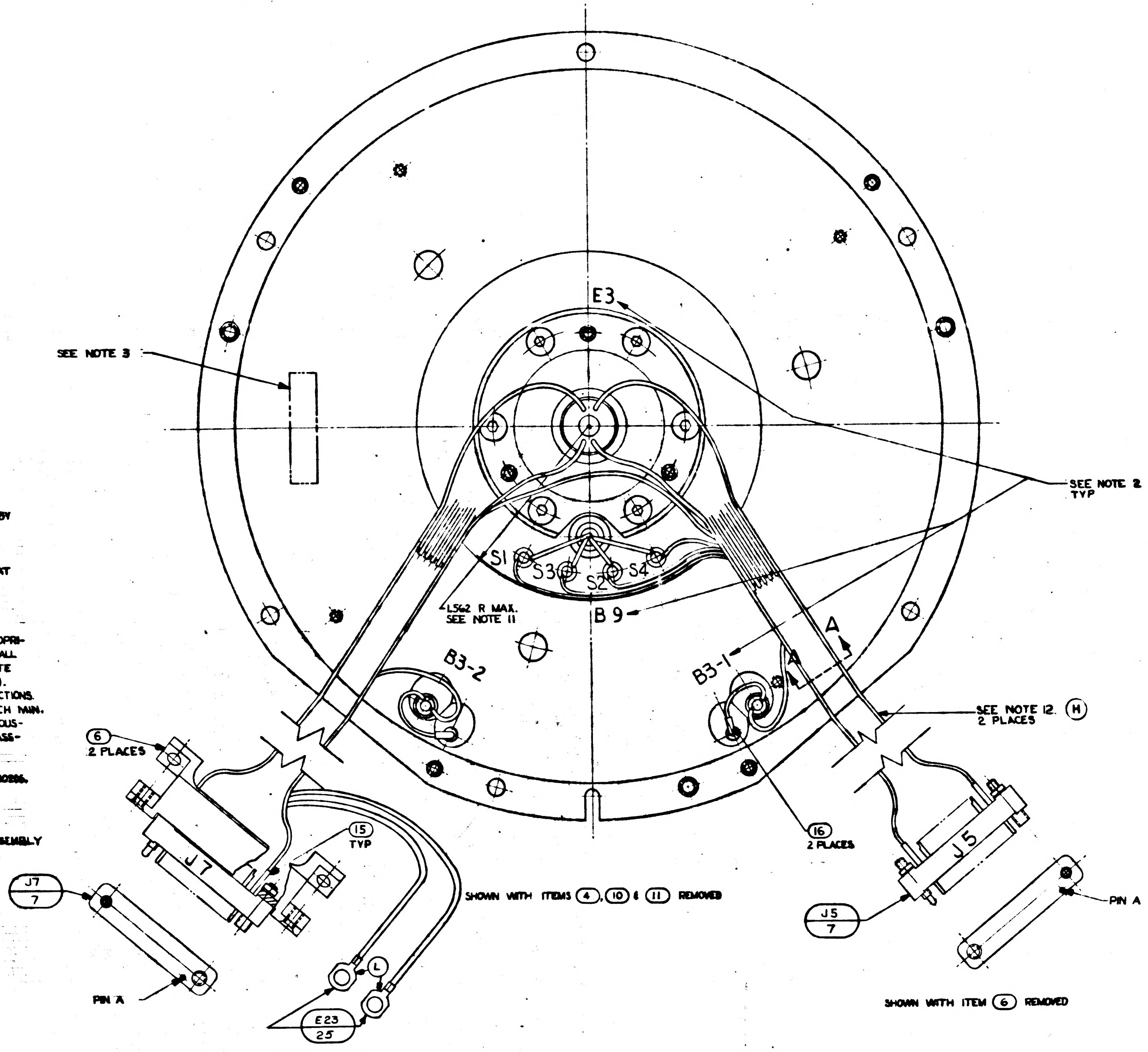
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS $\frac{.10}{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   - ⑪ ⑫ ⑬ 5 IN-LB
   - ㉒ 3.5 IN-LB
5. Ⓗ SOLDER LEADS FROM ③ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉓. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑦ & ⑧ PER MIL-STD-440 USING ⑭. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ③ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ③.
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
12. Ⓗ USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
13. Ⓛ HEAT SHRINK SLEEVING ON ITEMS ㉕ & ㉖ AFTER ASSEMBLY

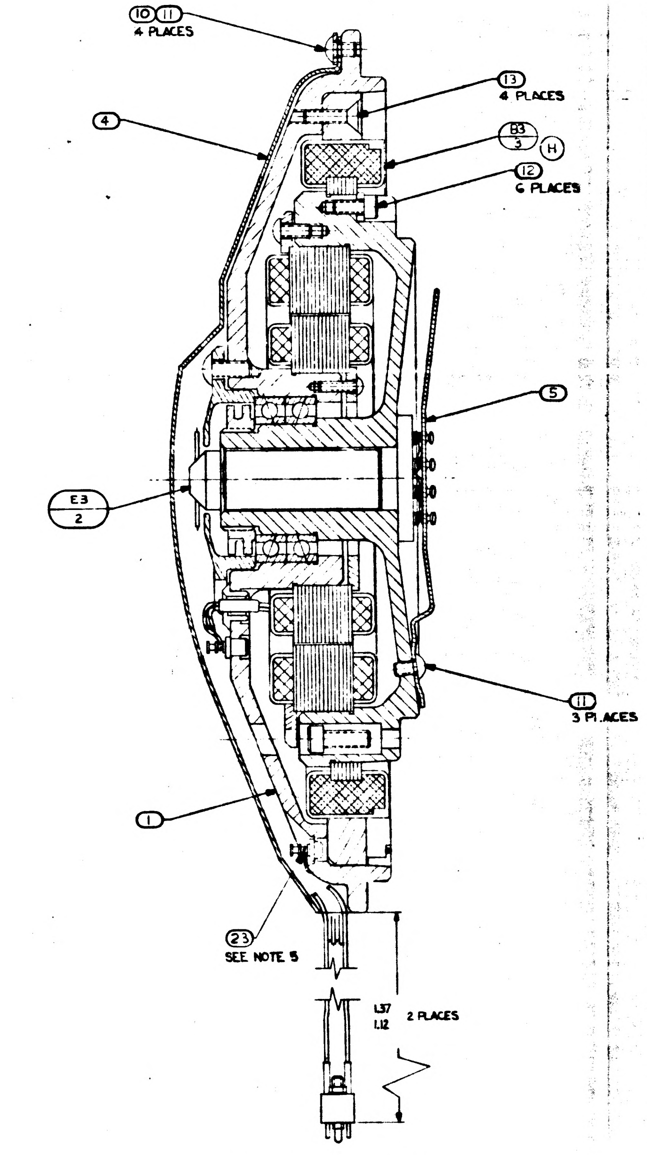


SECTION A-A
2 PLACES



SECTION C-C
2 PLACES

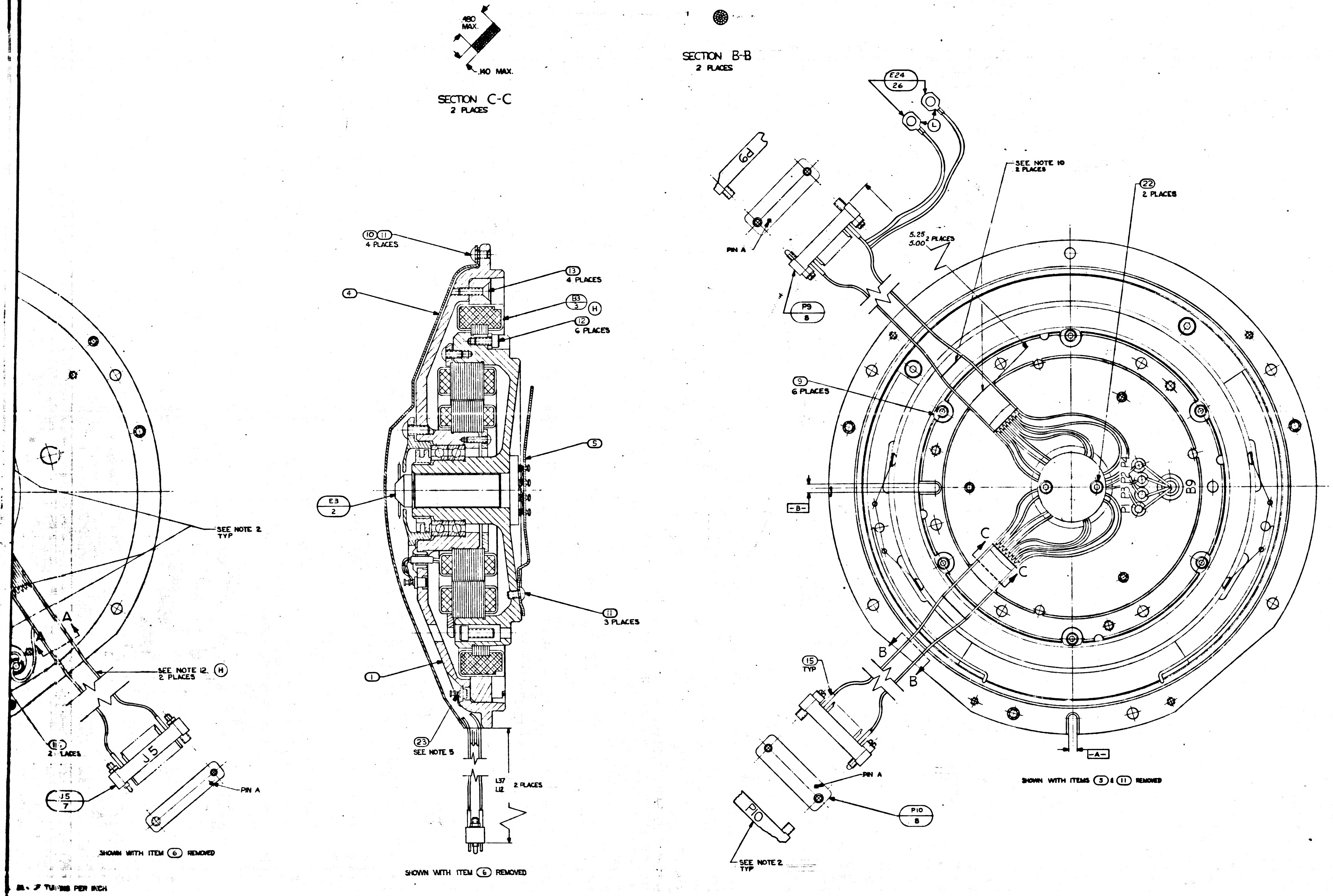




SHOWN WITH ITEM ⑥ REMOVED

1000206	REV	SHEET
	L	1

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	G	REPLACES REV F WITH CHANGES TDRR 01487	4-23-63	
	H	TDRR 01996	7-10-63	
	J	TDRR 03188	9-17-63	
	K	TDRR 04052	10-23-63	
	L	TDRR 05167	1-6-64	
	M	TDRR 06237	18 Feb 64	


.480 MAX.
.140 MAX.
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
E24
26
L
SEE NOTE 10
2 PLACES
22
2 PLACES
P9
PIN A
5.25
5.00
2 PLACES
P9
8
9
6 PLACES
10 11
4 PLACES
4
13
4 PLACES
B3
3
H
12
6 PLACES
5
E3
2
-B-
P3
P2
P1
B9
C
C
SEE NOTE 2
TYP
11
3 PLACES
A
A
SEE NOTE 12 H
2 PLACES
1
15
TYP
B
B
-A-
PIN A
P10
8
P10
SEE NOTE 2
TYP
23
SEE NOTE 5
L37
L12
2 PLACES
11
2 PLACES
J5
J5
7
PIN A
SHOWN WITH ITEM 6 REMOVED
SHOWN WITH ITEM 6 REMOVED
SHOWN WITH ITEMS 3 & 11 REMOVED

-7 TURNS PER INCH

TURNS MAX

REPLACES REV F WITH CHANGES

MASTER

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
L	2	SHIELD & GROUND ASSEMBLY	1000020-2			26
L	2	SHIELD & GROUND ASSEMBLY	1000020-1			25
L	A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2 TYPE P	24
	A/R	SOLDER	SN10WARP 2	QQ-S-571		23
	2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
	1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
	1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	8" TOTAL LG	20
	1	WIRE, ELEC TYPE E-28 RED		MIL-W-16878	6" TOTAL LG	19
	1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
	1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30" TOTAL LG	17
	2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LG	16
	86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
	A/R	SOLDER	SN60 WRP2	QQ-S-571		14
	4	SCR, FLT HD, SELF LKG, HEX SOC	1000104-17			13
J	6	SCR, CAP, SELF LKG, HEX SOC	NAS1352C04L4			12
	7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
	4	WASHER, FLAT, ROUND	1000254			10
	6	CLAMP, TORQUE MOTOR	1000087			9
	2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
	2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
	2	BRACKET, CONNECTOR, ELEC	1000125			6
	1	GUIDE, WIRE, STUB SHAFT MA	1000152			5
	1	GUIDE, WIRE, BEARING HSG MA	1000092			4
	1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
	1	SLIP RING ASSY, ELEC, 40 CONT	1000057			2
	1	16 X RESOLVER ASSY IA & MA	1000162			1

LIST OF PARTS AND MATERIALS

1000206 M

1000203	DL1000801
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN PALERMO
APPROVED FOR MSC
W J Rhine 6-26-63
FINAL APPROVAL
DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000206
SHEET 1 OF 1

	REV	SHEET
1000206	M	1

INCHES
PHOTOGRAPHIC SCALE ONLY

E2

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J5-R	E3-25	
2-1	WHT/BRN/VIO		J5-U	E3-33	
2-2	WHT/BRN/GY		J5-V	E3-34	
3-1	WHT/GY		J5-X	E3-19	
3-2	WHT/BLK/BRN		J5-Y	E3-20	
4	WHT/BRN/BLU		J5-T	E3-32	
5-1	YEL	20	J5-W	B9-S2	
5-2	BLU	21	J5-Z	B9-S4	
6-1	WHT/RED/ORN		J5-a	E3-35	
6-2	WHT/RED/YEL		J5-b	E3-36	
7-1	WHT/RED/BLU		J5-d	E3-38	
7-2	WHT/RED/GRN		J5-z	E3-37	
8-1	BLK	17	J5-e	B9-S3	
8-2	RED	19	J5-h	B9-S1	
9-1	WHT/BRN/GRN		J5-M	E3-31	
9-2	WHT/BRN/YEL		J5-L	E3-30	
10-1	WHT/BLK/ORN		J5-J	E3-22	
10-2	WHT/BLK/RED		J5-H	E3-21	
11-1	WHT/BLK/YEL		J5-S	E3-23	
11-2	WHT/BLK/GRN		J5-N	E3-24	
12-1	WHT/RED/GY		J5-E	E3-40	
12-2	WHT/RED/VIO		J5-D	E3-39	
13-1	WHT/BLK/VIO		J5-B	E3-26	
13-2	WHT/BRN/ORN		J5-A	E3-29	
14-1	WHT/BLK/GY		J5-F	E3-27	
14-2	WHT/BRN/RED		J5-C	E3-28	
15-1	WHT/BLK		J7-R	E3-11	
16-1	WHT/ORN		J7-U	E3-14	
17	WHT/BLU		J7-X	E3-17	
18-1	WHT		J7-P	E3-10	
15-2	WHT/BRN		J7	E3-12	
16-2	WHT/RED		J7 T	E3-13	
16-3	WHT/YEL		J7-V	E3-15	
19	WHT/GRN		J7-W	E3-16	
20	WHT/VIO		J7-Y	E3-18	
21-1	BLK	17	J7-z	B3-1	
21-2	WHT	18	J7-e	B3-2	
22	BLK		B3-BLK	B3-1	
23	WHT		B3-WHT	B3-2	
18-2	GY		J7-M	E3-9	
24-1	VIO		J7-J	E3-8	
25	YEL		J7-E	E3-5	
26-1	BRN		J7-B	E3-2	
24-2	BLU		J7-H	E3-7	
27	ORN		J7-D	E3-4	
28	GRN		J7-F	E3-6	
26-2	BLK		J7-A	E3-1	
26-3	RED		J7-C	E3-3	
29-1	WHT/BLK		P9-R	E3-11	
30-1	WHT/RED		P9-T	E3-13	
30-2	WHT/ORN		P9-U	E3-14	
31	WHT/BLU		P9-X	E3-17	
30-3	WHT/YEL		P9-V	E3-15	
32	WHT/GRN		P9-W	E3-16	
33	WHT/VIO		P9-Y	E3-18	
29-2	WHT/BRN		P9-S	E3-12	
34-1	WHT		P9-P	E3-10	
34-2	GY		P9-M	E3-9	
35-1	VIO		P9-J	E3-8	
36	YEL		P9-E	E3-5	
37-1	BRN		P9-B	E3-2	
38-1	RED	19	P9-N	B9-P1	
38-2	BLK	17	P9-K	B9-P3	
35-2	BLU		P9-H	E3-7	
39	GRN		P9-F	E3-6	
40	ORN		P9-D	E3-4	
37-2	RED		P9-C	E3-3	
37-3	BLK		P9-A	E3-1	
41	WHT/BLK/BLU		P10-R	E3-25	
42	WHT/BRN/BLU		P10-T	E3-32	
43-1	WHT/BLK/BRN		P10-Y	E3-20	
43-2	WHT/GY		P10-X	E3-19	
44-1	WHT/RED/ORN		P10-a	E3-35	
44-2	WHT/RED/YEL		P10-b	E3-36	
45-1	WHT/RED/BLU		P10-d	E3-38	
45-2	WHT/RED/GRN		P10-z	E3-37	
46-1	WHT/RED/GY		P10-Z	E3-40	
46-2	WHT/RED/VIO		P10-f	E3-39	
47-1	WHT/BRN/GRN		P10-M	E3-31	
47-2	WHT/BRN/YEL		P10-L	E3-30	
48-1	WHT/BLK/ORN		P10-J	E3-22	
48-2	WHT/BLK/RED		P10-H	E3-21	
49-1	WHT/BLK/YEL		P10-S	E3-23	
49-2	WHT/BLK/GRN		P10-N	E3-24	
50-1	WHT/BLK/VIO		P10-B	E3-26	
50-2	WHT/BRN/ORN		P10-A	E3-29	
51-1	WHT/BLK/GY		P10-F	E3-27	
51-2	WHT/BRN/RED		P10-C	E3-28	
52-1	WHT/BRN/GY		B9-P2	E3-34	
52-2	WHT/BRN/VIO		B9-P4	E3-33	
16-A	BLK		SHIELD 16	E23	
26-A	BLK		SHIELD 26	E23	
30-A	BLK		SHIELD 30	E24	
37-A	BLK		SHIELD 37	E24	

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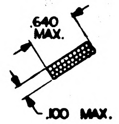
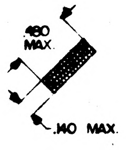
NOTES:

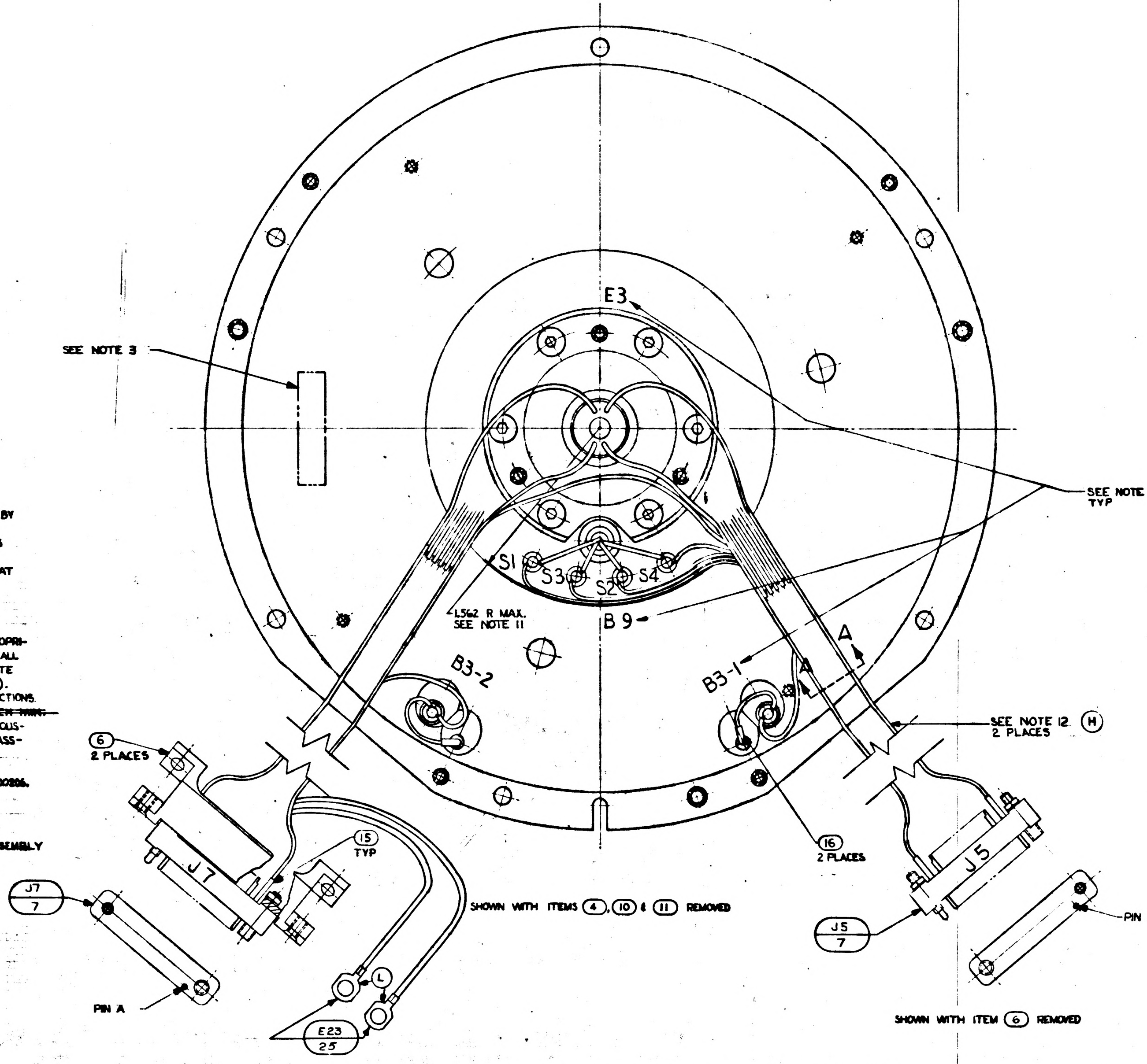
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .10/.14 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   ⑪ ⑫ ⑬ 5 IN-LB
   ㉒ 3.5 IN-LB
5. Ⓗ SOLDER LEADS FROM ③ TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ㉓. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑦ & ⑧ PER MIL-STD-440 USING ⑭. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. Ⓜ ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ③ WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ③.
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
12. Ⓗ USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
13. Ⓛ HEAT SHRINK SLEEVING ON ITEMS ㉕ & ㉖ AFTER ASSEMBLY



SECTION A-A
2 PLACES

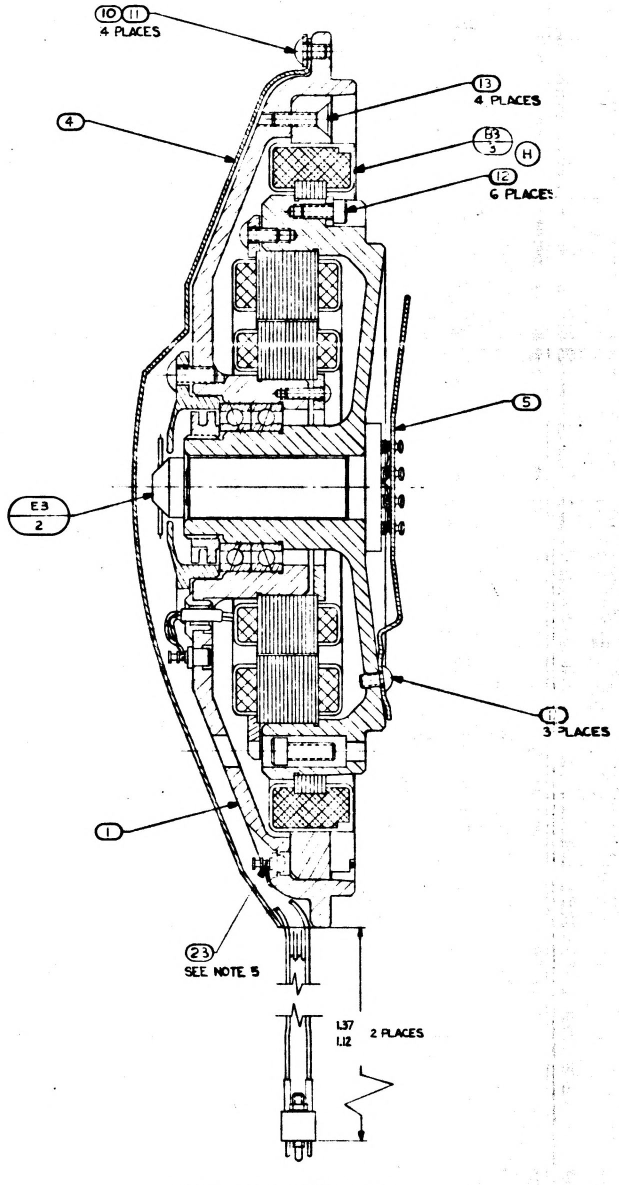


SECTION C-C
2 PLACES



SHOWN WITH ITEMS ④, ⑩ & ⑪ REMOVED

SHOWN WITH ITEM ⑥ REMOVED



SHOWN WITH ITEM ⑨ REMOVED

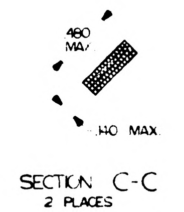
Ⓜ TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000206	M	1

INCHES
PHOTOGRAPHIC SCALE ONLY

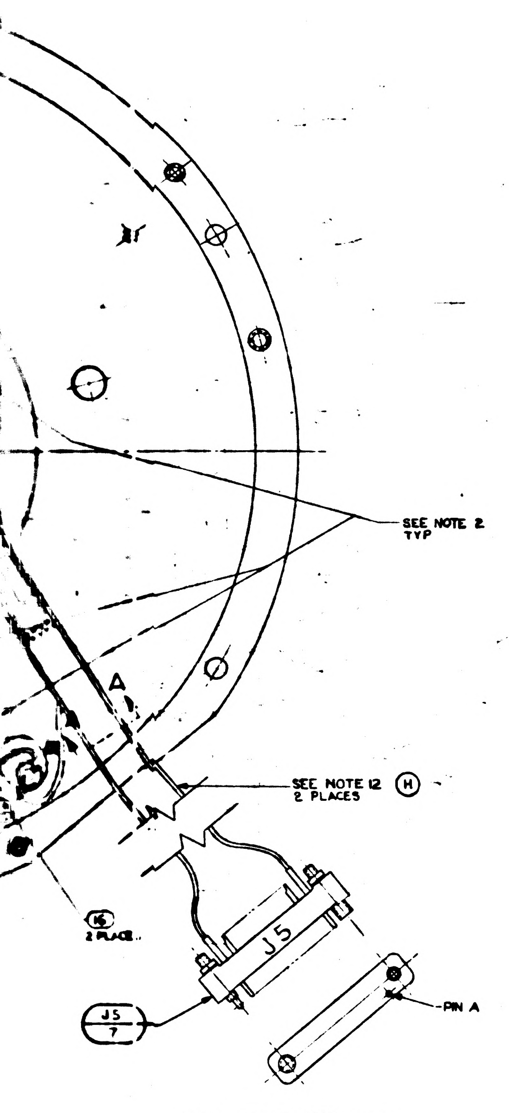
REVISIONS					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	G	REPLACES REV F WITH CHANGES TDRR 01687	4-29-63		
	H	TDRR 01986	7-16-63		WK
	J	TDRR 03188	9-17-63		WK
	K	TDRR 04052	10-23-63		WK
	L	TDRR 05167	1-6-64		WK
	M	TDRR 06237	18 FEB 64		WK
	N	REVISED. PER TDRR 07948			



480 MAX
.110 MAX

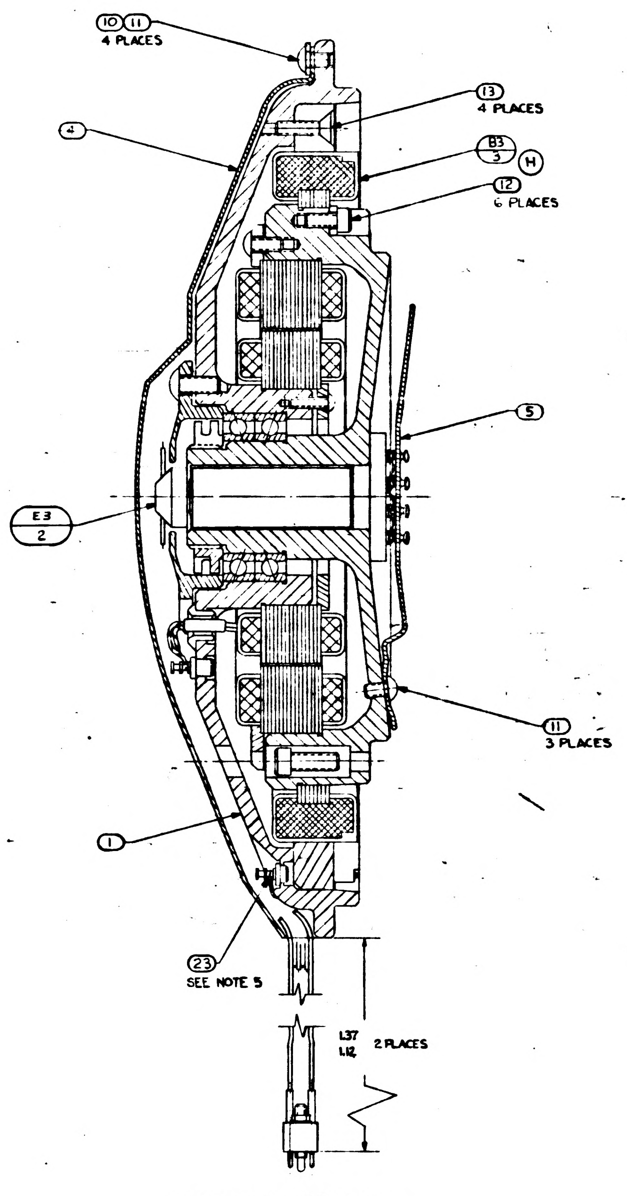
SECTION C-C
2 PLACES

SECTION B-B
2 PLACES



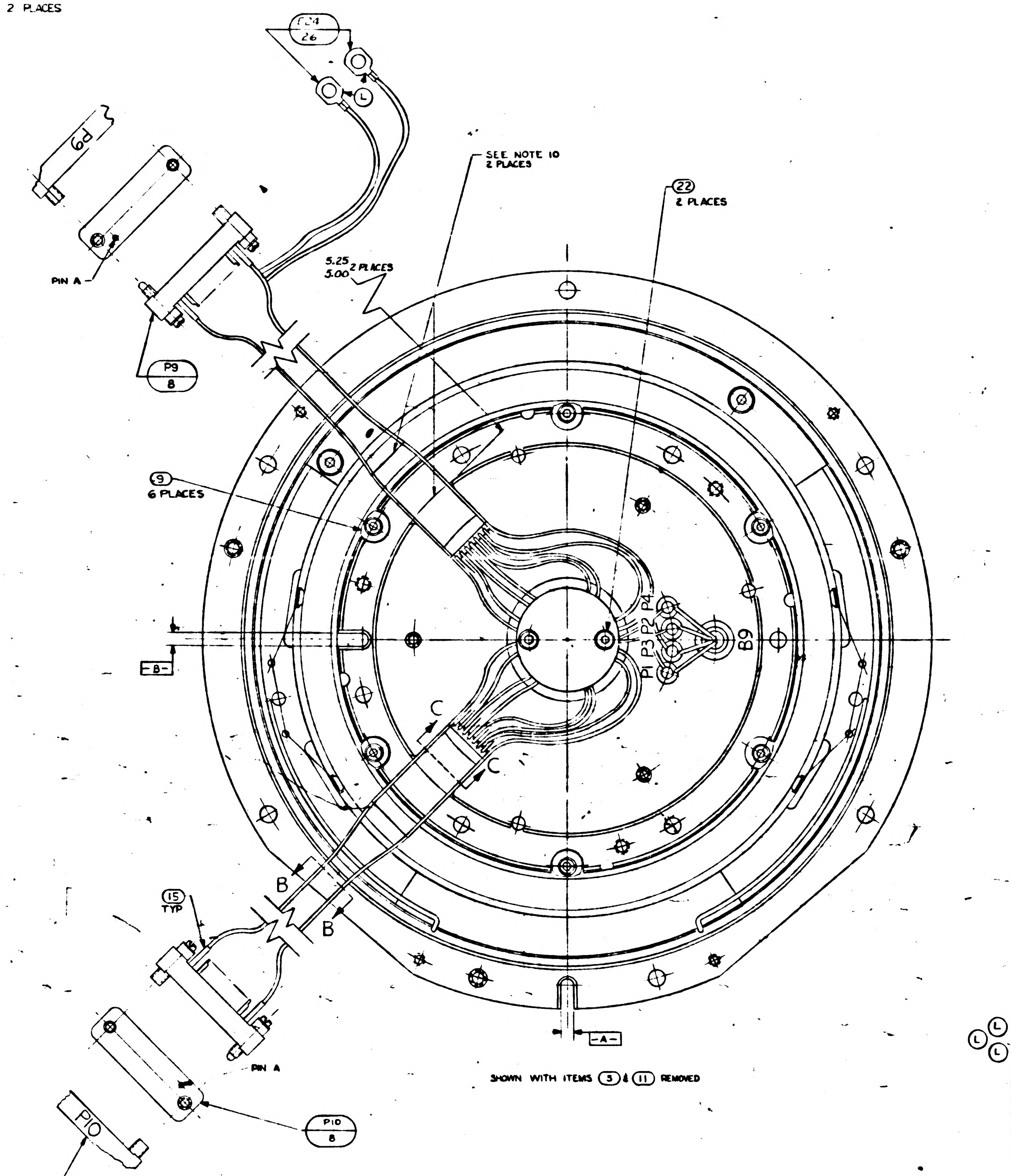
SEE NOTE 2 TYP
A
SEE NOTE 12 (H) 2 PLACES
16 2 PLACE
J5
J5 7
PIN A

SHOWN WITH ITEM ⑥ REMOVED



10 11 4 PLACES
4
13 4 PLACES
B3 3 (H)
12 6 PLACES
5
E3 2
11 3 PLACES
1
23 SEE NOTE 5
L37 L12 2 PLACES

SHOWN WITH ITEM ⑥ REMOVED



C24 26
L
SEE NOTE 10 2 PLACES
22 2 PLACES
P9
PIN A
5.25 5.00 2 PLACES
P9 8
9 6 PLACES
B
C
P1 P2 P3 P4
B9
A
15 TYP
B
B
PIN A
P10 8
P10
SEE NOTE 2 TYP

SHOWN WITH ITEMS ③ & ⑪ REMOVED

NUMBER OF TURNS PER INCH

NO OF FULL TURNS MAX
4
3

REPLACES REV F WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
(L)	2	SHIELD & GROUND ASSEMBLY	1000020-2			26
(L)	2	SHIELD & GROUND ASSEMBLY	1000020-1			25
(L)	A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713		24
	A/R	SOLDER	SN10WARP 2	QQ-S-571		23
	2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
	1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
	1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	8" TOTAL LG	20
	1	WIRE, ELEC TYPE E-28 RED		MIL-W-16878	16" TOTAL LG	19
	1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
	1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30 TOTAL LG	17
	2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LG	16
	86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
	A/R	SOLDER	SN60 WARP2	QQ-S-571		14
	4	SCR, FLT HD, SELF LKG, HEX SOC	1000104-17			13
(J)	6	SCR, CAP, SELF LKG, HEX SOC	NAS1352C04L4			12
	7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
	4	WASHER, FLAT, ROUND	1000254			10
	6	CLAMP, TORQUE MOTOR	1000087			9
	2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
	2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
	2	BRACKET, CONNECTOR, ELEC	1000125			6
	1	GUIDE, WIRE, STUB SHAFT MA	1000192			5
	1	GUIDE, WIRE, BEARING HSG MA	1000092			4
	1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
	1	SLIP RING ASSY, ELEC, 40 CONT	1000097			2
	1	16 X RESOLVER ASSY IA & MA	1000162			1

LIST OF PARTS AND MATERIALS

1000203	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
DATE
APPROVED
CHECKED
DRAWN PALERMO 4-12-62
APPROVED FOR MSC
W. J. Rhine 6-26-63
FINAL APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000206
SHEET 1 OF 1

1000206 N

1000206	REV	SHEET
	N	1

2/1000206

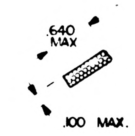
1000206

WIRING LEGEND

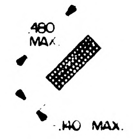
COND NO	COLOR	FIND NO	FROM	TO
1	WHT/BLK/BLU		J5-R	E3-25
2-1	WHT/BRN/VIO		J5-U	E3-33
2-2	WHT/BRN/GY		J5-V	E3-34
3-1	WHT/GY		J5-X	E3-19
3-2	WHT/BLK/BRN		J5-Y	E3-20
14-3	WHT/BRN/BLU		J5-T	E3-32
5-1	YEL	20	J5-W	B9-S2
5-2	BLU	21	J5-Z	B9-S4
6-1	WHT/RED/ORN		J5-a	E3-35
6-2	WHT/RED/YEL		J5-b	E3-36
7-1	WHT/RED/BLU		J5-d	E3-38
7-2	WHT/RED/GRN		J5-z	E3-37
8-1	BLK	17	J5-e	B9-S3
8-2	RED	19	J5-h	B9-S1
9-1	WHT/BRN/GRN		J5-M	E3-31
9-2	WHT/BRN/YEL		J5-L	E3-30
10-1	WHT/BLK/ORN		J5-J	E3-22
10-2	WHT/BLK/RED		J5-H	E3-21
11-1	WHT/BLK/YEL		J5-S	E3-23
11-2	WHT/BLK/GRN		J5-N	E3-24
12-1	WHT/RED/GY		J5-E	E3-40
12-2	WHT/RED/VIO		J5-D	E3-39
13-1	WHT/BLK/VIO		J5-B	E3-26
13-2	WHT/BRN/ORN		J5-A	E3-29
14-1	WHT/BLK/GY		J5-F	E3-27
14-2	WHT/BRN/RED		J5-C	E3-28
15-1	WHT/BLK		J7-R	E3-11
16-1	WHT/ORN		J7-U	E3-14
17-1	WHT/BLU		J7-X	E3-17
18-1	WHT		J7-P	E3-10
15-2	WHT/BRN		J7-S	E3-12
16-2	WHT/RED		J7-T	E3-13
16-3	WHT/YEL		J7-V	E3-15
17-2	WHT/GRN		J7-W	E3-16
17-3	WHT/VIO		J7-Y	E3-18
21-1	BLK	17	J7-Z	B3-1
21-2	WHT	18	J7-e	B3-2
22	BLK		B3-BLK	B3-1
23	WHT		B3-WHT	B3-2
18-2	GY		J7-M	E3-9
24-1	VIO		J7-J	E3-8
25-1	YEL		J7-E	E3-5
26-1	BRN		J7-B	E3-2
24-2	BLU		J7-H	E3-7
25-2	ORN		J7-D	E3-4
25-3	GRN		J7-F	E3-6
26-2	BLK		J7-A	E3-1
26-3	RED		J7-C	E3-3
29-1	WHT/BLK		P9-R	E3-11
30-1	WHT/RED		P9-T	E3-13
30-2	WHT/ORN		P9-U	E3-14
31-1	WHT/BLU		P9-X	E3-17
30-3	WHT/YEL		P9-V	E3-15
31-2	WHT/GRN		P9-W	E3-16
31-3	WHT/VIO		P9-Y	E3-18
29-2	WHT/BRN		P9-S	E3-12
34-1	WHT		P9-P	E3-10
34-2	GY		P9-M	E3-9
35-1	VIO		P9-J	E3-8
36-1	YEL		P9-E	E3-5
37-1	BRN		P9-B	E3-2
38-1	RED	19	P9-N	B9-P1
38-2	BLK	17	P9-K	B9-P3
35-2	BLU		P9-H	E3-7
36-2	GRN		P9-F	E3-6
36-3	ORN		P9-D	E3-4
37-2	RED		P9-C	E3-3
37-3	BLK		P9-A	E3-1
41	WHT/BLK/BLU		P10-R	E3-25
41-3	WHT/BRN/BLU		P10-T	E3-32
43-1	WHT/BLK/BRN		P10-Y	E3-20
43-2	WHT/GY		P10-X	E3-19
44-1	WHT/RED/ORN		P10-a	E3-35
44-2	WHT/RED/YEL		P10-b	E3-36
45-1	WHT/RED/BLU		P10-d	E3-38
45-2	WHT/RED/GRN		P10-z	E3-37
46-1	WHT/RED/GY		P10-Z	E3-40
46-2	WHT/RED/VIO		P10-f	E3-39
47-1	WHT/BRN/GRN		P10-M	E3-31
47-2	WHT/BRN/YEL		P10-L	E3-30
48-1	WHT/BLK/ORN		P10-J	E3-22
48-2	WHT/BLK/RED		P10-H	E3-21
49-1	WHT/BLK/YEL		P10-S	E3-23
49-2	WHT/BLK/GRN		P10-N	E3-24
50-1	WHT/BLK/VIO		P10-B	E3-26
50-2	WHT/BRN/ORN		P10-A	E3-29
51-1	WHT/BLK/GY		P10-F	E3-27
51-2	WHT/BRN/RED		P10-C	E3-28
52-1	WHT/BRN/GY		B9-P2	E3-34
52-2	WHT/BRN/VIO		B9-P4	E3-33
16-A	BLK		SHIELD 16	E23
26-A	BLK		SHIELD 26	E23
30-A	BLK		SHIELD 30	E24
37-A	BLK		SHIELD 37	E24

NOTES:

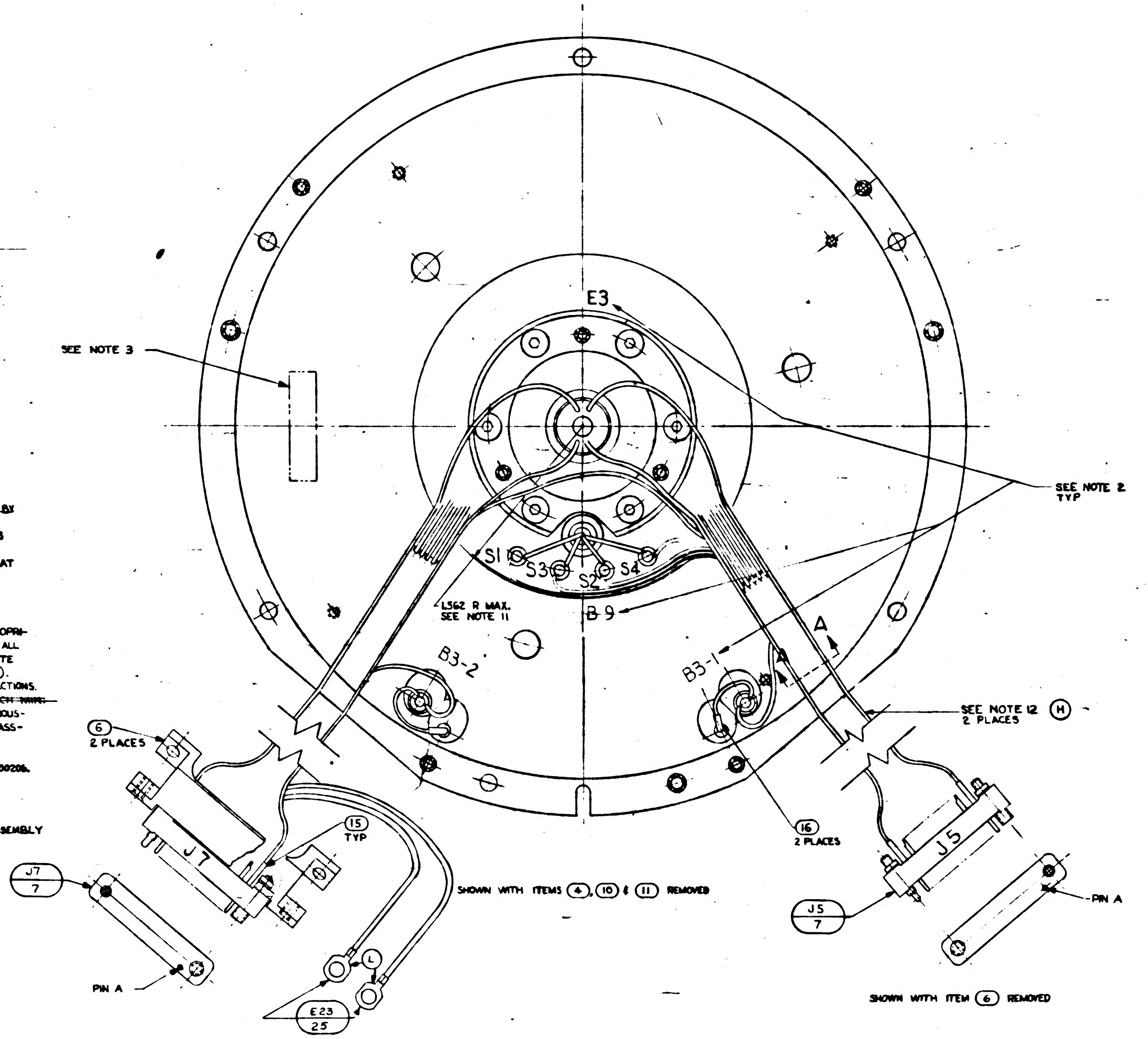
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .10/.14 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   (11)(12)(13) 5 IN-LB
   (22) 3.5IN-LB
5. (H) SOLDER LEADS FROM (3) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (23). SOLDER ALL OTHER LEADS TO EITHER ~~UPPER~~ SECTION OF ~~APPROPRIATE~~ TERMINAL OR (7) & (8) PER MIL-STD-440 USING (14). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. (M) ~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (3) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (3).
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
12. (H) USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
13. (L) HEAT SHRINK SLEEVING ON ITEMS (25) & (26) AFTER ASSEMBLY



SECTION A-A
2 PLACES

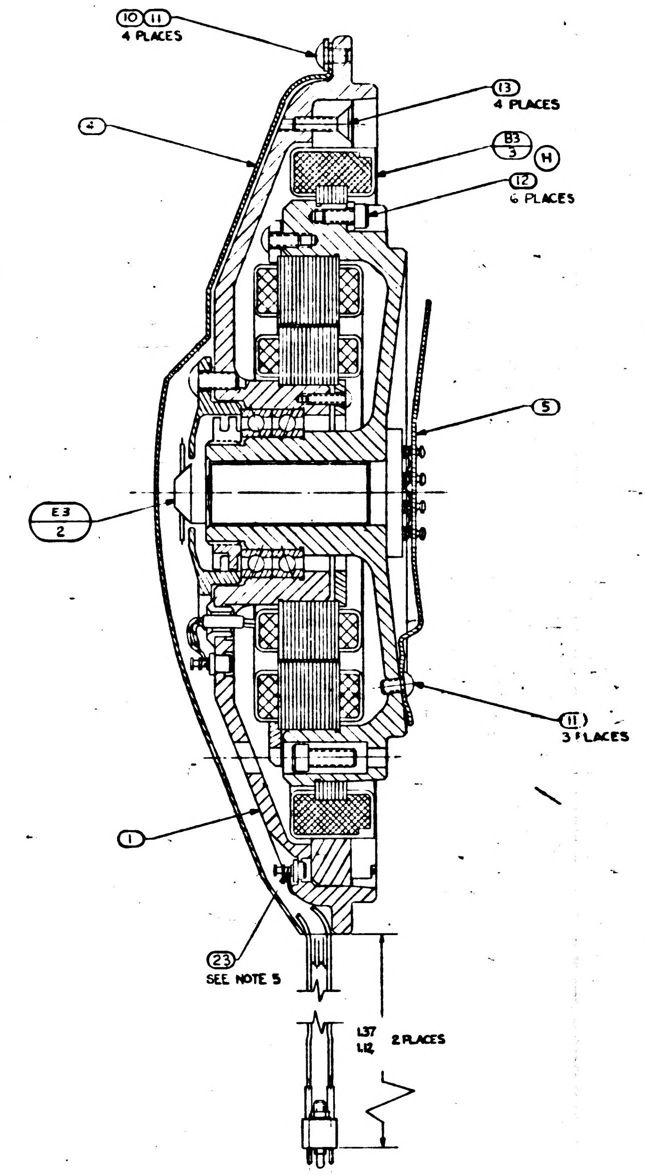


SECTION C-C
2 PLACES



SHOWN WITH ITEMS (4), (10) & (11) REMOVED

SHOWN WITH ITEM (6) REMOVED



SHOWN WITH ITEM (6) REMOVED

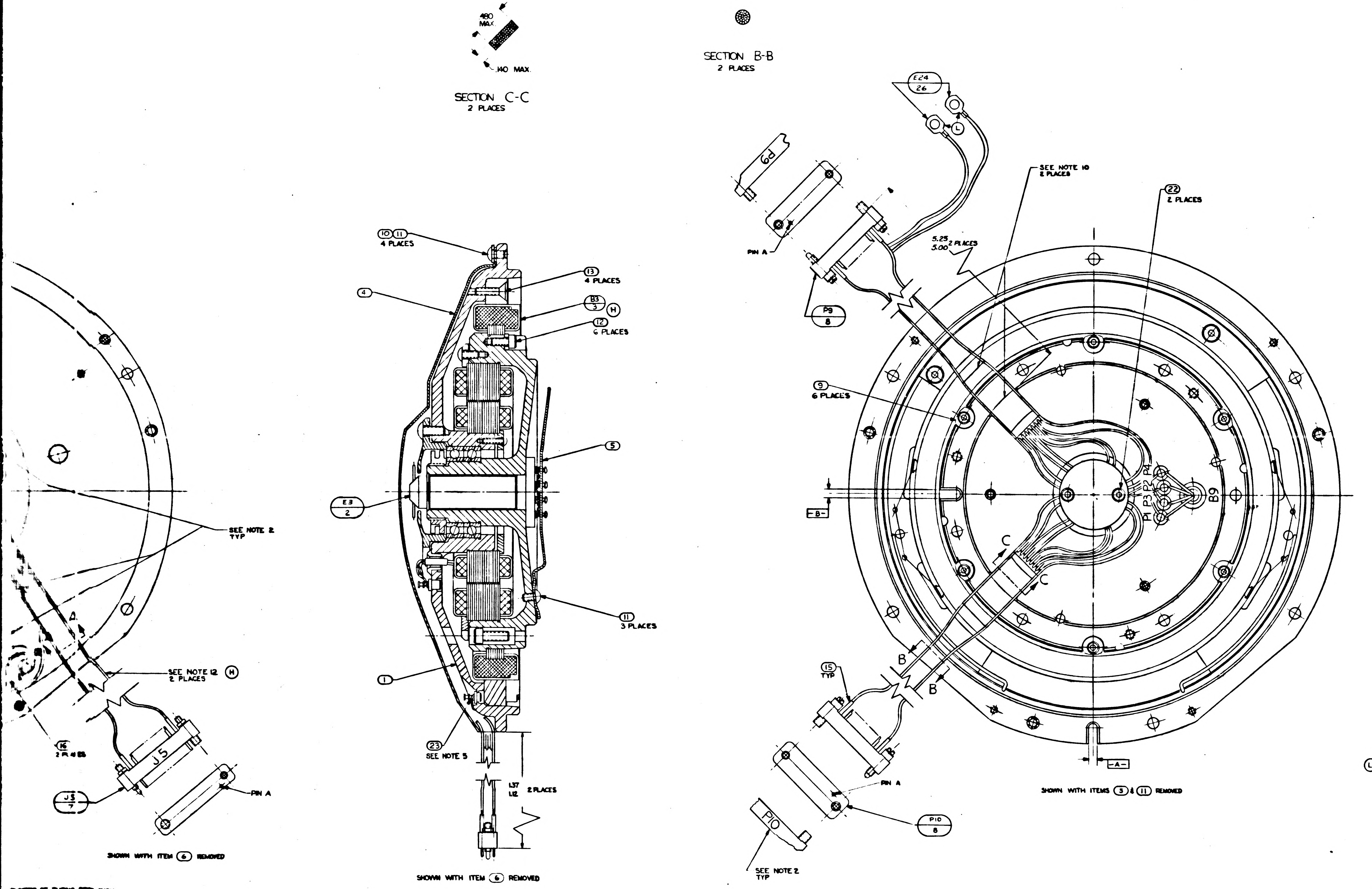
(M) TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000206	REV	SHEET
	N	1

1/1000206

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	G	REPLACES REV F WITH CHANGES TDRR C1687	4-29-63		
	H	TDRR 01986	7-16-63		
	J	TDRR 03188	9-17-63		
	K	TDRR 04052	10-23-63		
	L	TDRR 05167	1-6-64		
	M	TDRR 06237	18 Feb 64		
	N	REVISED PER TDRR 07948	4		
	P	REVISED PER TDRR 07954	15 MAY 64		


480 MAX
.140 MAX
SECTION C-C
2 PLACES
SECTION B-B
2 PLACES
E24
26
L
SEE NOTE 10
2 PLACES
22
2 PLACES
P9
PIN A
5.25
5.00
2 PLACES
P9
8
10 11
4 PLACES
13
4 PLACES
4
B3
3
H
12
6 PLACES
9
6 PLACES
5
E3
2
SEE NOTE 2
TYP
P1 P3 P2 P4
B9
C
C
-B-
11
3 PLACES
15
TYP
B
B
SEE NOTE 12
M
2 PLACES
1
23
SEE NOTE 5
16
J5
J5
7
PIN A
.137
.112
2 PLACES
PIN A
P10
P10
8
SEE NOTE 2
TYP
-A-
SHOWN WITH ITEMS 3 & 11 REMOVED
SHOWN WITH ITEM 6 REMOVED
SHOWN WITH ITEM 6 REMOVED

NUMBER OF TURNS PER INCH

NO. OF FULL TURNS MAX	
4	
3	

REPLACES REV F WITH CHANGES

	QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
L	2	SHIELD & GROUND ASSEMBLY	1000020-2			26
L	2	SHIELD & GROUND ASSEMBLY	1000020-1			25
L	A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713		24
	A/R	SOLDER	SN10WARP 2	QQ-S-571		23
	2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			22
	1	WIRE, ELEC TYPE E-28 BLU		MIL-W-16878	8" TOTAL LG	21
	1	WIRE, ELEC TYPE E-28 YEL		MIL-W-16878	6" TOTAL LG	20
	1	WIRE, ELEC TYPE E-28 RED		MIL-W-16878	16" TOTAL LG	19
	1	WIRE, ELEC TYPE E-28 WHT		MIL-W-16878	5" TOTAL LG	18
	1	WIRE, ELEC TYPE E-28 BLK		MIL-W-16878	30" TOTAL LG	17
P	2	INSULATION SLEEVING, ELEC, HEAT SHRINK	1010490-180		3/4 LG	16
	86	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LG	15
	A/R	SOLDER	SN60 WRP2	QQ-S-571		14
	4	SCR, FLT HD, SELF LKG, HEX SOC	1000104-17			13
J	6	SCR, CAP, SELF LKG, HEX SOC	NAS1352C04L4			12
	7	SCR, BUT HD, SELF LKG, SPL SOC	1000250-12			11
	4	WASHER, FLAT, ROUND	1000254			10
	6	CLAMP, TORQUE MOTOR	1000087			9
	2	CONNECTOR, ELEC, RECEP, 29 CONT	1000116			8
	2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			7
	2	BRACKET, CONNECTOR, ELEC	1000125			6
	1	GUIDE, WIRE, STUB SHAFT MA	1000152			5
	1	GUIDE, WIRE, BEARING HSG MA	1000092			4
	1	MOTOR, TORQUE, DC FRAMELESS	1000075			3
	1	SLIP RING ASSY, ELEC, 40 CONT	1000097			2
	1	16 X RESOLVER ASSY IA & MA	1000162			1

LIST OF PARTS AND MATERIALS

1000206 P

NEXT ASSY	USED ON
1000205	DL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED
CHECKED
DRAWN PALERMO 4-12-63
APPROVED FOR MSC W.G. Rhine 6-26-63
APPROVAL DATE

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE 2/1
UNIT WT
CODE IDENT

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000206
SHEET 1 OF 1

1000205	REV	SHEET
	N	1

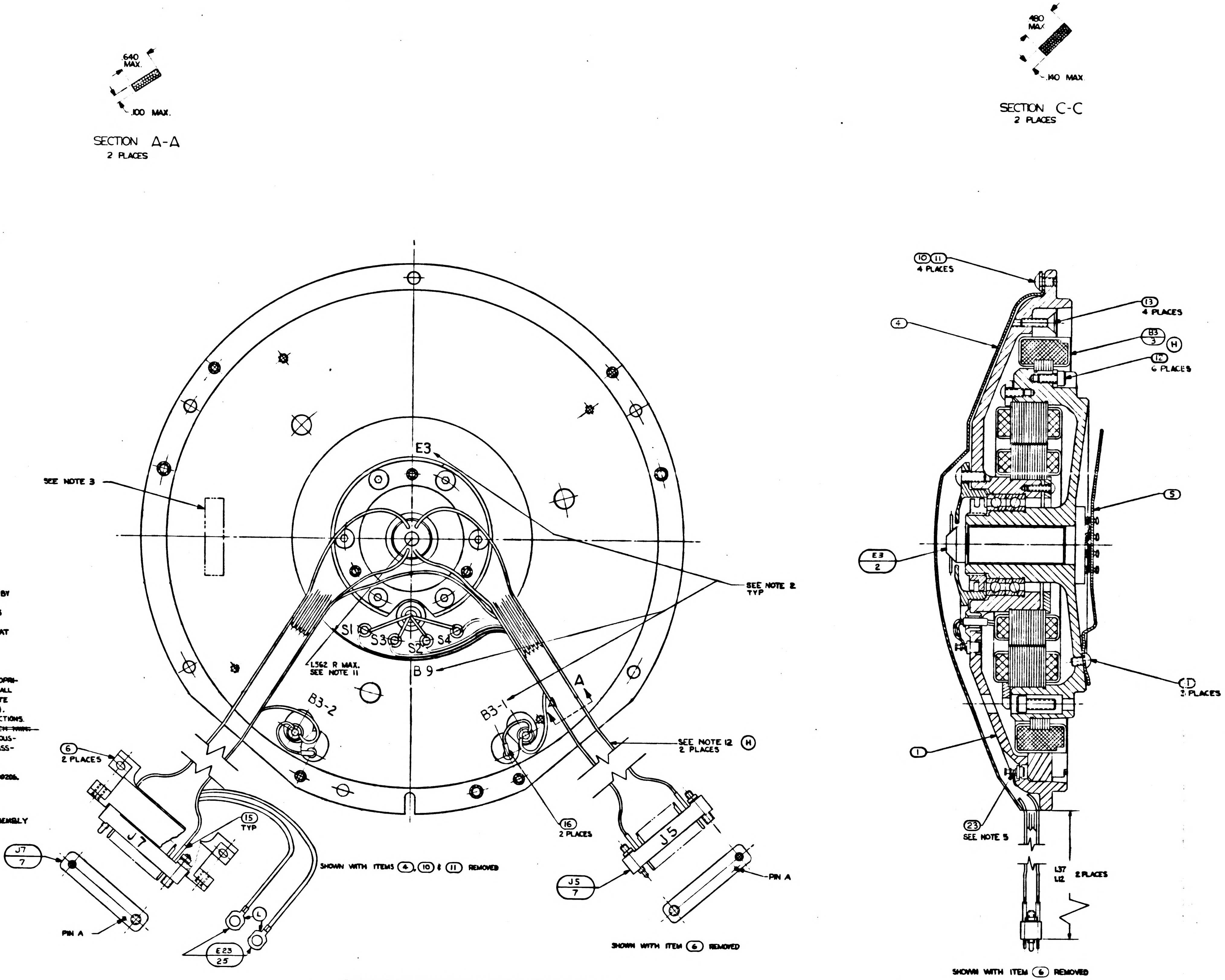
2/1000206

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO
1	WHT/BLK/BLU		J5-R	E3-25
2-1	WHT/BRN/VIO		J5-U	E3-33
2-2	WHT/BRN/GY		J5-V	E3-34
3-1	WHT/GY		J5-X	E3-19
3-2	WHT/BLK/BRN		J5-Y	E3-20
14-3	WHT/BRN/BLU		J5-T	E3-32
5-1	YEL	20	J5-W	B9-S2
5-2	BLU	21	J5-Z	B9-S4
6-1	WHT/RED/ORN		J5-a	E3-35
6-2	WHT/RED/YEL		J5-b	E3-36
7-1	WHT/RED/BLU		J5-d	E3-38
7-2	WHT/RED/GRN		J5-z	E3-37
8-1	BLK	17	J5-e	B9-S3
8-2	RED	19	J5-h	B9-S1
9-1	WHT/BRN/GRN		J5-M	E3-31
9-2	WHT/BRN/YEL		J5-L	E3-30
10-1	WHT/BLK/ORN		J5-J	E3-22
10-2	WHT/BLK/RED		J5-H	E3-21
11-1	WHT/BLK/YEL		J5-S	E3-23
11-2	WHT/BLK/GRN		J5-N	E3-24
12-1	WHT/RED/GY		J5-E	E3-40
12-2	WHT/RED/VIO		J5-D	E3-39
13-1	WHT/BLK/VIO		J5-B	E3-26
13-2	WHT/BRN/ORN		J5-A	E3-29
14-1	WHT/BLK/GY		J5-F	E3-27
14-2	WHT/BRN/RED		J5-C	E3-28
15-1	WHT/BLK		J7-R	E3-11
16-1	WHT/ORN		J7-U	E3-14
17-1	WHT/BLU		J7-X	E3-17
18-1	WHT		J7-P	E3-10
15-2	WHT/BRN		J7-S	E3-12
16-2	WHT/RED		J7-T	E3-13
16-3	WHT/YEL		J7-V	E3-15
17-2	WHT/GRN		J7-W	E3-16
17-3	WHT/VIO		J7-Y	E3-18
21-1	BLK	17	J7-z	B3-1
21-2	WHT	18	J7-e	B3-2
22	BLK		B3-BLK	B3-1
23	WHT		B3-WHT	B3-2
18-2	GY		J7-M	E3-9
24-1	VIO		J7-J	E3-8
25-1	YEL		J7-E	E3-5
26-1	BRN		J7-B	E3-2
24-2	BLU		J7-H	E3-7
25-2	ORN		J7-D	E3-4
25-3	GRN		J7-F	E3-6
26-2	BLK		J7-A	E3-1
26-3	RED		J7-C	E3-3
29-1	WHT/BLK		P9-R	E3-11
30-1	WHT/RED		P9-T	E3-13
30-2	WHT/ORN		P9-U	E3-14
31-1	WHT/BLU		P9-X	E3-17
30-3	WHT/YEL		P9-V	E3-15
31-2	WHT/GRN		P9-W	E3-16
31-3	WHT/VIO		P9-Y	E3-18
29-2	WHT/BRN		P9-S	E3-12
34-1	WHT		P9-P	E3-10
34-2	GY		P9-M	E3-9
35-1	VIO		P9-J	E3-8
36-1	YEL		P9-E	E3-5
37-1	BRN		P9-B	E3-2
38-1	RED	19	P9-N	B9-P1
38-2	BLK	17	P9-K	B9-P3
35-2	BLU		P9-H	E3-7
36-2	GRN		P9-F	E3-6
36-3	ORN		P9-D	E3-4
37-2	RED		P9-C	E3-3
37-3	BLK		P9-A	E3-1
41	WHT/BLK/BLU		P10-R	E3-25
51-3	WHT/BRN/BLU		P10-T	E3-32
43-1	WHT/BLK/BRN		P10-Y	E3-20
43-2	WHT/GY		P10-X	E3-19
44-1	WHT/RED/ORN		P10-a	E3-35
44-2	WHT/RED/YEL		P10-b	E3-36
45-1	WHT/RED/BLU		P10-d	E3-38
45-2	WHT/RED/GRN		P10-z	E3-37
46-1	WHT/RED/GY		P10-Z	E3-40
46-2	WHT/RED/VIO		P10-f	E3-39
47-1	WHT/BRN/GRN		P10-M	E3-31
47-2	WHT/BRN/YEL		P10-L	E3-30
48-1	WHT/BLK/ORN		P10-J	E3-22
48-2	WHT/BLK/RED		P10-H	E3-21
49-1	WHT/BLK/YEL		P10-S	E3-23
49-2	WHT/BLK/GRN		P10-N	E3-24
50-1	WHT/BLK/VIO		P10-B	E3-26
50-2	WHT/BRN/ORN		P10-A	E3-29
51-1	WHT/BLK/GY		P10-F	E3-27
51-2	WHT/BRN/RED		P10-C	E3-28
52-1	WHT/BRN/GY		B9-P2	E3-34
52-2	WHT/BRN/VIO		B9-P4	E3-33
16-A	BLK		SHIELD 16	E23
26-A	BLK		SHIELD 26	E23
30-A	BLK		SHIELD 30	E24
37-A	BLK		SHIELD 37	E24

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .10/.14 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND 1002019.
3. IDENTIFY USING DWG NO, REVISION LETTER AND SERIAL NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ± 7%
   (11) (12) (13) 5 IN-LB
   (22) 3.5 IN-LB
5. (H) SOLDER LEADS FROM (3) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (23). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (7) & (8) PER MIL-STD-440 USING (14). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS.
6. (M) ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MIN.~~
7. CAUTION: DO NOT SEPARATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (3) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (3).
8. MAXIMUM ALLOWABLE TORQUE: 15 OZ-IN.
9. ASSEMBLE AND TEST PER THE REQUIREMENTS OF ATP 1000206.
10. USE CHICAGO STITCH LACING IN AREAS INDICATED.
11. LEADS MUST NOT EXTEND BEYOND THIS RADIUS.
12. (H) USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED
13. (L) HEAT SHRINK SLEEVING ON ITEMS (25) & (26) AFTER ASSEMBLY


.640 MAX.
.100 MAX.
SECTION A-A
2 PLACES
.480 MAX
.140 MAX
SECTION C-C
2 PLACES
SEE NOTE 3
E3
SEE NOTE 2 TYP
S1
S2
S3
S4
.L562 R MAX.
SEE NOTE 11
B9
A
B3-2
B3-1
SEE NOTE 12 (H)
2 PLACES
6
2 PLACES
15
TYP
J7
J7
7
PIN A
L
E23
25
SHOWN WITH ITEMS 4, 10 & 11 REMOVED
16
2 PLACES
J5
J5
7
PIN A
SHOWN WITH ITEM 6 REMOVED
10 11
4 PLACES
13
4 PLACES
4
B3
3
H
12
6 PLACES
5
E3
2
1
23
SEE NOTE 5
C1
3 PLACES
L37
L12
2 PLACES
SHOWN WITH ITEM 6 REMOVED

(M) TWISTING TO CONSIST OF THE FOLLOWING NUMBER OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

1000206

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Mctor	6
1000116	Connector, Elect, Recept 29 Contacts	2
1000117	Connector, Elect, Plug 29 Contacts	2
1000112	Wire Guide Bearing Mt	1
1000152	Wire Guide Stub Shaft	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000203	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
WJ Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/2/62

INTERGIMBAL SUB-ASSEMBLY
16 SPEED
MIDDLE AXIS

SCALE	UNIT WT.	CODE IDENT.

M I T
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LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000206

SHEET OF

1000207

REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00204	12/27/62	WK

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1
1000162	16X Resolver Assembly IA & MA	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL 1000201

APPLICATION

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CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/14/62

INTERGIMBAL SUB-ASSEMBLY

16 SPEED
INNER AXIS

SCALE
UNIT WT.
CODE IDENT.

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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
(M)	A	TDRR 00204	12/27/62	CJB	WR.
	B	TDRR 00239	1/7/63		WR

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1
1000162	16X Resolver Assembly IA & MA	1
1000093-4	Scr, But Hd, Self lock, Hex Soc	2
1000104-5	Scr, Flat Hd Self lock, Hex Soc	4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000204	DL 1000201
NEXT ASSY	USED ON
APPLICATION	

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CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/14/62

INTERGIMBAL SUB-ASSEMBLY

16 SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 00204	12/27/62	ajB	WK.
Ⓜ	B	TDRR 00239	1/7/63		WR
	C	TDRR 00421	2/19/63	ajB	WR

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1
1000162	16X Resolver Assembly IA & MA	1
1000093-4	Scr, But Hd, Self lock, Hex Soc	2
1000104-4	Scr, Flat Hd Self lock, Hex Soc	4
1000104-17	Scr Flat Hd Self lock Hex Soc	4
NAS608C440LL4	Scr Soc Hd Cap Self lock	6

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL 1000201

APPLICATION

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CONTRACT
NAS 9-153

		DATE
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APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W A Rogger	12/14/62

INTERGIMBAL SUB-ASSEMBLY

16 SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 00204	12/27/62	ajB	WK
Ⓜ	B	TDRR 00239	1/7/63	Jh	WK
Ⓜ	C	TDRR 00421	2/19/63	ajB	WK
	D	TDRR 00762	4/10/63	ajB	WK

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1
1000162	16X Resolver Assembly IA & MA	1
1000093-4	Scr, But Hd, Self lock, Hex Soc	2
1000104-4	Scr, Flat Hd Self lock, Hex Soc	4
1000104-17	Scr Flat Hd Self lock Hex Soc	4
NAS608C440LL4	Scr Soc Hd Cap Self lock	6
1000125	Bracket Connector	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000204	DL 1000201
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W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W A Kupfer	12/14/62

INTERGIMBAL SUB-ASSEMBLY

16 SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
M	A	TDRR 00204	12/27/62	ajB WK.
M	B	TDRR 00239	1/7/63	WK
M	C	TDRR 00421	2/19/63	ajB WK
M	D	TDRR 00762	4/10/63	ajB WK.
	E	TDRR 01059	4/30/63	ajB WK

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1
1000162	16X Resolver Assembly IA & MA	1
~~1000093-4~~	~~Scr, But Hd, Self lock, Hex Soc~~	~~2~~
~~1000104-4~~	~~Scr, Flat Hd Self lock, Hex Soc~~	~~4~~
1000104-17	Scr Flat Hd Self lock Hex Soc	4
NAS608C440LL4	Scr Soc Hd Cap Self lock	6
1000125	Bracket Connector	2
1000250-2	Scr But Hd Self Ikg Spl Soc	2
1000250-12	Scr But Hd Self Ikg Spl Soc	4
1006776-15	Insulation Sleeving, Elect	5 inches
1006776-18	Insulation Sleeving, Elect	30 inches
1000254	Washer, Flat, Round	4

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

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W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/14/62

INTERGIMBAL SUB-ASSEMBLY

16 SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

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REVISIONS TDRR 00132

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 00204	12/27/62	ajB	WK
Ⓜ	B	TDRR 00239	1/7/63		WK
Ⓜ	C	TDRR 00421	2/19/63	ajB	WK
Ⓜ	D	TDRR 00762	4/10/63	ajB	WK
	E	TDRR 01059	4/30/63	ajB	WK
Ⓜ	F	TDRR 01526	6/12/63	ajB	

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1
1000162	16X Resolver Assembly IA & MA	1
~~1000093-4~~	~~Scr, But Hd, Self lock, Hex Soc~~	~~2~~
~~1000104-4~~	~~Scr, Flat Hd Self lock, Hex Soc~~	~~4~~
1000104-17	Scr Flat Hd Self lock Hex Soc	4
NAS608C440LL4	Scr Soc Hd Cap Self lock	6
1000125	Bracket Connector	2
1000250-2	Scr But Hd Self lkg Spl Soc	2
1000250-12	Scr But Hd Self lkg Spl Soc	4
1006776-15	Insulation Sleeving, Elect	1½ inches
1006776-18	Insulation Sleeving, Elect	23 inches
1000254	Washer, Flat, Round	4
1006776-16	Insulation Sleeving Elect.	2¼ inches
1006776-9	Insulation Sleeving Elect	5/8 inches
MIL-W-16878	Wire Elect Type E-28 BRN	3 inches
	BLU	8 inches
	YEL	10 inches
	RED	12 inches
	Wht	8 inches
	BLK	20 inches

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000204	DL 1000201
NEXT ASSY	USED ON

APPLICATION

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APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
	12/14/62

INTERGIMBAL SUB-ASSEMBLY

16 SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

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ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00132			
M	A	TDRR 00204	12/27/62	ajB	WK.
M	B	TDRR 00239	1/7/63		WK
M	C	TDRR 00421	2/19/63	ajB	WK
M	D	TDRR 00762	4/10/63	ajB	WK.
	E	TDRR 01059	4/30/63	ajB	WK
M	F	TDRR 01526	6/12/63	ajB	RKB
	G	REPLACED BY REV H WITH CHANGES TDRR 01926	7/9/63	ajB	

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1
1000162	16X Resolver Assembly IA & MA	1
~~1000093-4~~	~~Scr, But Hd, Self lock, Hex Soc~~	~~2~~
~~1000104-4~~	~~Scr, Flat Hd Self lock, Hex Soc~~	~~4~~
1000104-17	Scr Flat Hd Self lock Hex Soc	4
NAS608C440LL4	Scr Soc Hd Cap Self lock	6
1000125	Bracket Connector	2
1000250-2	Scr But Hd Self lkg Spl Soc	2
1000250-12	Scr But Hd Self lkg Spl Soc	4
1006776-15	Insulation Sleeving, Elect	1½ inches
1006776-18	Insulation Sleeving, Elect	23 inches
1000254	Washer, Flat, Round	4
1006776-16	Insulation Sleeving Elect.	2¼ inches
1006776-9	Insulation Sleeving Elect	5/8 inches
MIL-W-16878	Wire Elect Type E-28 BRN	3 inches
	BLU	8 inches
	YEL	10 inches
	RED	12 inches
	Wht	8 inches
	BLK	20 inches

REPLACED BY REV H WITH CHANGES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000204	DL 1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES DO NOT SCALE THIS DRAWING MATERIAL:	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153 APPROVED C J Boyce DATE 12/11/62 CHECKED DRAWN APPROVED FOR MSC W J Rhine 12-12-62 MIT/IL APPROVAL DATE 12/14/62	INTERGIMBAL SUB-ASSEMBLY 16 SPEED INNER AXIS SCALE UNIT WT. CODE IDENT.	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS. DWG. NO. MANNED SPACECRAFT CENTER HOUSTON TEXAS NASA DRAWING NO. 1000207 SHEET OF
NEXT ASSY	USED ON				
APPLICATION					

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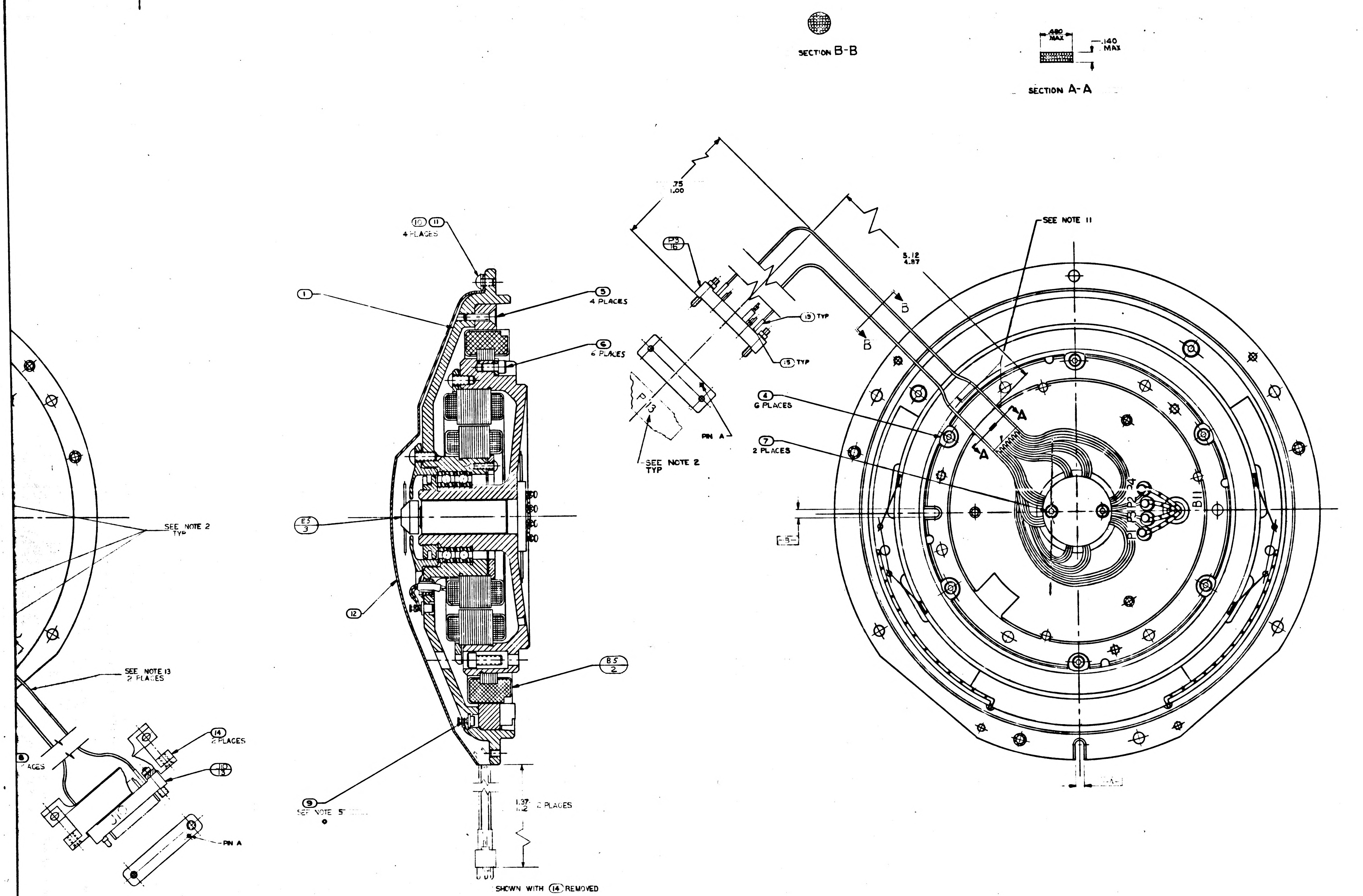
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES TDRR 01926	6-19-63	



SECTION B-B
.480 MAX
.140 MAX
SECTION A-A
.75
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SEE NOTE 11
P3
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15 TYP
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PIN A
SEE NOTE 2 TYP
10 11 4 PLACES
1
5 4 PLACES
6 6 PLACES
4 6 PLACES
7 2 PLACES
E5 3
12
B5 2
9
SEE NOTE 5
1.37
1.12
2 PLACES
SHOWN WITH 14 REMOVED
SEE NOTE 2 TYP
SEE NOTE 13 2 PLACES
14 2 PLACES
PIN A
B
A
B11

REPLACES REV G WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	20" TOT. LG	25
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	8" TOT. LG	24
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	12" TOT. LG	23
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	10" TOT. LG	22
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	8" TOT. LG	21
1	WIRE, ELEC, TYPE E-28 BRN		MIL-W-16878	3" TOT. LG	20
7	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	19
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	18
A/R	SOLDER	SN60WARP2	QQ-S-571		17
1	CONNECTOR, ELEC, RECEP, 34 CONT	1000119			16
73	INSULATION SLEEVING, ELEC.	1006776-18		1/4 LONG	15
2	BRACKET, CONNECTOR, ELEC.	1000125			14
2	CONNECTOR, ELEC, PLUG, 29 CONT.	1000117			13
1	GUIDE, WIRE, BRG, HSG. I.A.	1000112			12
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
A/R	SOLDER	SN60WARP2	QQ-S-571		9
2	INSULATION SLEEVING, ELEC.	1006776-15		1/4 LONG	8
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			7
6	SCR, CAP, SELF LKG, HEX, SOC	NAS[illegible]			6
4	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-17			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16X RSVR ASSY INNER & MIDDLE AXIS	1000162			1

LIST OF PARTS AND MATERIALS

1000204	BL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED [illegible] DATE 7/9/63
CHK'D
DRAWN L.SIDIKADAMEN 6/17/63
APPROVED FOR MSC
BY DIRECTION MIT APPROVAL
John [illegible]

INTERGIMBAL SUB ASSEMBLY
16 SPEED INNER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000207
SHEET 1 OF 1

H
1000207

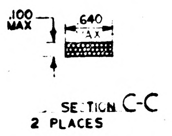
207 H

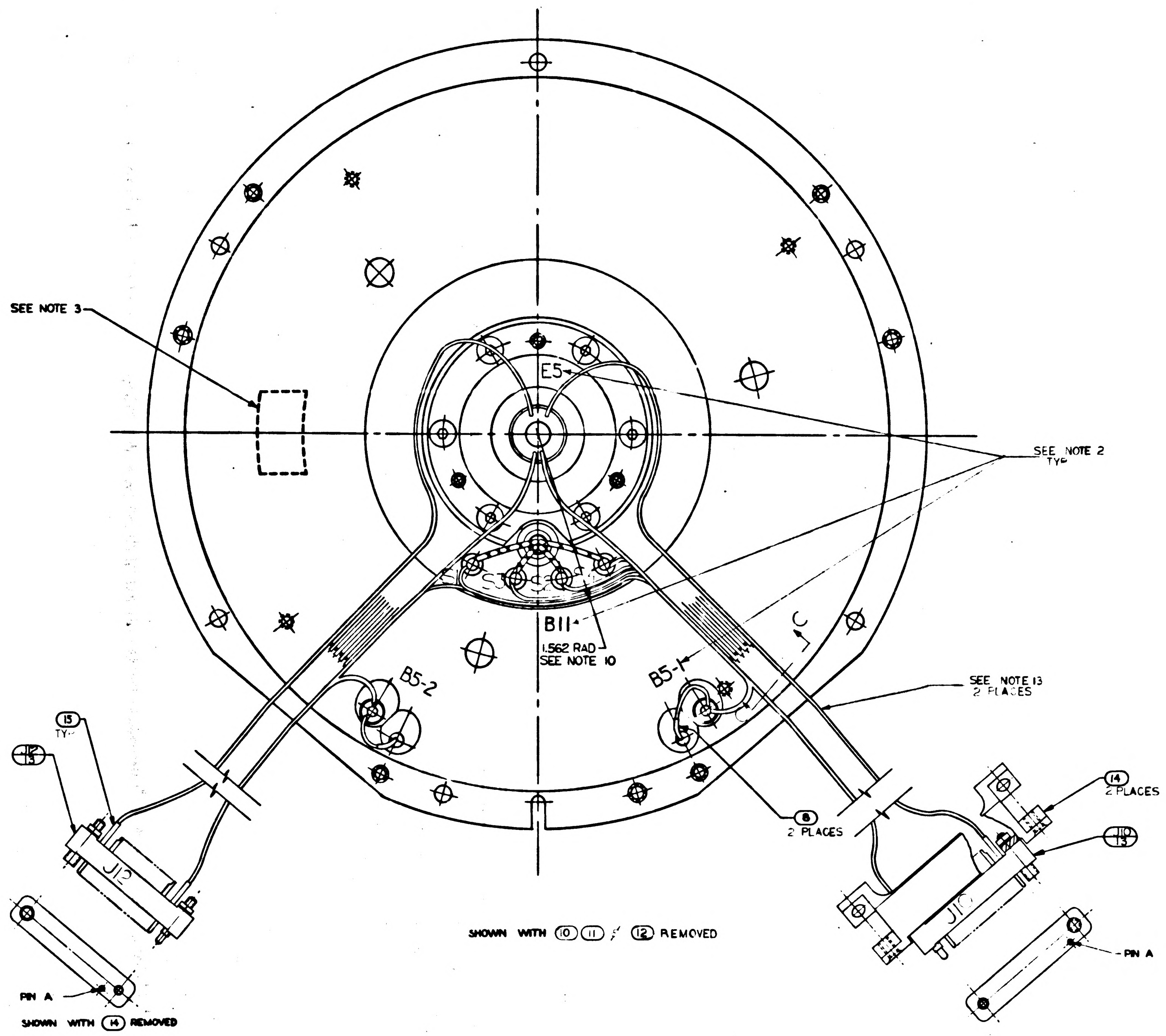
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

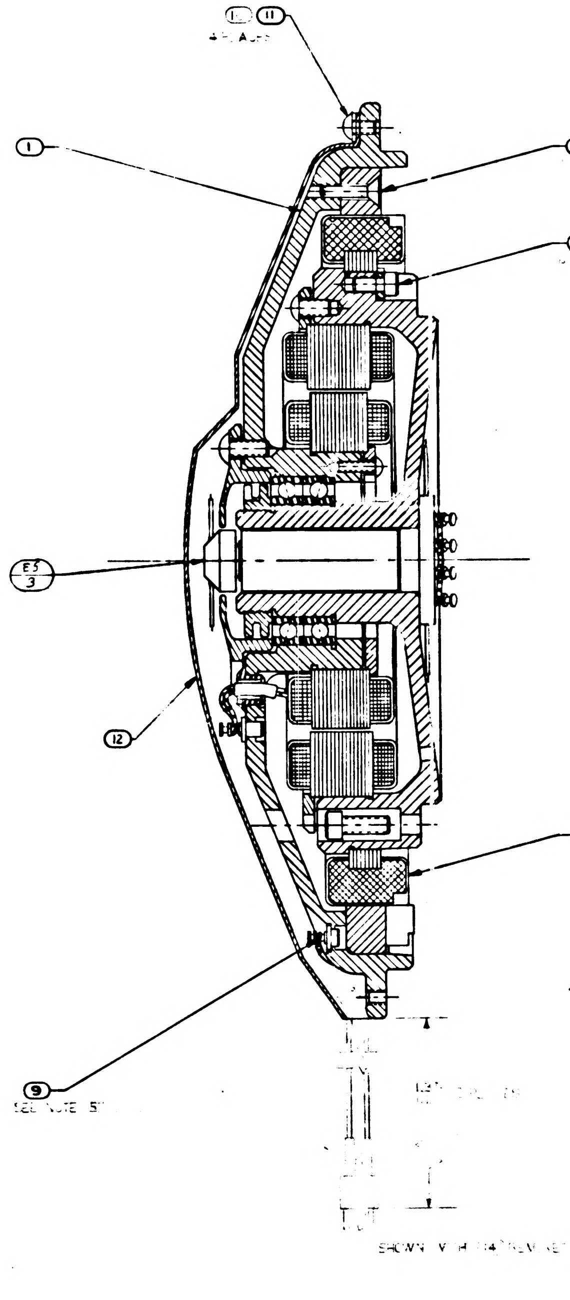
F2

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J10-R	E5-25	
2	WHT/BRN/BLU		J10-T	E5-32	
3	WHT/RED/GRN		J10-U	E5-35	
4	WHT/BRN/GY		J10-V	E5-34	
5-1	WHT/GY		J10-X	E5-19	8
5-2	WHT/BLK/BRN		J10-Y	E5-20	
6-1	WHT/RED/GY		J10-Z	E5-40	8
6-2	WHT/RED/VIO		J10-[illegible]	E5-39	
7-1	BLK	25	J10-a	B11-53	8
7-2	RED	23	J10-b	B11-S1	
8-1	BLU	21	J10-d	B11-S4	8
8-2	YEL	22	J10-[illegible]	B11-S2	
9	WHT/ORN		J10-G	E5-14	
10	WHT/BRN/VIO		J10-h	E5-33	
11-1	WHT/BRN/GRN		J10-M	E5-31	8
11-2	WHT/BRN/YEL		J10-L	E5-30	
12-1	WHT/BLK/YEL		J10-S	E5-23	8
12-2	WHT/BLK/GRN		J10-N	E5-24	
13-1	WHT/BLK/ORN		J10-J	E5-22	8
13-2	WHT/BLK/RED		J10-H	E5-21	
14	WHT/RED/YEL		J10-E	E5-36	
15	WHT/BLU		J10-K	E5-17	
16-1	WHT/BLK/VIO		J10-B	E5-26	8
16-2	WHT/BRN/ORN		J10-A	E5-29	
17-1	WHT/BLK/GY		J10-F	E5-27	8
17-2	WHT/BRN/RED		J10-C	E5-28	
18-1	BLU		J12-R	E5-7	8
18-2	VIO		J12-S	E5-8	
19	WHT/VIO		J12-T	E5-18	
20	BLK		J12-V	E5-1	
21	WHT/RED/GRN		J12-Z	E5-37	
22-1	GRN		J12-d	E5-6	8
22-2	YEL		J12-c	E5-5	
23-1	WHT	24	J12-M	B5-2	8
23-2	BLK	25	J12-L	B5-1	
24	WHT		B5-WHT	B5-2	
25	BLK		B5-BLK	B5-1	
26	WHT/GRN		J12-P	E5-16	
27	WHT/YEL		J12-J	E5-15	
28-1	WHT/BRN		J12-N	E5-12	8
28-2	WHT/RED		J12-K	E5-13	
29	WHT/RED/BLU		J12-H	E5-38	
30-1	BRN		J12-E	E5-2	8
30-2	RED		J12-D	E5-3	
30-3	ORN		J12-F	E5-4	
31-1	WHT		J12-B	E5-10	8
31-2	GY		J12-A	E5-9	
31-3	WHT/BLK		J12-C	E5-11	
32-1	WHT/BLK/GY		P13-X	E5-27	8
32-2	WHT/BRN/RED		P13-Z	E5-28	
33-1	WHT/BRN/ORN		P13-Y	E5-29	8
33-2	WHT/BLK/VIO		P13-W	E5-26	
34-1	RED		P13-BB	E5-3	8
34-2	ORN		P13-CC	E5-4	
34-3	BRN		P13-AA	E5-2	
35	BRN	20	P13-AA	P13-MM	
36	RED	23	P13-BB	P13-KK	
37	BLK		P13-FF	E5-1	
38-1	GRN		P13-HH	E5-6	8
38-2	YEL		P13-EE	E5-5	
39-1	VIO		P13-HH	E5-8	8
39-2	BLU		P13-EE	E5-7	
40-1	GY		P13-LL	E5-9	8
40-2	WHT		P13-JJ	E5-10	
40-3	WHT/BLK		P13-NN	E5-11	
41	RED	23	P13-DD	P13-KK	
42	WHT/RED/YEL		P13-U	E5-36	
43	WHT/RED/ORN		P13-T	E5-35	
44	WHT/RED/GRN		P13-V	E5-37	
45	WHT/ORN		P13-P	E5-14	
46	WHT/BRN/GY		P13-S	E5-34	
47	WHT/BLU		P13-N	E5-17	
48	WHT/BRN/VIO		P13-R	E5-33	
49	WHT/VIO		P13-J	E5-18	
50-1	WHT/BRN/GRN		P13-K	E5-31	8
50-2	WHT/BRN/YEL		P13-H	E5-30	
51-1	WHT/RED/GY		P13-M	E5-40	8
51-2	WHT/RED/VIO		P13-L	E5-39	
52	WHT/BLK/BLU		P13-E	E5-25	
53-1	WHT/BLK/GRN		P13-D	E5-24	8
53-2	WHT/BLK/YEL		P13-C	E5-23	
54	YEL	22	P13-C	P13-B	
55-1	WHT/BLK/ORN		P13-B	E5-22	8
55-2	WHT/BLK/RED		P13-A	E5-21	
56	WHT/BRN/BLU		P13-F	E5-32	
57-1	WHT/BRN		B11-P1	E5-12	8
57-2	WHT/RED		B11-P3	E5-13	
58-1	WHT/BLK/BRN		B11-P2	E5-20	8
58-2	WHT/GY		B11-P4	E5-19	
59	WHT/YEL		E5-15	SPARE	
60	WHT/GRN		E5-16	SPARE	
61	WHT/RED/BLU		E5-38	SPARE	







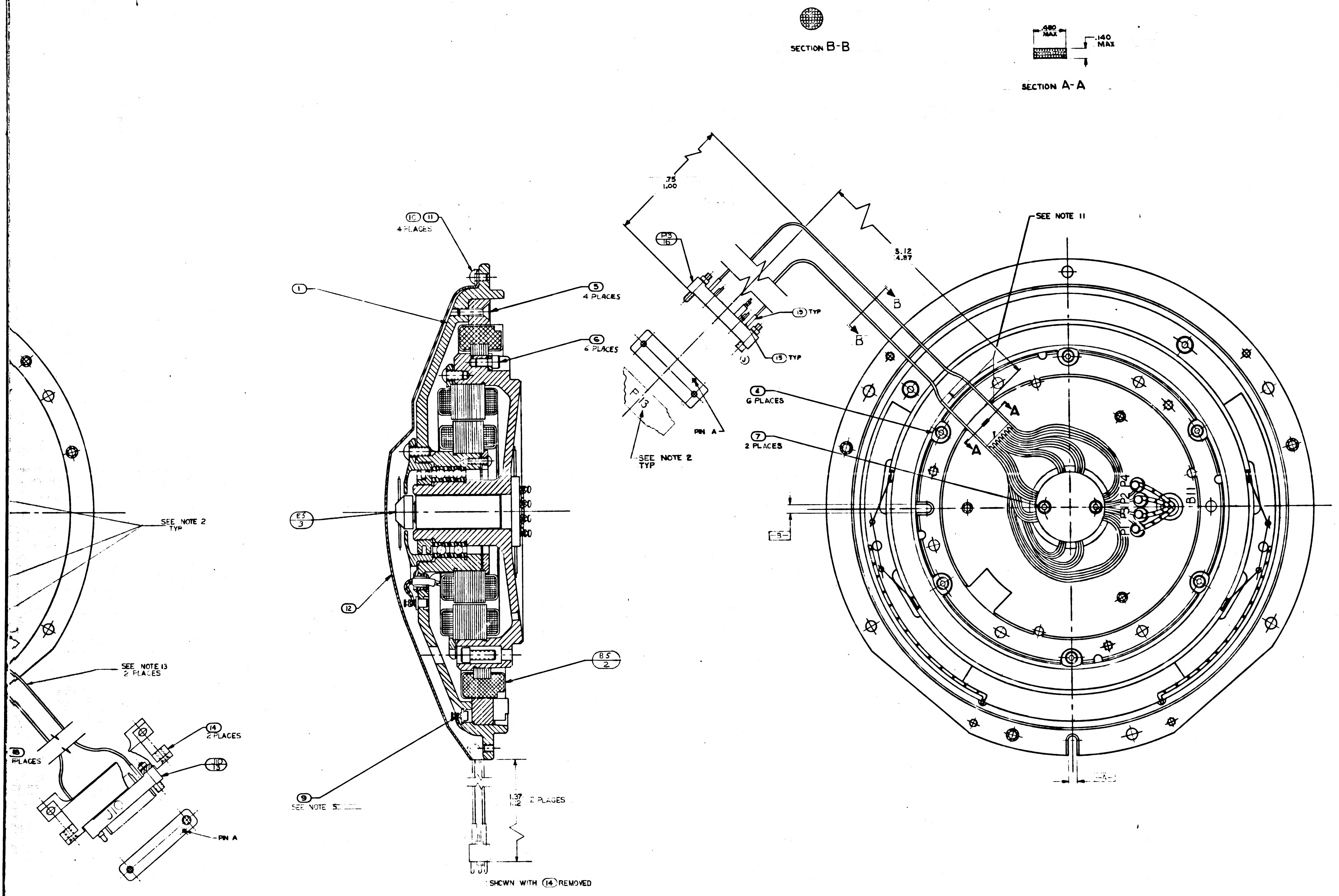
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .10 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND1002019
3. IDENTIFY USING DRAWING NUMBER REVISION LETTER & SER.NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ±7%
   (5) (6) ( ) 5 IN-LB
   (7) 3.5 IN-LB
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (9). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (16) PER MIL-STD-440 USING (17). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.
7. CAUTION: DO NOT SEPERATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (2) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (2)
8. MAXIMUM ALLOWABLE TORQUE : 15 OZ-IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000207
10. LEADS MUST NOT EXTEND BEYOND THIS RADIUS
11. USE CHICAGO STITCH LACING IN AREAS INDICATED
12. ALL SPARE LEADS TO BE 8.50±.12 LONG, TO TERMINATE NEAR $\frac{P13}{16}$ AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
13. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

1000207 REV H

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
H	REPLACES REV G WITH CHANGES TDRR 01926	6-19-63		
J	TDRR 03231	3-20-63		W.C.



SECTION B-B
.480 MAX
.140 MAX
SECTION A-A
.75
1.00
5.12
4.87
SEE NOTE 11
10
11
4 PLACES
1
5
4 PLACES
6
6 PLACES
P3
16
19 TYP
15 TYP
J
B
B
P13
PIN A
SEE NOTE 2 TYP
4
6 PLACES
7
2 PLACES
A
A
P4
P2
P1
B11
B
E3
3
12
SEE NOTE 2 TYP
SEE NOTE 13 2 PLACES
B5
2
14
2 PLACES
18
PLACES
J10
13
PIN A
9
SEE NOTE 5
1.37
1.12
2 PLACES
SHOWN WITH 14 REMOVED

REPLACES REV G WITH CHANGES

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	20" TOT. LG	25
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	8" TOT. LG	24
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	12" TOT. LG	23
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	10" TOT. LG	22
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	8" TOT. LG	21
1	WIRE, ELEC, TYPE E-28 BRN		MIL-W-16878	3" TOT. LG	20
7	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	19
A/R	TWINE, NYLON, WAXED		MIL-T-713	TYPE P	18
A/R	SOLDER	SN60WARP2	QQ-S-571		17
1	CONNECTOR, ELEC, RECEP, 34 CONT	1000119			16
73	INSULATION SLEEVING, ELEC.	1006776-18		3/4 LONG	15
2	BRACKET, CONNECTOR, ELEC.	1000125			14
2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			13
1	GUIDE, WIRE, BRG, HSG. I.A.	1000112			12
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
A/R	SOLDER	SN10WARP2	QQ-S-571		9
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LONG	8
2	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-2			7
6	SCR, CAP, SELF LKG, HEX, SOC	[illegible]			6
4	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-17			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000073			2
1	16X RSVR ASSY INNER & MIDDLE AXIS	1000162			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED C. S. Boyd DATE 7/9/63
DRAWN R. DEHAEMAN 4/17/63
APPROVED FOR MSC
BY DIRECTION MIT APPROVAL
John Finney

INTERGIMBAL SUB ASSEMBLY
16 SPEED INNER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000207
SHEET 1 OF 1

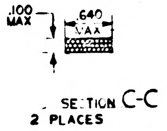
1000207

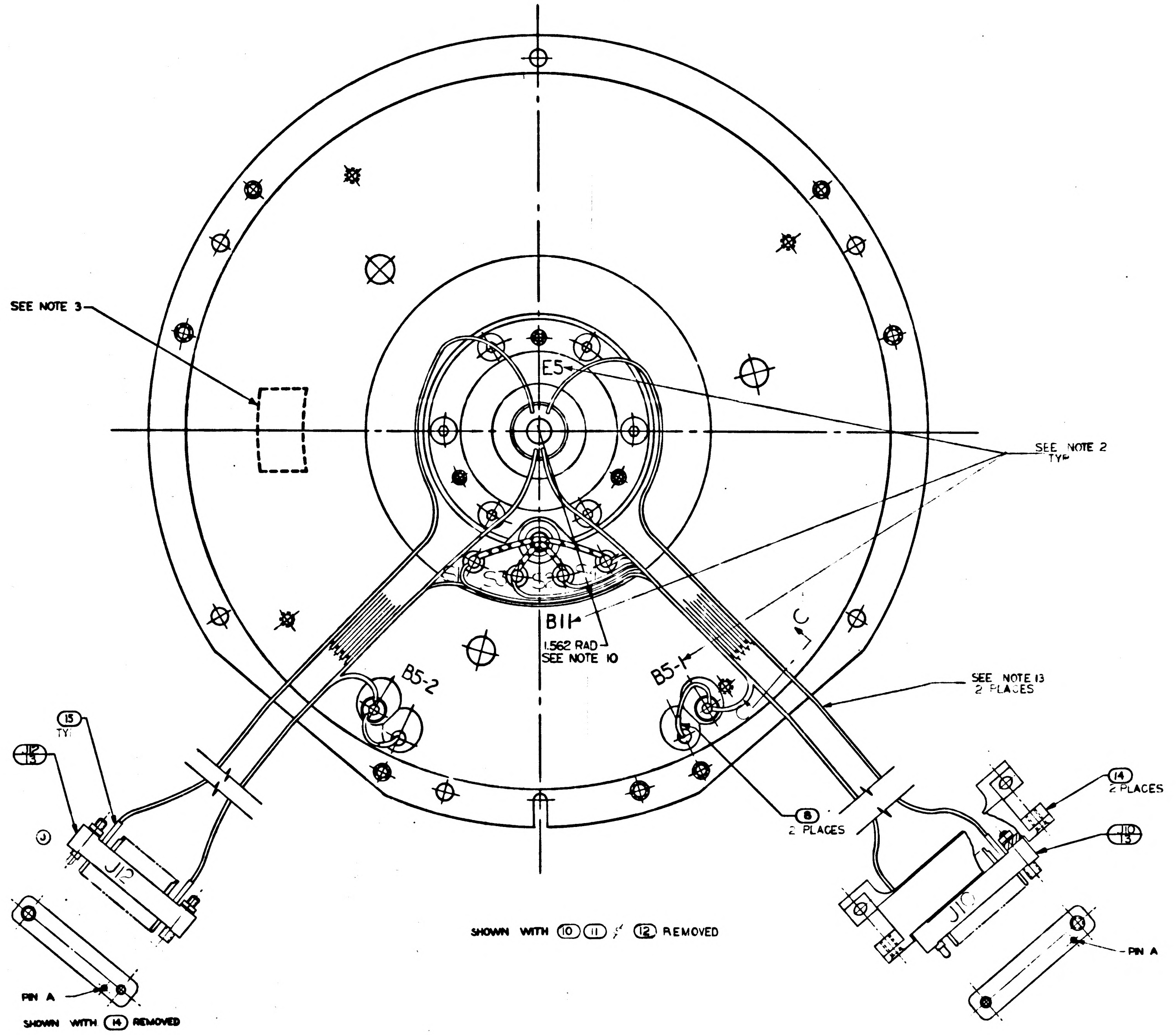
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

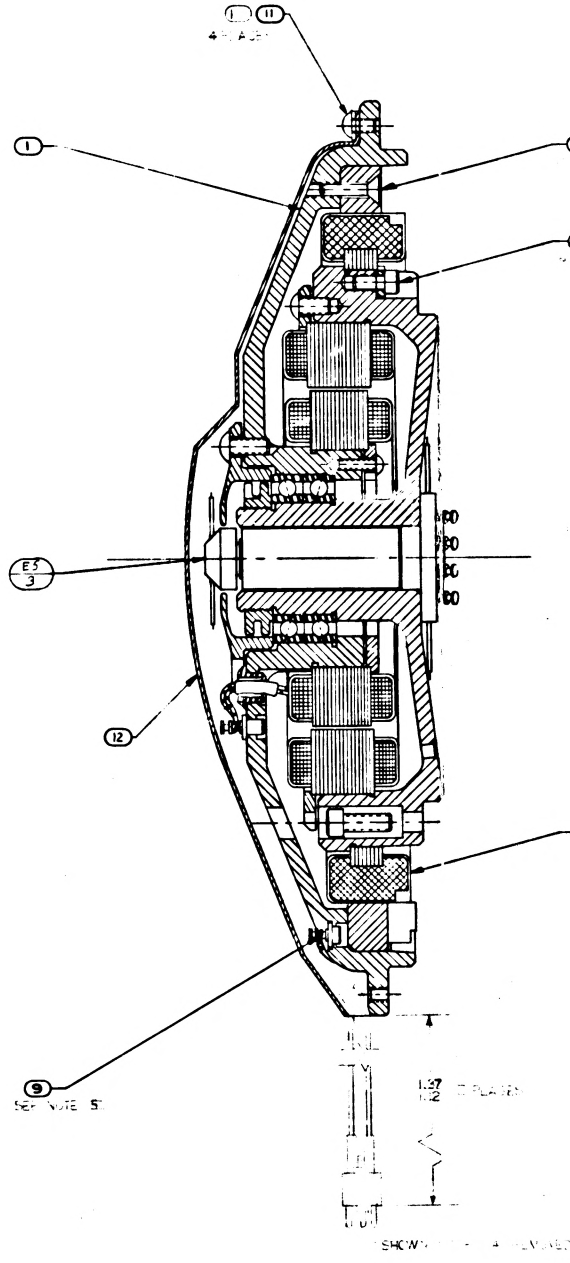
F-2

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J10-R	E5-25	
2	WHT/BRN/BLU		J10-T	E5-32	
3	WHT/RED/ORN		J10-U	E5-35	
4	WHT/BRN/GY		J10-V	E5-34	
5-1	WHT/GY		J10-X	E5-19	8
5-2	WHT/BLK/BRN		J10-Y	E5-20	
6-1	WHT/RED/GY		J10-Z	E5-40	8
6-2	WHT/RED/VIO		J10-f	E5-39	
7-1	BLK	26	J10-Z	B11-53	8
7-2	RED	23	J10-b	B11-51	
8-1	BLU	21	J10-d	B11-54	8
8-2	YEL	22	J10-a	B11-52	
9	WHT/ORN		J10-e	E5-14	
10	WHT/BRN/VIO		J10-h	E5-33	
11-1	WHT/BRN/GRN		J10-M	E5-31	8
11-2	WHT/BRN/YEL		J10-L	E5-30	
12-1	WHT/BLK/YEL		J10-S	E5-23	8
12-2	WHT/BLK/GRN		J10-N	E5-24	
13-1	WHT/BLK/ORN		J10-J	E5-22	8
13-2	WHT/BLK/RED		J10-H	E5-21	
14	WHT/RED/YEL		J10-E	E5-36	
15	WHT/BLU		J10-K	E5-17	
16-1	WHT/BLK/VIO		J10-B	E5-26	8
16-2	WHT/BRN/ORN		J10-A	E5-29	
17-1	WHT/BLK/GY		J10-F	E5-27	8
17-2	WHT/BRN/RED		J10-C	E5-28	
18-1	BLU		J12-R	E5-7	8
18-2	VIO		J12-S	E5-8	
19	WHT/VIO		J12-T	E5-18	
20	BLK		J12-V	E5-1	
21	WHT/RED/GRN		J12-Z	E5-37	
22-1	GRY		J12-d	E5-6	8
22-2	YEL		J12-c	E5-5	
23-1	WHT	24	J12-M	B5-2	8
23-2	BLK	25	J12-L	B5-1	
24	WHT		B5-WHT	B5-2	
25	BLK		B5-BLK	B5-1	
26	WHT/GRN		J12-P	E5-16	
27	WHT/YEL		J12-J	E5-15	
28-1	WHT/BRN		J12-N	E5-12	8
28-2	WHT/RED		J12-K	E5-13	
29	WHT/RED/BLU		J12-H	E5-38	
30-1	BRN		J12-E	E5-2	8
30-2	RED		J12-D	E5-3	
30-3	ORN		J12-F	E5-4	
31-1	WHT		J12-B	E5-10	8
31-2	GY		J12-A	E5-9	
31-3	WHT/BLK		J12-C	E5-11	
32-1	WHT/BLK/GY		P13-X	E5-27	8
32-2	WHT/BRN/RED		P13-Z	E5-28	
33-1	WHT/BRN/ORN		P13-Y	E5-29	8
33-2	WHT/BLK/VIO		P13-W	E5-26	
34-1	RED		P13-BB	E5-3	8
34-2	ORN		P13-CC	E5-4	
34-3	BRN		P13-AA	E5-2	
35	BRN	20	P13-AA	P13-MM	
36	RED	23	P13-BB	P13-KK	
37	BLK		P13-FF	E5-1	
38-1	GRN		P13-HH	E5-6	8
38-2	YEL		P13-EE	E5-5	
39-1	VIO		P13-HH	E5-8	8
38-2	BLU		P13-EE	E5-7	
40-1	GY		P13-LL	E5-9	8
40-2	WHT		P13-JJ	E5-10	
40-3	WHT/BLK		P13-NN	E5-11	
41	RED	23	P13-DD	P13-KK	
42	WHT/RED/YEL		P13-U	E5-36	
43	WHT/RED/ORN		P13-T	E5-35	
44	WHT/RED/GRN		P13-V	E5-37	
45	WHT/ORN		P13-P	E5-14	
46	WHT/BRN/GY		P13-S	E5-34	
47	WHT/BLU		P13-N	E5-17	
48	WHT/BRN/VIO		P13-R	E5-33	
49	WHT/VIO		P13-J	E5-18	
50-1	WHT/BRN/GRN		P13-K	E5-31	8
50-2	WHT/BRN/YEL		P13-H	E5-30	
51-1	WHT/RED/GY		P13-M	E5-40	8
51-2	WHT/RED/VIO		P13-L	E5-39	
52	WHT/BLK/BLU		P13-E	E5-25	
53-1	WHT/BLK/GRN		P13-D	E5-24	8
53-2	WHT/BLK/YEL		P13-C	E5-23	
54	YEL	22	P13-C	P13-B	
55-1	WHT/BLK/ORN		P13-B	E5-22	8
55-2	WHT/BLK/RED		P13-A	E5-21	
56	WHT/BRN/BLU		P13-F	E5-32	
57-1	WHT/BRN		B11-P1	E5-12	8
57-2	WHT/RED		B11-P3	E5-13	
58-1	WHT/BLK/BRN		B11-P2	E5-20	8
58-2	WHT/GY		B11-P4	E5-19	
59	WHT/YEL		E5-15	SPARE	
60	WHT/GRN		E5-16	SPARE	
61	WHT/RED/BLU		E5-38	SPARE	







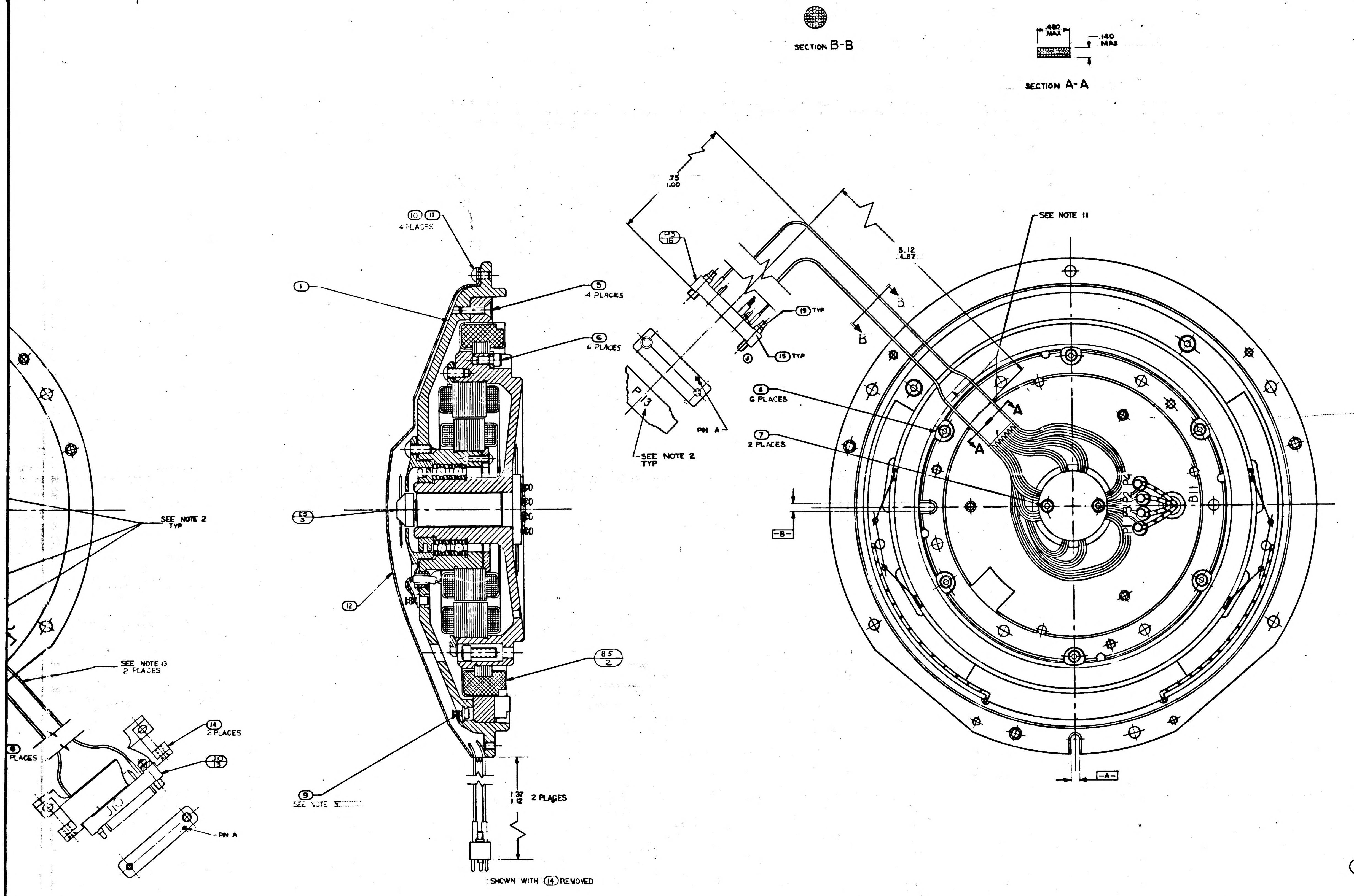
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS $\frac{.10}{.12}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND1002019
3. IDENTIFY USING DRAWING NUMBER REVISION LETTER & SER.NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ±7%
   (5) (6) ( ) 5 IN-LB
   (7) 3.5 IN-LB
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (9). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (16) PER MIL-STD-440 USING (17). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.
7. CAUTION: DO NOT SEPERATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (2) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (2)
8. MAXIMUM ALLOWABLE TORQUE : 15 OZ-IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000207
10. LEADS MUST NOT EXTEND BEYOND THIS RADIUS
11. USE CHICAGO STITCH LACING IN AREAS INDICATED
12. ALL SPARE LEADS TO BE 8.50±.12 LONG, TO TERMINATE NEAR $\frac{P13}{16}$ AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
13. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

1000207 REV J

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES TDRR 01926	6-19-63	
J	TDRR 03231	9-20-63	
K	TDRR 05171	1-6-64	



SECTION B-B
.480 MAX
.140 MAX
SECTION A-A
.75
1.00
5.12
4.87
SEE NOTE 11
10 11
4 PLACES
1
5
4 PLACES
6
6 PLACES
P13
16
19 TYP
15 TYP
J
P13
PIN A
SEE NOTE 2 TYP
4
6 PLACES
7
2 PLACES
A
A
B
B
B11
P14
SEE NOTE 2 TYP
12
SEE NOTE 13 2 PLACES
8
PLACES
14
2 PLACES
10
13
J10
PIN A
8 5
2
9
SEE NOTE 5
1.37
1.12
2 PLACES
SHOWN WITH 14 REMOVED
-B-
-A-

…CONSIST OF THE FOLLOWING
…PER INCH MINIMUM

NO.	OF TURNS
	4
	3

REPLACES REV G WITH CHANGES

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	TERMINAL LUG	1010717-1			26
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	23" TOT. LG	25
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	8" TOT. LG	24
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	12" TOT. LG	23
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	10" TOT. LG	22
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	8" TOT. LG	21
1	WIRE, ELEC, TYPE E-28 BRN		MIL-W-16878	3" TOT. LG	20
7	INSULATION, SLEEVING, ELEC	1006776-16		1/4 LONG	19
A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2 TYPE P	18
A/R	SOLDER	SN60WARP2	QQ-S-571		17
1	CONNECTOR, ELEC, RECEP, 34 CONT.	1000119			16
73	INSULATION SLEEVING, ELEC.	1006776-18		1/4 LONG	15
2	BRACKET, CONNECTOR, ELEC.	1000125			14
2	CONNECTOR, ELEC, PLUG, 29 CONT.	1000117			13
1	GUIDE, WIRE, BRG, HSG. I.A.	1000112			12
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
A/R	SOLDER	SN60WARP2	QQ-S-571		9
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LONG	8
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			7
6	SCR, CAP, SELF LKG, HEX, SOC	NAS1352-4L4			6
4	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-17			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16X RSVR ASSY INNER & MIDDLE AXIS	1000162			1

LIST OF PARTS AND MATERIALS

MASTER

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED — DATE 6/19/63
CHK'ED
DRAWN R. SIDKABAUSH 4/17/63
APPROVED FOR MSC
BY DIRECTOR MIT APPROVAL
John Finney

INTERGIMBAL SUB ASSEMBLY 16 SPEED INNER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000207
SHEET 1 OF 1

1000207 K

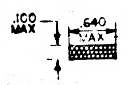
REV	SHEET
K	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

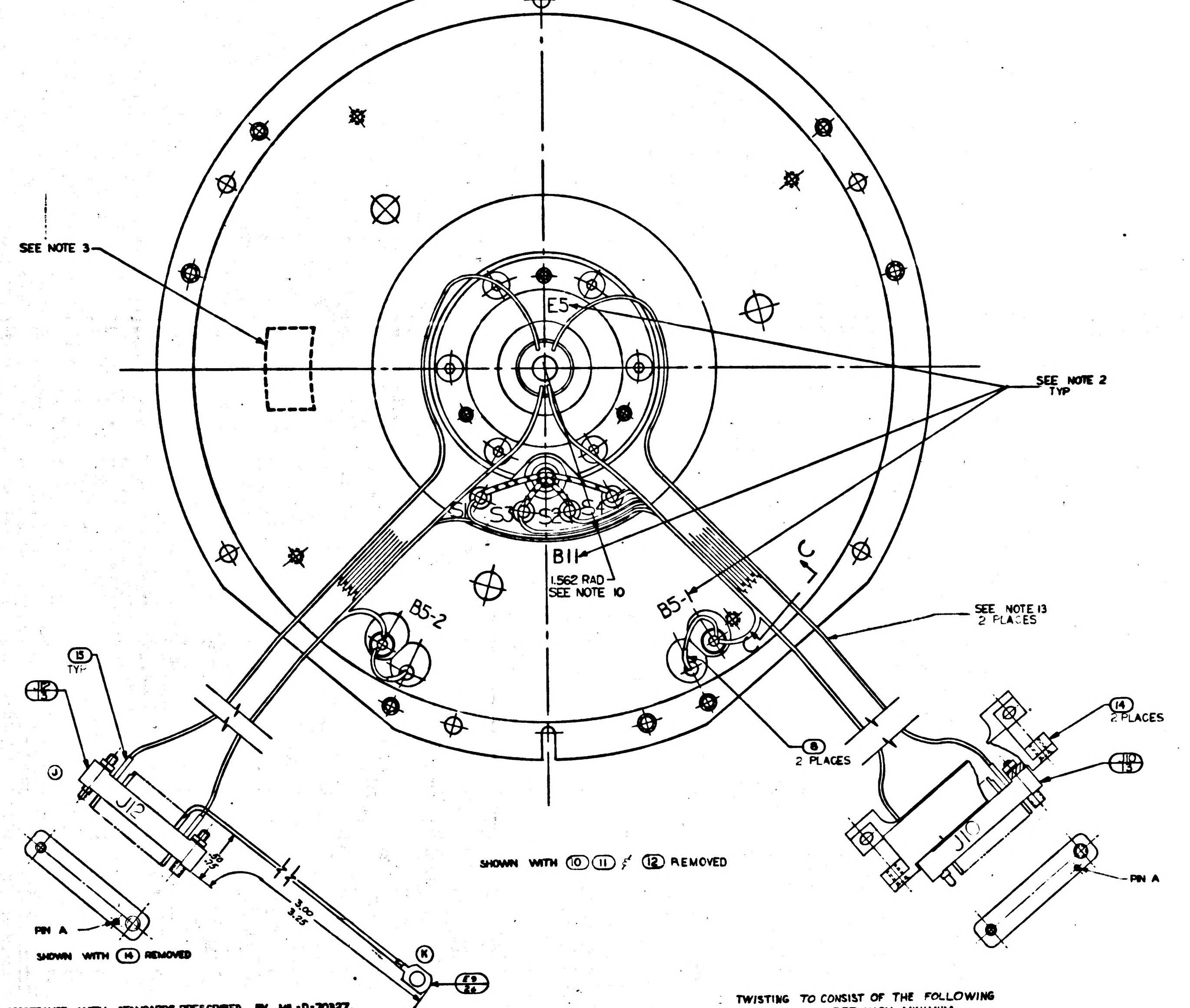
F-2

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J10-R	E5-25	
2	WHT/BRN/BLU		J10-T	E5-32	
3	WHT/RED/ORN		J10-U	E5-35	
4	WHT/BRN/GY		J10-V	E5-34	
5-1	WHT/GY		J10-X	E5-19	8
5-2	WHT/BLK/BRN		J10-Y	E5-20	
6-1	WHT/RED/GY		J10-Z	E5-40	8
6-2	WHT/RED/VIO		J10-a	E5-39	
7-1	BLK	26	J10-Z	B11-53	8
7-2	RED	23	J10-b	B11-51	
8-1	BLU	21	J10-a	B11-54	8
8-2	YEL	22	J10-c	B11-52	
9	WHT/ORN		J10-e	E5-14	
10	WHT/BRN/VIO		J10-h	E5-33	
11-1	WHT/BRN/GRN		J10-M	E5-31	8
11-2	WHT/BRN/YEL		J10-L	E5-30	
12-1	WHT/BLK/YEL		J10-S	E5-23	8
12-2	WHT/BLK/GRN		J10-N	E5-24	
13-1	WHT/BLK/ORN		J10-J	E5-22	8
13-2	WHT/BLK/RED		J10-H	E5-21	
14	WHT/RED/YEL		J10-E	E5-36	
15	WHT/BLU		J10-K	E5-17	
16-1	WHT/BLK/VIO		J10-B	E5-26	8
16-2	WHT/BRN/ORN		J10-A	E5-29	
17-1	WHT/BLK/GY		J10-F	E5-27	8
17-2	WHT/BRN/RED		J10-C	E5-28	
18-1	BLU		J12-R	E5-7	8
18-2	VIO		J12-S	E5-8	
19	WHT/VIO		J12-T	E5-18	
20	BLK		J12-V	E5-1	
21	WHT/RED/GRN		J12-Z	E5-37	
22-1	GRN		J12-d	E5-6	8
22-2	YEL		J12-c	E5-5	
23-1	WHT	24	J12-M	B5-2	8
23-2	BLK	25	J12-L	B5-1	
24	WHT		B5-WHT	B5-2	
25	BLK		B5-BLK	B5-1	
26	WHT/GRN		J12-P	E5-16	
27	WHT/YEL		J12-J	E5-15	
28-1	WHT/BRN		J12-N	E5-12	8
28-2	WHT/RED		J12-K	E5-13	
29	WHT/RED/BLU		J12-H	E5-38	
30-1	BRN		J12-E	E5-2	8
30-2	RED		J12-D	E5-3	
30-3	ORN		J12-F	E5-4	
31-1	WHT		J12-B	E5-10	8
31-2	GY		J12-A	E5-9	
31-3	WHT/BLK		J12-C	E5-11	
32-1	WHT/BLK/GY		P13-X	E5-27	8
32-2	WHT/BRN/RED		P13-Z	E5-28	
33-1	WHT/BRN/ORN		P13-Y	E5-29	8
33-2	WHT/BLK/VIO		P13-W	E5-26	
34-1	RED		P13-BB	E5-3	8
34-2	ORN		P13-CC	E5-4	
34-3	BRN		P13-AA	E5-2	
35	BRN	20	P13-AA	P13-MM	
36	RED	23	P13-BB	P13-KK	
37	BLK		P13-FF	E5-1	
38-1	GRN		P13-HH	E5-6	8
38-2	YEL		P13-EE	E5-5	
39-1	VIO		P13-HH	E5-6	8
39-2	BLU		P13-EE	E5-7	
40-1	GY		P13-LL	E5-9	8
40-2	WHT		P13-JJ	E5-10	
40-3	WHT/BLK		P13-NN	E5-11	
41	RED	23	P13-DD	P13-KK	
42	WHT/RED/YEL		P13-U	E5-36	
43	WHT/RED/ORN		P13-T	E5-35	
44	WHT/RED/GRN		P13-V	E5-37	
45	WHT/ORN		P13-P	E5-14	
46	WHT/BRN/GY		P13-S	E5-34	
47	WHT/BLU		P13-N	E5-17	
48	WHT/BRN/VIO		P13-R	E5-33	
49	WHT/VIO		P13-J	E5-18	
50-1	WHT/BRN/GRN		P13-K	E5-31	8
50-2	WHT/BRN/YEL		P13-H	E5-30	
51-1	WHT/RED/GY		P13-M	E5-40	8
51-2	WHT/RED/VIO		P13-L	E5-39	
52	WHT/BLK/BLU		P13-E	E5-25	
53-1	WHT/BLK/GRN		P13-D	E5-24	8
53-2	WHT/BLK/YEL		P13-C	E5-23	
54	YEL	22	P13-C	P13-[illegible]	
55-1	WHT/BLK/ORN		P13-B	E5-22	8
55-2	WHT/BLK/RED		P13-A	E5-21	
56	WHT/BRN/BLU		P13-F	E5-32	
57-1	WHT/BRN		B11-P1	E5-12	8
57-2	WHT/RED		B11-P3	E5-13	
58-1	WHT/BLK/BRN		B11-P2	E5-20	8
58-2	WHT/GY		B11-P4	E5-19	
59	WHT/YEL		E5-15	SPARE	
60	WHT/GRN		E5-16	SPARE	
61	WHT/RED/BLU		E5-38	SPARE	
Ⓚ 62	BLK	25	J12-V	E9	



SECTION C-C
2 PLACES



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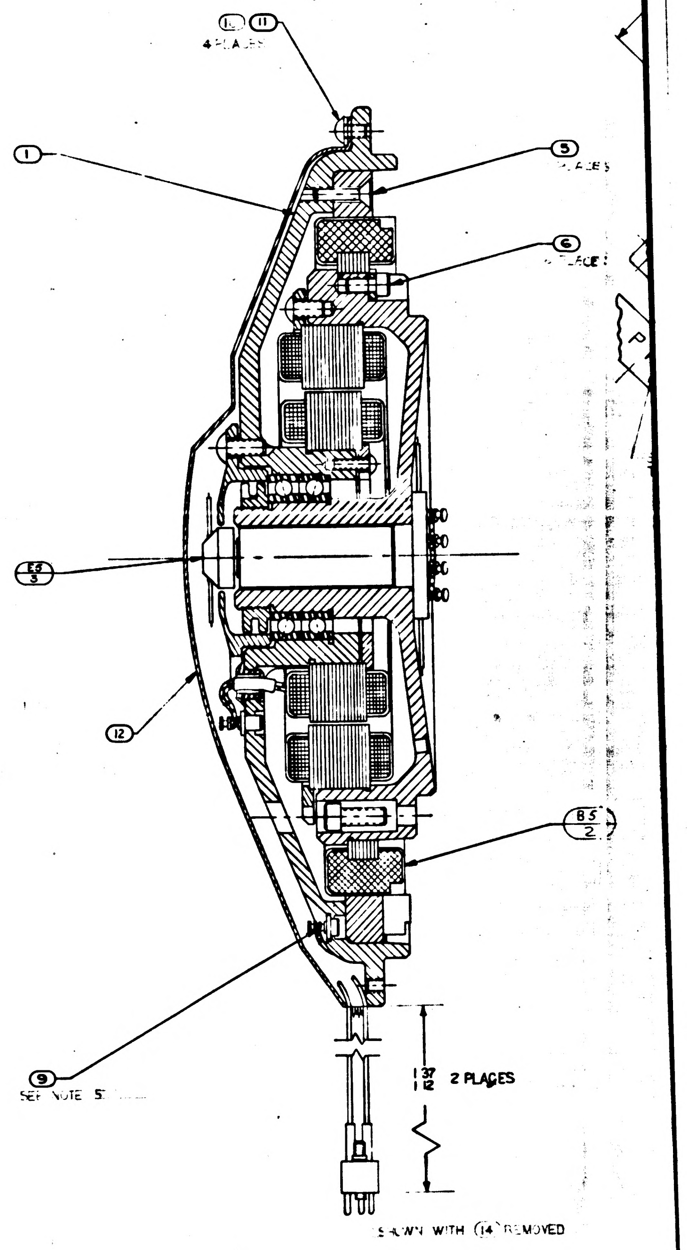
SHOWN WITH ⑭ REMOVED



SHOWN WITH ⑭ REMOVED

NOTES:

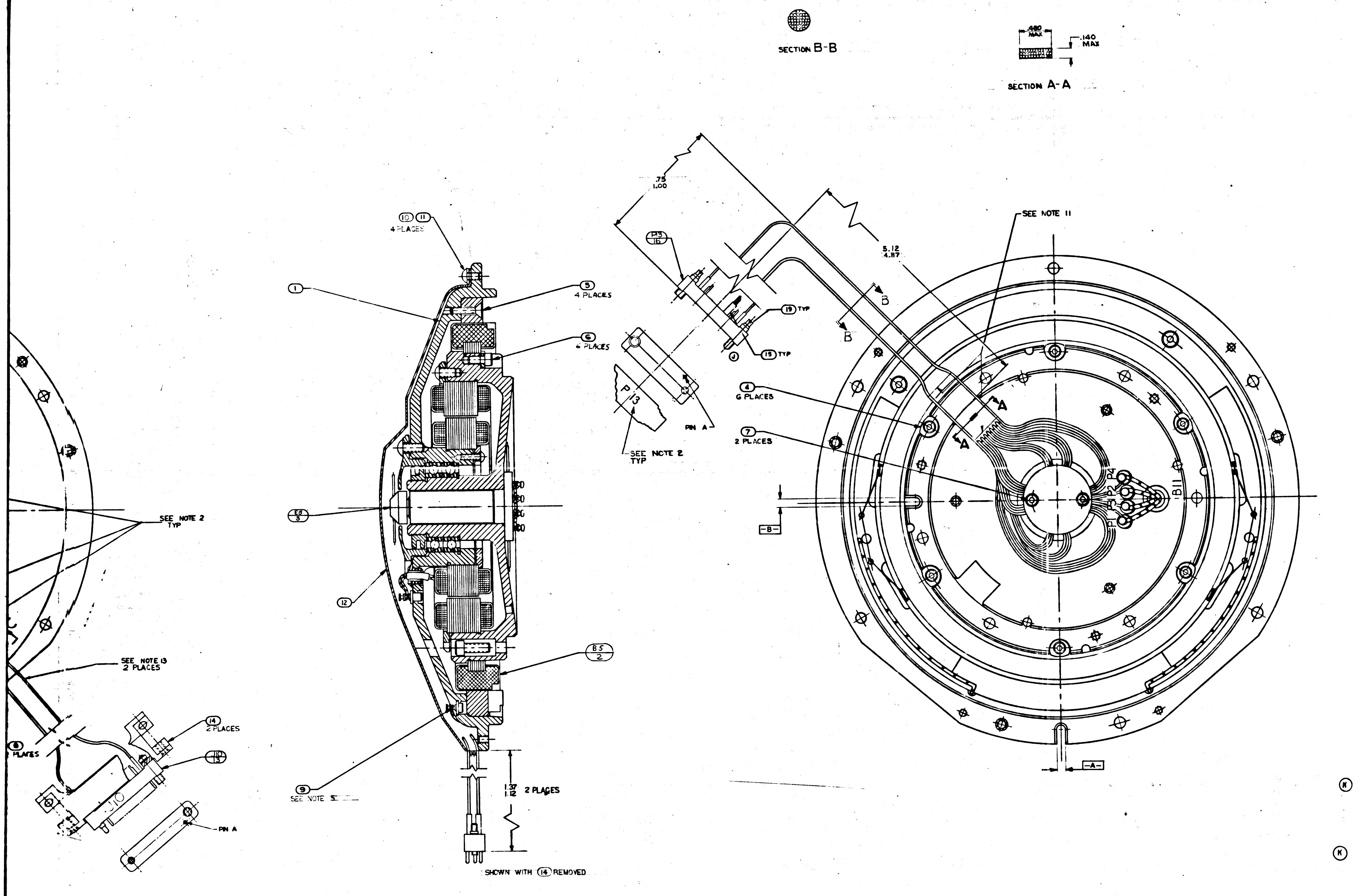
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS $^{.19}_{.14}$ HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND1002019
3. IDENTIFY USING DRAWING NUMBER REVISION LETTER & SER.NO.AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ±7%
   ⑤ ⑥ ( ) 5 IN-LB
   ⑦ 3.5 IN-LB
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ⑨. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ⑬ & ⑯ PER MIL-STD-440 USING ⑰. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM.~~
7. CAUTION: DO NOT SEPERATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE : 15 OZ-IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000207
10. LEADS MUST NOT EXTEND BEYOND THIS RADIUS
11. USE CHICAGO STITCH LACING IN AREAS INDICATED
12. ALL SPARE LEADS TO BE 8.50±.12 LONG,TO TERMINATE NEAR $\frac{P13}{16}$ AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
13. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

TWISTING TO CONSIST OF THE FOLLOWING NO. OF TURNS PER INCH MINIMUM

NO. OF LEADS	NO. OF TURNS
2	4
3	3

	REV	SHEET
1000207	K	1

SYM	DESCRIPTION	DATE	APPROVAL	
H	REPLACES REV G WITH CHANGES TDRR 01926	5-29-63		
J	TDRR 03231	9 20 63		
K	TDRR 05171	1-6-64		
L	TDRR 06237			



SECTION B-B
.480 MAX
.140 MAX
SECTION A-A
10 11 4 PLACES
1
5 4 PLACES
6 6 PLACES
.75 1.00
P3 16
19 TYP
15 TYP
J
5.12 4.87
SEE NOTE 11
B
B
A
A
P 13
PIN A
SEE NOTE 2 TYP
4 6 PLACES
7 2 PLACES
E6 3
SEE NOTE 2 TYP
-B-
B11
12
B5 2
9 SEE NOTE 5
1.37 1.12 2 PLACES
SHOWN WITH 14 REMOVED
-A-
SEE NOTE 13 2 PLACES
8 PLACES
14 2 PLACES
P2 13
PIN A

OF THE FOLLOWING

	NO. OF FULL TURNS MAX
	4
	3

REPLACES REV G WITH CHANGES

	QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
K	1	TERMINAL LUG	1010717-1			26
	1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	23" TOT. LG	25
	1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	8" TOT. LG	24
	1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	12" TOT. LG	23
	1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	10" TOT. LG	22
	1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	8" TOT. LG	21
	1	WIRE, ELEC, TYPE E-28 BRN		MIL-W-16878	3" TOT. LG	20
	7	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	19
K	A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2 TYPE P	18
	A/R	SOLDER	SN60WARP2	QQ-S-571		17
	1	CONNECTOR, ELEC, RECEP, 34 CONT	1000119			16
	73	INSULATION SLEEVING, ELEC.	1006776-18		1/4 LONG	15
	2	BRACKET, CONNECTOR, ELEC.	1000125			14
	2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			13
	1	GUIDE, WIRE, BRG, HSG. I.A.	1000112			12
	4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			11
	4	WASHER, FLAT, ROUND	1000254			10
	A/R	SOLDER	SN10WARP2	QQ-S-571		9
	2	INSULATION SLEEVING, ELEC.	1006776-15		1/4 LONG	8
	2	SCR, BUT. HD, SELF LKG, SPL SOC	1000250-2			7
J	6	SCR, CAP, SELF LKG, HEX, SOC	NAS1352C4LL4			6
	4	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-17			5
	6	CLAMP, TORQUE MOTOR	1000087			4
	1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
	1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
	1	16X RSVR ASSY INNER & MIDDLE AXIS	1000162			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000204	BL1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT
NAS 9 153
APPROVED DATE 7/9/63
CHK'D
DRAWN R.SKIKABUSH 4/17/63
APPROVED FOR MSC
BY DIRECTION MIT APPROVAL
John F. Tallon

INTERGIMBAL SUB ASSEMBLY 16 SPEED INNER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000207
SHEET 1 OF 1

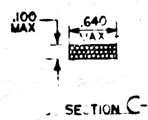
1000207 L

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

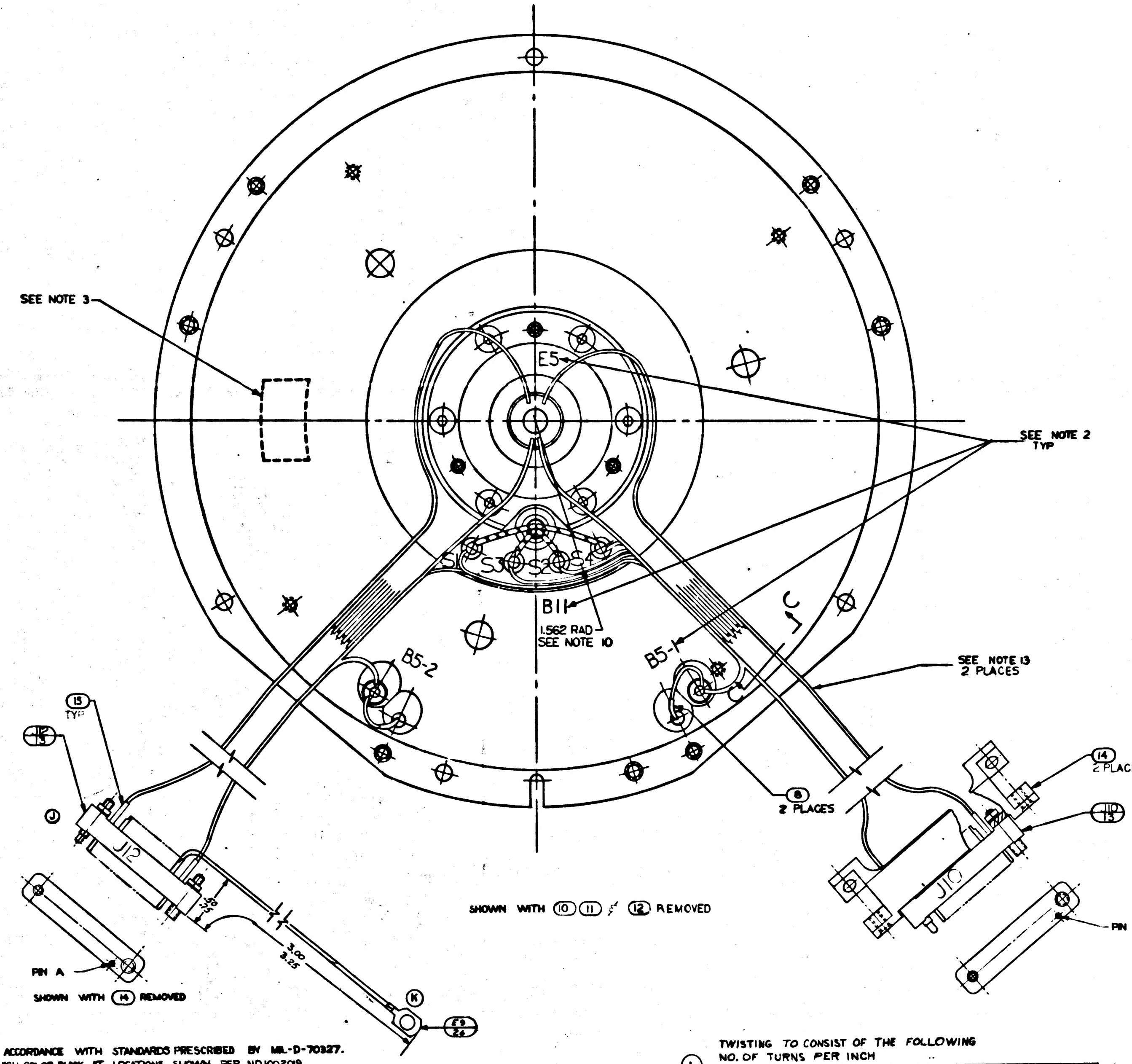
F-2

WIRING LEGEND

COND NO	COLOR	FIND NO	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J10-R	E5-25	
2	WHT/BRN/BLU		J10-T	E5-32	
3	WHT/RED/ORN		J10-U	E5-35	
4	WHT/BRN/GY		J10-V	E5-34	
5-1	WHT/GY		J10-X	E5-19	8
5-2	WHT/BLK/BRN		J10-Y	E5-20	
6-1	WHT/RED/GY		J10-Z	E5-40	8
6-2	WHT/RED/VIO		J10-g	E5-39	
7-1	BLK	26	J10-a	B11-53	8
7-2	RED	23	J10-b	B11-51	
8-1	BLU	21	J10-d	B11-54	8
8-2	YEL	22	J10-c	B11-52	
9	WHT/ORN		J10-e	E5-14	
10	WHT/BRN/VIO		J10-h	E5-33	
11-1	WHT/BRN/GRN		J10-M	E5-31	8
11-2	WHT/BRN/YEL		J10-L	E5-30	
12-1	WHT/BLK/YEL		J10-S	E5-23	8
12-2	WHT/BLK/GRN		J10-N	E5-24	
13-1	WHT/BLK/ORN		J10-J	E5-22	8
13-2	WHT/BLK/RED		J10-H	E5-21	
14	WHT/RED/YEL		J10-E	E5-36	
15	WHT/BLU		J10-K	E5-17	
16-1	WHT/BLK/VIO		J10-B	E5-26	8
16-2	WHT/BRN/ORN		J10-A	E5-29	
17-1	WHT/BLK/GY		J10-F	E5-27	8
17-2	WHT/BRN/RED		J10-C	E5-28	
18-1	BLU		J12-R	E5-7	8
18-2	VIO		J12-S	E5-8	
19	WHT/VIO		J12-T	E5-18	
20	BLK		J12-V	E5-1	
21	WHT/RED/GRN		J12-Z	E5-37	
22-1	GRN		J12-d	E5-6	8
22-2	YEL		J12-c	E5-5	
23-1	WHT	24	J12-M	B5-2	8
23-2	BLK	25	J12-L	B5-1	
24	WHT		B5-WHT	B5-2	
25	BLK		B5-BLK	B5-1	
26	WHT/GRN		J12-P	E5-16	
27	WHT/YEL		J12-J	E5-15	
28-1	WHT/BRN		J12-N	E5-12	8
28-2	WHT/RED		J12-K	E5-13	
29	WHT/RED/BLU		J12-H	E5-38	
30-1	BRN		J12-E	E5-2	8
30-2	RED		J12-D	E5-3	
30-3	ORN		J12-F	E5-4	
31-1	WHT		J12-B	E5-10	8
31-2	GY		J12-A	E5-9	
31-3	WHT/BLK		J12-C	E5-11	
32-1	WHT/BLK/GY		P13-X	E5-27	8
32-2	WHT/BRN/RED		P13-Z	E5-28	
33-1	WHT/BRN/ORN		P13-Y	E5-29	8
33-2	WHT/BLK/VIO		P13-W	E5-26	
34-1	RED		P13-BB	E5-3	8
34-2	ORN		P13-CC	E5-4	
34-3	BRN		P13-AA	E5-2	
35	BRN	20	P13-AA	P13-MM	
36	RED	23	P13-BB	P13-KK	
37	BLK		P13-FF	E5-1	
38-1	GRN		P13-HH	E5-6	8
38-2	YEL		P13-EE	E5-5	
39-1	VIO		P13-HH	E5-8	8
39-2	BLU		P13-EE	E5-7	
40-1	GY		P13-LL	E5-9	8
40-2	WHT		P13-JJ	E5-10	
40-3	WHT/BLK		P13-NN	E5-11	
41	RED	23	P13-DD	P13-KK	
42	WHT/RED/YEL		P13-U	E5-36	
43	WHT/RED/ORN		P13-T	E5-35	
44	WHT/RED/GRN		P13-V	E5-37	
45	WHT/ORN		P13-P	E5-14	
46	WHT/BRN/GY		P13-S	E5-34	
47	WHT/BLU		P13-N	E5-17	
48	WHT/BRN/VIO		P13-R	E5-33	
49	WHT/VIO		P13-J	E5-18	
50-1	WHT/BRN/GRN		P13-K	E5-31	8
50-2	WHT/BRN/YEL		P13-H	E5-30	
51-1	WHT/RED/GY		P13-M	E5-40	8
51-2	WHT/RED/VIO		P13-L	E5-39	
52	WHT/BLK/BLU		P13-E	E5-25	
53-1	WHT/BLK/GRN		P13-D	E5-24	8
53-2	WHT/BLK/YEL		P13-C	E5-23	
54	YEL	22	P13-C	P13-B	
55-1	WHT/BLK/ORN		P13-B	E5-22	8
55-2	WHT/BLK/RED		P13-A	E5-21	
56	WHT/BRN/BLU		P13-F	E5-32	
57-1	WHT/BRN		B11-P1	E5-12	8
57-2	WHT/RED		B11-P3	E5-13	
58-1	WHT/BLK/BRN		B11-P2	E5-20	8
58-2	WHT/GY		B11-P4	E5-18	
59	WHT/YEL		E5-15	SPARE	
60	WHT/GRN		E5-16	SPARE	
61	WHT/RED/BLU		E5-38	SPARE	
Ⓚ 62	BLK	25	J12-V	E9	



SECTION C-C
2 PLACES



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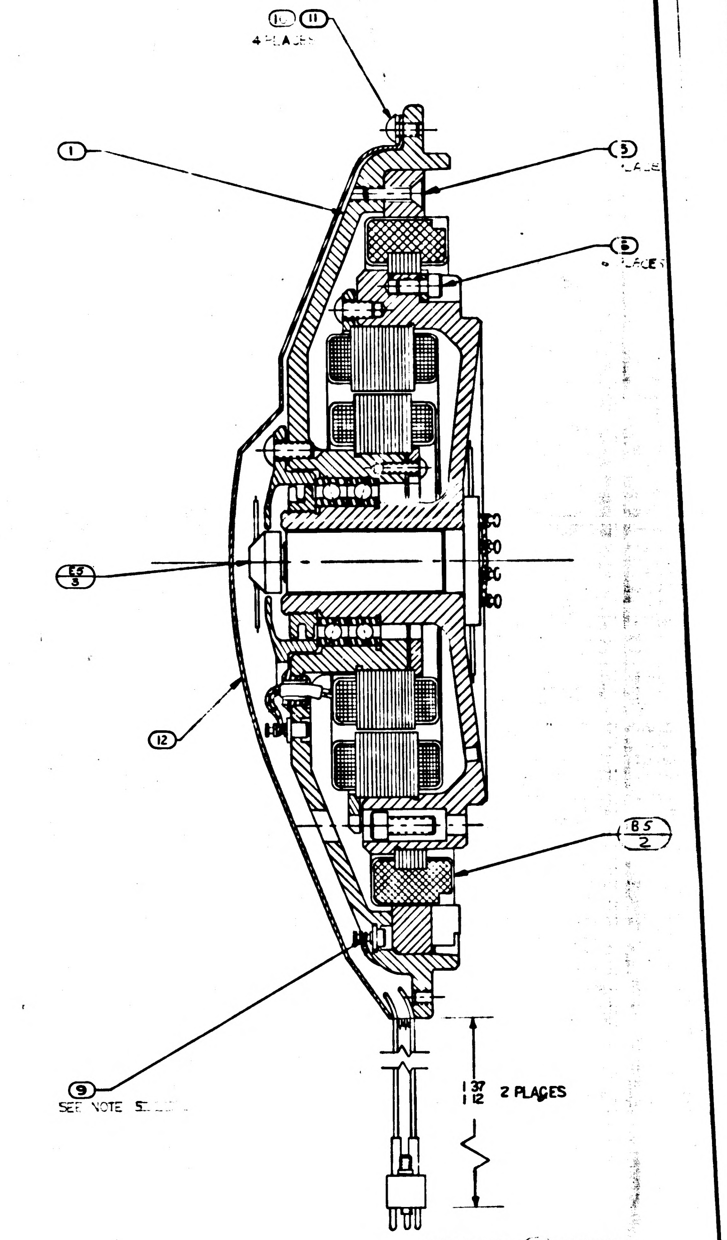
SHOWN WITH (10) (11) & (12) REMOVED



SHOWN WITH (14) REMOVED

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .12/.14 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND1002019
3. IDENTIFY USING DRAWING NUMBER REVISION LETTER & SER.NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ±7%
   (5) (6) ( ) 5 IN-LB
   (7) 3.5 IN-LB
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (9). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (16) PER MIL-STD-440 USING (17). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPERATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (2) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (2)
8. MAXIMUM ALLOWABLE TORQUE : 15 OZ-IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000207
10. LEADS MUST NOT EXTEND BEYOND THIS RADIUS
11. USE CHICAGO STITCH LACING IN AREAS INDICATED
12. ALL SPARE LEADS TO BE 8.50±.12 LONG, TO TERMINATE NEAR (P13/16) AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
13. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

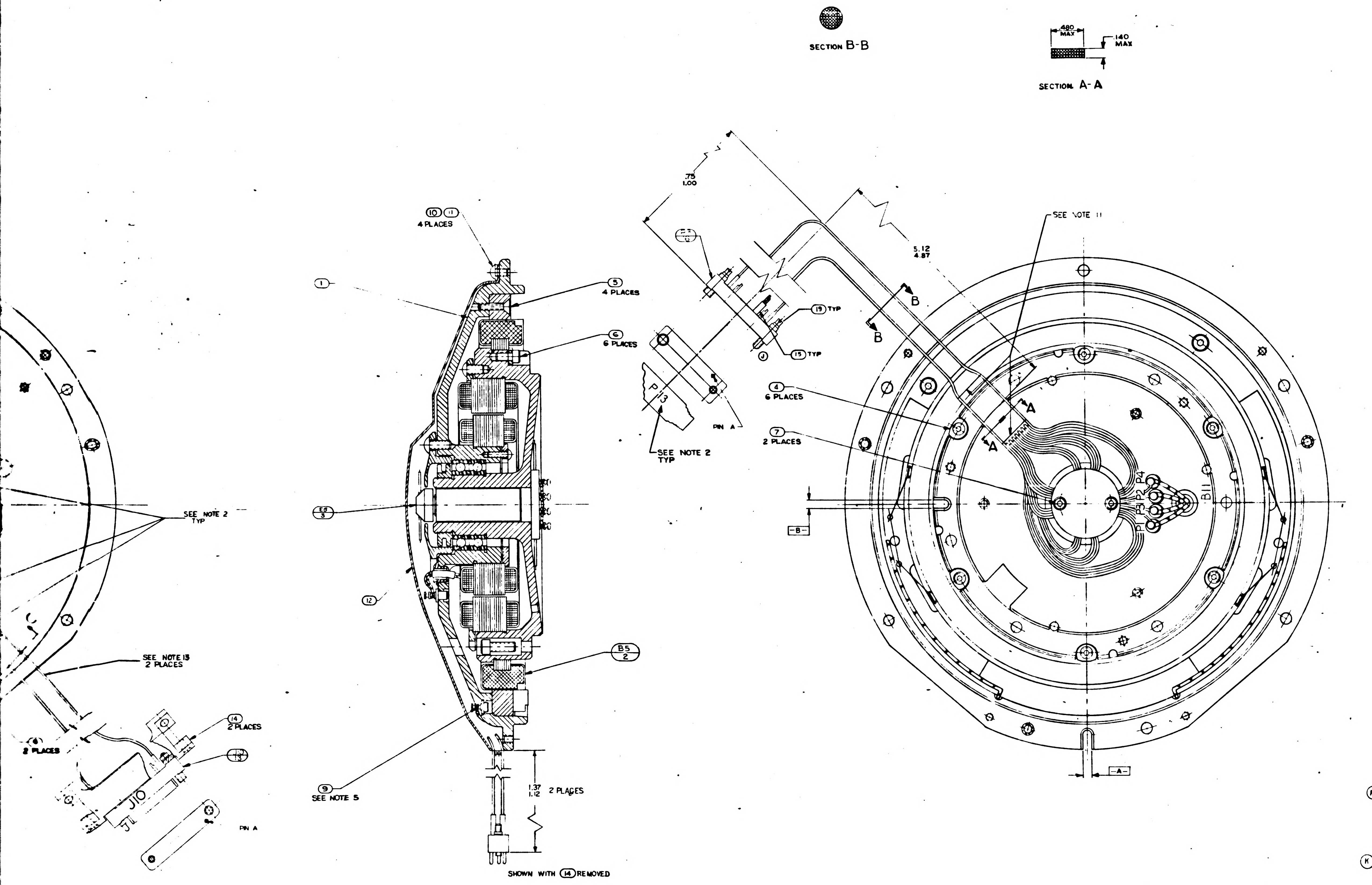
Ⓛ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000207	L	1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
SYM	DESCRIPTION	DATE	APPROVAL	
H	REPLACES REV G WITH CHANGES TDRR 01926	6-19-63		
J	TDRR 03231	9-20-63		WK
K	TDRR 05171	1-6-64		WK
L	TDRR 06237	FEB 64		WK
M	REVISED PER TDRR 07949			



SECTION B-B
.480 MAX
.140 MAX
SECTION A-A
4
3
2
1
D
C
B
10 11
4 PLACES
1
5
4 PLACES
6
6 PLACES
.75
1.00
5.12
4.87
SEE NOTE 11
B
B
A
A
19 TYP
15 TYP
P13
PIN A
SEE NOTE 2
TYP
4
6 PLACES
7
2 PLACES
P4
P2
P3
P1
B11
B
SEE NOTE 2
TYP
12
SEE NOTE 13
2 PLACES
B5
2
14
2 PLACES
13
2 PLACES
J10
PIN A
9
SEE NOTE 5
1.37
1.12
2 PLACES
SHOWN WITH 14 REMOVED
A

...TO CONSIST OF THE FOLLOWING
...TURNS PER INCH

...LAGS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
		4
		3

REPLACES REV G WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
1	TERMINAL LUG	1010717-1			26
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	23" TOT. LG	25
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	8" TOT. LG	24
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	12" TOT. LG	23
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	10" TOT. LG	22
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	8" TOT. LG	21
1	WIRE, ELEC, TYPE E-28 BRN		MIL-W-16878	3" TOT. LG	20
7	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	19
A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2 TYPE P	18
A/R	SOLDER	SN60WARP2	QQ-S-571		17
1	CONNECTOR, ELEC, RECEP, 34 CONT	1000119			16
73	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LONG	15
2	BRACKET, CONNECTOR, ELEC.	1000125			14
2	CONNECTOR, ELEC, PLUG, 29 CONT.	1000117			13
1	GUIDE, WIRE, BRG, HSG. I.A.	1000112			12
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
A/R	SOLDER	SN60WARP2	QQ-S-571		9
2	INSULATION SLEEVING, ELEC.	1006776-15		3/4 LONG	8
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			7
6	SCR, CAP, SELF LKG, HEX, SOC	NAS1352C00LL4			6
4	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-17			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16X RSVR ASSY INNER & MIDDLE AXIS	1000162			1

LIST OF PARTS AND MATERIALS

1000207 M

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED — DATE 7/5/63
DRAWN R.SCHABAUGH 4/17/63
APPROVED FOR MSC
Jack Bunnell
BY DIRECTION MIT APPROVAL
John Finney 7/5/63

INTERGIMBAL SUB ASSEMBLY
16 SPEED INNER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

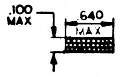
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON
NASA DRAWING NO
1000207
SHEET 1 OF 1

1000207
REV M SHEET 1

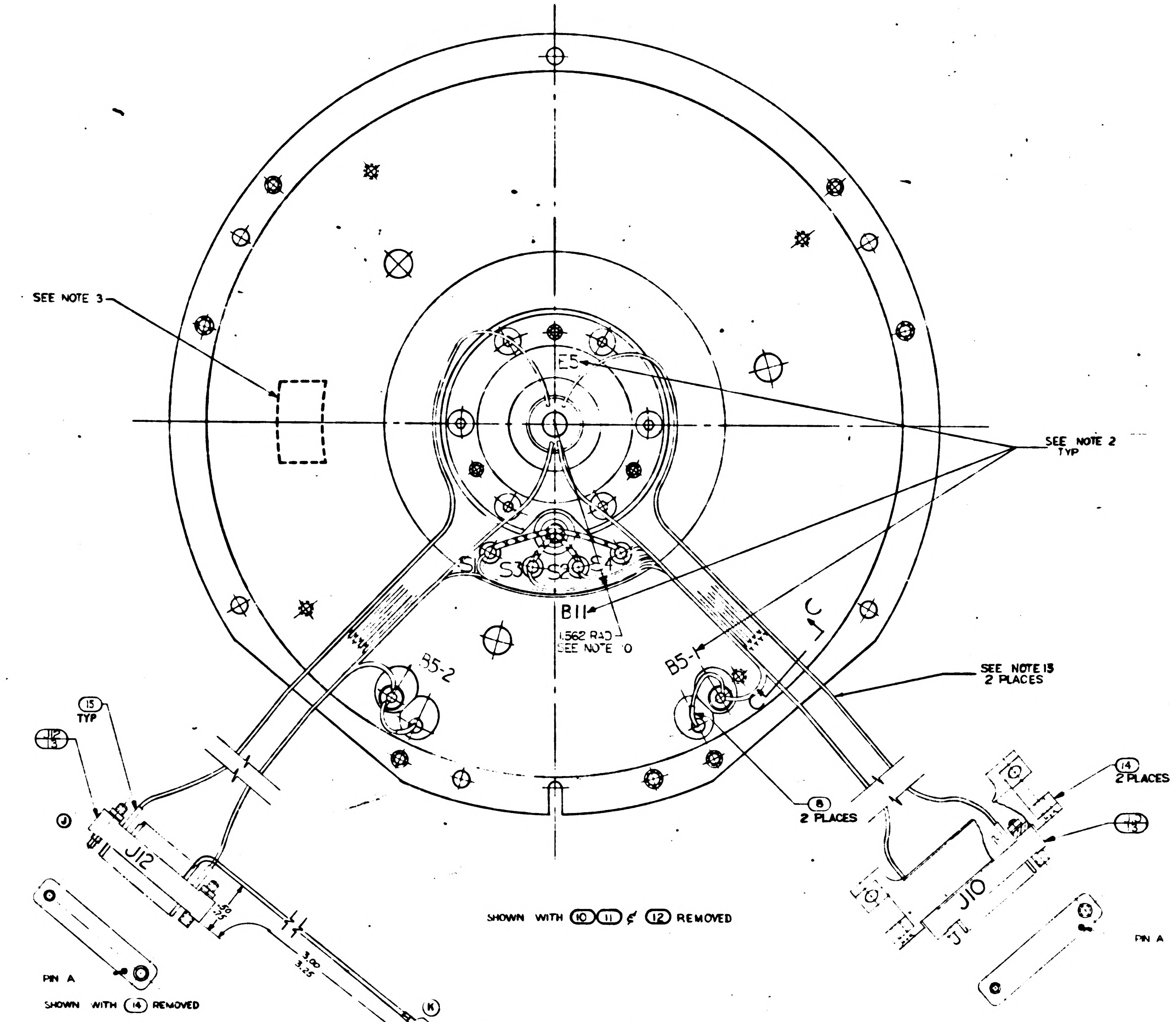
2/1000207

WIRING LEGEND

COND NO	COLOR	FIND NO.	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J10-R	E5-25	
17-3	WHT/BRN/BLU		J10-T	E5-32	
3	WHT/RED/ORN		J10-U	E5-35	
4	WHT/BRN/GY		J10-V	E5-34	
5-1	WHT/GY		J10-X	E5-19	
5-2	WHT/BLK/BRN		J10-Y	E5-20	
6-1	WHT/RED/GY		J10-Z	E5-40	
6-2	WHT/RED/VIO		J10-f	E5-39	
7-1	BLK	25	J10-a	B11-S3	
7-2	RED	23	J10-b	B11-S1	
8-1	BLU	21	J10-d	B11-S4	
8-2	YEL	22	J10-c	B11-S2	
22-3	WHT/ORN		J12-c	E5-14	
10	WHT/BRN/VIO		J10-h	E5-33	
11-1	WHT/BRN/GRN		J10-M	E5-31	
11-2	WHT/BRN/YEL		J10-L	E5-30	
12-1	WHT/BLK/YEL		J10-S	E5-23	
12-2	WHT/BLK/GRN		J10-N	E5-24	
13-1	WHT/BLK/ORN		J10-J	E5-22	
13-2	WHT/BLK/RED		J10-H	E5-21	
14	WHT/RED/YEL		J10-E	E5-36	
18-3	WHT/BLU		J12-S	E5-17	
16-1	WHT/BLK/VIO		J10-B	E5-26	
16-2	WHT/BRN/ORN		J10-A	E5-29	
17-1	WHT/BLK/GY		J10-F	E5-27	
17-2	WHT/BRN/RED		J10-C	E5-28	
18-1	BLU		J12-R	E5-7	
18-2	VIO		J12-S	E5-8	
19	WHT/VIO		J12-T	E5-18	
20	BLK		J12-V	E5-1	
21	WHT/RED/GRN		J12-Z	E5-37	
22-1	GRN		J12-d	E5-6	
22-2	YEL		J12-C	E5-5	
23-1	WHT	24	J12-M	B5-2	
23-2	BLK	25	J12-L	B5-1	
24	WHT		B5-WHT	B5-2	
25	BLK		B5-BLK	B5-1	
18-4	WHT/GRN		J12-R.	E5-16	
22-4	WHT/YEL		J12-d	E5-15	
28-1	WHT/BRN		J12-N	E5-12	
28-2	WHT/RED		J12-K	E5-13	
29	WHT/RED/BLU		J12-H	E5-38	
30-1	BRN		J12-E	E5-2	
30-2	RED		J12-D	E5-3	
30-3	ORN		J12-F	E5-4	
31-1	WHT		J12-B	E5-10	
31-2	GY		J12-A	E5-9	
31-3	WHT/BLK		J12-C	E5-11	
32-1	WHT/BLK/GY		P13-X	E5-27	
32-2	WHT/BRN/RED		P13-Z	E5-28	
33-1	WHT/BRN/ORN		P13-Y	E5-29	
33-2	WHT/BLK/VIO		P13-W	E5-26	
34-1	RED		P13-BB	E5-3	
34-2	ORN		P13-CC	E5-4	
34-3	BRN		P13-AA	E5-2	
35	BRN	20	P13-AA	P13-MM	
36	RED	23	P13-BB	P13-KK	
37	BLK		P13-FF	E5-1	
38-1	GRN		P13-HH	E5-6	
38-2	YEL		P13-EE	E5-5	
39-1	VIO		P13-T	E5-8	
39-2	BLU		P13-P	E5-7	
40-1	GY		P13-LL	E5-9	
40-2	WHT		P13-JJ	E5-10	
40-3	WHT/BLK		P13-NN	E5-11	
41	RED	23	P13-DD	P13-KK	
42	WHT/RED/YEL		P13-U	E5-36	
43	WHT/RED/ORN		P13-N	E5-35	
44	WHT/RED/GRN		P13-V	E5-37	
38-3	WHT/ORN		P13-EE	E5-14	
46	WHT/BRN/GY		P13-S	E5-34	
39-3	WHT/BLU		P13-T	E5-17	
48	WHT/BRN/VIO		P13-R	E5-33	
49	WHT/VIO		P13-J	E5-18	
50-1	WHT/BRN/GRN		P13-K	E5-31	
50-2	WHT/BRN/YEL		P13-H	E5-30	
51-1	WHT/RED/GY		P13-M	E5-40	
51-2	WHT/RED/VIO		P13-L	E5-39	
52	WHT/BLK/BLU		P13-E	E5-25	
53-1	WHT/BLK/GRN		P13-D	E5-24	
53-2	WHT/BLK/YEL		P13-C	E5-23	
54	YEL	22	P13-C	P13-B	
55-1	WHT/BLK/ORN		P13-B	E5-22	
55-2	WHT/BLK/RED		P13-A	E5-21	
32-3	WHT/BRN/BLU		P13-F	E5-32	
57-1	WHT/BRN		B11-P1	E5-12	
57-2	WHT/RED		B11-P3	E5-13	
58-1	WHT/BLK/BRN		B11-P2	E5-20	
58-2	WHT/GY		B11-P4	E5-19	
38-4	WHT/YEL		E5-15	P13-HH	
39-4	WHT/GRN		E5-16	P13-P	
61	WHT/RED/BLU		E5-38	SPARE	
Ⓚ 62	BLK	25	J12-V	E9	

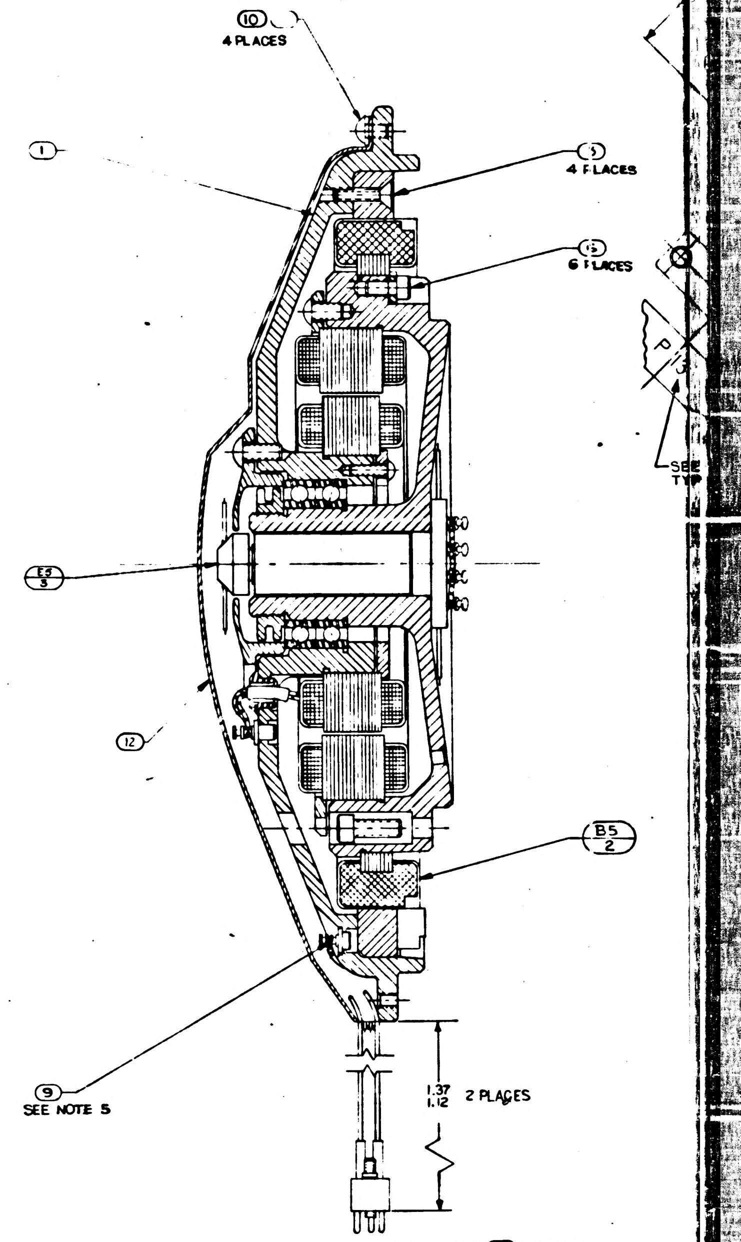


SECTION C-C
2 PLACES



SHOWN WITH ⑩ ⑪ & ⑫ REMOVED

SHOWN WITH ⑭ REMOVED



SHOWN WITH ⑭ REMOVED

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .10/.14 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND1002019
3. IDENTIFY USING DRAWING NUMBER REVISION LETTER & SER. NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ±7%
   ⑤ ⑥ ⑪ 5 IN-LB
   ⑦ 3.5 IN-LB
5. SOLDER LEADS FROM ② TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING ⑨. SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR ③ & ⑥ PER MIL STD 440 USING ⑰. WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPERATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR ② WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR ②
8. MAXIMUM ALLOWABLE TORQUE 15 OZ-IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000207
10. LEADS MUST NOT EXTEND BEYOND THIS RADIUS
11. USE CHICAGO STITCH LACING IN AREAS INDICATED
12. ALL SPARE LEADS TO BE 8.50 ± .12 LONG, TO TERMINATE NEAR P13/16 AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
13. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

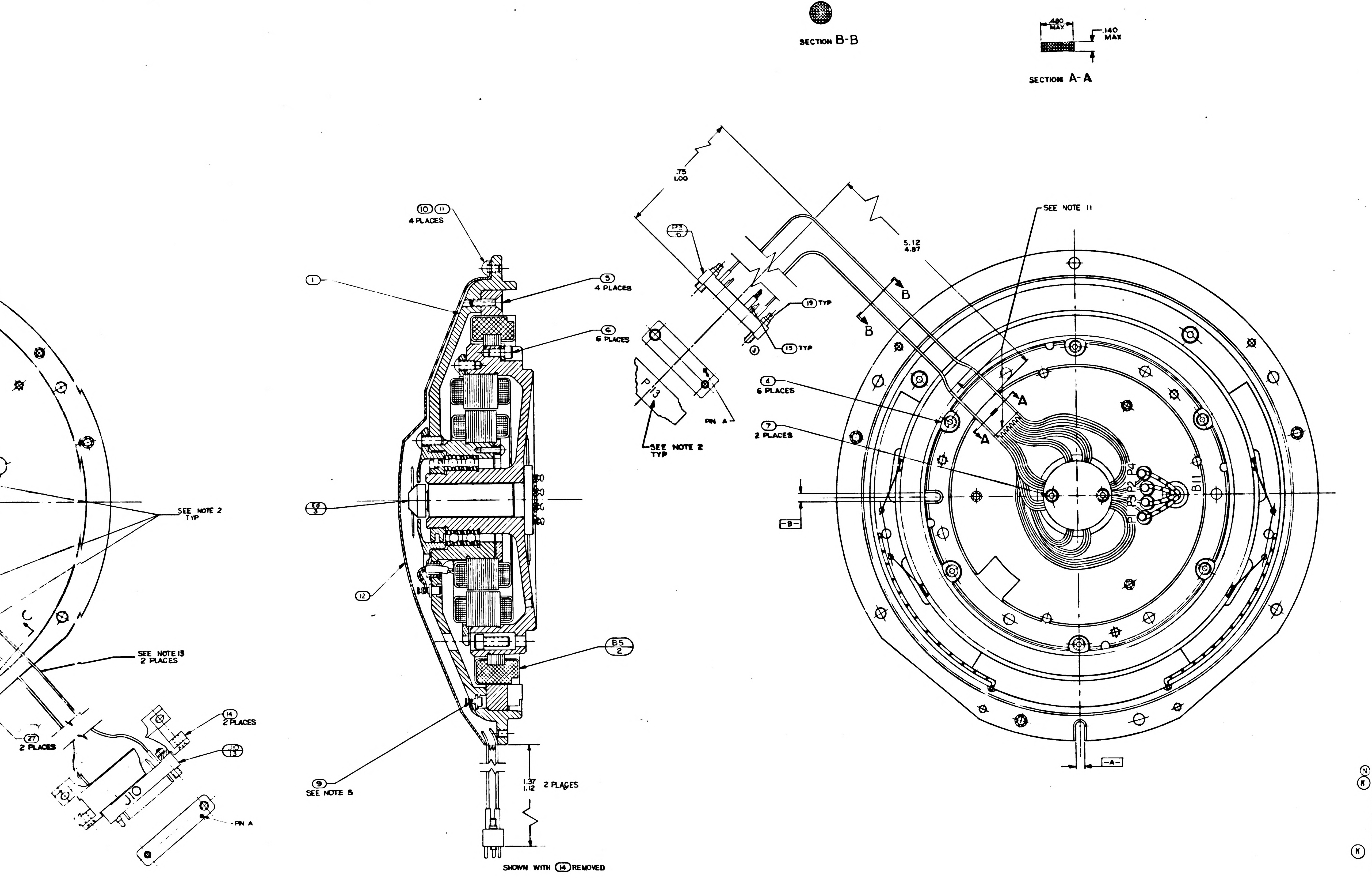
Ⓛ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000207	M	1

1/1000207

SYM	DESCRIPTION	DATE	APPROVAL	
H	REPLACES REV G WITH CHANGES TDRR 01926	6-19-63		
J	TDRR 03231	9-20-63		WK
K	TDRR 05171	1-6-64		WK
L	TDRR 06237	18 FEB 64		WK
M	REVISED PER TDRR 07949	4 MAR 64		
N	REVISED PER TDRR 07954	22 MAR 64	EFB	


SECTION B-B
.480 MAX
.140 MAX
SECTION A-A
10 11 4 PLACES
1
5 4 PLACES
6 6 PLACES
.75 1.00
B5 6
19 TYP
15 TYP
J
P13
PIN A
SEE NOTE 2 TYP
5.12 4.87
SEE NOTE 11
B
B
A
A
4 6 PLACES
7 2 PLACES
B11
P4
P3
B
B5 3
12
B5 2
9 SEE NOTE 5
1.37 1.12 2 PLACES
SHOWN WITH 14 REMOVED
SEE NOTE 2 TYP
SEE NOTE 13 2 PLACES
27 2 PLACES
14 2 PLACES
J10
PIN A
A

TING TO CONSIST OF: THE FOLLOWING
F TURNS PER INCH

# LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
		4
MORE		3

REPLACES REV G WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	INSULATION SLEEVING, ELEC. HEAT SHRINK	1010490-180		3/4 LONG	27
1	TERMINAL LUG	1010717-1			26
1	WIRE, ELEC, TYPE E-28 BLK		MIL-W-16878	23" TOT. LG	25
1	WIRE, ELEC, TYPE E-28 WHT		MIL-W-16878	8" TOT. LG	24
1	WIRE, ELEC, TYPE E-28 RED		MIL-W-16878	12" TOT. LG	23
1	WIRE, ELEC, TYPE E-28 YEL		MIL-W-16878	10" TOT. LG	22
1	WIRE, ELEC, TYPE E-28 BLU		MIL-W-16878	8" TOT. LG	21
1	WIRE, ELEC, TYPE E-28 BRN		MIL-W-16878	3" TOT. LG	20
7	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	19
A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2 TYPE P	18
A/R	SOLDER	SN60WARP2	QQ-S-571		17
1	CONNECTOR, ELEC, RECEP, 34 CONT	1000119			16
73	INSULATION SLEEVING, ELEC.	1006776-18		5/16 LONG	15
2	BRACKET, CONNECTOR, ELEC.	1000125			14
2	CONNECTOR, ELEC, PLUG, 29 CONT.	1000117			13
1	GUIDE, WIRE, BRG, HSG. I.A.	1000112			12
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
A/R	SOLDER	SN10WARP2	QQ-S-571		9
~~2~~	~~INSULATION SLEEVING, ELEC.~~	~~1006776-15~~		~~3/4 LONG~~	~~8~~
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			7
6	SCR, CAP, SELF LKG, HEX, SOC	NAS13E200LL4			6
4	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-17			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000073			2
1	16X RSVR ASSY INNER & MIDDLE AXIS	1000162			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
DATE
APPROVED 7/9/63
CHECKED
DRAWN R.SICKABAUGH 4/17/63
APPROVED FOR MSC
Jack Barnard
BY DIRECTION MIT APPROVAL
John Finney 7/10/63

INTERGIMBAL SUB ASSEMBLY
16 SPEED INNER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000207
SHEET 1 OF

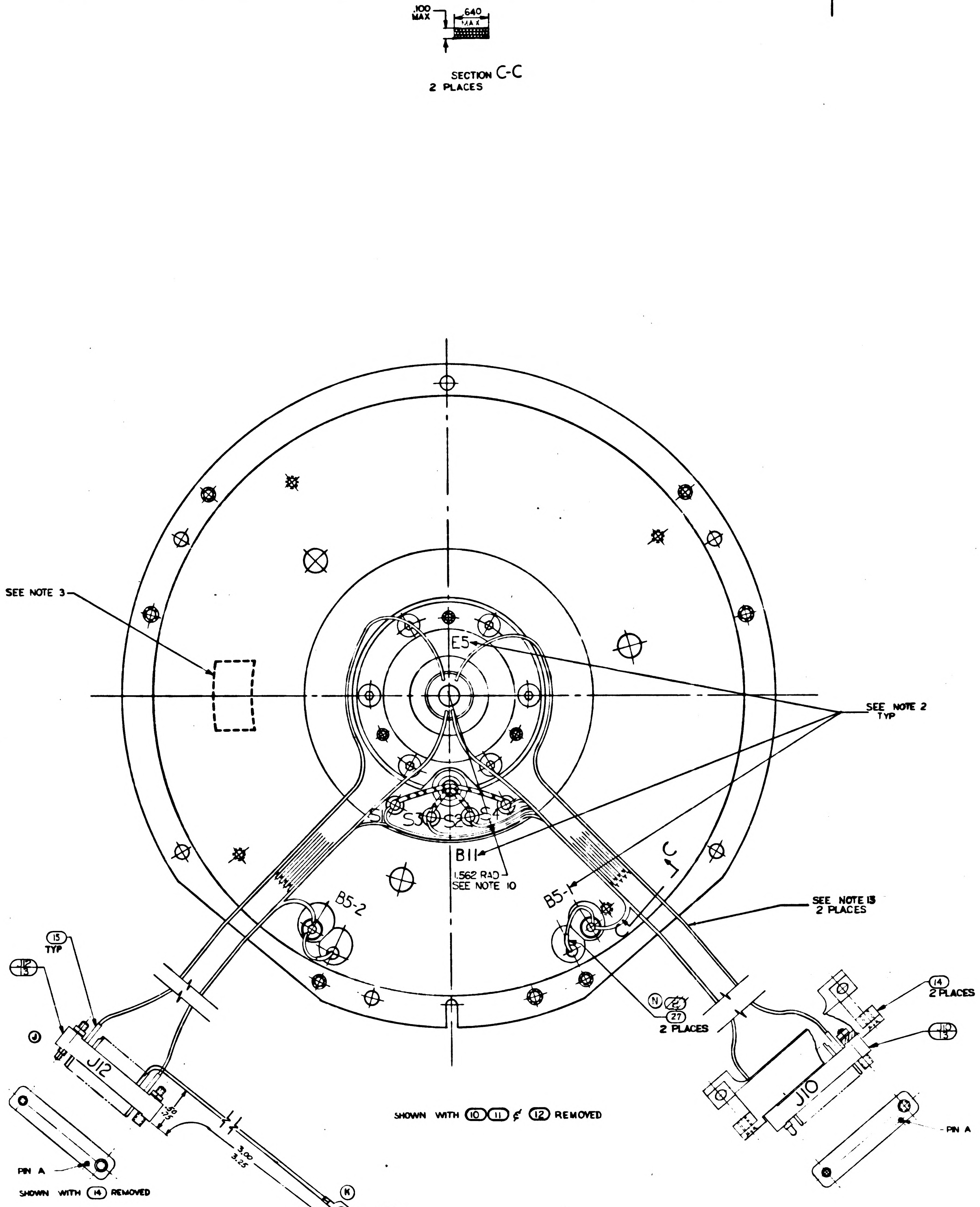
N
1000207

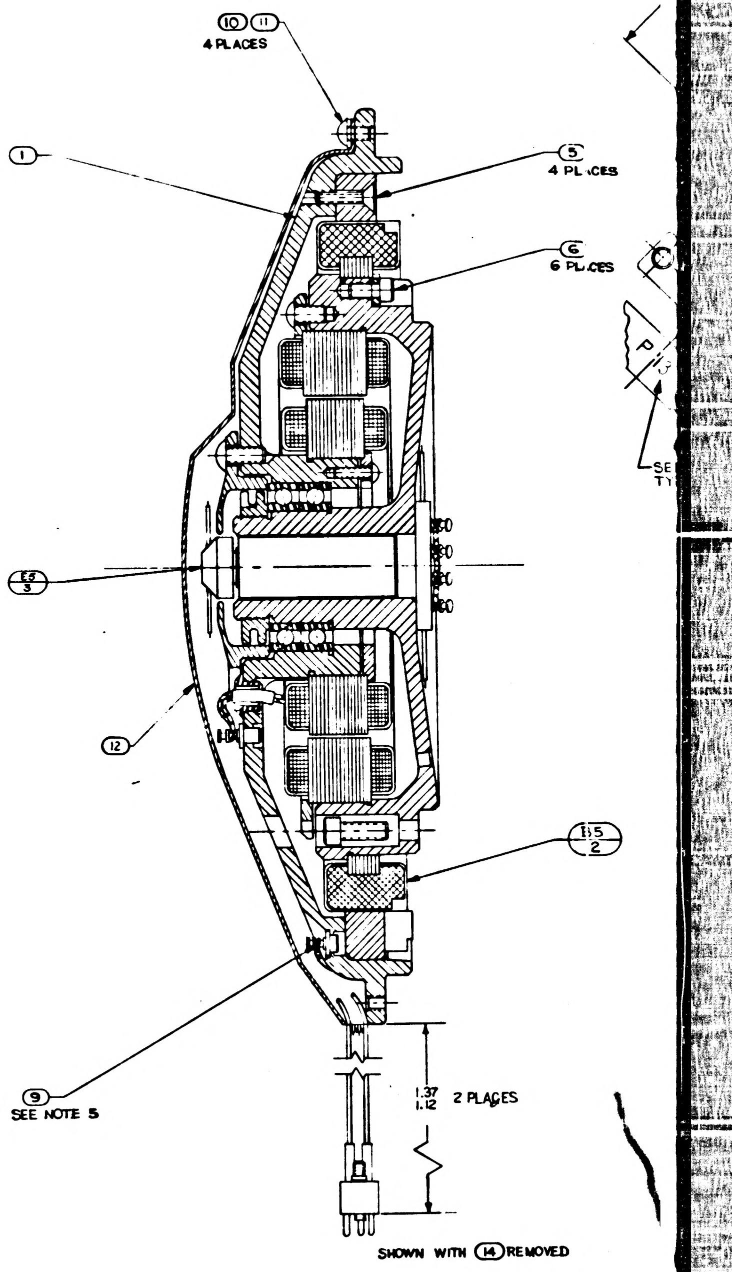
REV SHEET 1

2/1000207

WIRING LEGEND

COND. NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J10-R	E5-25	
17-3	WHT/BRN/BLU		J10-T	E5-32	
3	WHT/RED/ORN		J10-U	E5-35	
4	WHT/BRN/GY		J10-V	E5-34	
5-1	WHT/GY		J10-X	E5-19	
5-2	WHT/BLK/BRN		J10-Y	E5-20	
6-1	WHT/RED/GY		J10-Z	E5-40	
6-2	WHT/RED/VIO		J10-f	E5-39	
7-1	BLK	25	J10-a	B11-S3	
7-2	RED	23	J10-b	B11-S1	
8-1	BLU	21	J10-d	B11-S4	
8-2	YEL	22	J10-c	B11-S2	
22-3	WHT/ORN		J12-c	E5-14	
10	WHT/BRN/VIO		J10-h	E5-33	
11-1	WHT/BRN/GRN		J10-M	E5-31	
11-2	WHT/BRN/YEL		J10-L	E5-30	
12-1	WHT/BLK/YEL		J10-S	E5-23	
12-2	WHT/BLK/GRN		J10-N	E5-24	
13-1	WHT/BLK/ORN		J10-J	E5-22	
13-2	WHT/BLK/RED		J10-H	E5-21	
14	WHT/RED/YEL		J10-E	E5-36	
18-3	WHT/BLU		J12-S	E5-17	
16-1	WHT/BLK/VIO		J10-B	E5-26	
16-2	WHT/BRN/ORN		J10-A	E5-29	
17-1	WHT/BLK/GY		J10-F	E5-27	
17-2	WHT/BRN/RED		J10-C	E5-28	
18-1	BLU		J12-R	E5-7	
18-2	VIO		J12-S	E5-8	
19	WHT/VIO		J12-T	E5-18	
20	BLK		J12-V	E5-1	
21	WHT/RED/GRN		J12-Z	E5-37	
22-1	GRN		J12-d	E5-6	
22-2	YEL		J12-C	E5-5	
23-1	WHT	24	J12-M	B5-2	
23-2	BLK	25	J12-L	B5-1	
24	WHT		B5-WHT	B5-2	
25	BLK		B5-BLK	B5-1	
18-4	WHT/GRN		J12-R	E5-16	
22-4	WHT/YEL		J12-d	E5-15	
28-1	WHT/BRN		J12-N	E5-12	
28-2	WHT/RED		J12-K	E5-13	
29	WHT/RED/BLU		J12-H	E5-38	
30-1	BRN		J12-E	E5-2	
30-2	RED		J12-D	E5-3	
30-3	ORN		J12-F	E5-4	
31-1	WHT		J12-B	E5-10	
31-2	GY		J12-A	E5-9	
31-3	WHT/BLK		J12-C	E5-11	
32-1	WHT/BLK/GY		P13-X	E5-27	
32-2	WHT/BRN/RED		P13-Z	E5-28	
33-1	WHT/BRN/ORN		P13-Y	E5-29	
33-2	WHT/BLK/VIO		P13-W	E5-26	
34-1	RED		P13-BB	E5-3	
34-2	ORN		P13-CC	E5-4	
34-3	BRN		P13-AA	E5-2	
35	BRN	20	P13-AA	P13-MM	
36	RED	23	P13-BB	P13-KK	
37	BLK		P13-FF	E5-1	
38-1	GRN		P13-HH	E5-6	
38-2	YEL		P13-EE	E5-5	
39-1	VIO		P13-T	E5-8	
39-2	BLU		P13-P	E5-7	
40-1	GY		P13-LL	E5-9	
40-2	WHT		P13-JJ	E5-10	
40-3	WHT/BLK		P13-NN	E5-11	
41	RED	23	P13-DD	P13-KK	
42	WHT/RED/YEL		P13-U	E5-36	
43	WHT/RED/ORN		P13-N	E5-35	
44	WHT/RED/GRN		P13-V	E5-37	
38-3	WHT/ORN		P13-EE	E5-14	
46	WHT/BRN/GY		P13-S	E5-34	
39-3	WHT/BLU		P13-T	E5-17	
48	WHT/BRN/VIO		P13-R	E5-33	
49	WHT/VIO		P13-J	E5-18	
50-1	WHT/BRN/GRN		P13-K	E5-31	
50-2	WHT/BRN/YEL		P13-H	E5-30	
51-1	WHT/RED/GY		P13-M	E5-40	
51-2	WHT/RED/VIO		P13-L	E5-39	
52	WHT/BLK/BLU		P13-E	E5-25	
53-1	WHT/BLK/GRN		P13-D	E5-24	
53-2	WHT/BLK/YEL		P13-C	E5-23	
54	YEL	22	P13-C	P13-B	
55-1	WHT/BLK/ORN		P13-B	E5-22	
55-2	WHT/BLK/RED		P13-A	E5-21	
32-3	WHT/BRN/BLU		P13-F	E5-32	
57-1	WHT/BRN		B11-P1	E5-12	
57-2	WHT/RED		B11-P3	E5-13	
58-1	WHT/BLK/BRN		B11-P2	E5-20	
58-2	WHT/GY		B11-P4	E5-19	
38-4	WHT/YEL		E5-15	P13-HH	
39-4	WHT/GRN		E5-16	P13-P	
61	WHT/RED/BLU		E5-38	SPARE	
Ⓚ 62	BLK	25	J12-V	E9	





NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .10 .14 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND1002019
3. IDENTIFY USING DRAWING NUMBER REVISION LETTER & SER.NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ±7%
   (5)(6)(11) 5 IN-LB
   (7) 3.5 IN-LB
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (9). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (16) PER MIL STD 440 USING (17). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
6. ~~TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPERATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (2) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (2)
8. MAXIMUM ALLOWABLE TORQUE : 15 OZ-IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000207
10. LEADS MUST NOT EXTEND BEYOND THIS RADIUS
11. USE CHICAGO STITCH LACING IN AREAS INDICATED
12. ALL SPARE LEADS TO BE 8.50 ± .12 LONG, TO TERMINATE NEAR (P13/16) AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
13. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

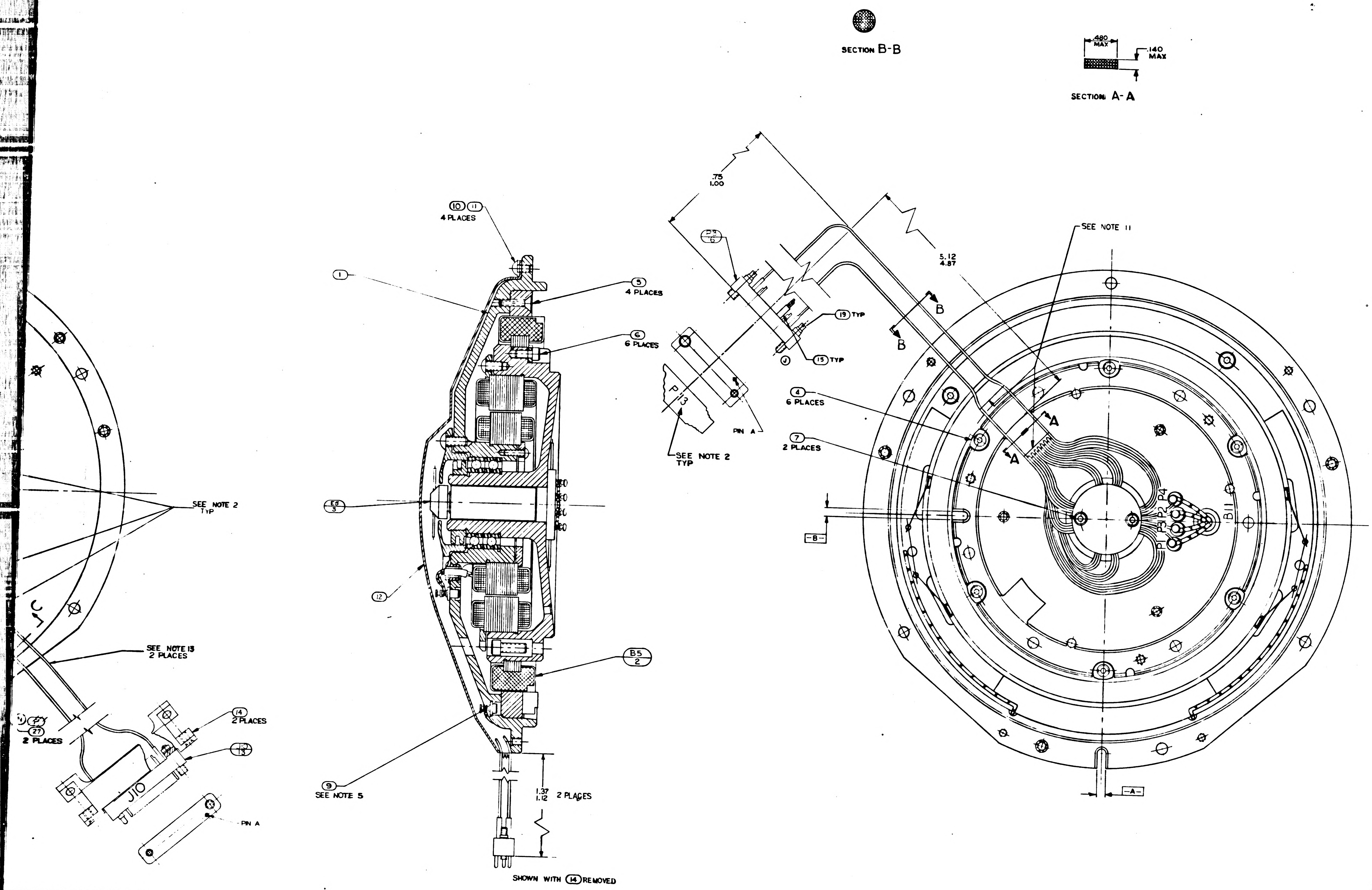
Ⓛ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000207	N	1

1/1000207

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES TDRR 01926	6-19-63	
J	TDRR 03231	9-20-63	
K	TDRR 05171	1-6-64	
L	TDRR 06237	18 FEB 64	
M	REVISED PER TDRR 07949	4 MAR 64	
N	REVISED PER TDRR 07954	22 MAR 64	RFB
P	REVISED PER TDRR 33[illegible]	[illegible]	


SECTION B-B
.480 MAX
.140 MAX
SECTION A-A
.75
1.00
5.12
4.87
SEE NOTE 11
10 11
4 PLACES
1
5
4 PLACES
6
6 PLACES
B5
6
19 TYP
15 TYP
J
P13
PIN A
SEE NOTE 2
TYP
4
6 PLACES
7
2 PLACES
B
A
P1 P2 P3 P4
B11
-B-
-A-
E3
3
SEE NOTE 2
TYP
12
SEE NOTE 13
2 PLACES
B5
2
14
2 PLACES
27
2 PLACES
J10
PIN A
9
SEE NOTE 5
1.37
1.12
2 PLACES
SHOWN WITH 14 REMOVED

...G TO CONSIST OF THE FOLLOWING
...TURNS PER INCH

...LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
...	2	4
...ORE	1	3

REPLACES REV G WITH CHANGES

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO
2	INSULATION SLEEVING, ELEC. HEAT SHRINK	1010490-180		3/4 LONG	27
1	TERMINAL LUG	1010717-1			26
1	WIRE, ELEC, TYPE E-28 BLK	1010416-1	MIL-W-16878	23" TOT. LG	25
1	WIRE, ELEC, TYPE E-28 WHT	-10	MIL-W-16878	8" TOT. LG	24
1	WIRE, ELEC, TYPE E-28 RED	-3	MIL-W-16878	12" TOT. LG	23
1	WIRE, ELEC, TYPE E-28 YEL	-5	MIL-W-16878	10" TOT. LG	22
1	WIRE, ELEC, TYPE E-28 BLU	[illegible]	MIL-W-16878	8" TOT. LG	21
1	WIRE, ELEC, TYPE E-28 BRN	-2	MIL-W-16878	3" TOT. LG	20
7	INSULATION, SLEEVING, ELEC	1006776-16		5/16 LONG	19
A/R	TAPE, NYLON, WAXED, BLK		MIL-T-713	CLASS 2 TYPE P	18
A/R	SOLDER	SN60WARP2	QQ-S-571		17
1	CONNECTOR, ELEC, RECEP, 34 CONT	000119			16
73	INSULATION SLEEVING, ELEC.	1006776-18		3/16 LONG	15
2	BRACKET, CONNECTOR, ELEC.	1000125			14
2	CONNECTOR, ELEC, PLUG, 29 CONT	1000117			13
1	GUIDE, WIRE, BRG, HSG. I.A.	1000112			12
4	SCREW, BUT HD, SELF LKG, SPL SOC	1000250-12			11
4	WASHER, FLAT, ROUND	1000254			10
A/R	SOLDER	SN10WARP2	QQ-S-571		9
~~2~~	~~INSULATION SLEEVING, ELEC.~~	~~1006776-15~~		~~1/2 LONG~~	8
2	SCR, BUT HD, SELF LKG, SPL SOC	1000250-2			7
6	SCR, CAP, SELF LKG, HEX, SOC	NAS1352C04L4			6
4	SCR, FLAT HD, SELF LKG, HEX SOC	1000104-17			5
6	CLAMP, TORQUE MOTOR	1000087			4
1	SLIP RING ASSY, ELEC, 40 CONT	1000037			3
1	MOTOR, TORQUE, D.C., FRAMELESS	1000075			2
1	16X RSVR ASSY INNER & MIDDLE AXIS	1000162			1

LIST OF PARTS AND MATERIALS

1000204	DL1000201
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9 153
APPROVED A J Boyce DATE 7/9/63
CHECKED
DRAWN R.SICKABAUGH 4/17/63
APPROVED FOR MSC Jack Burnard
BY DIRECTION MIT APPROVAL John Fitney 7/10/63

INTERGIMBAL SUB ASSEMBLY
16 SPEED INNER AXIS

SCALE 2/1
UNIT WT
CODE IDENT

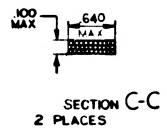
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000207
SHEET 1 OF 1

000207	REV	SHEET
	P	1

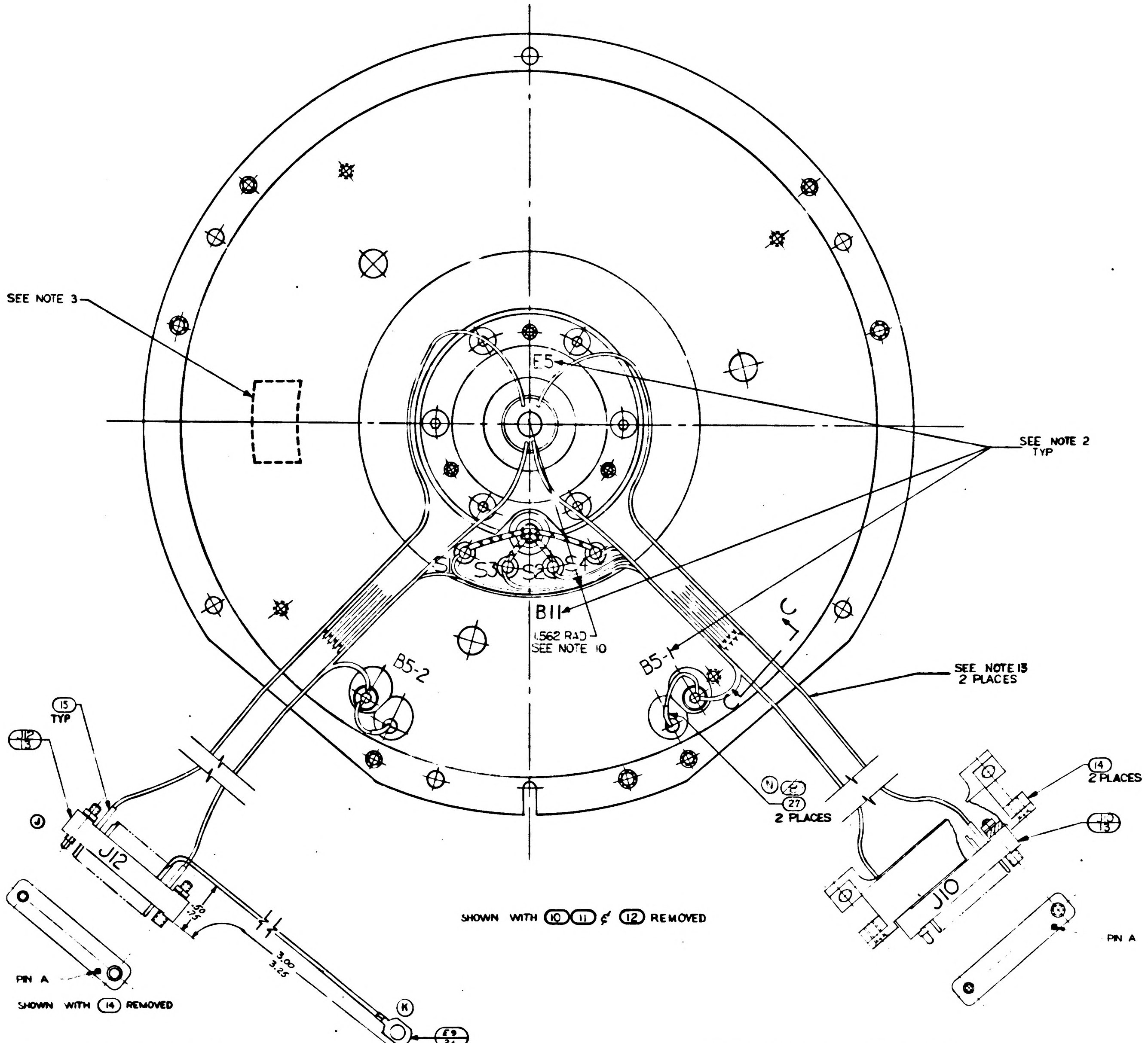
2/1000207

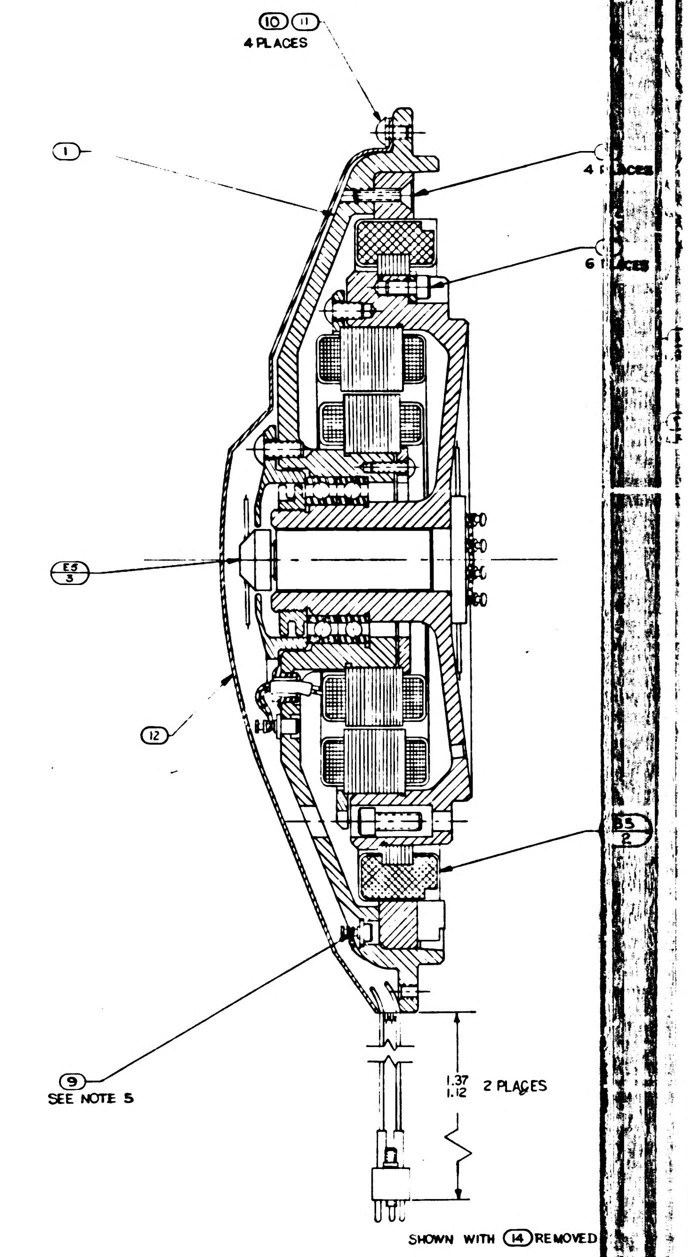
WIRING LEGEND

COND. NO.	COLOR	FIND NO.	FROM	TO	SEE NOTE 6
1	WHT/BLK/BLU		J10-R	E5-25	
17-3	WHT/BRN/BLU		J10-T	E5-32	
3	WHT/RED/ORN		J10-U	E5-35	
4	WHT/BRN/GY		J10-V	E5-34	
5-1	WHT/GY		J10-X	E5-19	
5-2	WHT/BLK/BRN		J10-Y	E5-20	
6-1	WHT/RED/GY		J10-Z	E5-40	
6-2	WHT/RED/VIO		J10-f	E5-39	
7-1	BLK	25	J10-a	B11-S3	
7-2	RED	23	J10-b	B11-S1	
8-1	BLU	21	J10-d	B11-S4	
8-2	YEL	22	J10-c	B11-S2	
22-3	WHT/ORN		J12-c	E5-14	
10	WHT/BRN/VIO		J10-h	E5-33	
11-1	WHT/BRN/GRN		J10-M	E5-31	
11-2	WHT/BRN/YEL		J10-L	E5-30	
12-1	WHT/BLK/YEL		J10-S	E5-23	
12-2	WHT/BLK/GRN		J10-N	E5-24	
13-1	WHT/BLK/ORN		J10-J	E5-22	
13-2	WHT/BLK/RED		J10-H	E5-21	
14	WHT/RED/YEL		J10-E	E5-36	
18-3	WHT/BLU		J12-S	E5-17	
16-1	WHT/BLK/VIO		J10-B	E5-26	
16-2	WHT/BRN/ORN		J10-A	E5-29	
17-1	WHT/BLK/GY		J10-F	E5-27	
17-2	WHT/BRN/RED		J10-C	E5-28	
18-1	BLU		J12-R	E5-7	
18-2	VIO		J12-S	E5-8	
19	WHT/VIO		J12-T	E5-18	
20	BLK		J12-V	E5-1	
21	WHT/RED/GRN		J12-Z	E5-37	
22-1	GRN		J12-d	E5-6	
22-2	YEL		J12-C	E5-5	
23-1	WHT	24	J12-M	B5-2	
23-2	BLK	25	J12-L	B5-1	
24	WHT		B5-WHT	B5-2	
25	BLK		B5-BLK	B5-1	
18-4	WHT/GRN		J12-R	E5-16	
22-4	WHT/YEL		J12-d	E5-15	
28-1	WHT/BRN		J12-N	E5-12	
28-2	WHT/RED		J12-K	E5-13	
29	WHT/RED/BLU		J12-H	E5-38	
30-1	BRN		J12-E	E5-2	
30-2	RED		J12-D	E5-3	
30-3	ORN		J12-F	E5-4	
31-1	WHT		J12-B	E5-10	
31-2	GY		J12-A	E5-9	
31-3	WHT/BLK		J12-C	E5-11	
32-1	WHT/BLK/GY		P13-X	E5-27	
32-2	WHT/BRN/RED		P13-Z	E5-28	
33-1	WHT/BRN/ORN		P13-Y	E5-29	
33-2	WHT/BLK/VIO		P13-W	E5-26	
34-1	RED		P13-BB	E5-3	
34-2	ORN		P13-CC	E5-4	
34-3	BRN		P13-AA	E5-2	
35	BRN	20	P13-AA	P13-MM	
36	RED	23	P13-BB	P13-KK	
37	BLK		P13-FF	E5-1	
38-1	GRN		P13-HH	E5-6	
38-2	YEL		P13-EE	E5-5	
39-1	VIO		P13-T	E5-8	
39-2	BLU		P13-P	E5-7	
40-1	GY		P13-LL	E5-9	
40-2	WHT		P13-JJ	E5-10	
40-3	WHT/BLK		P13-NN	E5-11	
41	RED	23	P13-DD	P13-KK	
42	WHT/RED/YEL		P13-U	E5-36	
43	WHT/RED/ORN		P13-N	E5-35	
44	WHT/RED/GRN		P13-V	E5-37	
38-3	WHT/ORN		P13-EE	E5-14	
46	WHT/BRN/GY		P13-S	E5-34	
39-3	WHT/BLU		P13-T	E5-17	
48	WHT/BRN/VIO		P13-R	E5-33	
49	WHT/VIO		P13-J	E5-18	
50-1	WHT/BRN/GRN		P13-K	E5-31	
50-2	WHT/BRN/YEL		P13-H	E5-30	
51-1	WHT/RED/GY		P13-M	E5-40	
51-2	WHT/RED/VIO		P13-L	E5-39	
52	WHT/BLK/BLU		P13-E	E5-25	
53-1	WHT/BLK/GRN		P13-D	E5-24	
53-2	WHT/BLK/YEL		P13-C	E5-23	
54	YEL	22	P13-C	P13-B	
55-1	WHT/BLK/ORN		P13-B	E5-22	
55-2	WHT/BLK/RED		P13-A	E5-21	
32-3	WHT/BRN/BLU		P13-F	E5-32	
57-1	WHT/BRN		B11-P1	E5-12	
57-2	WHT/RED		B11-P3	E5-13	
58-1	WHT/BLK/BRN		B11-P2	E5-20	
58-2	WHT/GY		B11-P4	E5-19	
38-4	WHT/YEL		E5-15	P13-HH	
39-4	WHT/GRN		E5-16	P13-P	
61	WHT/RED/BLU		E5-38	SPARE	
Ⓚ 62	BLK	25	J12-V	E9	



SECTION C-C
2 PLACES





NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK CHARACTERS .10/.14 HIGH COLOR BLACK AT LOCATIONS SHOWN PER ND1002019
3. IDENTIFY USING DRAWING NUMBER REVISION LETTER & SER. NO. AT THE INDICATED LOCATION PER NOTE 2.
4. SCREW TORQUE REQUIREMENTS: ±7%
   (5) (6) (11) 5 IN-LB
   (7) 3.5 IN-LB
5. SOLDER LEADS FROM (2) TO LOWER SECTION OF APPROPRIATE TERMINAL PER MIL-STD-440 USING (9). SOLDER ALL OTHER LEADS TO EITHER UPPER SECTION OF APPROPRIATE TERMINAL OR (13) & (16) PER MIL STD 440 USING (17). WIRE INSULATION SHALL BE WITHIN .06 OF SOLDERED CONNECTIONS
~~6. TWISTED CONDUCTORS TO CONSIST OF 4 FULL TURNS PER INCH MINIMUM~~
7. CAUTION: DO NOT SEPERATE STUB SHAFT FROM BEARING HOUSING OR REMOVE TORQUE MOTOR (2) WITHOUT FIRST ASSEMBLING KEEPER TO TORQUE MOTOR (2)
8. MAXIMUM ALLOWABLE TORQUE : 15 OZ-IN.
9. ASSEMBLE & TEST PER THE REQUIREMENTS OF ATP 1000207
10. LEADS MUST NOT EXTEND BEYOND THIS RADIUS
11. USE CHICAGO STITCH LACING IN AREAS INDICATED
12. ALL SPARE LEADS TO BE 8.50 ± .12 LONG, TO TERMINATE NEAR (P13/16) AFTER FOLDING BACK ON THEMSELVES. ENDS TO BE INSULATED BEFORE WRAPPING INTO HARNESS
13. USE FIGURE EIGHT STITCH LACING IN AREAS INDICATED

Ⓛ TWISTING TO CONSIST OF THE FOLLOWING
NO. OF TURNS PER INCH

NO. OF LEADS	NO. OF FULL TURNS MIN	NO. OF FULL TURNS MAX
2 OR 3	2	4
4 OR MORE	1	3

	REV	SHEET
1000207	P	1

1000207

REVISIONS TDRR 00132				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART NO.	DESCRIPTION	REQ'D
1000037	Slip Ring Assy, Electrical, 40 Contacts	1
1000075	Motor, Torque DC, Frameless	1
1000087	Clamps, Torque Motor	6
1000117	Connector Elect, Plug 29 Contacts	2
1000119	Connector, Elect, Recept 34 Contacts	1
1000112	Guide Wire Brg Mt,	1

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000204	DL 1000201

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	12/11/62
CHECKED		
DRAWN		

APPROVED FOR MSC
W J Rhine 12-12-62

MIT/IL APPROVAL	DATE
W A Koppe	12/14/62

INTERGIMBAL SUB-ASSEMBLY

16 SPEED
INNER AXIS

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

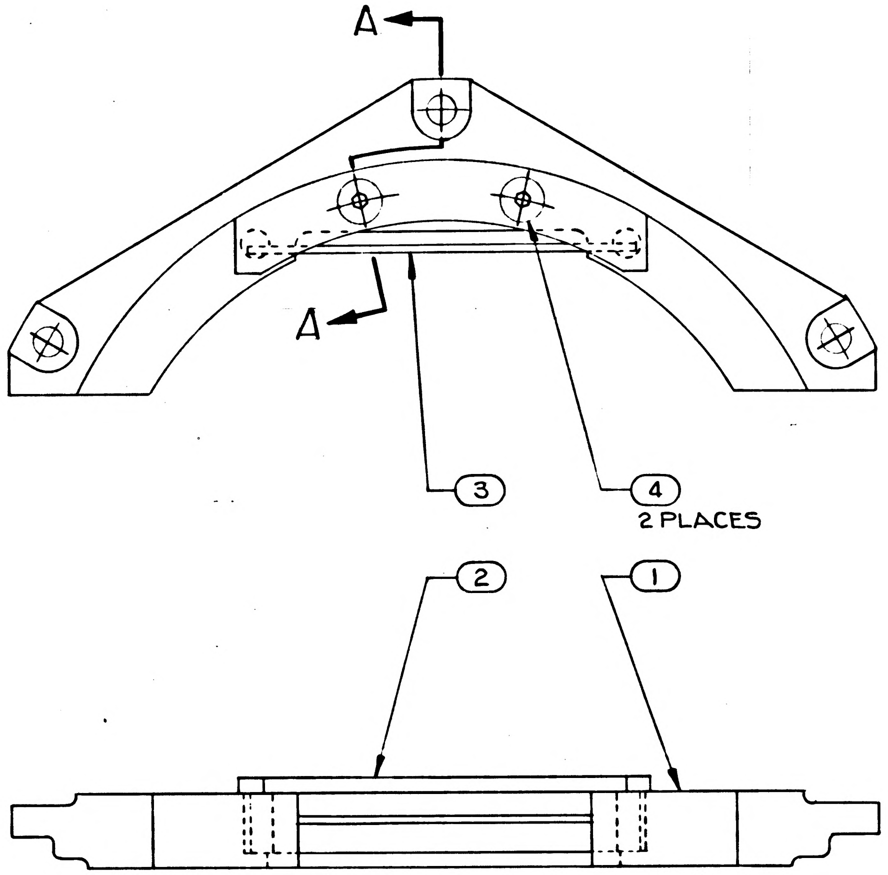
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

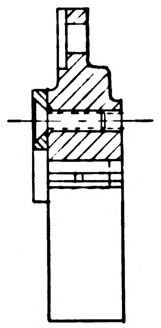
NASA DRAWING NO.
1000207

SHEET OF

REVISIONS TDRR 00457

ZONE	SYM	DESCRIPTION	DATE	APPROVAL





SECTION A-A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

1000208

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	SCREW, FLAT HD, SELF-LOCKING, SOC, HEX	1000104-3			4
1	CONTACT	1000199			3
1	CLIP, RETAINING	1000198			2
1	BRACKET, RETAINING	1000200			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000008	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-29-63

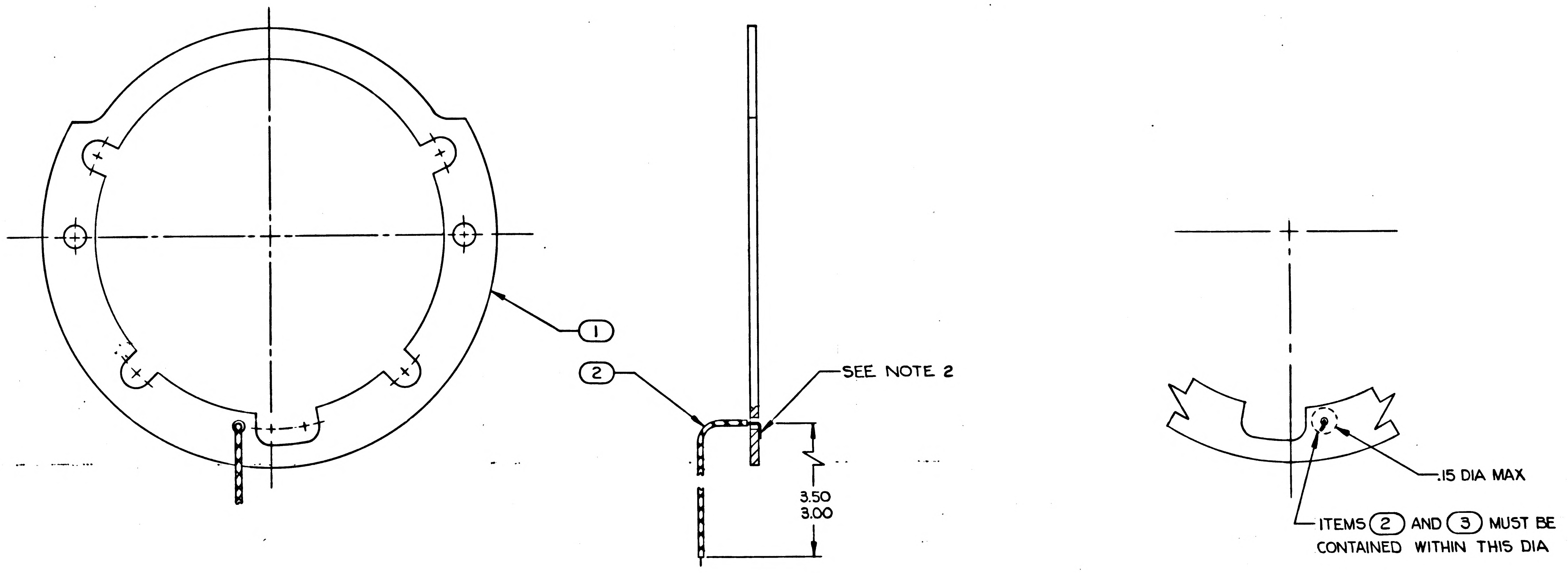
APPROVED FOR MSC
W J Rhine 2-27-63
MIT/IL APPROVAL DATE
W Cuffer 27 Feb 63

CONTACT ASSY
LIMIT SWITCH

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000208
SHEET 1 OF 1

REVISIONS TDRR 00457				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE ITEMS ① AND ② IN ACCORDANCE WITH MIL-STD-440B USING ITEM ③
3. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	SOLDER	SN60 WARP 2	QQ-S-571C		3
A/R	WIRE AWG 28 GY		MIL-W-16878	TYPE E-28	2
1	CONDUCTOR	1000195			1

LIST OF PARTS AND MATERIALS

	DL1000201
1000211	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-28-6.

APPROVED FOR MSC
W J Rhine 2-27-63

MIT/IL APPROVAL	DATE
W [illegible]	27 Feb 63

CONDUCTOR ASSY, OUTER LIMIT SWITCH

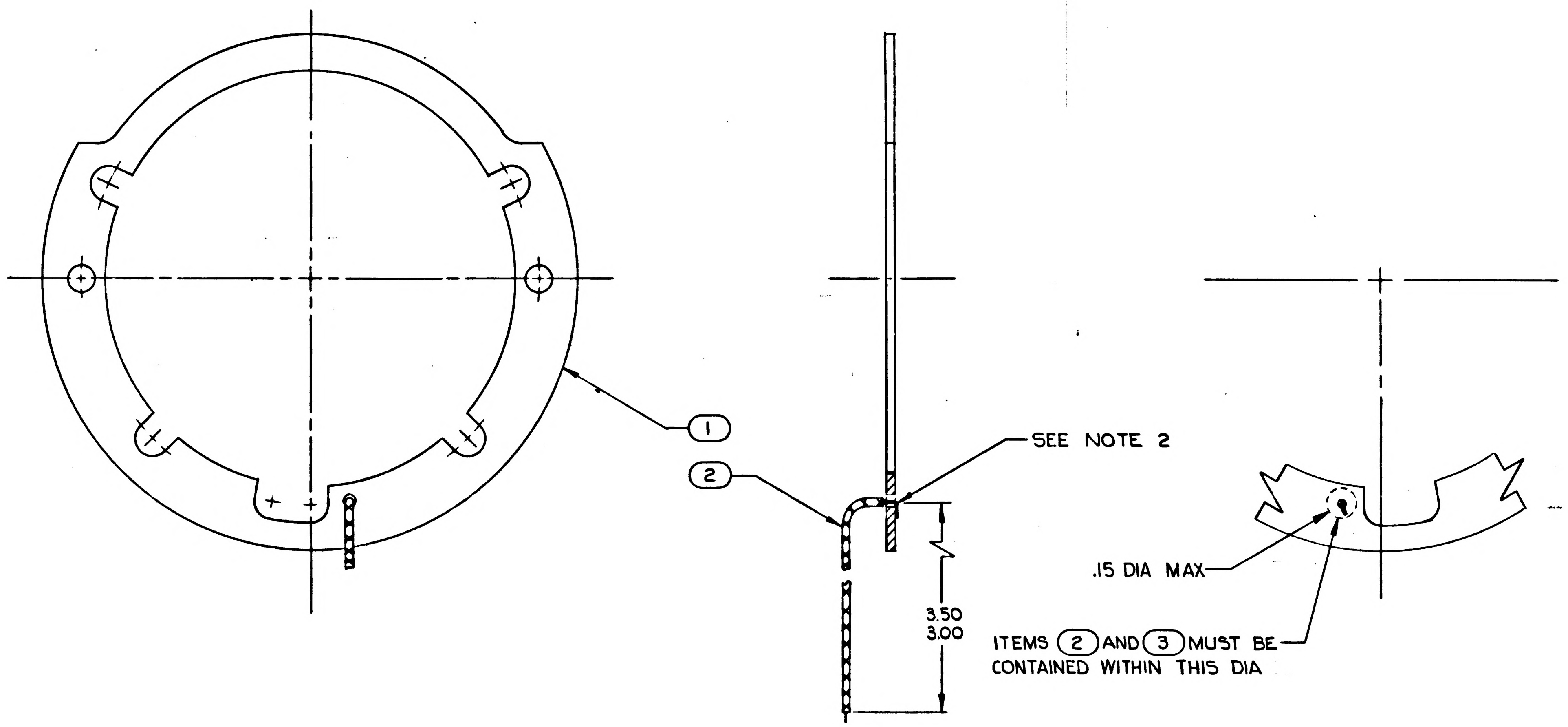
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000209
SHEET 1 OF 1

1000209

REVISIONS TDRR 00457

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE ITEMS ① AND ② IN ACCORDANCE WITH MIL-STD-440B USING ITEM ③
3. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	SOLDER	SN60WARP2	QQ-S-571C		3
A/R	WIRE AWG 28 BLK		MIL-W-16878	TYPE E-28	2
1	CONDUCTOR	1000195			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000211	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-25-63
APPROVED FOR MSC	WJ Rhine	2-27-63
MIT/IL APPROVAL		DATE
	W Trageser	27 Feb 63

CONDUCTOR ASSY INNER LIMIT SWITCH

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

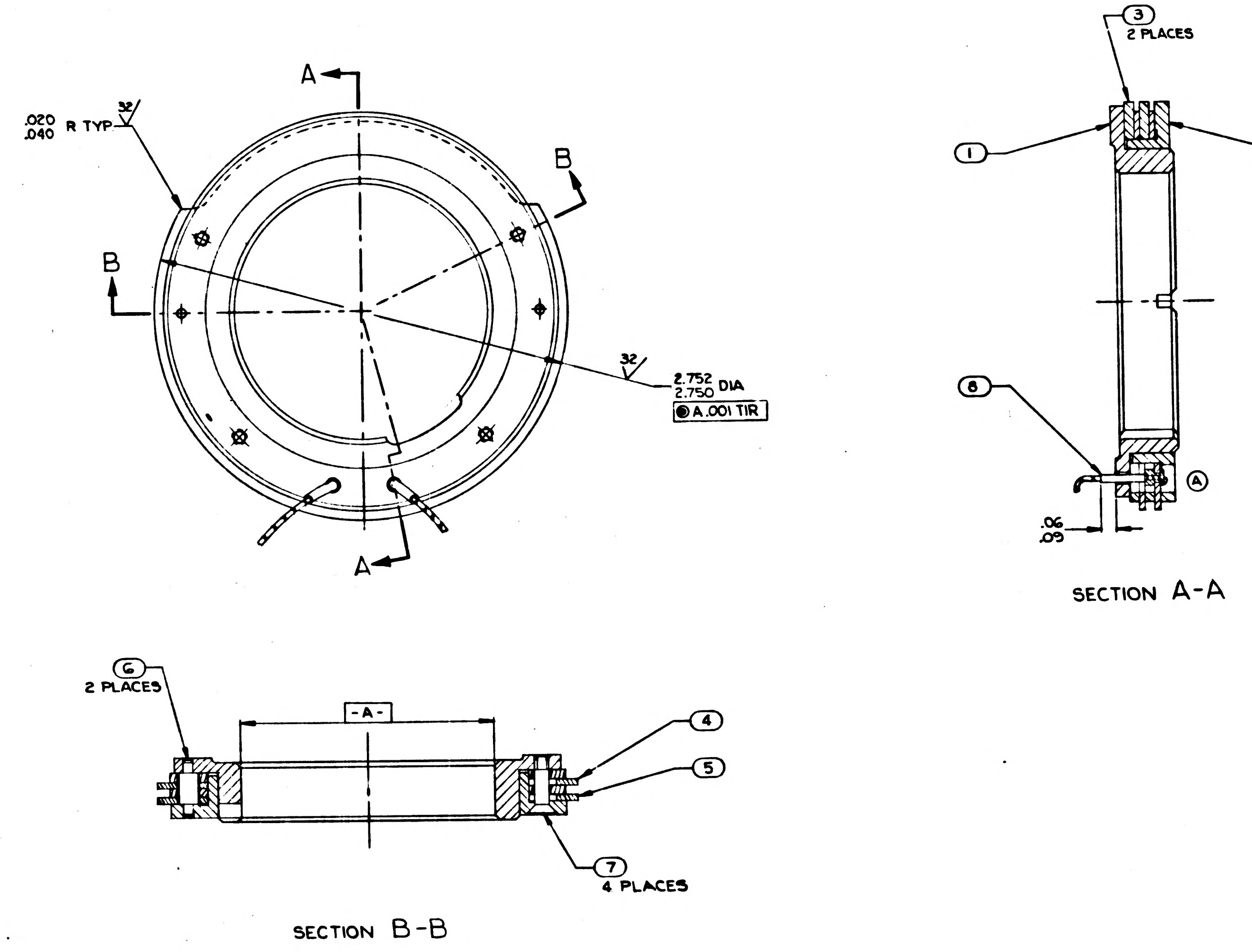
NASA DRAWING NO. 1000210

SHEET 1 OF 1

1000210

REVISIONS TDRR 00457				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01041	1 MAY 63	ago wk

Ⓜ



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	SLEEVING, INSULATED, ELEC	1006776-20			8
4	SCREW, FLAT HD. SOC. HEX	1000104-4			7
2	SPACER	1000193			6
1	CONDUCTOR, ASSY INNER	1000210			5
1	CONDUCTOR, ASSY OUTER	1000209			4
2	RING, SPACER	1000196			3
1	RETAINING RING,	1000194			2
1	MOUNTING RING,	1000197			1

LIST OF PARTS AND MATERIALS

	DL1000201
1000008	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	G J Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-29-63

APPROVED FOR MSC
W J Wilkins 2-27-63

MIT/IL APPROVAL	DATE
WK for	27 Feb 63

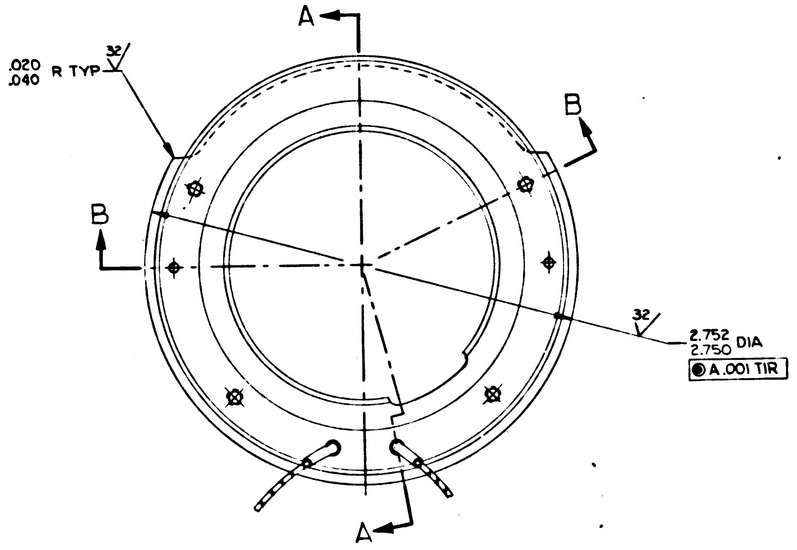
LIMIT SWITCH,
MIDDLE AXIS

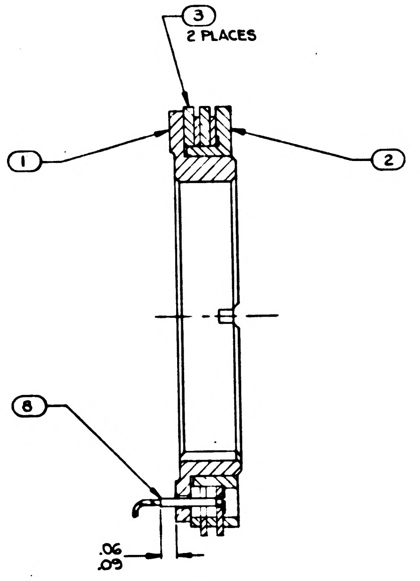
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000211
SHEET 1 OF 1

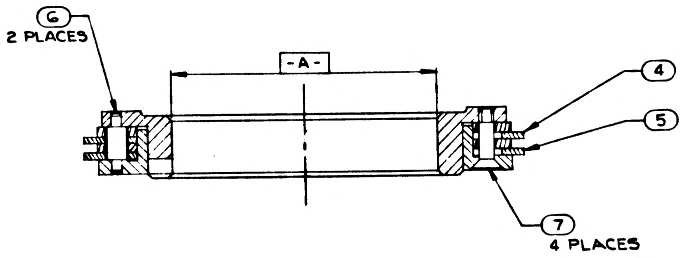
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	REVISIONS DRR 0045 DESCRIPTION	DATE	APPROVAL





SECTION A-A



SECTION B-B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURER'S SYMBOL PER MIL-STD-130
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	SLEEVING, INSULATED, ELEC	1006776-20			8
4	SCREW, FLAT HD. SOC. HEX	1000104-4			7
2	SPACER	1000193			6
1	CONDUCTOR, ASSY INNER	1000210			5
1	CONDUCTOR, ASSY OUTER	1000209			4
2	RING, SPACER	1000196			3
1	RETAINING RING,	1000194			2
1	MOUNTING RING,	1000197			1

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL1000201
1000008	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	G J Boyce	2-26-63
CHECKED		
DRAWN	R.G.S.	1-29-63

APPROVED FOR MSC
W J Rhine 2-27-63
MIT/IL APPROVAL DATE
27 Feb 63

LIMIT SWITCH, MIDDLE AXIS

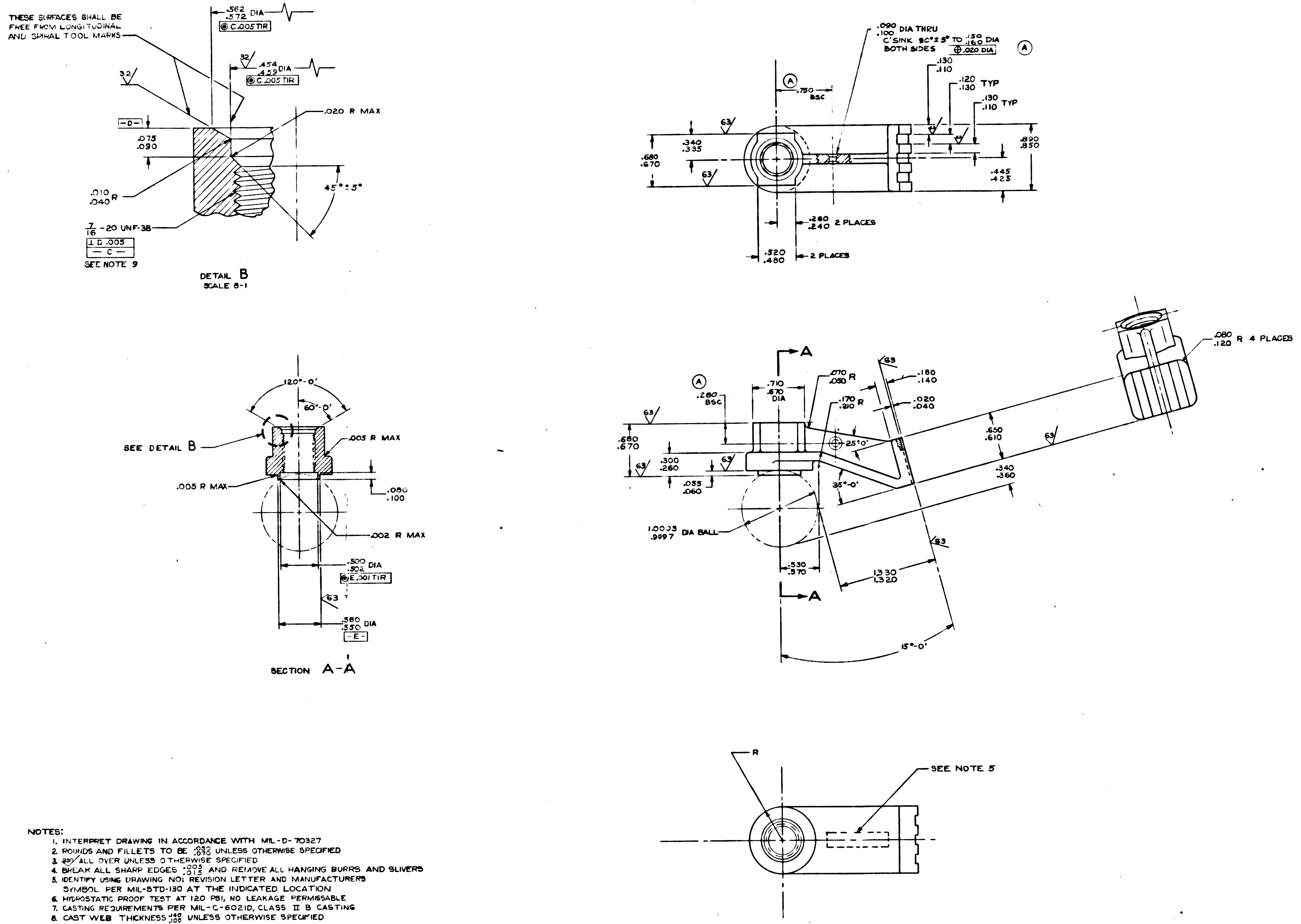
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000211
SHEET 1 OF 1

1000211

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00457		
	A	TDRR 00850	4-17-63	

Ⓜ



THESE SURFACES SHALL BE FREE FROM LONGITUDINAL AND SPIRAL TOOL MARKS
.562 .572 DIA
C .005 TIR
.454 .429 DIA
C .005 TIR
32
-D-
.075 .090
.020 R MAX
.010 .040 R
45° ± 5°
7/16 -20 UNF-3B
⊥ D .005
— C —
SEE NOTE 9
DETAIL B
SCALE 8-1
.090 .100 DIA THRU
C'SINK 90° ± 5° TO .150 .160 DIA
BOTH SIDES ⊕ .020 DIA
A
.750 BSC
.130 .110
.120 .130 TYP
.130 .110 TYP
63
.680 .670
.340 .335
.890 .850
.445 .425
.260 .240 2 PLACES
.520 .480 2 PLACES
120°-0'
60°-0'
SEE DETAIL B
.005 R MAX
.005 R MAX
.080 .100
.002 R MAX
.500 .502 DIA
E .001 TIR
.560 .550 DIA
-E-
SECTION A-A
A
.710 .670 DIA
.260 BSC
.070 .050 R
.170 .210 R
.180 .140
.020 .040
.080 .120 R 4 PLACES
25°0'
.300 .260
.055 .060
35°-0'
.650 .610
.340 .360
1.0003 .9997 DIA BALL
.530 .570
1.330 1.320
15°-0'
R
SEE NOTE 5

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ROUNDS AND FILLETS TO BE $^{.030}_{.070}$ UNLESS OTHERWISE SPECIFIED
3. 250/ ALL OVER UNLESS OTHERWISE SPECIFIED
4. BREAK ALL SHARP EDGES $^{.005}_{.015}$ AND REMOVE ALL HANGING BURRS AND SLIVERS
5. IDENTIFY USING DRAWING NO; REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130 AT THE INDICATED LOCATION
6. HYDROSTATIC PROOF TEST AT 120 PSI, NO LEAKAGE PERMISSABLE
7. CASTING REQUIREMENTS PER MIL-C-6021D, CLASS II B CASTING
8. CAST WEB THICKNESS $^{.140}_{.100}$ UNLESS OTHERWISE SPECIFIED
9. THREADS MUST CONFORM TO MIL-S-7742

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL000201
1000083	DL000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL: ALUMINUM ALLOY A 612-T5 PER MIL-SPEC QQ-A-601 C

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		2-21-63
CHECKED		
DRAWN	R. CONTANT	2-20-63
APPROVED FOR MSC		2-27-63
MIT/IL APPROVAL	W Ruffin	2-27-63

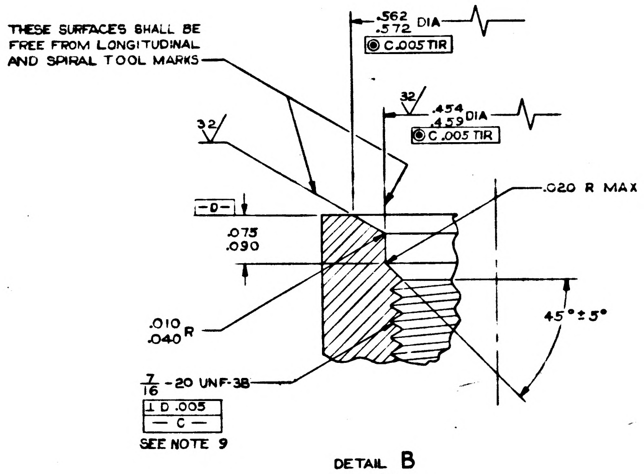
BRACKET CONNECTOR
HEAT EXCHANGER

SCALE 2/1
UNIT WT.
CODE IDENT.

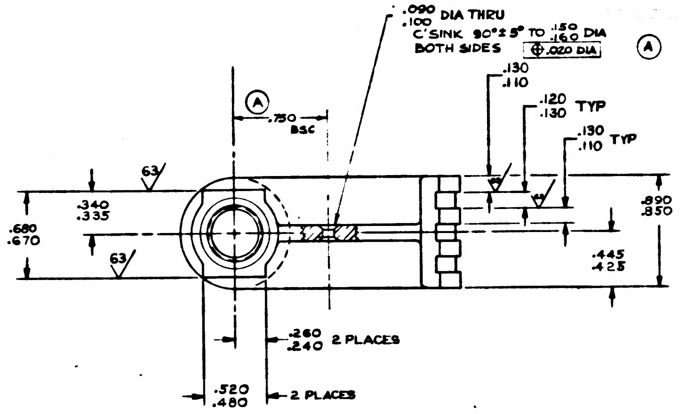
MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000212
SHEET 1 OF 1

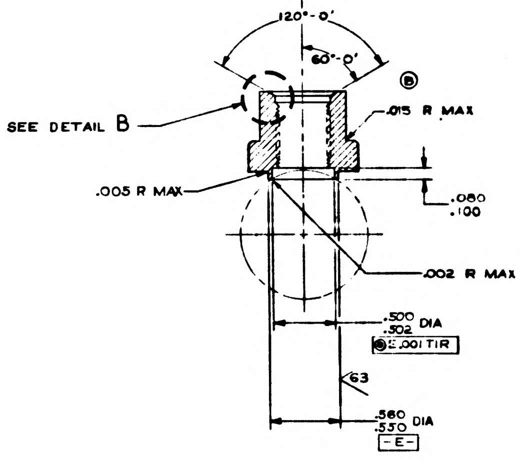
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS	TDRR 00457			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00850	4-17-63	
	B	TDRR 01054	4-30-63	

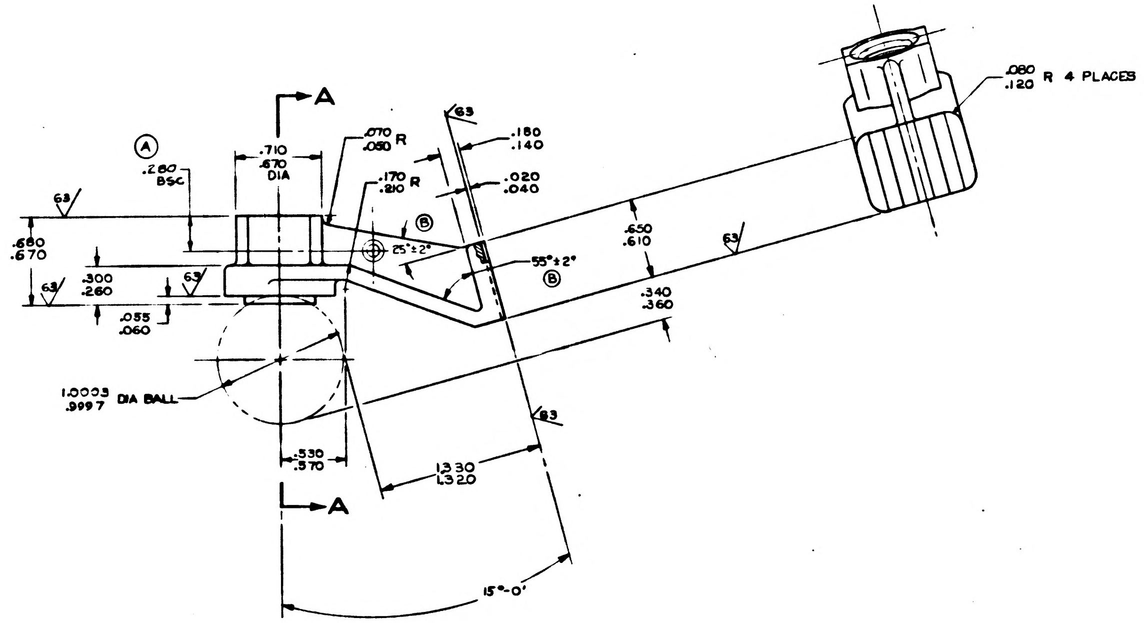

THESE SURFACES SHALL BE FREE FROM LONGITUDINAL AND SPIRAL TOOL MARKS
.562 .572 DIA
C .005 TIR
.454 .459 DIA
C .005 TIR
32
-D-
.075 .090
.020 R MAX
.010 .040 R
45°±5°
7/16 -20 UNF-3B
⊥ D .005
-C-
SEE NOTE 9

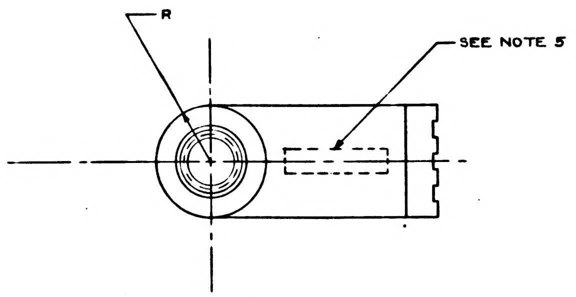
DETAIL B
SCALE 8-1


.090 .100 DIA THRU
C'SINK 90°±5° TO .150 .160 DIA BOTH SIDES
.020 DIA
A
.750 BSC
.130 .110
.120 .130 TYP
.130 .110 TYP
63
.340 .335
.680 .670
.890 .850
.445 .425
.260 .240 2 PLACES
.520 .480 2 PLACES


120°-0'
60°-0'
B
SEE DETAIL B
.015 R MAX
.005 R MAX
.080 .100
.002 R MAX
.500 .502 DIA
.001 TIR
63
.560 .550 DIA
-E-

SECTION A-A


A
A
.710 .670 DIA
.070 .050 R
.170 .810 R
.260 BSC
63
.180 .140
.020 .040
.080 .120 R 4 PLACES
.680 .670
.300 .260
.055 .060
B
25°±2°
55°±2°
.650 .610
.340 .360
1.0003 .9997 DIA BALL
.330 .370
1.330 1.320
15°-0'



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ROUNDS AND FILLETS TO BE $^{.030}_{.070}$ UNLESS OTHERWISE SPECIFIED
3. 250 ALL OVER UNLESS OTHERWISE SPECIFIED
4. BREAK ALL SHARP EDGES $^{.005}_{.015}$ AND REMOVE ALL HANGING BURRS AND SLIVERS
5. IDENTIFY USING DRAWING NO; REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130 AT THE INDICATED LOCATION
6. HYDROSTATIC PROOF TEST AT 120 PSI, NO LEAKAGE PERMISSABLE
7. CASTING REQUIREMENTS PER MIL-C-6021D, CLASS II B CASTING
8. CAST WEB THICKNESS $^{.140}_{.100}$ UNLESS OTHERWISE SPECIFIED
9. THREADS MUST CONFORM TO MIL-S-7742

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL000201
1000083	DL000301

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.005 ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL: ALUMINUM ALLOY A 612-T5 PER MIL-SPEC QQ-A-601 C

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	J. Bogue	2-21-63
CHECKED		
DRAWN	R. CONTANT	2-20-63

APPROVED FOR MSC
2-22-63

INIT/L APPROVAL	DATE
	2-26-63

BRACKET CONNECTOR
HEAT EXCHANGER

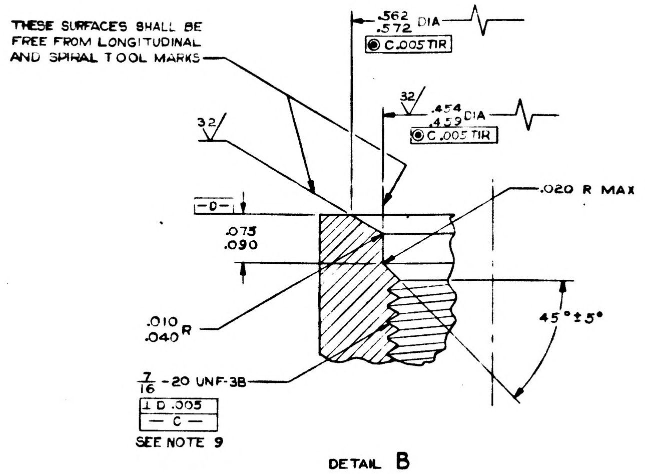
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000212
SHEET 1 OF 1

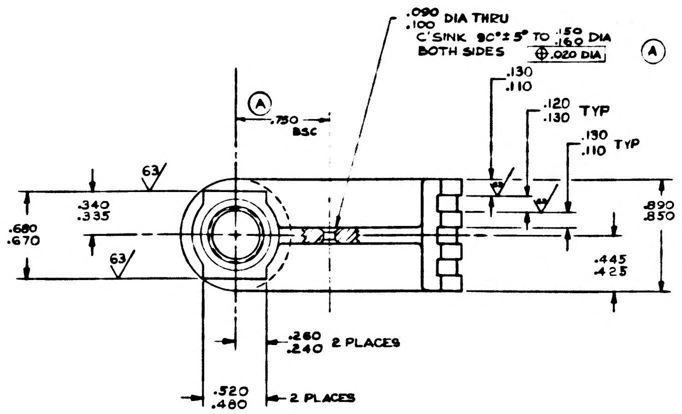
1000212 A

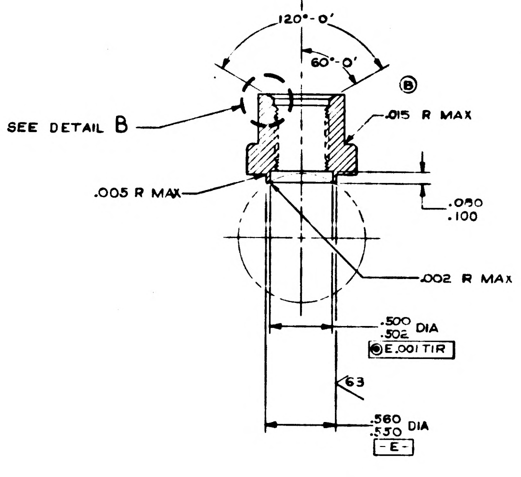
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS		TDRR 00457		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00850	4-17-63	wH
	B	TDRR 01054	4-30-63	wK
	C	TDRR 01688	6-19-63	

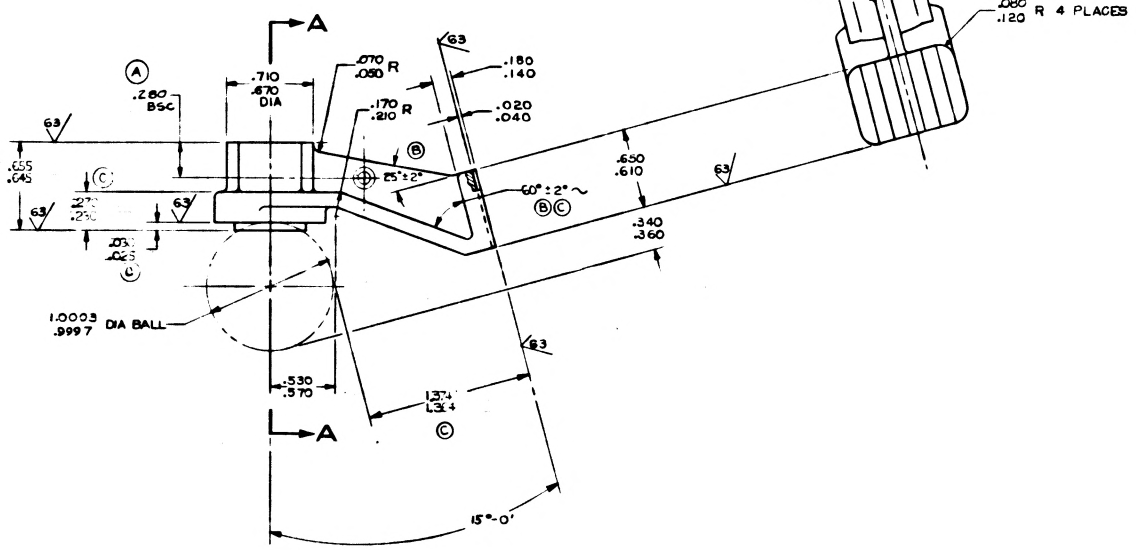

THESE SURFACES SHALL BE FREE FROM LONGITUDINAL AND SPIRAL TOOL MARKS
.562 .572 DIA
◉ C .005 TIR
32
.454 .459 DIA
◉ C .005 TIR
32
-D-
.075 .090
.020 R MAX
.010 .040 R
45° ± 5°
7/16 -20 UNF-3B
⊥ D .005
— C —
SEE NOTE 9

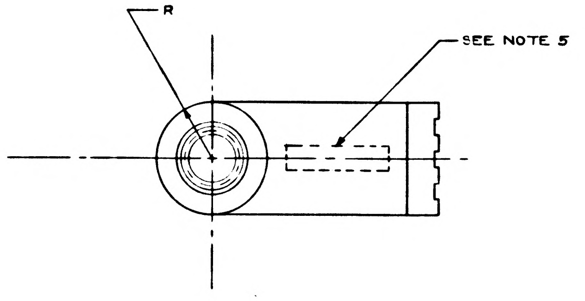
DETAIL B
SCALE 8-1


.090 .100 DIA THRU
C'SINK 90° ± 5° TO .150 .160 DIA
BOTH SIDES
⌖ .020 DIA
Ⓐ
Ⓐ
.750 BSC
.130 .110
.120 .130 TYP
.130 .110 TYP
63
63
.340 .335
.680 .670
.890 .850
.445 .425
.260 .240 2 PLACES
.520 .480 2 PLACES


120°-0'
60°-0'
Ⓑ
SEE DETAIL B
.015 R MAX
.005 R MAX
.080 .100
.002 R MAX
.500 .502 DIA
◉ E .001 TIR
63
.560 .550 DIA
-E-

SECTION A-A


A
A
Ⓐ
.280 BSC
.710 .670 DIA
.070 .050 R
.170 .210 R
63
.180 .140
.020 .040
63
Ⓒ
.655 .645
Ⓒ
.270 .230
63
63
.030 .025
Ⓒ
Ⓑ
25° ± 2°
60° ± 2°
Ⓑ Ⓒ
.650 .610
63
.340 .360
.080 .120 R 4 PLACES
1.0003 .9997 DIA BALL
.530 .570
1.374 1.364
Ⓒ
63
15°-0'



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ROUNDS AND FILLETS TO BE $^{.050}_{.070}$ UNLESS OTHERWISE SPECIFIED
3. 250 ALL OVER UNLESS OTHERWISE SPECIFIED
4. BREAK ALL SHARP EDGES $^{.005}_{.015}$ AND REMOVE ALL HANGING BURRS AND SLIVERS
5. IDENTIFY USING DRAWING NO; REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130 AT THE INDICATED LOCATION
6. HYDROSTATIC PROOF TEST AT 120 PSI, NO LEAKAGE PERMISSABLE
7. CASTING REQUIREMENTS PER MIL-C-6021D, CLASS II B CASTING
8. CAST WEB THICKNESS $^{.140}_{.100}$ UNLESS OTHERWISE SPECIFIED
9. THREADS MUST CONFORM TO MIL-S-7742

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.005 ANGLES ±0°-30'
	DL000201	DO NOT SCALE THIS DRAWING
1000083	DL000301	MATERIAL: ALUMINUM ALLOY A 612-T5 PER MIL-SPEC QQ-A-601 C
NEXT ASSY	USED ON	
APPLICATION		

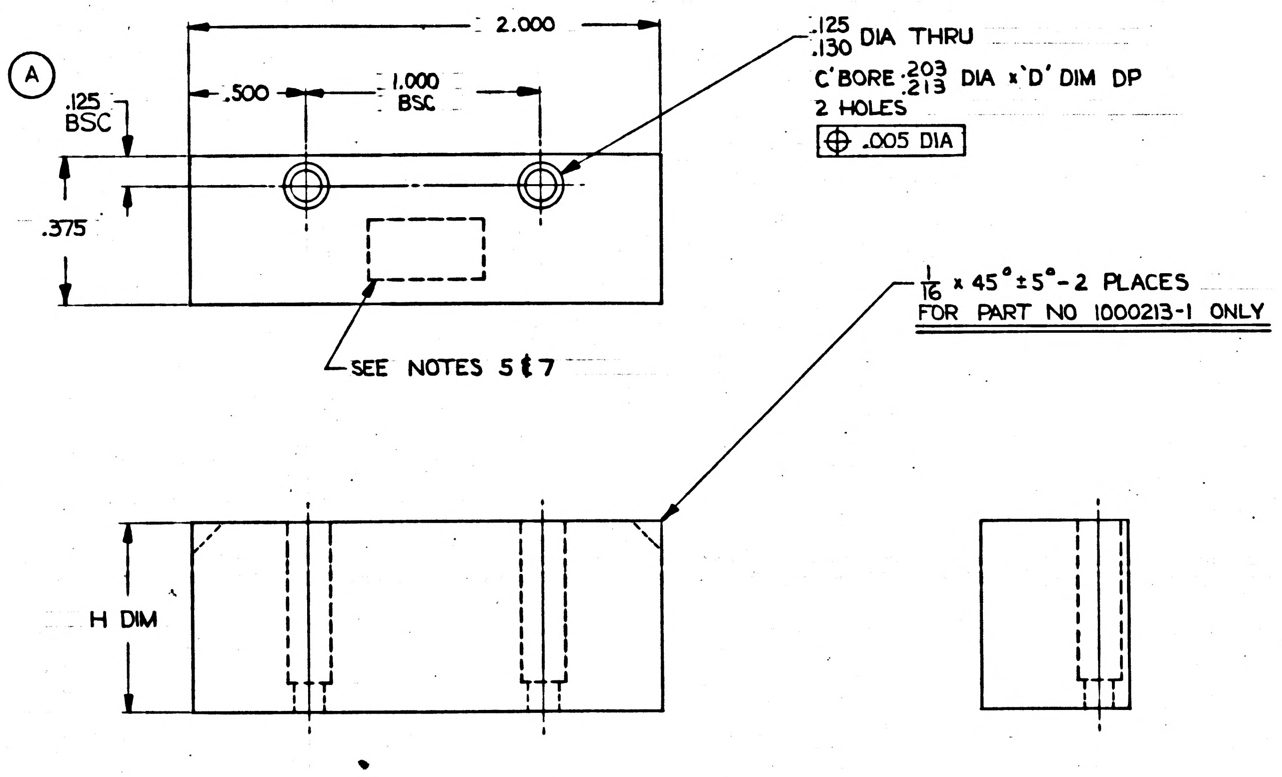
MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE	BRACKET CONNECTOR HEAT EXCHANGER	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
APPROVED	2-21-63		DWG. NO.
CHECKED			MANNED SPACECRAFT CENTER HOUSTON TEXAS
DRAWN P. CONTANT	2-20-63		
APPROVED FOR MSC	2-22-63		NASA DRAWING NO 1000212
MIT/IL APPROVAL	DATE	SCALE 2/1 · UNIT WT. · CODE IDENT.	SHEET 1 OF 1

00212

PART NO	H DIM	D DIM	WT. OZ CALC (REF) Ⓐ
1000213-1	.625	.500	4.24
1000213-2	.500	.375	3.45
1000213-3	.375	.250	2.58
1000213-4	.250	.125	1.75

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	QJB WK



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\checkmark}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE.
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2.
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ——
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-25-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1/4/63

WEIGHT, BALANCE
STABLE MEMBER

SCALE ——
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000213

SHEET 1 OF 1

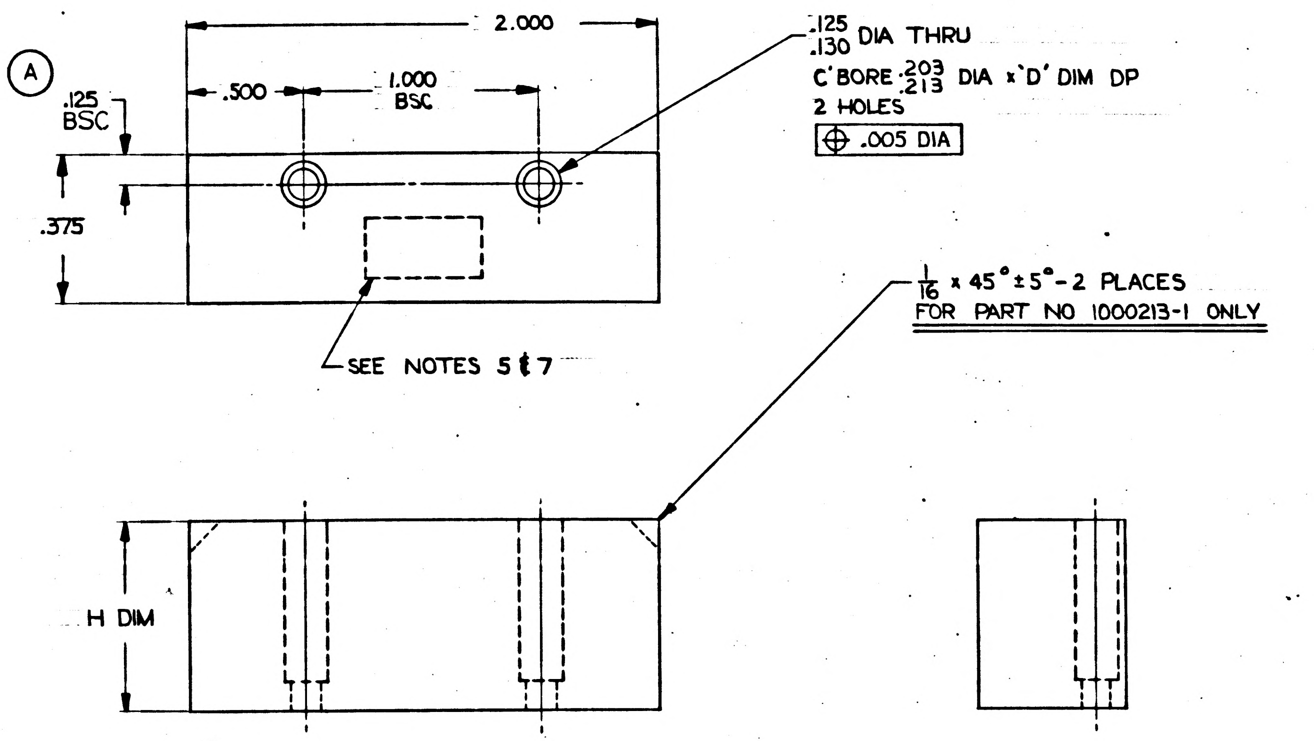
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000213 A

PART NO	H DIM	D DIM	WT. OZ CALC (REF) Ⓐ
1000213-1	.625	.500	4.24
1000213-2	.500	.375	3.45
1000213-3	.375	.250	2.58
1000213-4	.250	.125	1.75

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
Ⓜ	A	TDRR 01803	7-2-63	ajB	WK
	B	TDRR 02509	8-14-63	ajB	WK



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\surd}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE.
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2.
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	NEXT ASSY	USED ON
Ⓑ	1001500	DL1001500
	1000201	DL1000201
	1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ——
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-25-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL		DATE
	W Kupfer	1 May 63

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
——		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000213
SHEET 1 OF 1

MASTER

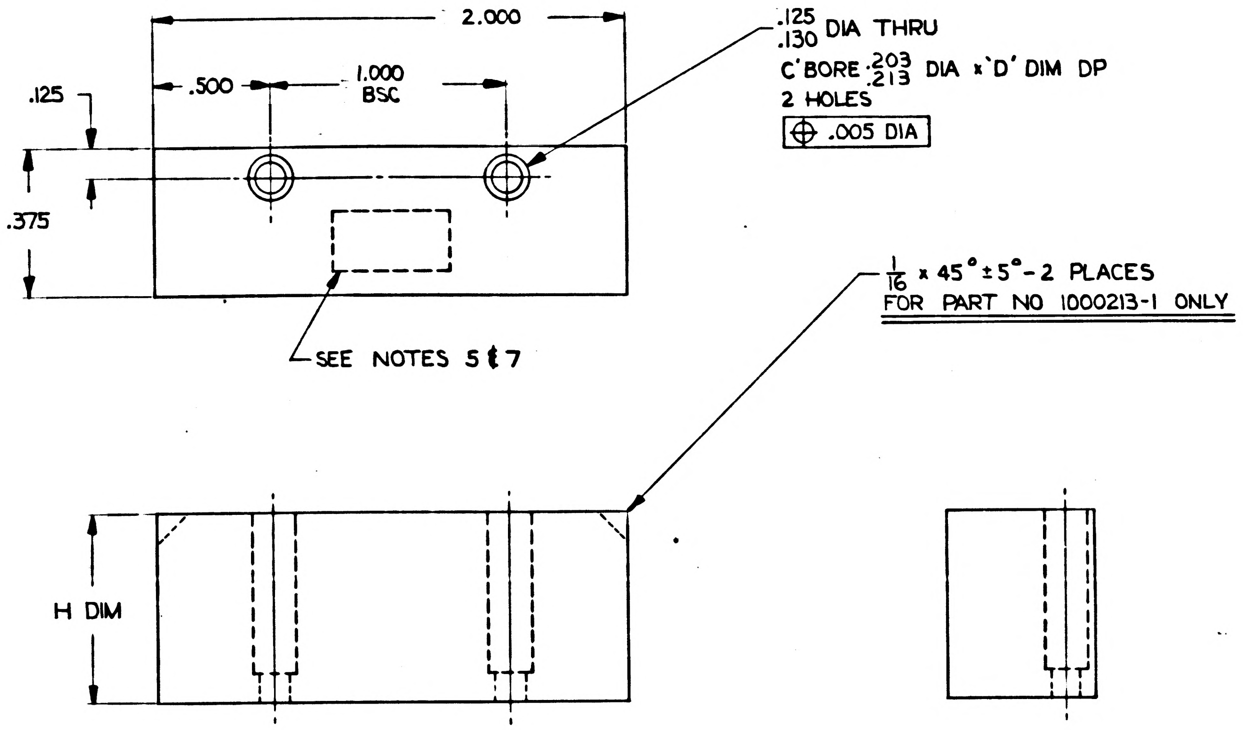
1000213 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	H DIM	D DIM	WT. OZ CALC
1000213-1	.625	.500	4.24
000213-2	.500	.375	3.45
1000213-3	.375	.250	2.58
1000213-4	.250	.125	1.75

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



2.000
.500
1.000 BSC
.125
.375
.125 .130 DIA THRU
C'BORE .203 .213 DIA x 'D' DIM DP
2 HOLES
⊕ .005 DIA
1/16 x 45° ± 5° - 2 PLACES
FOR PART NO 1000213-1 ONLY
SEE NOTES 5 & 7
H DIM

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\checkmark}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE.
6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3.
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ——
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-25-63
APPROVED FOR MSC	W J Rehme	5-1-63
MIT/IL APPROVAL		DATE
	W Guyllon	1 May 63

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
——		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000213
SHEET 1 OF 1

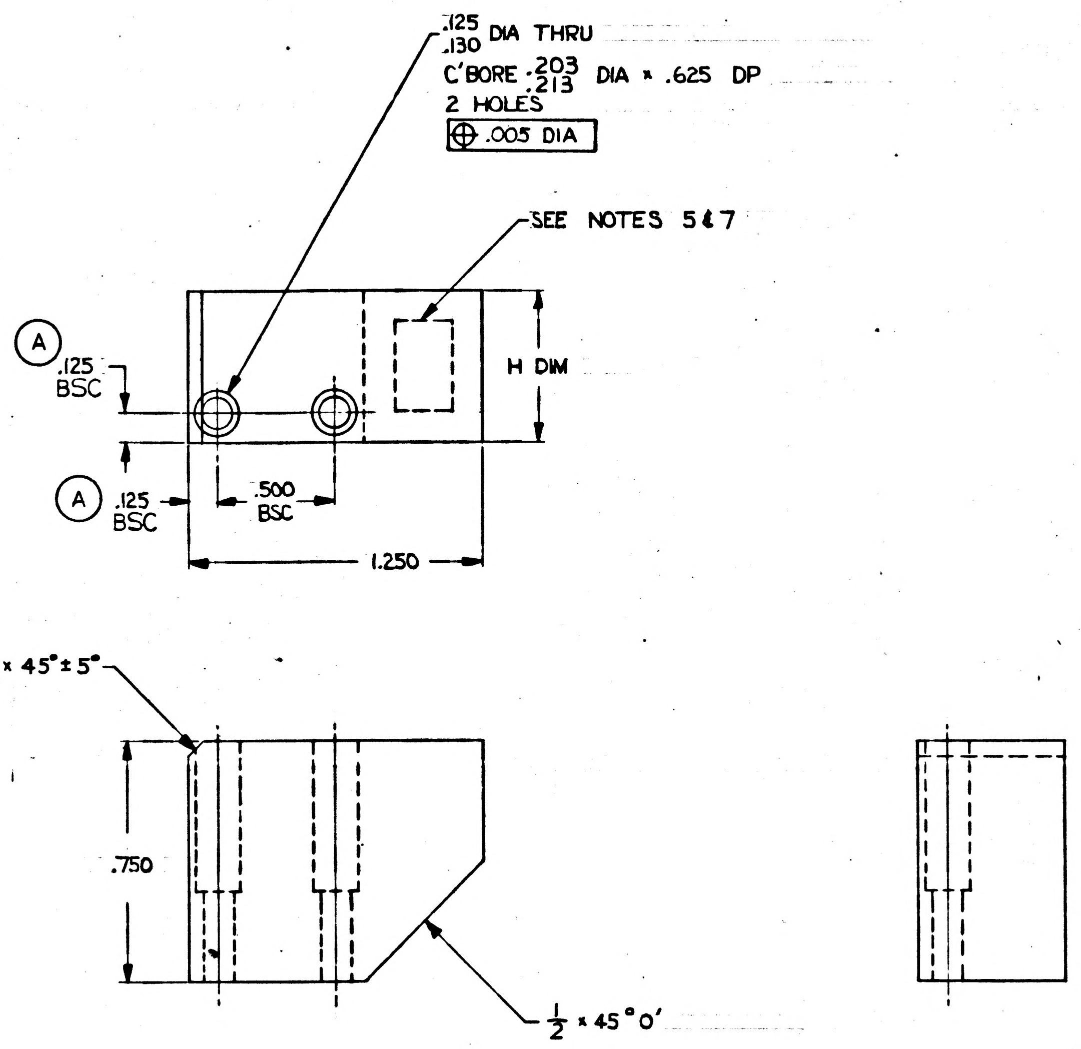
1000213

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	H DIM	WT OZ CALC (REF) Ⓐ
1000214-1	.250	1.55
1000214-2	.375	2.56

Ⓜ

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	ajB WK



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. 250√ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

1000201	DL 1000201
1000001	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-26-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL		DATE
	WKeppler	1 May 63

WEIGHT, BALANCE
STABLE MEMBER

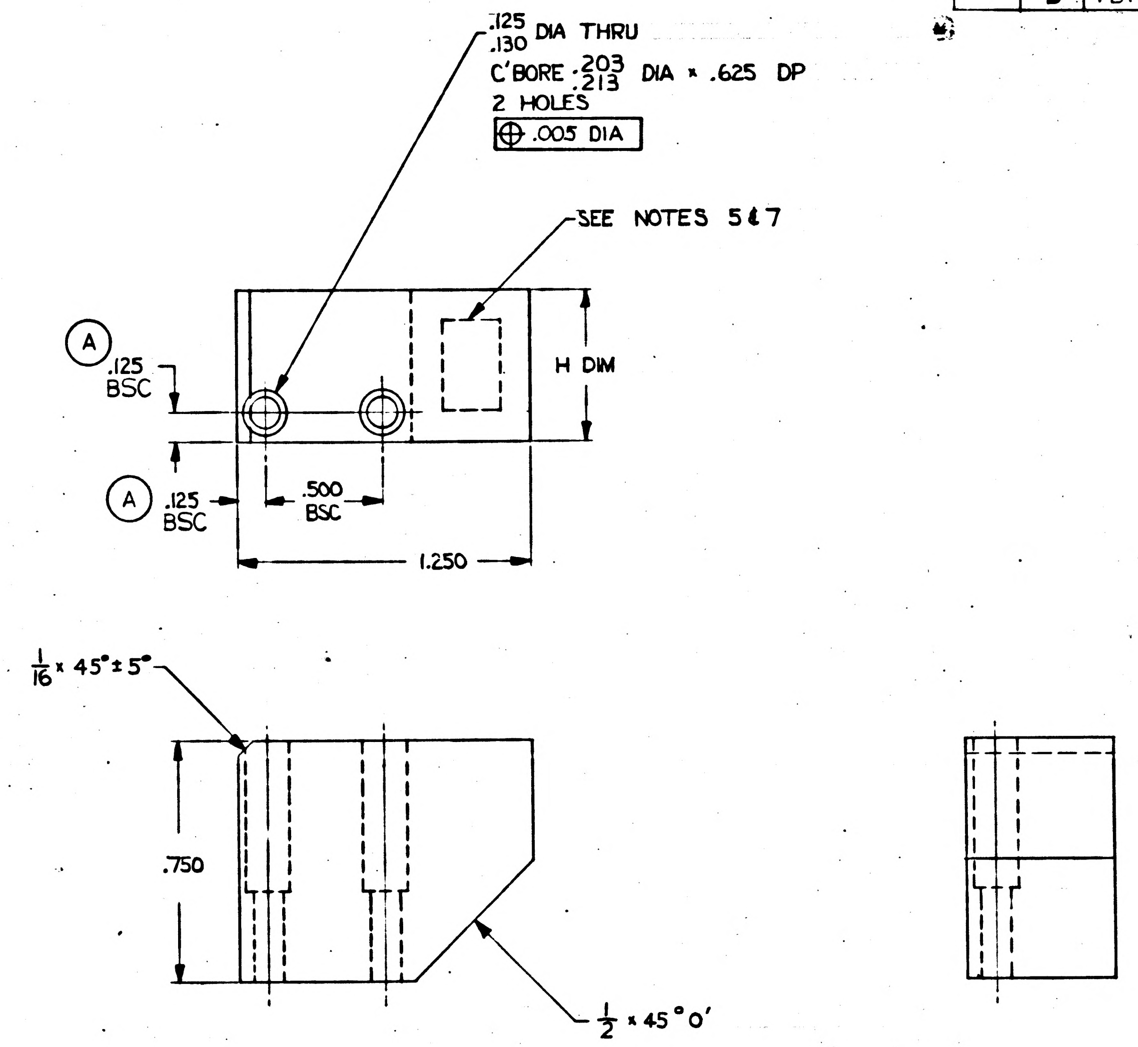
SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000214
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	H DIM	WT OZ CALC (REF) Ⓐ
1000214-1	.250	1.55
1000214-2	.375	2.56

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	ajB WK
	B	TDRR 02509	8-14-63	ajB WK



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\sqrt[250]{}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

MASTER Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1001500	DL1001500
1000201	DL1000201
1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	ajBoyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-26-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL		DATE
	WKupfer	1Aug63

WEIGHT, BALANCE
STABLE MEMBER

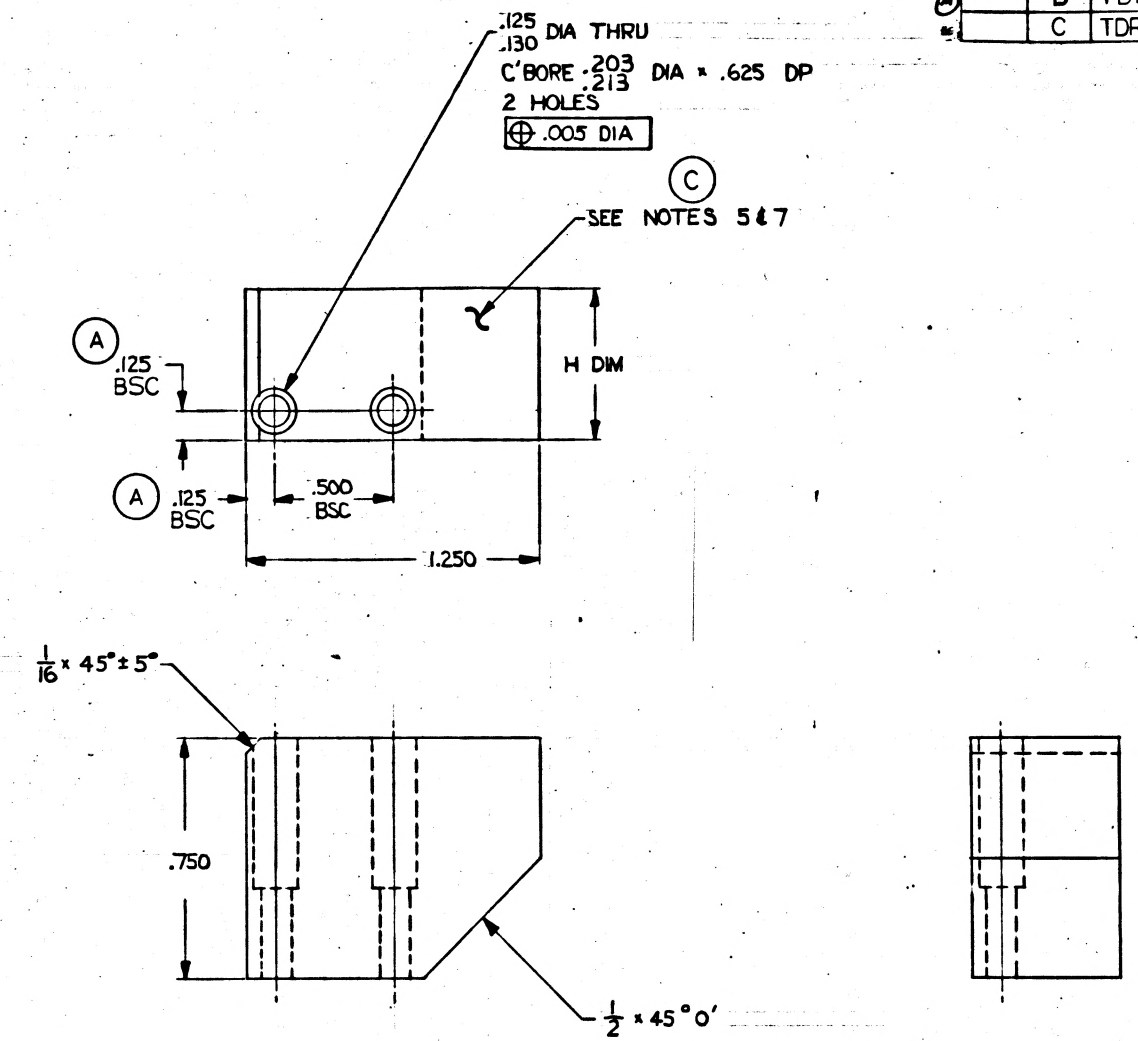
SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000214
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	H DIM	WT OZ CALC (REF) Ⓐ
1000214-1	.250	1.55
1000214-2	.375	2.56

REVISIONS TDRR 01025					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	ajB	WH
	B	TDRR 02509	8-14-63	ajB	WH
	C	TDRR 05610	1-8-64		



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
Ⓑ 2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
MALLORY METALLURGICAL CO.
3029 EAST WASHINGTON ST
INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES .005/.015.
4. 250/ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
Ⓐ 6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
Ⓒ 7. IDENTIFY USING DWG NO, APPLICABLE DASH NO, & REVISION LETTER ON INDICATED SURFACE PER ND 1002019

MASTER Ⓑ

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ±0°30'
1001500	DL1001500	
1000201	DL1000201	DO NOT SCALE THIS DRAWING
1000001	DL1000001	MATERIAL: SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	ajBoyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-26-63
APPROVED FOR MSC	WG Rhine	5-1-63
MIT/IL APPROVAL	WHupfer	1/14/63

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

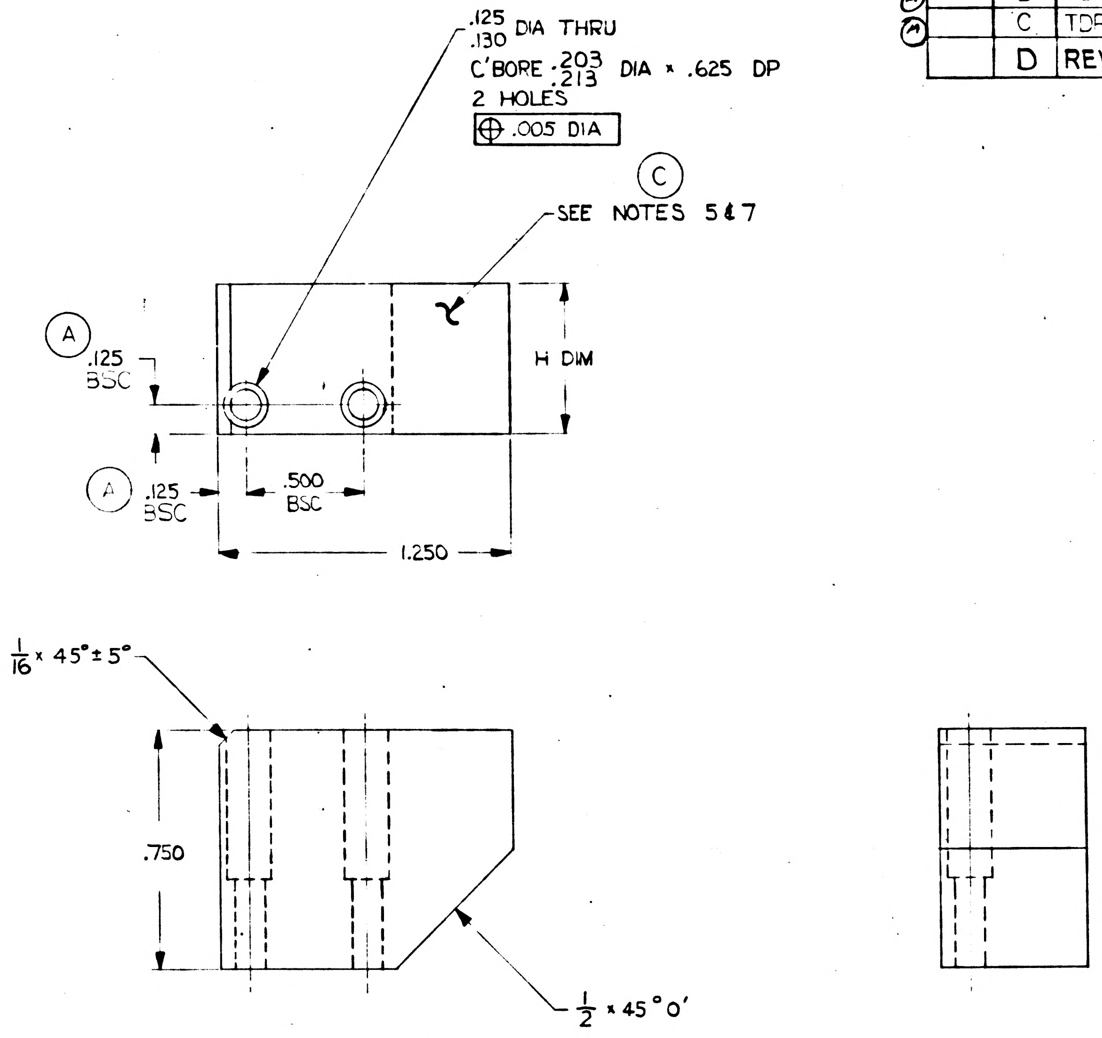
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000214

SHEET 1 OF 1

PART NO	H DIM	WT OZ CALC (REF) Ⓐ
000214-1	.250	1.55
1000214-2	.375	2.56

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	ajB WH
	B	TDRR 02509	8-4-63	ajB WH
	C	TDRR 05610	1-8-64	JAH
	D	REVISED PER TDRR 23538	8 NOV 65	J J J



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

Ⓑ 2. MATERIAL SHALL MEET THE REQUIREMENTS OF NASA DRAWING NO. 1010839.

3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.

4. 250√ ALL OVER.

5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE

Ⓐ 6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2

Ⓒ 7. IDENTIFY USING DWG NO, APPLICABLE DASH NO, & REVISION LETTER ON INDICATED SURFACE PER ND 1002019

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓑ 1001500	DL1001500	
1000201	DL1000201	
1000001	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-26-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	WHupler	DATE

WEIGHT, BALANCE
STABLE MEMBER

SCALE ——
UNIT WT.
CODE IDENT. 80230

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000214
SHEET 1 OF 1

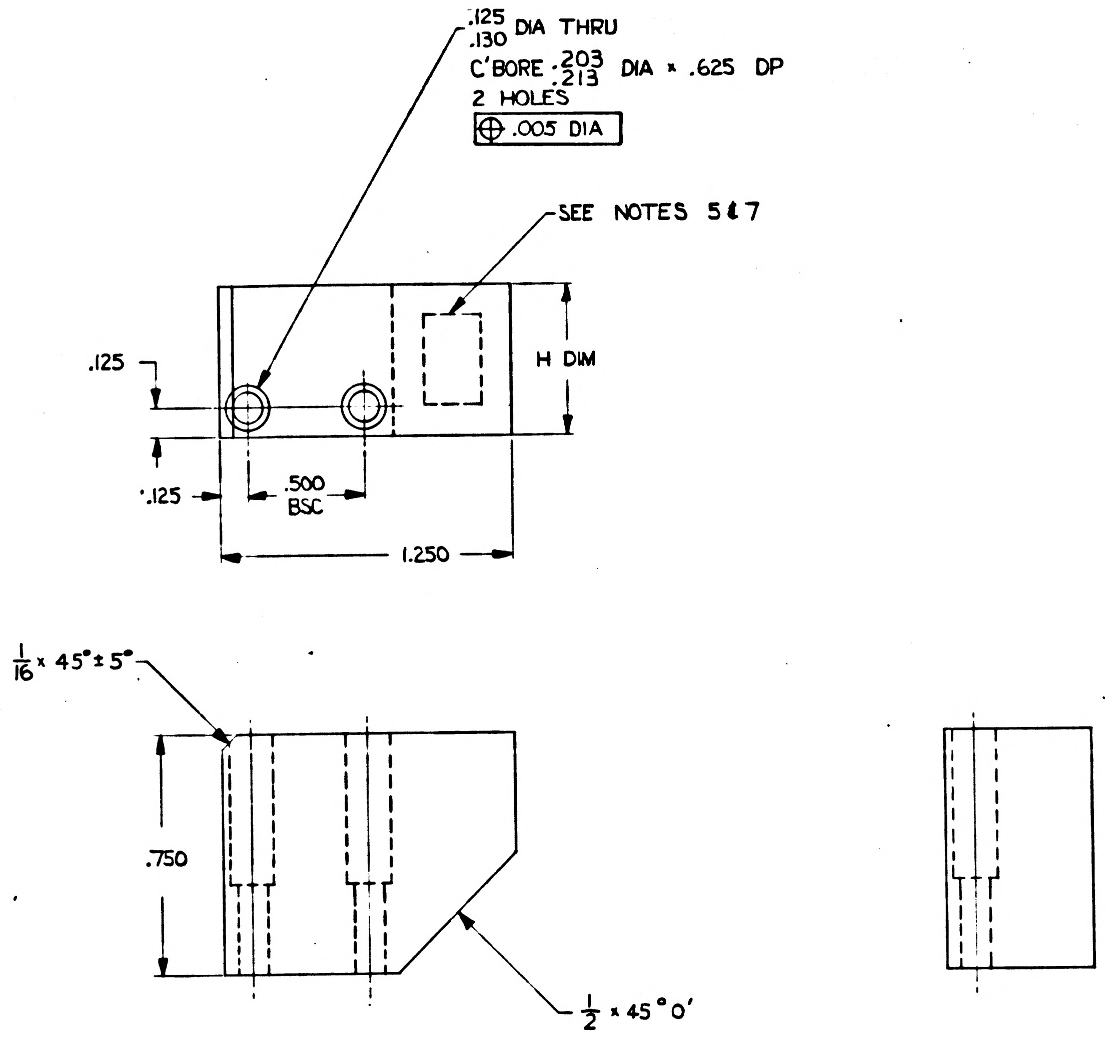
1000214 D

PART NO	H DIM	WT OZ CALC
1000214-1	.250	1.55
1000214-2	.375	2.56

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

M



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $^{250}\surd$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3.
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES ±0°30'

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-26-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kepler	1 May 63

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
—		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

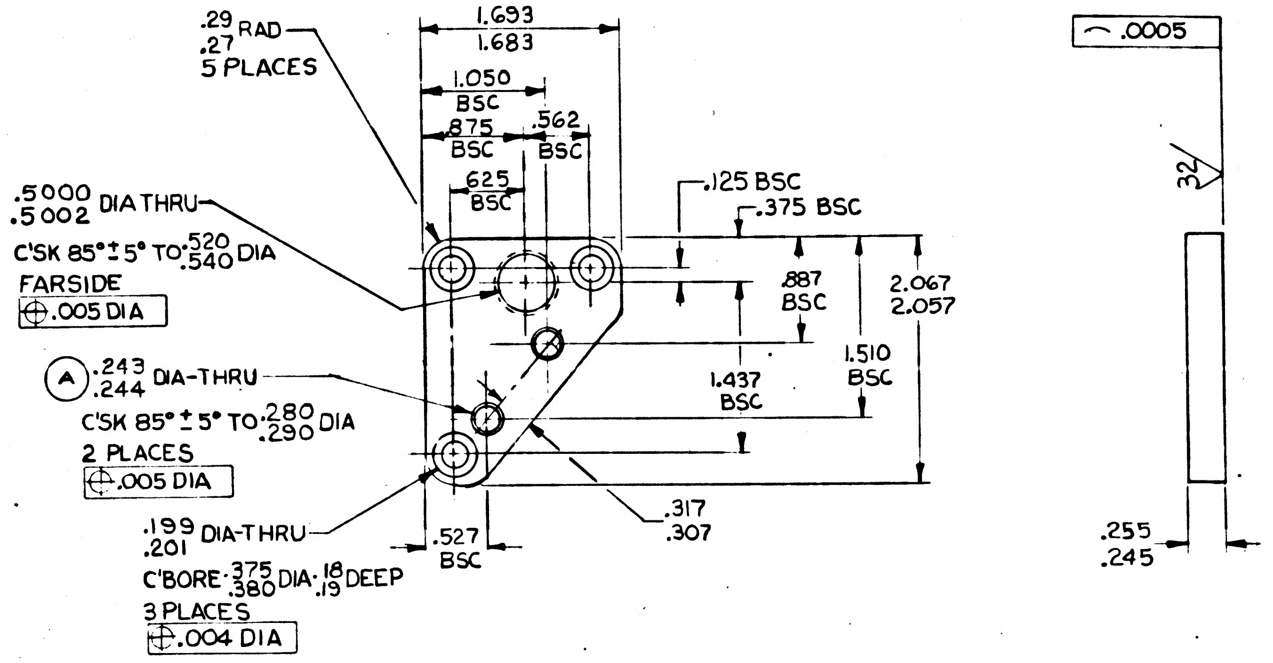
NASA DRAWING NO.
1000214

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000215 A

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 01023		
	A	TDRR 01442	6-5-63	AJB BXB



.29 .27 RAD 5 PLACES
1.693 1.683
1.050 BSC
.875 BSC
.562 BSC
.625 BSC
.5000 .5002 DIA THRU
C'SK 85° ± 5° TO .520 .540 DIA FARSIDE
⌖ .005 DIA
.125 BSC
.375 BSC
.887 BSC
2.067 2.057
1.510 BSC
1.437 BSC
Ⓐ .243 .244 DIA-THRU
C'SK 85° ± 5° TO .280 .290 DIA
2 PLACES
⌖ .005 DIA
.317 .307
.199 .201 DIA-THRU
C'BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⌖ .004 DIA
.527 BSC
⌒ .0005
32
.255 .245

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63√ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416 COND A FORM BAR FIN COLD SPEC QQ-S-763

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/26/63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	W Tuffer	1/4/63

PAD
CASE MOUNTING
1X RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000215
SHEET 1 OF 1

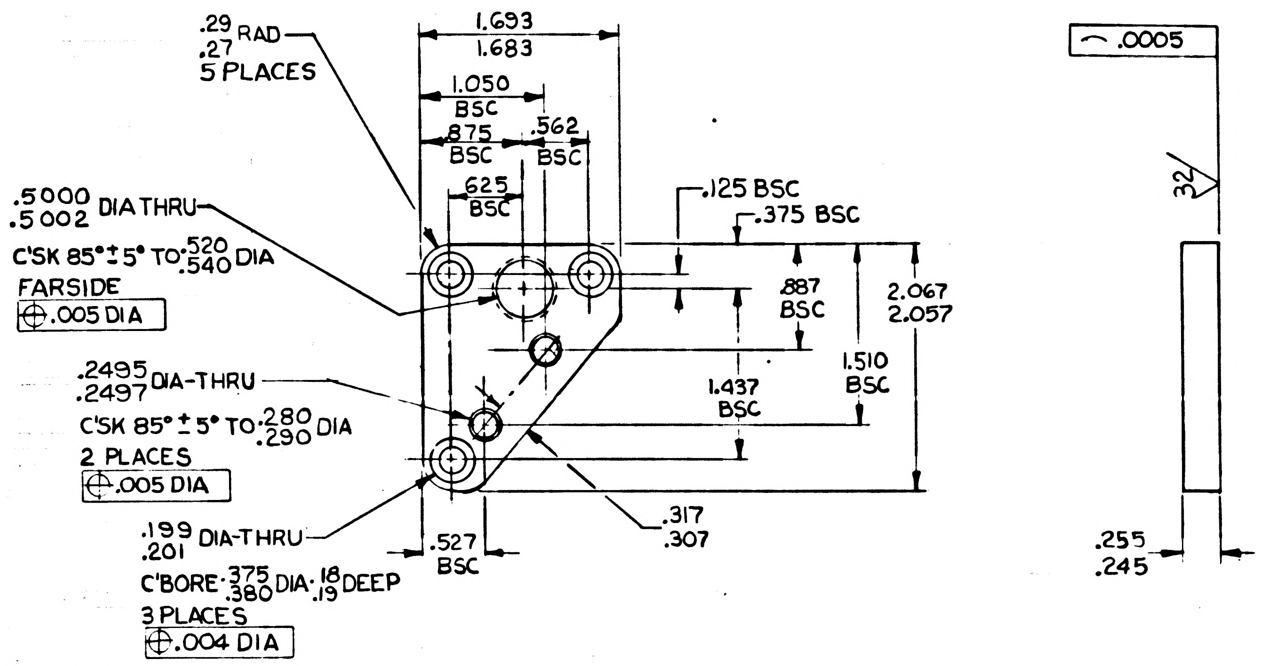
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000215

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 01023



.29 .27 RAD 5 PLACES
1.693 1.683
1.050 BSC
.875 BSC
.562 BSC
.625 BSC
.5000 .5002 DIA THRU
C'SK 85° ± 5° TO .520 .540 DIA
FARSIDE
⊕ .005 DIA
.125 BSC
.375 BSC
.887 BSC
2.067 2.057
1.510 BSC
1.437 BSC
.2495 .2497 DIA-THRU
C'SK 85° ± 5° TO .280 .290 DIA
2 PLACES
⊕ .005 DIA
.199 .201 DIA-THRU
C'BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⊕ .004 DIA
.527 BSC
.317 .307
⌒ .0005
32
.255 .245

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. $\overset{63}{\surd}$ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

	DL1000201
1000085	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416 COND A FORM BAR FIN COLD SPEC QQ-S-763

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/26/63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL		DATE
	W Tepper	1/4/63

PAD
CASE MOUNTING
IX RIGHT HAND

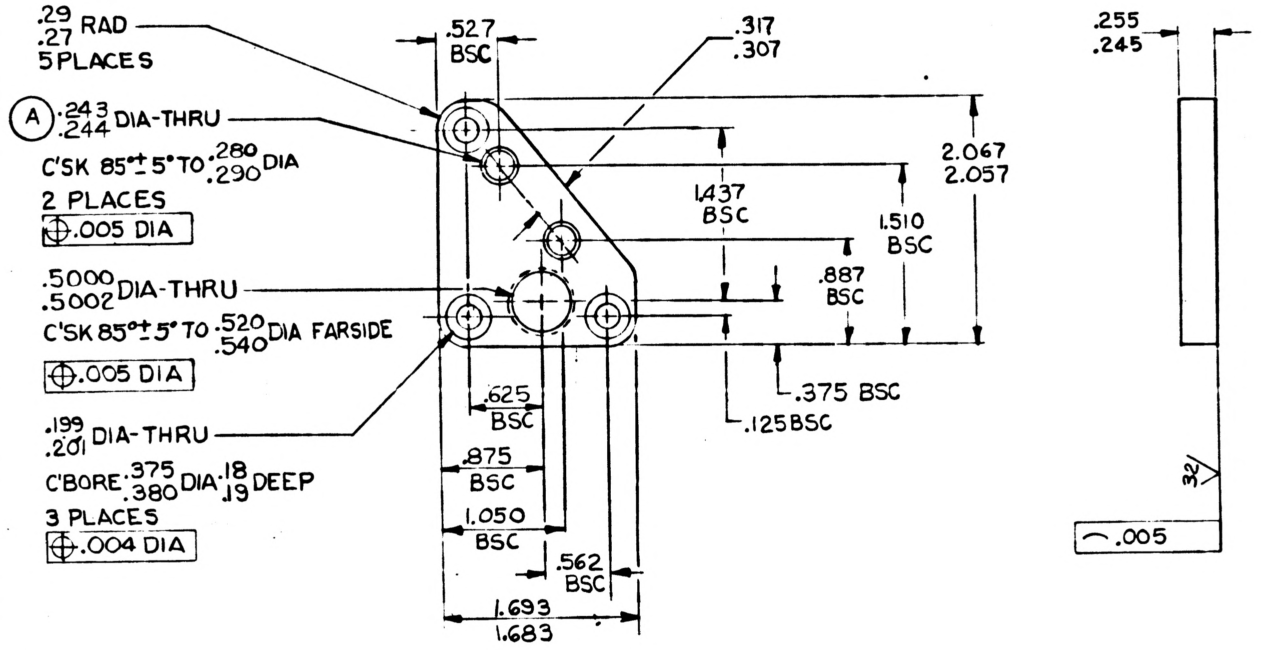
SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000215
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000216 A

REVISIONS TDRR 01023				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01442	6-5-63	AJB



.29 .27 RAD 5 PLACES
Ⓐ .243 .244 DIA-THRU
C'SK 85°±5° TO .280 .290 DIA
2 PLACES
⌖ .005 DIA
.5000 .5002 DIA-THRU
C'SK 85°±5° TO .520 .540 DIA FARSIDE
⌖ .005 DIA
.199 .201 DIA-THRU
C'BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⌖ .004 DIA
.527 BSC
.317 .307
2.067 2.057
1.437 BSC
1.510 BSC
.887 BSC
.375 BSC
.125 BSC
.625 BSC
.875 BSC
1.050 BSC
.562 BSC
1.693 1.683
.255 .245
32
⌒ .005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63 MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000085	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: CRES CL 416
COND A FORM BAR
FIN COLD SPEC QQ-S-763

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJBoyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/29/63

APPROVED FOR MSC W J Rhine 5-1-63

MIT/IL APPROVAL	DATE

PAD
CASE MOUNTING
1X LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO. 1000216

SHEET 1 OF 1

INCHES
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PHOTOGRAPHIC SCALE ONLY

B	1000216

REVISIONS TDRR 01023

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
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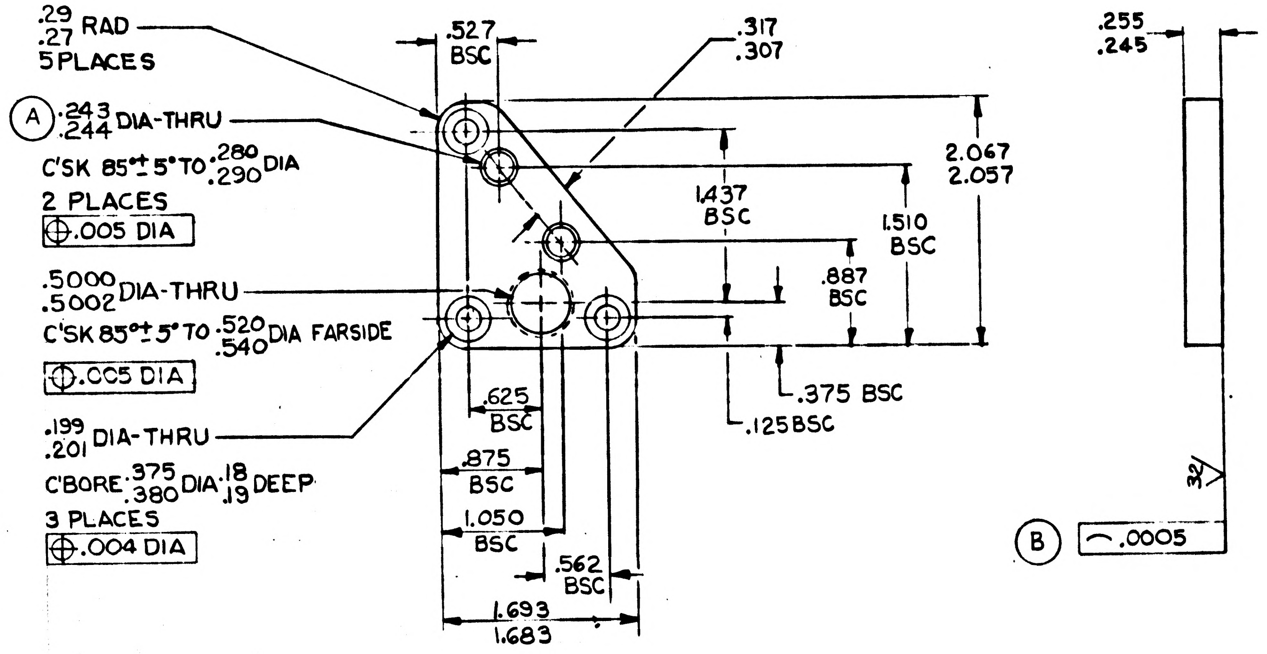
	B	TDRR 03659	10-8-63	SAH	WK



.29 .27 RAD 5 PLACES
Ⓐ .243 .244 DIA-THRU
C'SK 85°±5° TO .280 .290 DIA
2 PLACES
⌖ .005 DIA
.5000 .5002 DIA-THRU
C'SK 85°±5° TO .520 .540 DIA FARSIDE
⌖ .005 DIA
.199 .201 DIA-THRU
C'BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⌖ .004 DIA
.527 BSC
.317 .307
1.437 BSC
1.510 BSC
.887 BSC
2.067 2.057
.375 BSC
.125 BSC
.625 BSC
.875 BSC
1.050 BSC
.562 BSC
1.693 1.683
.255 .245
32
Ⓑ ⌒ .0005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $\genfrac{}{}{0pt}{}{.005}{.015}$
3. $\overset{63}{\vee}$ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN E-300

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

	DL1000201	
1000085	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES CL 416
COND A FORM BAR
FIN COLD SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/29/63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	5/1/63

PAD
CASE MOUNTING
1X LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

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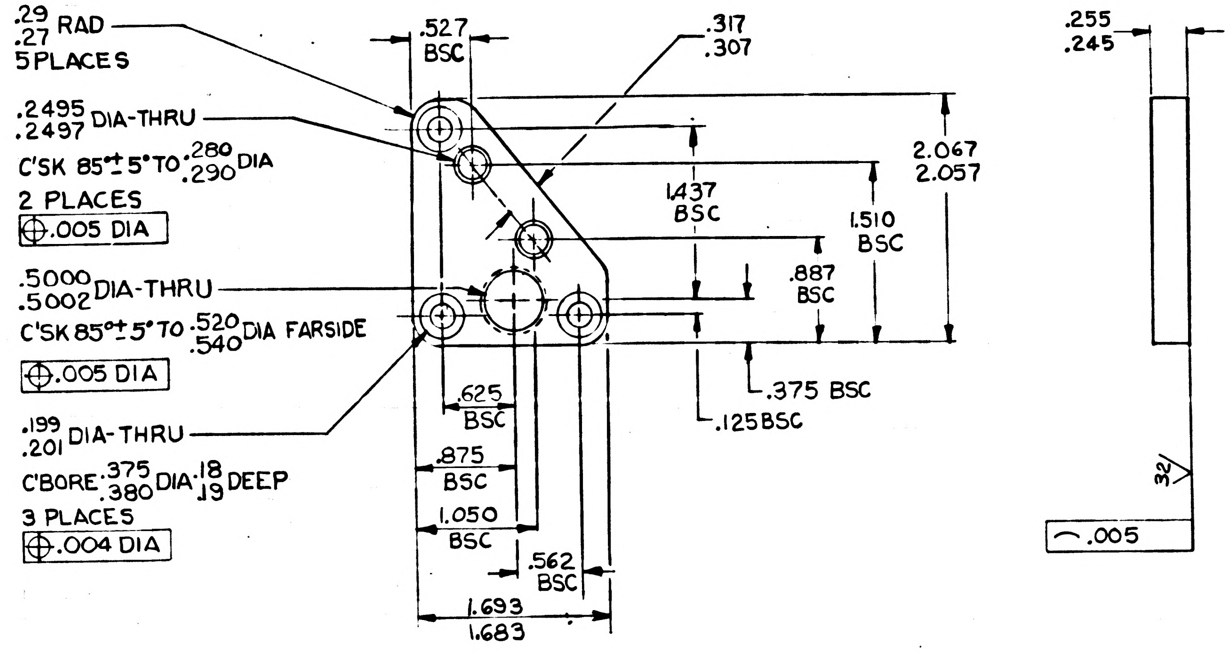
REVISIONS TDRR 01023				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


.29 .27 RAD 5 PLACES
.2495 .2497 DIA-THRU
C'SK 85°±5° TO .280 .290 DIA
2 PLACES
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1000085	DL1000001
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MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/29/63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1/4/63

PAD
CASE MOUNTING
1X LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

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SHEET 1 OF 1

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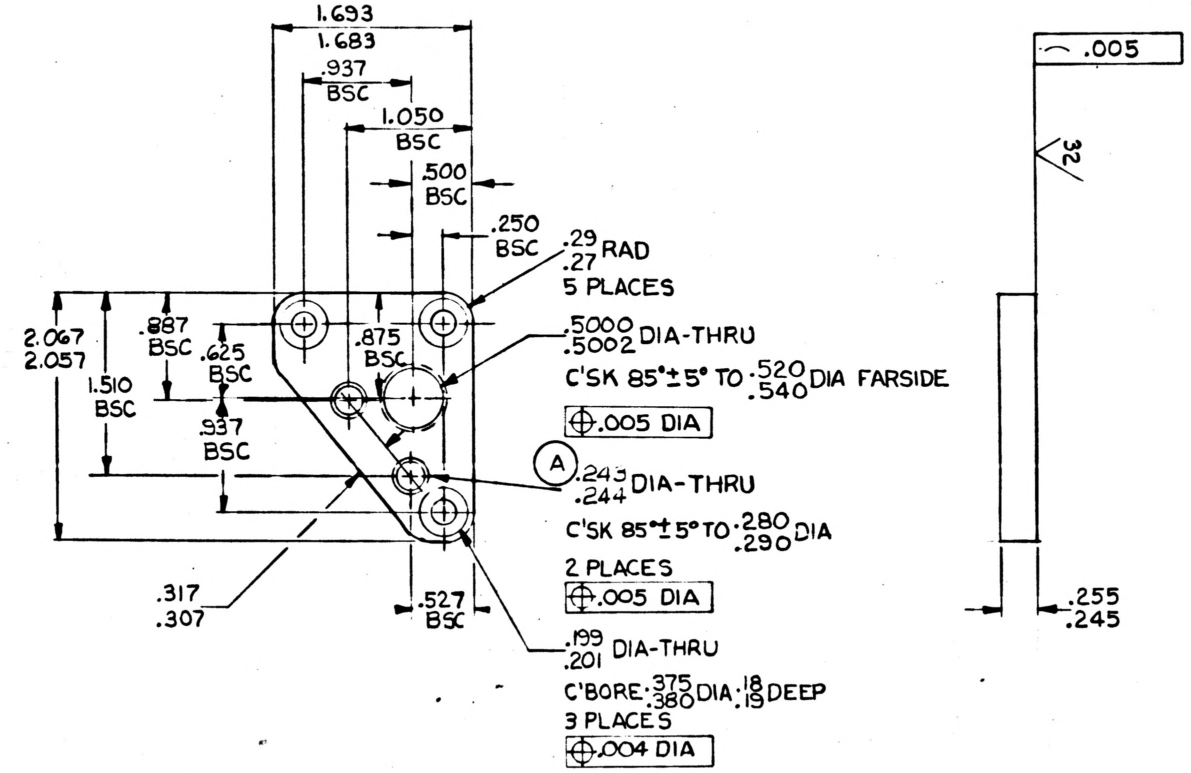
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 01023		
	A	TDRR 01442	6-5-63	AJB RXB



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C'BORE .375 .380 DIA .18 .19 DEEP
3 PLACES
⊕ .004 DIA
⌒ .005
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.255 .245

NOTES:

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2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. $\sqrt{63}$ MACHINE FINISH UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14702 FIN E-300

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

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		UNLESS OTHERWISE SPECIFIED
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	DL1000201	DO NOT SCALE THIS DRAWING
100085	DL1000001	MATERIAL: CRES CL 416 COND A FORM BAR FIN COLD SPEC QQ-S-763
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/29/63
APPROVED FOR MSC	WJ Rhine 5-1-63	
MIT/IL APPROVAL	W Capper	1 May 63

PAD
CASE MOUNTING
16X RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

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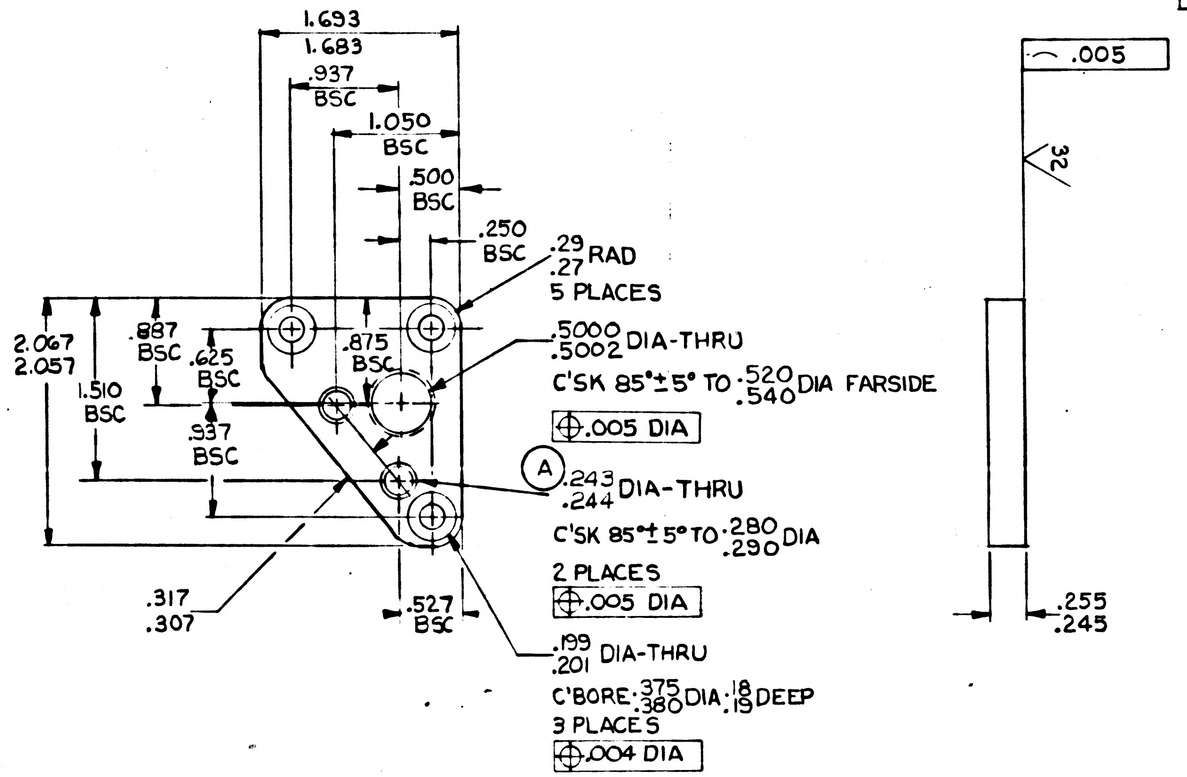
REVISIONS TDRR 01023				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01442	6-5-63	AJB RKB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	DL1000201	DO NOT SCALE THIS DRAWING
100085	DL1000001	MATERIAL: CRES CL 416 COND A FORM BAR FIN COLD SPEC QQ-S-763
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/2-63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Cafer	1 May 63

PAD
CASE MOUNTING
16X RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT
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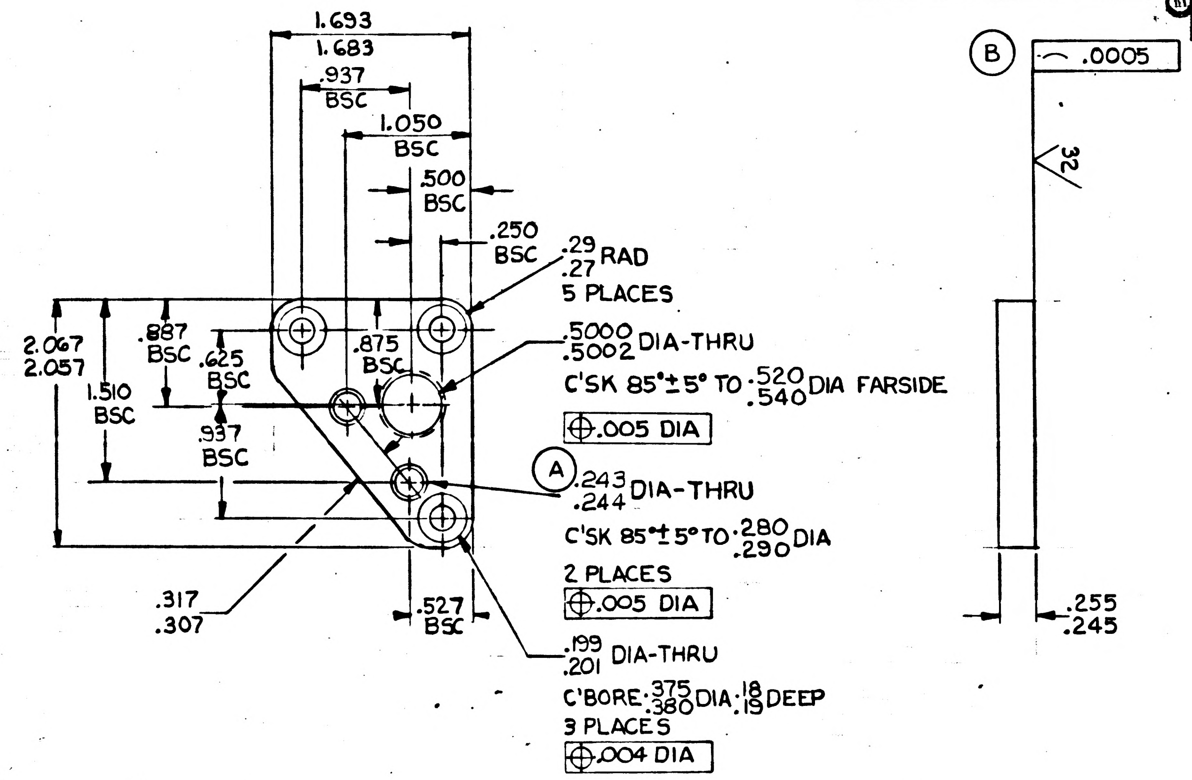
REVISIONS TDRR 01023				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01442	6-5-63	aJB RKB
	B	TDRR 03659	10-8-63	WK



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QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
	DL1000201
100085	DL1000001

APPLICATION

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FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: CRES CL 416
COND A FORM BAR FIN
COLD SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/29/63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Copper	1 May 63

PAD
CASE MOUNTING
16X RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

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SHEET 1 OF 1

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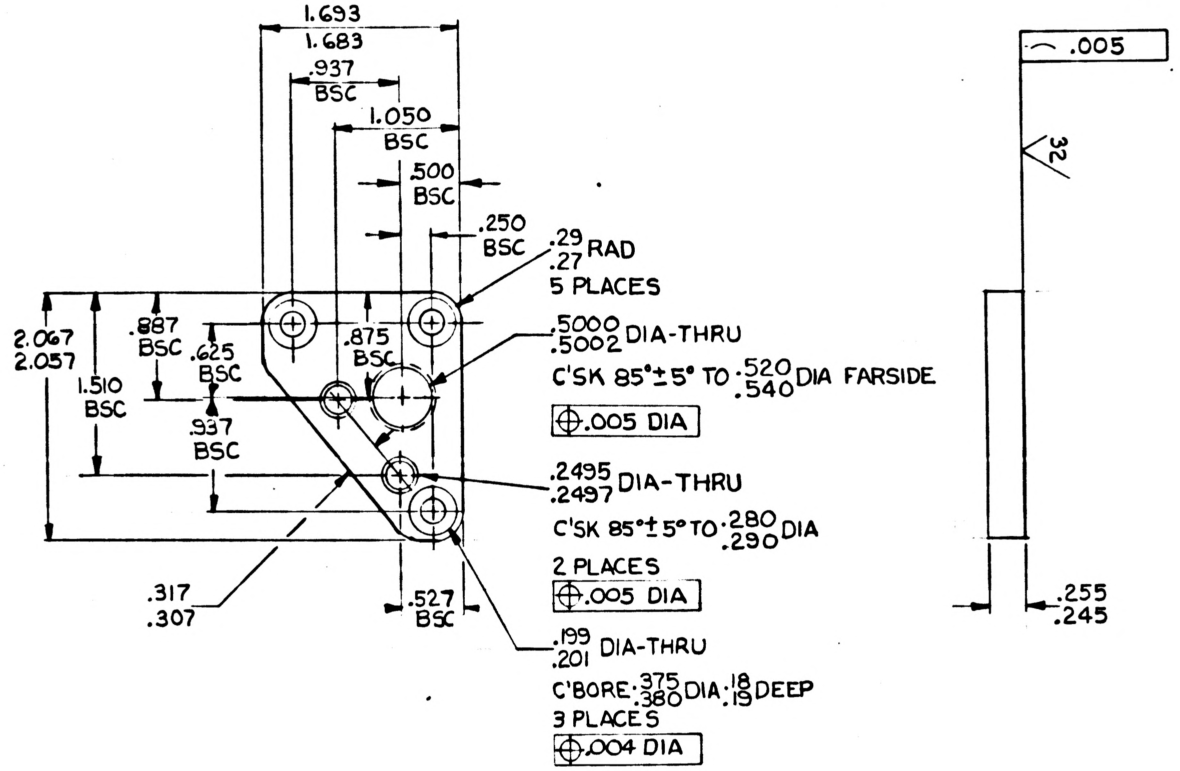
REVISIONS TDRR 01023				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL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LIST OF PARTS AND MATERIALS

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100085	DL1000001
NEXT ASSY	USED ON
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MATERIAL: CRES CL 416
COND A FORM BAR FIN
COLD SPEC QQ-S-763

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/29/63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

PAD
CASE MOUNTING
16X RIGHT HAND

SCALE	UNIT WT.	CODE IDENT.
1/1		

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INCHES
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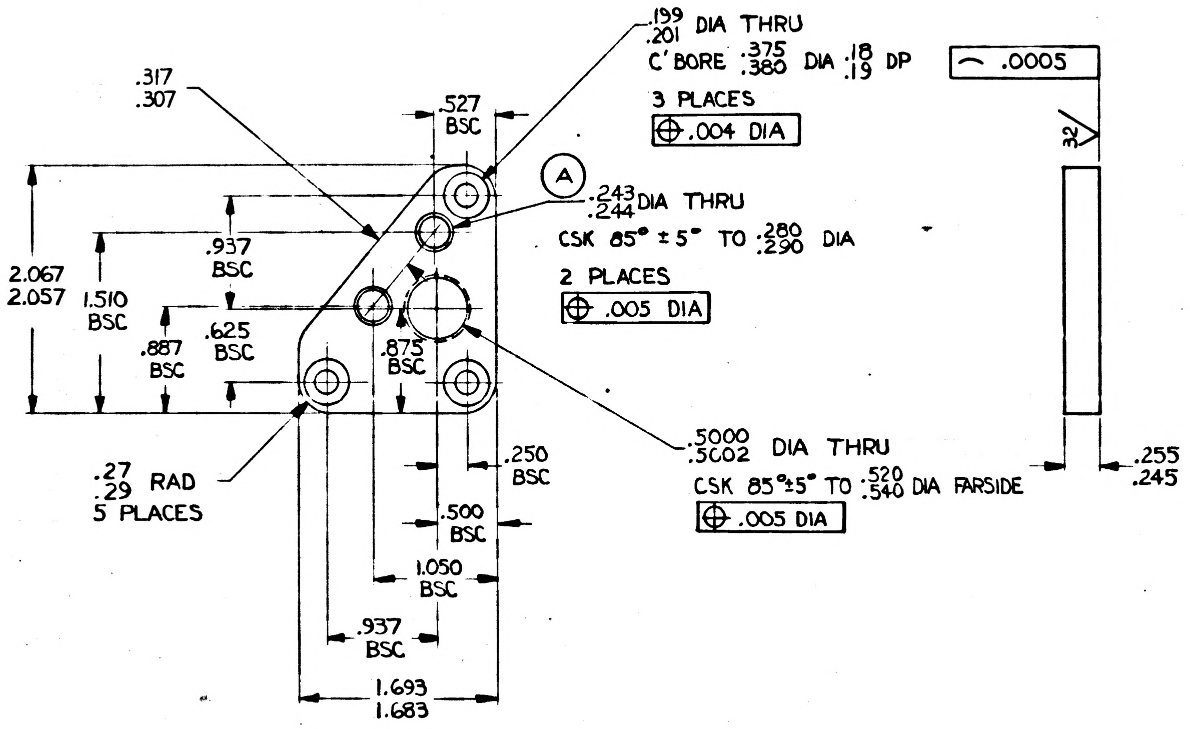
REVISIONS TDRR 01023				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01442	6-5-63	agB RKB


.199 .201 DIA THRU
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1.693 1.683

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1000085	DL 1000001
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MATERIAL
CRES CL 416
COND A FORM BAR
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MIT INSTRUMENTATION LAB
CONTRACT
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		DATE
APPROVED	a J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-29-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W/ [illegible]	1 May 63

PAD
CASE MOUNTING
16X LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
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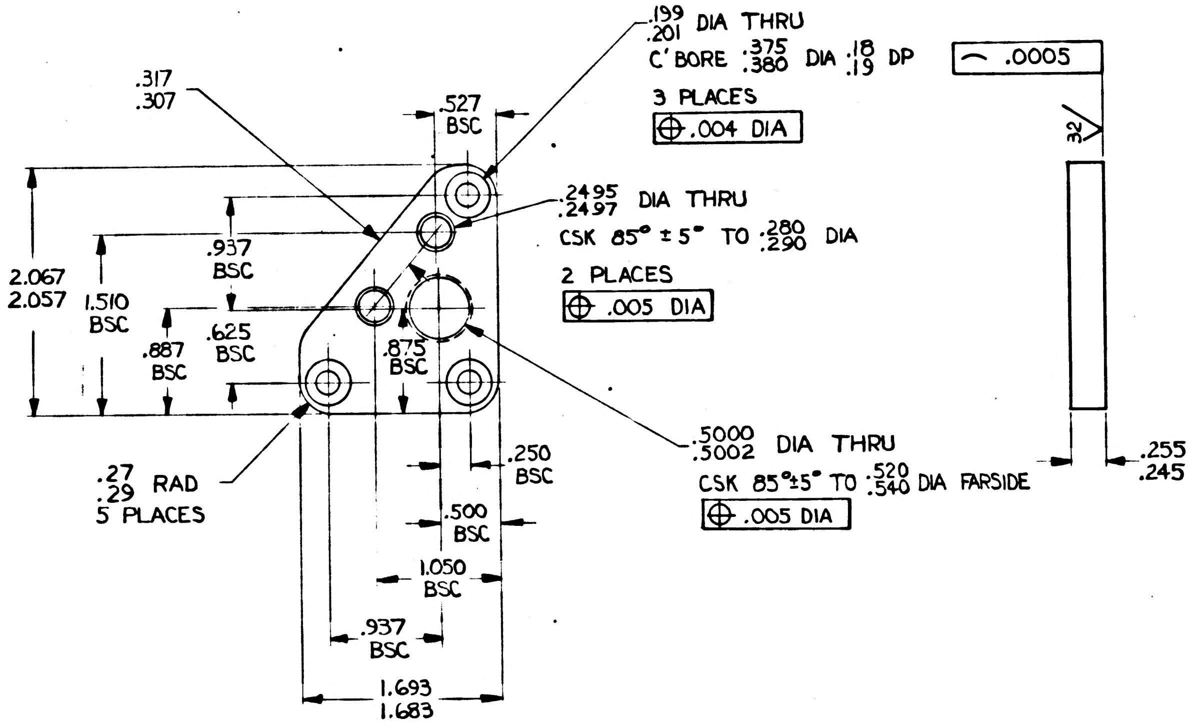

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LIST OF PARTS AND MATERIALS

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1000085	DL 1000001
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MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

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APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W/Kupfer	1 May 63

PAD
CASE MOUNTING
16X LEFT HAND

SCALE	UNIT WT.	CODE IDENT.
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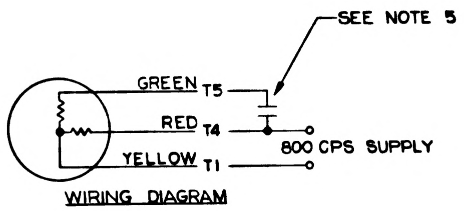
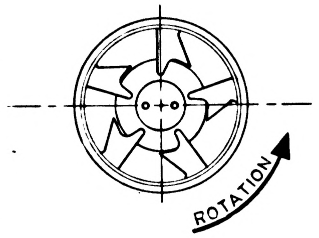
REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	B	REDRAWN & REVISED	4/30/63	AJB

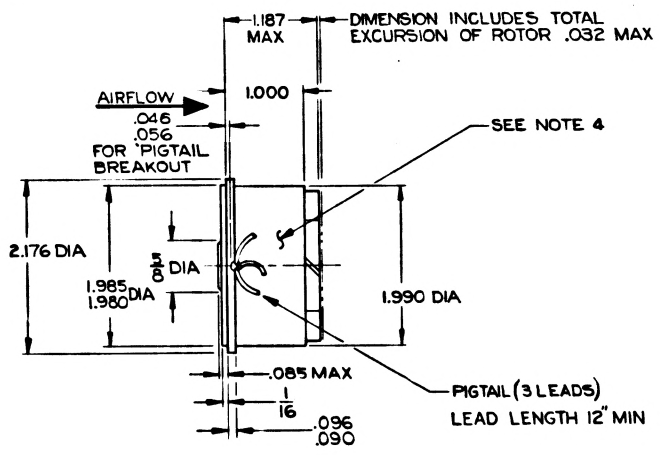


WIRING DIAGRAM

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STADARDS PRESCRIBED BY MIL-D-70327
2. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPEC ND1015404 CLASS 2
3. PACKING & SHIPPING: THE BLOWER SHALL BE PRESERVED AND PACKAGED IN ACCORDANCE WITH MIL-P-17555 LEVEL B
4. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NO. MAY ALSO BE USED
5. BLOWER SHALL MEET THE FOLLOWING OPERATING REQUIREMENTS WITH 800 CPS SINGLE PHASE SINE WAVE (SWITCHED WAVE FORM) VOLTAGE APPLIED AND 1.5 MFD CAPACITOR CONNECTED AS SHOWN IN WIRING DIAGRAM
   - A. ELECTRICAL:
     - 1. WITH VOLTAGE INCREASED GRADUALLY FROM ZERO, THE MOTOR SHALL START AT 5.0 V RMS MAXIMUM
     - 2. WITH VOLTAGE DECREASED GRADUALLY FROM 24 VOLTS RMS THE MOTOR SHALL STOP AT 3.0 V RMS MINIMUM
     - 3. POWER CONSUMPTION: 10 WATTS MAX
     - 4. VOLTAGE RANGE: 0 VOLTS TO 26 VOLTS RMS
   - B. MECHANICAL:
     - 1. AT 24 V RMS INPUT, ONE ATMOSPHERE PRESSURE AND AT ROOM TEMP.
       - a. ROTOR SPEED: 17,000 RPM MIN IN DIRECTION SHOWN (FREE AIR DILIVERY)
       - b. FREE AIR DILIVERY: 23 CFM MIN
       - c. STATIC PRESSURE AT NO DILIVERY: 1.8 INCHES OF WATER MIN
     - 2. AIRFLOW: IN DIRECTION SHOWN
6. BLOWER SHALL MEET THE FOLLOWING STATIC (NON-OPERATING) REQUIREMENTS
   - A. ELECTRICAL:
     - 1. DC RESISTANCE AT 20° TO 25° CENTIGRADE: T1 TO T4: 20.5 Ω ± 10%
       T1 TO T5: 22.5 Ω ± 10%
     - 2. INSULATION RESISTANCE: 100 MEGOHMS MIN AT 500 V DC APPLIED FOR ONE MINUTE MAX
   - B. MECHANICAL:
     - 1. LEADS SHALL CONFORM TO MIL-W-16878 TYPE E-30 AND SHALL BE THE COLOR SPECIFIED IN THE WIRING DIAGRAM
     - 2. MATERIAL: HOUSING AND IMPELLER SHALL BE ALUMINUM.
       HOUSING: ANODIZED PER MIL-A-8625 DYED BLACK OR FINISHED WITH BLACK ENAMEL PER MIL-E-5557 TYPE IV
       IMPELLER: FINISHED WITH BLACK ENAMEL PER MIL-E-5557 TYPE IV
7. DESIGN REQUIREMENT:
   - A. BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS SPECIFIED IN NASA SPEC ND 1002058 PARAGRAPHS 4.2.6 THRU 4.6.10 EXCEPT BLOWER MUST OPERATE AT FULL SPEED CONDITION AT 3.0 PSIA MAX PRESSURE AND 100°F MIN AMBIENT TEMP FOR 96 HOURS WITHOUT FAILURE
   - B. THE BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF THIS DRAWING FOR 2,000 HOURS OF OPERATION AT 24 V RMS INPUT AND 135° ± 5° AMBIENT TEMPERATURE
   - C. THE BLOWER SHALL HAVE A SHELF LIFE OF AT LEAST 5 YEARS, WITHOUT OPERATION, AT AMBIENT ROOM TEMPERATURE, AFTER FINAL ACCEPTANCE AT THE VENDORS PLANT
   - D. DESIGN OBJECTIVES REQUIRE MAXIMUM RELIABILITY OF THE BLOWER DURING IT'S PERIOD OF USEFUL LIFE. EVERY EFFORT SHALL BE MADE TO DESIGN AND PRODUCER BLOWERS CAPABLE OF MEETING A MAXIMUM FAILURE RATE OF 3 PER 1,000,000 HOURS.





PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ±1/32 DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-30-63
CHECKED		
DRAWN	R.G.S.	4-25-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

BLOWER, VARIABLE SPEED
SPECIFICATION CONTROL DRAWING

SCALE 1/1
UNIT WT.
CODE IDENT.

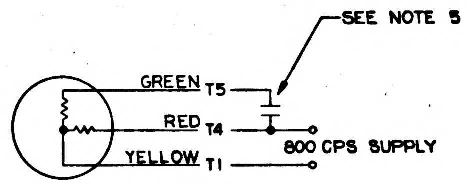
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000219
SHEET 1 OF 1

1000219 B

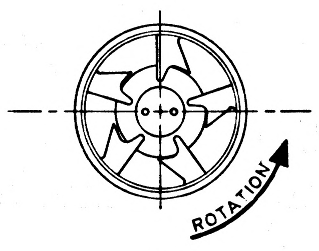
INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

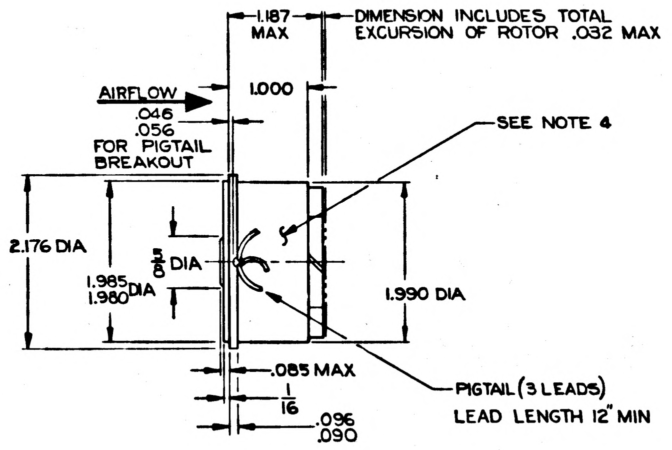
REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	B	REDRAWN & REVISED	4/30/63	ajB	
	C	TDRR 01694	6/25/63	ajB	WS



WIRING DIAGRAM





NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPEC ND1015404 CLASS 2
3. PACKING & SHIPPING: THE BLOWER SHALL BE PRESERVED AND PACKAGED IN ACCORDANCE WITH MIL-P-17555 LEVEL B
4. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NO. MAY ALSO BE USED
5. BLOWER SHALL MEET THE FOLLOWING OPERATING REQUIREMENTS WITH 800 CPS SINGLE PHASE SINE WAVE (SWITCHED WAVE FORM) VOLTAGE APPLIED AND 1.5 MFD CAPACITOR CONNECTED AS SHOWN IN WIRING DIAGRAM
   A. ELECTRICAL:
      * 1. WITH VOLTAGE INCREASED GRADUALLY FROM ZERO, THE MOTOR SHALL START AT 5.0 V RMS MAXIMUM
      * 2. WITH VOLTAGE DECREASED GRADUALLY FROM 24 VOLTS RMS THE MOTOR SHALL STOP AT 3.0 V RMS MINIMUM
      * 3. POWER CONSUMPTION: 10 WATTS MAX
      4. VOLTAGE RANGE: 0 VOLTS TO 26 VOLTS RMS
   B. MECHANICAL:
      1. AT 24 V RMS INPUT, ONE ATMOSPHERE PRESSURE AND AT ROOM TEMP.
         * a. ROTOR SPEED: 17,000 RPM MIN IN DIRECTION SHOWN (FREE AIR DELIVERY)
         Ⓒ ** b. FREE AIR DELIVERY: 23 CFM MIN
         ** c. STATIC PRESSURE AT NO DELIVERY: 1.6 INCHES OF WATER MIN
      2. AIRFLOW: IN DIRECTION SHOWN
6. BLOWER SHALL MEET THE FOLLOWING STATIC (NON-OPERATING) REQUIREMENTS
   A. ELECTRICAL:
      * 1. DC RESISTANCE AT 20° TO 25° CENTIGRADE: T1 TO T4: 20.5 Ω ± 10%
         T1 TO T5: 22.5 Ω ± 10%
      * 2. INSULATION RESISTANCE: 100 MEGOHMS MIN AT 500 V DC APPLIED FOR ONE MINUTE MAX
   B. MECHANICAL:
      * 1. LEADS SHALL CONFORM TO MIL-W-16878 TYPE E-30 AND SHALL BE THE COLOR SPECIFIED IN THE WIRING DIAGRAM
      ** 2. MATERIAL: HOUSING AND IMPELLER SHALL BE ALUMINUM.
         HOUSING: ANODIZED PER MIL-A-8625 DYED BLACK OR FINISHED WITH BLACK ENAMEL PER MIL-E-5557 TYPE IV
         IMPELLER: FINISHED WITH BLACK ENAMEL PER MIL-E-5557 TYPE IV
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   A. BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS SPECIFIED IN NASA SPEC ND 1002058 PARAGRAPHS 4.2.6 THRU 4.6.10 EXCEPT BLOWER MUST OPERATE AT FULL SPEED CONDITION AT 3.0 PSIA MAX PRESSURE AND 100°F MIN AMBIENT TEMP FOR 96 HOURS WITHOUT FAILURE
   Ⓒ B. THE BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF THIS DRAWING FOR 2,000 HOURS OF OPERATION AT 24 V RMS INPUT AND 135° ± 5° F AMBIENT TEMPERATURE
   Ⓒ C. THE BLOWER SHALL HAVE A SHELF LIFE OF AT LEAST 5 YEARS, WITHOUT OPERATION, AT AMBIENT ROOM TEMPERATURE, AFTER FINAL ACCEPTANCE AT THE VENDORS PLANT, *IF STORED IN EXCESS OF ONE YEAR PROVISIONS SHOULD BE MADE FOR BEARING REPLACEMENT*
   D. *DESIGN OBJECTIVES REQUIRE MAXIMUM RELIABILITY OF THE BLOWER DURING ITS PERIOD OF USEFUL LIFE. EVERY EFFORT SHALL BE MADE TO DESIGN AND PRODUCE BLOWERS CAPABLE OF MEETING A MAXIMUM FAILURE RATE OF 3 PER 1,000,000 HOURS*

Ⓒ * *ACCEPTANCE TESTS (100%)*

Ⓒ ** *PERIODIC PRODUCTION TESTS*

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MASTER

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1000002	DL1000001

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MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

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APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	R.G.S.	4-29-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

BLOWER, VARIABLE SPEED
SPECIFICATION CONTROL DRAWING

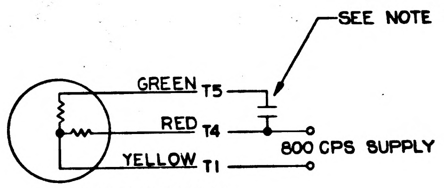
SCALE 1/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000219
SHEET 1 OF 1

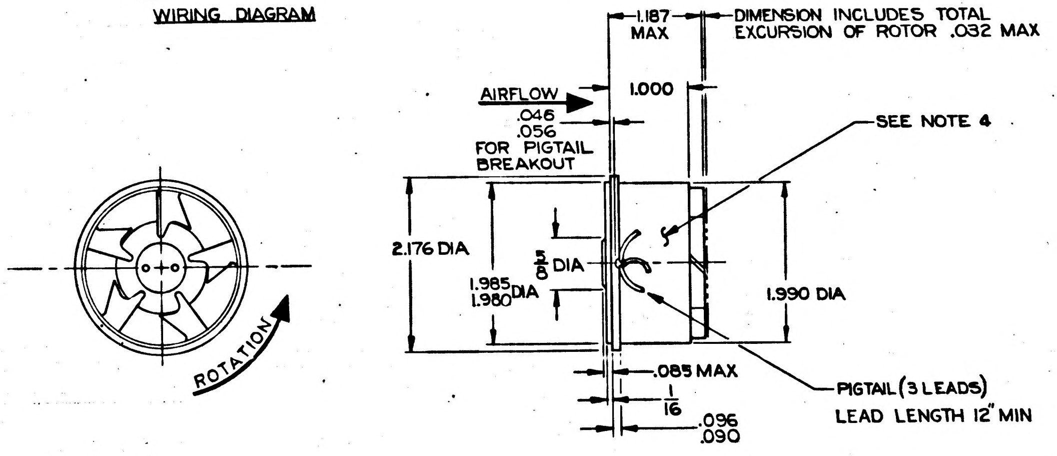
1000219 C

INCHES
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
REVISIONS TDRR 01025					
	B	REDRAWN & REVISED	4/30/63	ajB	
	C	TDRR 01694	6/25/69	ajB	WS
	D	TDRR 12526	9-29-64		



WIRING DIAGRAM



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   - A. ELECTRICAL:
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     - * 2. WITH VOLTAGE DECREASED GRADUALLY FROM 24 VOLTS RMS THE MOTOR SHALL HAVE A MAXIMUM SPEED OF 150 RPM AT 3.0 V RMS
     - * 3. POWER CONSUMPTION: 10 WATTS MAX
     - 4. VOLTAGE RANGE: 0 VOLTS TO 26 VOLTS RMS
   - B. MECHANICAL:
     - 1. AT 24 V RMS INPUT, ONE ATMOSPHERE PRESSURE AND AT ROOM TEMP.
       - * a. ROTOR SPEED: 17,000 RPM MIN IN DIRECTION SHOWN (FREE AIR DELIVERY)
       - Ⓒ ** b. FREE AIR DELIVERY: 23 CFM MIN
       - ** c. STATIC PRESSURE AT NO DELIVERY: 1.6 INCHES OF WATER MIN
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   - A. ELECTRICAL:
     - * 1. DC RESISTANCE AT 20° TO 25° CENTIGRADE: T1 TO T4: 20.5 Ω ± 10%
       T1 TO T5: 22.5 Ω ± 10%
     - * 2. INSULATION RESISTANCE: 100 MEGOHMS MIN AT 500 V DC APPLIED FOR ONE MINUTE MAX
   - B. MECHANICAL:
     - * 1. LEADS SHALL CONFORM TO MIL-W-16878 TYPE E-30 AND SHALL BE THE COLOR SPECIFIED IN THE WIRING DIAGRAM
     - ** 2. MATERIAL: HOUSING AND IMPELLER SHALL BE ALUMINUM.
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   - Ⓒ C. THE BLOWER SHALL HAVE A SHELF LIFE OF AT LEAST 5 YEARS, WITHOUT OPERATION, AT AMBIENT ROOM TEMPERATURE, AFTER FINAL ACCEPTANCE AT THE VENDORS PLANT, *IF STORED IN EXCESS OF ONE YEAR PROVISIONS SHOULD BE MADE FOR BEARING REPLACEMENT*
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Ⓒ * *ACCEPTANCE TESTS (100%)*

Ⓒ ** *PERIODIC PRODUCTION TESTS*

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MASTER

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LIST OF PARTS AND MATERIALS					

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1000202	DL1000201
1000002	DL1000001

APPLICATION

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MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		4/30/63
CHECKED		
DRAWN	R.G.S.	4-25-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL		1 May 63

BLOWER,
VARIABLE SPEED
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
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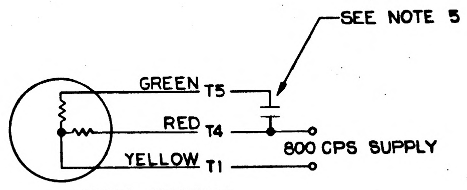
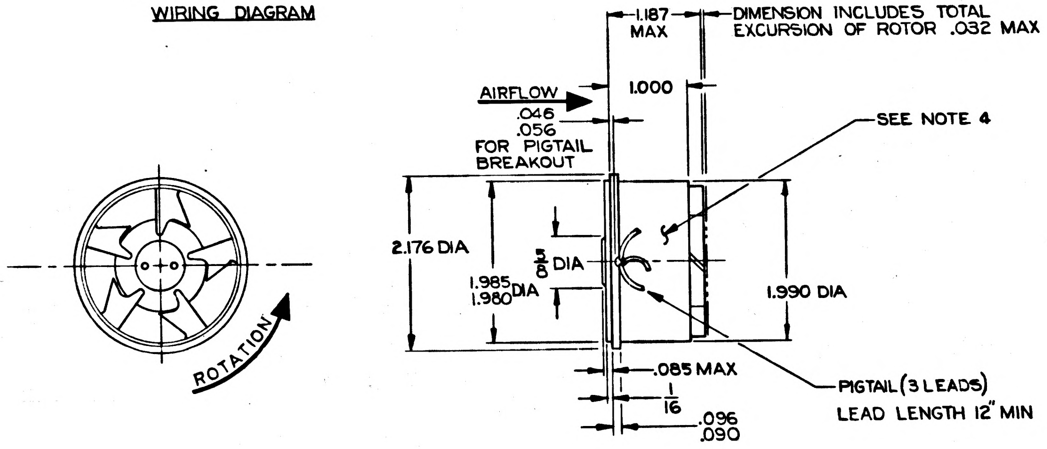
NASA DRAWING NO.
1000219
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	B	REDRAWN & REVISED	4/30/63	ajB	
	C	TDRR 01694	6/25/63	ajB	WB
	D	TDRR 12526	9-29-64		
	E	REVISED PER TDRR 13951	11-12-64	WK	

REVISIONS TDRR 01025



WIRING DIAGRAM



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ⓒ * *ACCEPTANCE TESTS (100%)*

ⓒ ** *PERIODIC PRODUCTION TESTS*

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MASTER

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LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

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DIMENSIONS ARE IN INCHES
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MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED aj Boyce DATE 4/30/63
CHECKED
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BLOWER, VARIABLE SPEED
SPECIFICATION CONTROL DRAWING

SCALE 1/1
UNIT WT.
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MIT INSTRUMENTATION LABORATORY
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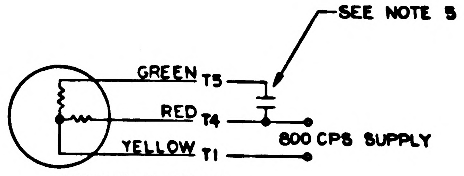
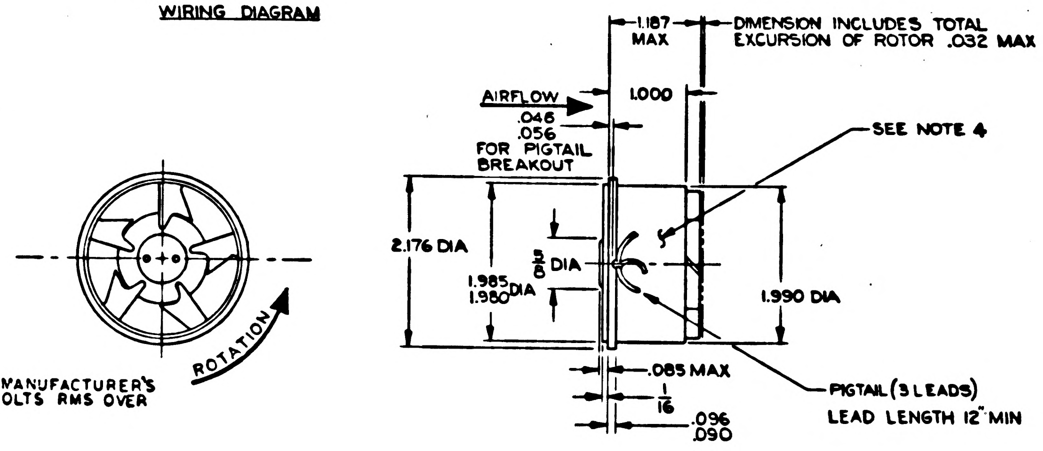
SHEET 1 OF 1

		REVISIONS TDRR 01025		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	B	REDRAWN & REVISED	4/30/63	[illegible]
	C	TDRR 01694	[illegible]	[illegible] WS
	D	TDRR12526	[illegible]	[illegible]
	E	REVISED PER TDRR 13351	[illegible]	[illegible]
	F	REVISED PER TDRR 16804	[illegible]	[illegible]



WIRING DIAGRAM



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      * 2. WITH VOLTAGE DECREASED GRADUALLY FROM 24 VOLTS RMS THE MOTOR SHALL HAVE A MAXIMUM SPEED OF 150 RPM AT 3.0V RMS WHEN CHECKED DURING MANUFACTURER'S FINAL INSPECTION AND USER'S RECEIVING INSPECTION. MAXIMUM SPEED AT 3.0 VOLTS RMS OVER 2000 HRS OF OPERATING LIFE SHALL BE 2000 RPM
      * 3. POWER CONSUMPTION: 10 WATTS MAX
      4. VOLTAGE RANGE: 0 VOLTS TO 26 VOLTS RMS
   B. MECHANICAL:
      1. AT 24 V RMS INPUT, ONE ATMOSPHERE PRESSURE AND AT ROOM TEMP.
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         T1 TO T5: 22.5Ω ± 10%
      * 2. INSULATION RESISTANCE: 100 MEGOHMS MIN AT 500 V DC APPLIED FOR ONE MINUTE MAX
   B. MECHANICAL:
      * 1. LEADS SHALL CONFORM TO MIL-W-16878 TYPE E-30 AND SHALL BE THE COLOR SPECIFIED IN THE WIRING DIAGRAM
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   Ⓒ C. THE BLOWER SHALL HAVE A SHELF LIFE OF AT LEAST 5 YEARS, WITHOUT OPERATION, AT AMBIENT ROOM TEMPERATURE, AFTER FINAL ACCEPTANCE AT THE VENDORS PLANT, IF STORED IN EXCESS OF ONE YEAR PROVISIONS SHOULD BE MADE FOR BEARING REPLACEMENT
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DUPLICATE MASTER

REPLACED WITHOUT CHANGE BY REV "G" PER TDRR 30731

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MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED
CHECKED
DRAWN
APPROVED FOR MSC W J [illegible]
MIT/IL APPROVAL W [illegible]
DATE

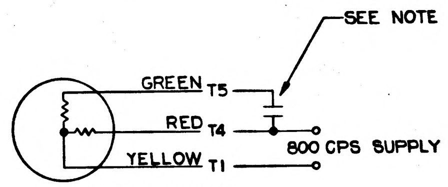
BLOWER, VARIABLE SPEED
SPECIFICATION CONTROL DRAWING

SCALE 1/1
UNIT WT.
CODE IDENT.

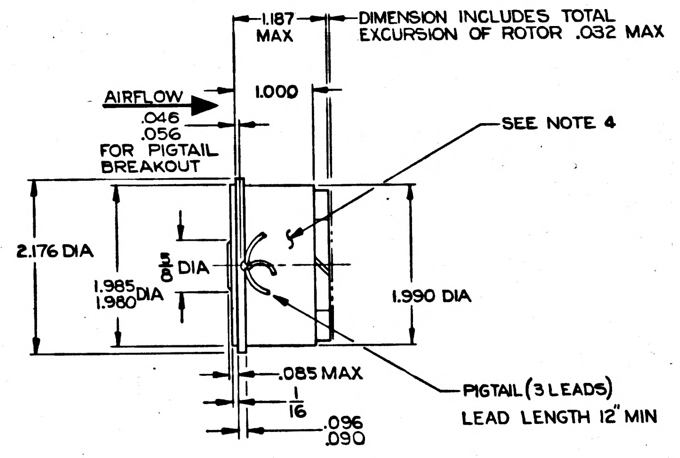
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE MASS
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000219
SHEET 1 OF 1

1000219 F

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 01025			
	B	REDRAWN & REVISED	4/30/63	ajB	
	C	TDRR 01694	6/25/63	ajB	WS
	D	TDRR 12526	9-29-64		
	E	REVISED PER TDRR 13951	11-12-64	WR	
	F	REVISED PER TDRR 16804	3-2-65	WL	



WIRING DIAGRAM



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPEC ND1015404 CLASS 2
3. PACKING & SHIPPING: THE BLOWER SHALL BE PRESERVED AND PACKAGED IN ACCORDANCE WITH MIL-P-17555 LEVEL B
4. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO. & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NO. MAY ALSO BE USED
5. BLOWER SHALL MEET THE FOLLOWING OPERATING REQUIREMENTS WITH 800 CPS SINGLE PHASE SINE WAVE (SWITCHED WAVE FORM) VOLTAGE APPLIED AND 1.5 MFD CAPACITOR CONNECTED AS SHOWN IN WIRING DIAGRAM
   A. ELECTRICAL:
   - *1. WITH VOLTAGE INCREASED GRADUALLY FROM ZERO, THE MOTOR SHALL START AT 5.0 V RMS MAXIMUM
   - *2. WITH VOLTAGE DECREASED GRADUALLY FROM 24 VOLTS RMS THE MOTOR SHALL HAVE A MAXIMUM SPEED OF 150 RPM AT 3.0V RMS WHEN CHECKED DURING MANUFACTURER'S FINAL INSPECTION AND USER'S RECEIVING INSPECTION. MAXIMUM SPEED AT 3.0 VOLTS RMS OVER 2000 HRS OF OPERATING LIFE SHALL BE 2000 RPM.
   - *3. POWER CONSUMPTION: 10 WATTS MAX
   - 4. VOLTAGE RANGE: 0 VOLTS TO 26 VOLTS RMS

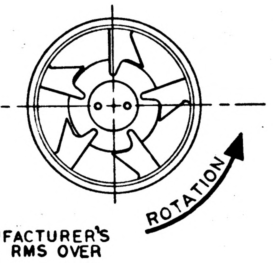
   B. MECHANICAL:
   - 1. AT 24 V RMS INPUT, ONE ATMOSPHERE PRESSURE AND AT ROOM TEMP.
     - *a. ROTOR SPEED: 17,000 RPM MIN IN DIRECTION SHOWN (FREE AIR DELIVERY)
     - Ⓒ **b. FREE AIR DELIVERY: 23 CFM MIN
     - **c. STATIC PRESSURE AT NO DELIVERY: 1.6 INCHES OF WATER MIN
   - 2. AIRFLOW: IN DIRECTION SHOWN

6. BLOWER SHALL MEET THE FOLLOWING STATIC (NON-OPERATING) REQUIREMENTS
   A. ELECTRICAL:
   - *1. DC RESISTANCE AT 20° TO 25° CENTIGRADE: T1 TO T4: 20.5Ω ± 10%
     T1 TO T5: 22.5Ω ± 10%
   - *2. INSULATION RESISTANCE: 100 MEGOHMS MIN AT 500 V DC APPLIED FOR ONE MINUTE MAX

   B. MECHANICAL:
   - *1. LEADS SHALL CONFORM TO MIL-W-16878 TYPE E-30 AND SHALL BE THE COLOR SPECIFIED IN THE WIRING DIAGRAM
   - **2. MATERIAL: HOUSING AND IMPELLER SHALL BE ALUMINUM.
     HOUSING: ANODIZED PER MIL-A-8625 DYED BLACK OR FINISHED WITH BLACK ENAMEL PER MIL-E-5557 TYPE IV
     IMPELLER: FINISHED WITH BLACK ENAMEL PER MIL-E-5557 TYPE IV
7. DESIGN REQUIREMENT:
   - A. BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS SPECIFIED IN NASA SPEC ND 1002058 PARAGRAPHS 4.2.6 THRU 4.6.10 EXCEPT BLOWER MUST OPERATE. AT FULL SPEED CONDITION AT 3.0 PSIA MAX PRESSURE AND 100°F MIN AMBIENT TEMP FOR 96 HOURS WITHOUT FAILURE
   - Ⓒ B. THE BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF THIS DRAWING FOR 2,000 HOURS OF OPERATION AT 24V RMS INPUT AND 135° ± 5°F AMBIENT TEMPERATURE EXCEPT AS NOTED IN PARAGRAPH 5.A.2.
   - Ⓒ C. THE BLOWER SHALL HAVE A SHELF LIFE OF AT LEAST 5 YEARS, WITHOUT OPERATION, AT AMBIENT ROOM TEMPERATURE, AFTER FINAL ACCEPTANCE AT THE VENDORS PLANT, IF STORED IN EXCESS OF ONE YEAR PROVISIONS SHOULD BE MADE FOR BEARING REPLACEMENT
   - D. DESIGN OBJECTIVES REQUIRE MAXIMUM RELIABILITY OF THE BLOWER DURING ITS PERIOD OF USEFUL LIFE. EVERY EFFORT SHALL BE MADE TO DESIGN AND PRODUCER BLOWERS CAPABLE OF MEETING A MAXIMUM FAILURE RATE OF 3 PER 1,000,000 HOURS

Ⓒ * ACCEPTANCE TESTS (100%)

Ⓒ ** PERIODIC PRODUCTION TESTS



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000202	DL1000201
1000002	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/32 DECIMALS ±.010 ANGLES ——
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	aj Boyce	4-30-63
CHECKED		
DRAWN	R.G.S.	4-25-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

BLOWER, VARIABLE SPEED
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
1/1		

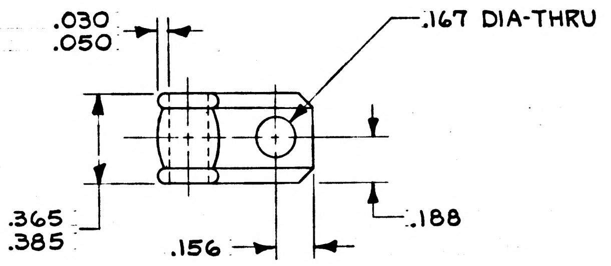
MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000219
SHEET 1 OF 1

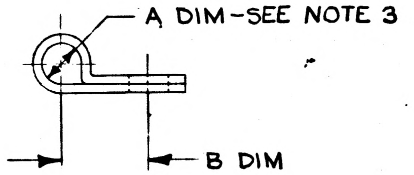
1000219 E

PART NUMBER	WECKESSER PART NUMBER	A DIM	B DIM
1000220-1	1/16-4NA	.055	.275
1000220-2	3/32-4NA	.085	.291
1000220-3	1/8-4NA	.115	.310
1000220-4	3/16-4NA	.172	.373
1000220-5	1/4-4NA	.234	.407
1000220-6	5/16-4NA	.297	.448
1000220-7	3/8-4NA	.359	.479
1000220-8	7/16-4NA	.422	.510
1000220-9	1/2-4NA	.484	.542
1000220-10	9/16-4NA	.547	.603
1000220-11	19/32-4NA	.578	.619
1000220-12	5/8-4NA	.609	.634
1000220-13	5/32 4NA	.140	.373/.309
1000220-14	7/32 4NA	.203	.436/.372
1000220-15	9/32 4NA	.265	.470/.406
1000220-16	11/32 4NA	.328	.502/.438
1000220-17	13/32 4NA	.390	.537/.473
1000220-18	15/32 4NA	.453	.572/.508
1000220-19	17/32 4NA	.515	.605/.541

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REVISED PER TDRR 15698	2/2/65	WK

(M)





NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 REMOVE ALL BURRS AND SHARP EDGES
3 DIMENSION "A" IS APPLICABLE IN CLOSED POSITION ONLY
4 IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130
5 SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND 1015404 CLASS 3
6 MATERIAL: POLYAMIDE (NYLON) PLASTIC PER MIL-P-17091

ORIGINAL SOURCE OF SUPPLY
WECKESSER CO., INC.
5701 NORTHWEST HIGHWAY
CHICAGO 46, ILL.
WECKESSER PART NO.- SEE TABLE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	RES	1-29-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	W	DATE

CLAMP, CABLE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000220
SHEET 1 OF 1

PART NUMBER		A DIM	B DIM
1000220-1		.055	.275
1000220-2		.085	.291
1000220-3		.115	.310
1000220-4		.172	.373
1000220-5		.234	.407
1000220-6		.297	.448
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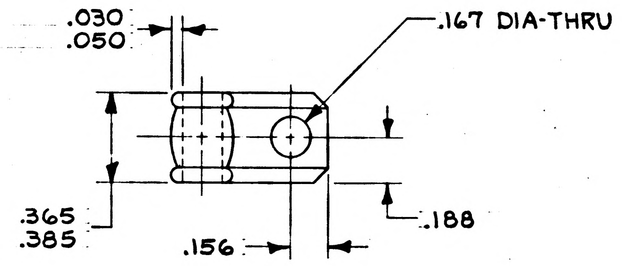
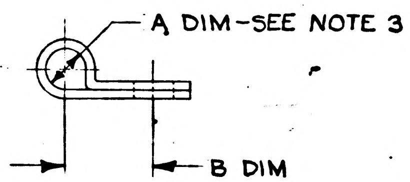
1000220-16		.328	.502/.438
1000220-17		.390	.537/.473
1000220-18		.453	.572/.508
1000220-19		.515	.605/.541

Ⓜ

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REVISED PER TDRR 15698	2/2/65	WK
	B	REVISED PER TDRR 20167	6/22/65	WK





NOTES

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2. REMOVE ALL BURRS AND SHARP EDGES
3. DIMENSION "A" IS APPLICABLE IN CLOSED POSITION ONLY
4. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130
5. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND 1015404 CLASS 3
6. MATERIAL: POLYAMIDE (NYLON) PLASTIC PER MIL-P-17091

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 6

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	RES	1-29-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL		DATE
	W Graff	1May63

CLAMP, CABLE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000220
SHEET 1 OF 1

PART NUMBER		A DIM	B DIM
1000220-1		.055	.275
1000220-2		.085	.291
1000220-3		.115	.310
1000220-4		.172	.373
1000220-5		.234	.407
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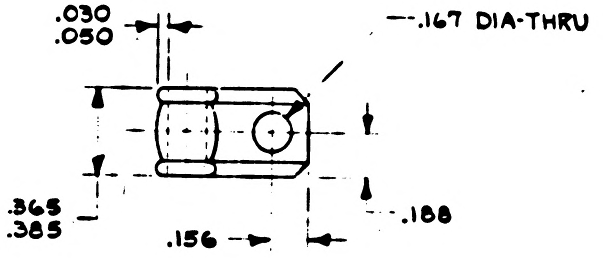
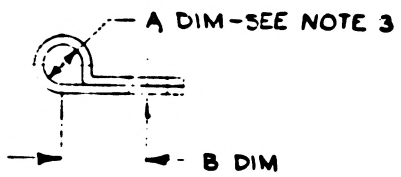
1000220-11		.578	.619
1000220-12		.609	.634
1000220-13		.140	.373/.309
1000220-14		.203	.436/.372
1000220-15		.265	.470/.406
1000220-16		.328	.502/.438
1000220-17		.390	.537/.473
1000220-18		.453	.572/.508
1000220-19		.515	.605/.541

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REVISED PER TDRR 15698	[illegible]	WR
	B	REVISED PER TDRR 20167	[illegible]	WR





NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
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6 MATERIAL: POLYAMIDE (NYLON) PLASTIC PER MIL-P-17091

[illegible]

REPLACED WITHOUT CHANGE
BY REV "C" PER TDRR 30734

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ——
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 6

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	[illegible]
CHECKED		
DRAWN	RES	1-29-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	[illegible]

CLAMP, CABLE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000220
SHEET 1 OF 1

PART NUMBER	A DIM	B DIM
1000220-1	.055	.275
1000220-2	.085	.291
1000220-3	.115	.310
1000220-4	.172	.373
1000220-5	.234	.407
1000220-6	.297	.448
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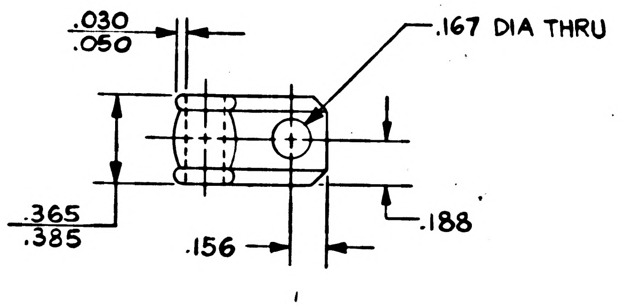
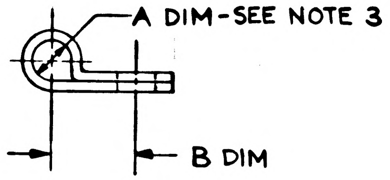
1000220-14	.203	.436/.372
1000220-15	.265	.470/.406
1000220-16	.328	.502/.438
1000220-17	.390	.537/.473
1000220-18	.453	.572/.508
1000220-19	.515	.605/.541





REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
C		REPLACES REV "B" WITHOUT CHANGE PER TDRR 30734		14 JUL 66	A.N.

TDRR 01025

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REMOVE ALL BURRS AND SHARP EDGES.
3. DIMENSION "A" IS APPLICABLE IN CLOSED POSITION ONLY.
4. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER MIL-STD-130.
5. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND1015404 CLASS 3.
6. MATERIAL: POLYAMIDE (NYLON) PLASTIC PER MIL-P-17091.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 6
CONTRACT NAS 9-153

MIT
INSTRUMENTATION LAB.
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN RES DATE 1-29-63
CHECKED
APPROVAL A.J. BOYCE 4-30-63
APPROVAL
NASA APPROVAL W.J. RHINE 5-1-63
MIT APPROVAL W. KUPFER 1 MAY 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CLAMP, CABLE
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
1000220
SCALE 2:1
SHEET 1 OF 1

MIL 1077C-P

PART NUMBER	WECKESSER PART NUMBER	A DIM	B DIM
1000220-1	1/16-4NA	.055	.275
1000220-2	3/32-4NA	.085	.291
1000220-3	1/8-4NA	.115	.310
1000220-4	3/16-4NA	.172	.373
1000220-5	1/4-4NA	.234	.407
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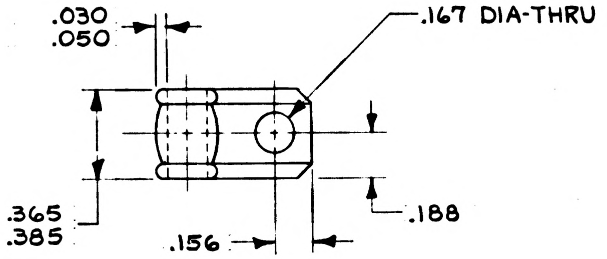
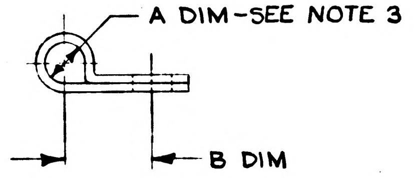
1000220-9	1/2-4NA	.484	.542
1000220-10	9/16-4NA	.547	.603
1000220-11	19/32-4NA	.578	.619
1000220-12	5/8-4NA	.609	.634

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 01025

(M)





NOTES

1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 REMOVE ALL BURRS AND SHARP EDGES
3 DIMENSION "A" IS APPLICABLE IN CLOSED POSITION ONLY
4 IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130
5 SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPEC ND 1015404 CLASS 3
6 MATERIAL: POLYAMIDE (NYLON) PLASTIC PER MIL-P-17091

MASTER

ORIGINAL SOURCE OF SUPPLY
WECKESSER CO., INC.
5701 NORTHWEST HIGHWAY
CHICAGO 46, ILL.
WECKESSER PART NO.- SEE TABLE

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
MULTIPLE	DL1000201
USAGE	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	1/30/63
CHECKED		
DRAWN	RES	1-29-63

APPROVED FOR MSC 5-1-63

MIT/IL APPROVAL	DATE
	1Aug63

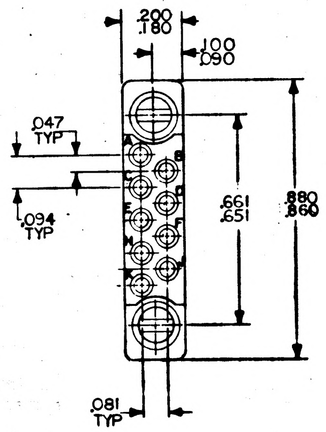
CLAMP, CABLE
SPECIFICATION CONTROL DRAWING

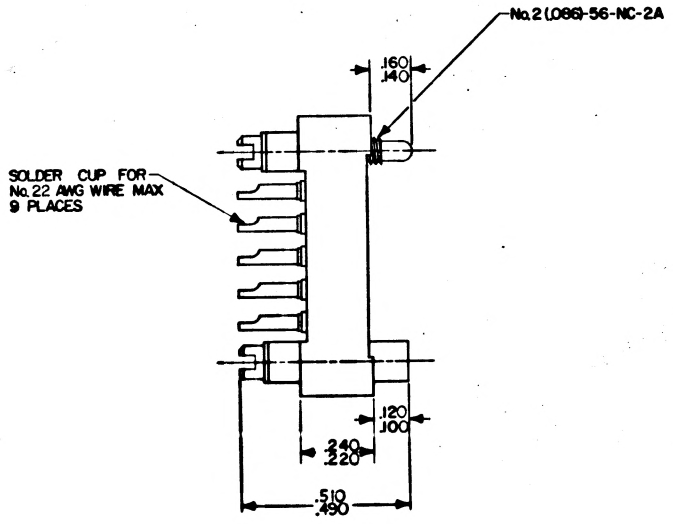
SCALE	UNIT WT.	CODE IDENT.
2/1		

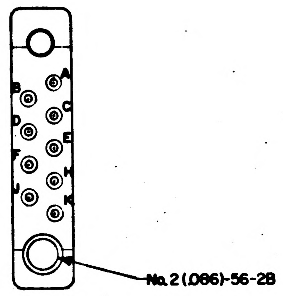
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000220
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03485	10-15-63	WK







REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30(GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000222
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

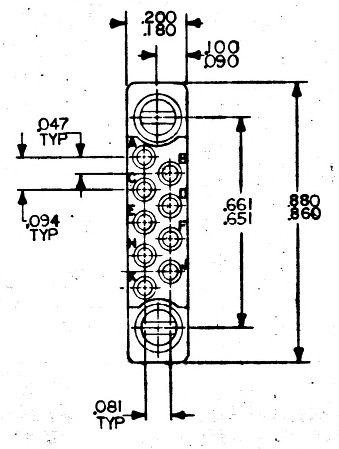
MULTIPLE	DL1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.002 ANGLES —	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	CONNECTOR, ELECTRICAL RECEPTACLE 9 CONTACTS	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
USAGE	DL1000001	DO NOT SCALE THIS DRAWING	APPROVED 5/17/63 CHECKED DRAWN MORSE 4-11-63	SPECIFICATION CONTROL DRAWING	DWG. NO.
NEXT ASSY	USED ON	MATERIAL: SEE NOTE 2A1	APPROVED FOR MSC 5-22-63	SCALE 4/1	MANNED SPACECRAFT CENTER HOUSTON TEXAS
APPLICATION			MIT/IL APPROVAL DATE 22 May 63	UNIT WT.	NASA DRAWING NO. 1000221
				CODE IDENT.	SHEET 1 OF 1 SHEET

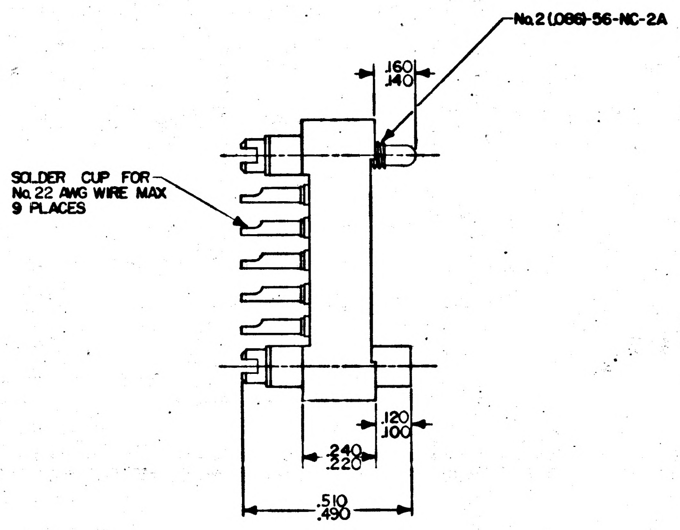
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

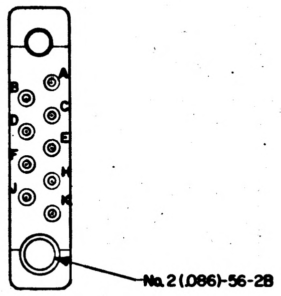
REVISIONS TDRR 01328

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03485	10-15-63	sast WK

(M)







REQUIREMENTS:

1. GENERAL
    - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
    - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
    - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.
    - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
    - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
    - A. MECHANICAL REQUIREMENTS:
        - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
          SCREWS; STAINLESS STEEL, PASSIVATED
          BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30(GREEN)
        - 2) DIMENSIONS: AS SHOWN ON DRAWING
        - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000222
    - B. ELECTRICAL REQUIREMENTS:
        - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
        - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
    - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
      140 VRMS AT 70,000 FT
    - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
    - C. CONTACT RATINGS; 3 AMPS
    - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
    - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
    - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

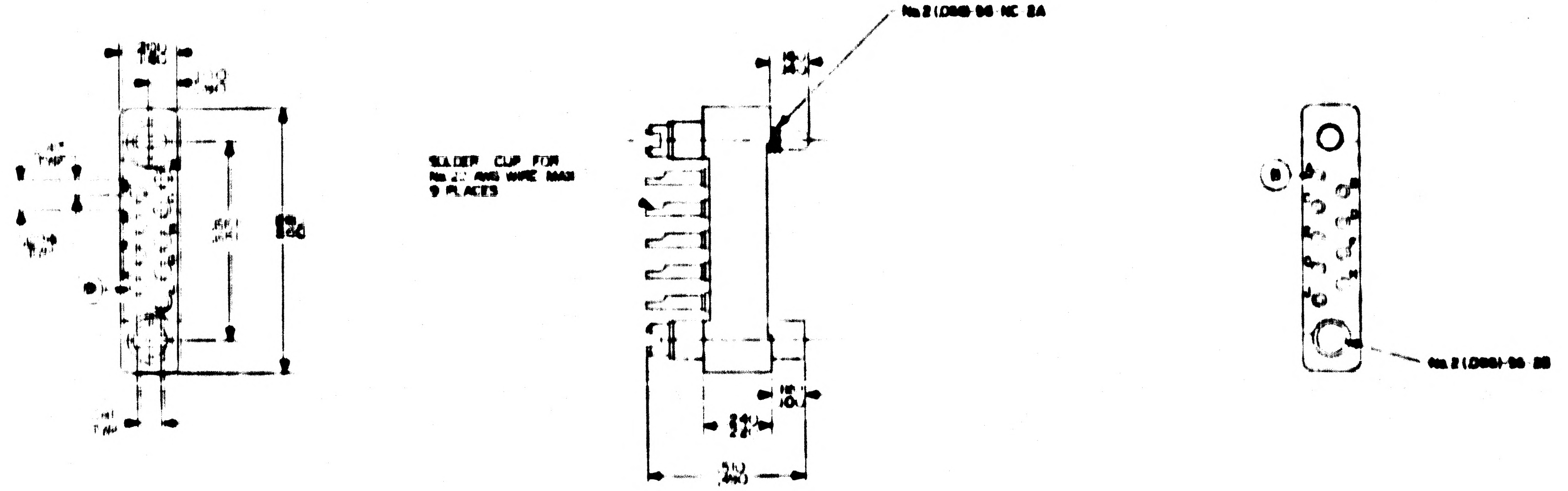
MIT INSTRUMENTATION LAB CONTRACT
NAS 9-153
APPROVED: J. Bogan DATE: 5/17/63
CHECKED:
DRAWN: MORSE 4-1-63
APPROVED FOR MSC: W.J. Rhine 5-22-63
MIT/IL APPROVAL: W. Gufler DATE: 22 May 63

CONNECTOR, ELECTRICAL
RECEPTACLE
9 CONTACTS

SPECIFICATION CONTROL DRAWING
SCALE: 4/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000221
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY



REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN [illegible] CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN [illegible] UNLESS MODIFIED OR AMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.
   - D. IDENTIFY UNITS USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-[illegible] UNLESS MODIFIED BY [illegible] OR ELSEWHERE IN THIS DRAWING.
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS
     - 1) MATERIAL: CONTACTS, PHOSPHOR [illegible], GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SPRING, STAINLESS STEEL, PASSIVATED
       BODY, GLASS FILLED DIALLYL PHTHALATE PER MIL-M-[illegible], TYPE GDI-30(GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO [illegible]
   - B. ELECTRICAL REQUIREMENTS
     - 1) INSULATION RESISTANCE: [illegible] MEGOHMS MIN AT [illegible] VDC
     - 2) DIELECTRIC STRENGTH: [illegible] VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS
   - A. SERVICE RATING: [illegible] VRMS AT SEA LEVEL
     [illegible] VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH [illegible] VRMS AT 70,000 FT
   - C. CONTACT RATING: 5 AMPS
   - D. CONTACT RESISTANCE: [illegible] MV AT 5 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE: 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER: [illegible] ± .005

PROCURE ONLY FROM APPROVED SOURCES LISTED IN [illegible] FOR THIS DRAWING.

LIST OF PARTS AND MATERIALS

SEE NOTE 2A1

APPLICATION

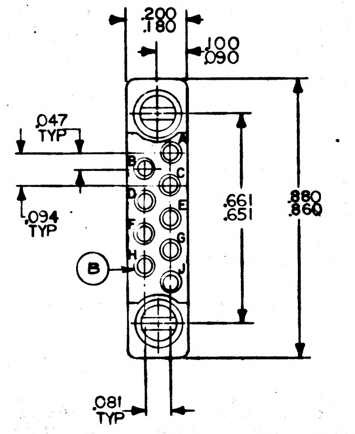
CONNECTOR ELECTRICAL
RECEPTACLE
9 CONTACTS

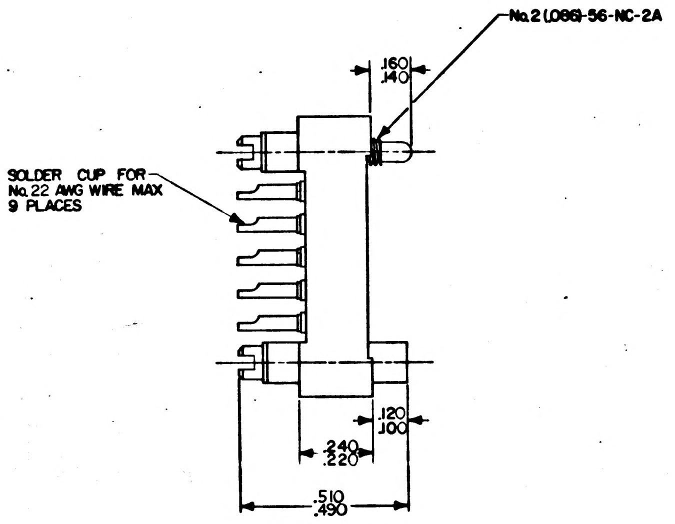
SPECIFICATION CONTROL DRAWING

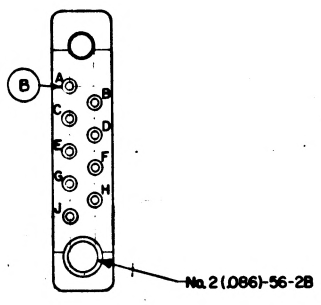
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03485	10-15-63	
	B	TDRR 05606	12-19-63	







REQUIREMENTS:

1. **GENERAL**
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. **INSPECTION & ACCEPTANCE**
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30(GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000222
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. **DESIGN REQUIREMENTS:**
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED G.J. Boyce 5/17/63
CHECKED
DRAWN MORSE 1-11-63
APPROVED FOR MSC W.J. Robins 5-28-63
MIT/IL APPROVAL 23 May 63

CONNECTOR, ELECTRICAL
RECEPTACLE
9 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000221
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 01328				
	A	TDRR 03485	10-15-63	
	B	TDRR 05606	12-19-63	
	C	TDRR 05835	1-21-64	
	D	TDRR 05948	1-27-64	

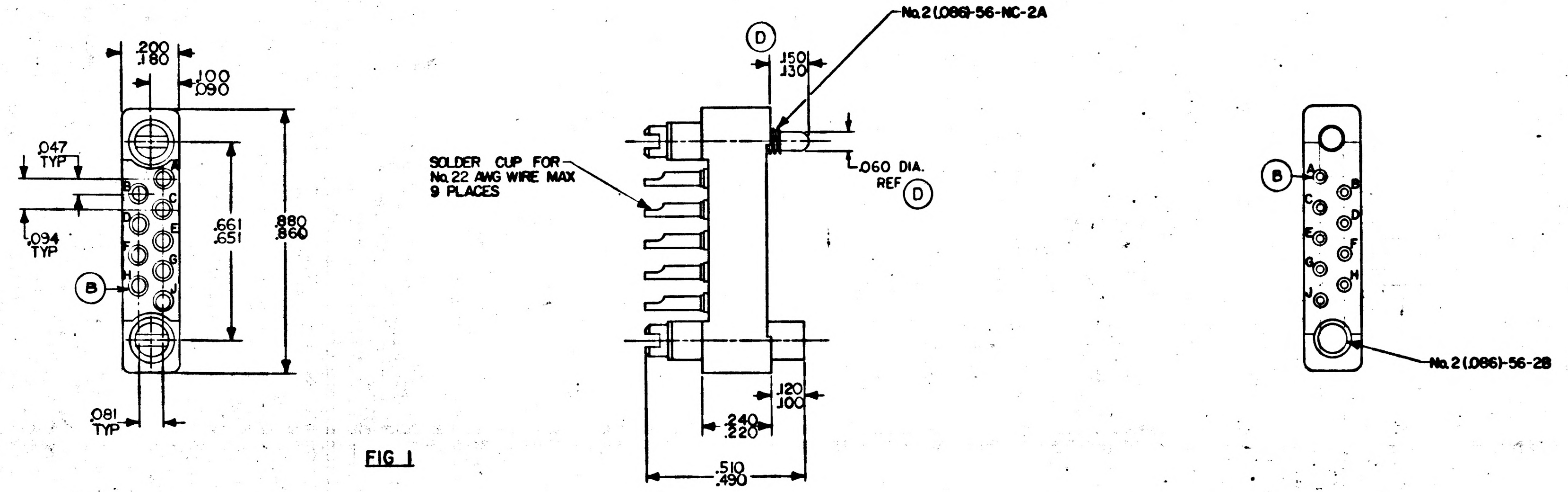
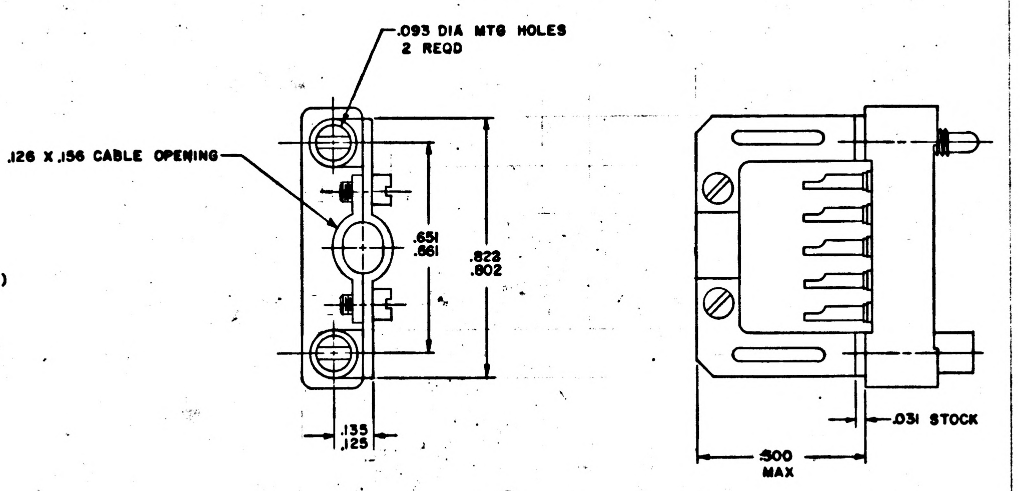


FIG 1

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30(GREEN)
       BRACKET; ALUMINUM ALLOY, 5052-H32, QQ-A-318 - ANODIZED PER MIL-A-8625, TYPE II (FIG. 2, ONLY)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000222.
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002



Ⓒ FIG 2
WITH CABLE BRACKET

DRAWING NO.	FIG NO.
1000221-1	1
1000221-2	2

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED 5/17/63
CHECKED
DRAWN MORSE 1-11-63
APPROVED FOR MSC 5-28-63
MIT/IL APPROVAL DATE 23 May 63

CONNECTOR, ELECTRICAL
RECEPTACLE
9 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000221
SHEET 1 OF 1 SHEET

REVISIONS TDRR 01328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03485	10-15-63	WK
	B	TDRR 05606	12-19-63	
	C	TDRR 05835	1-21-64	WK
	D	TDRR 05948	1-27-64	
	E	TDRR 06235	2-11-64	

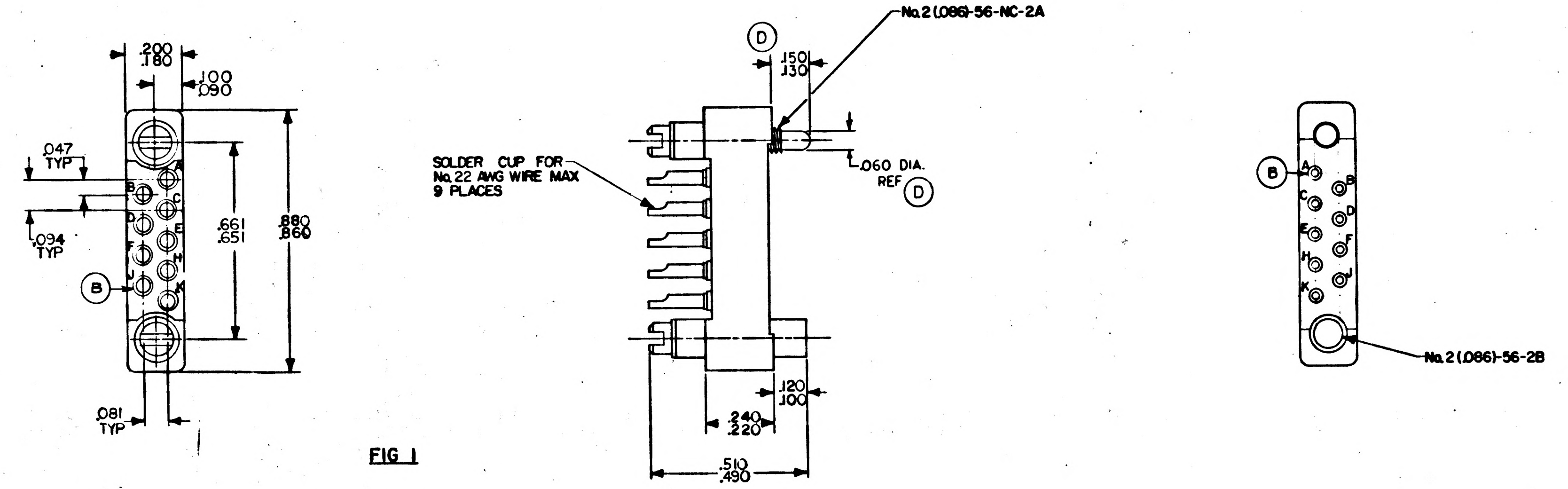
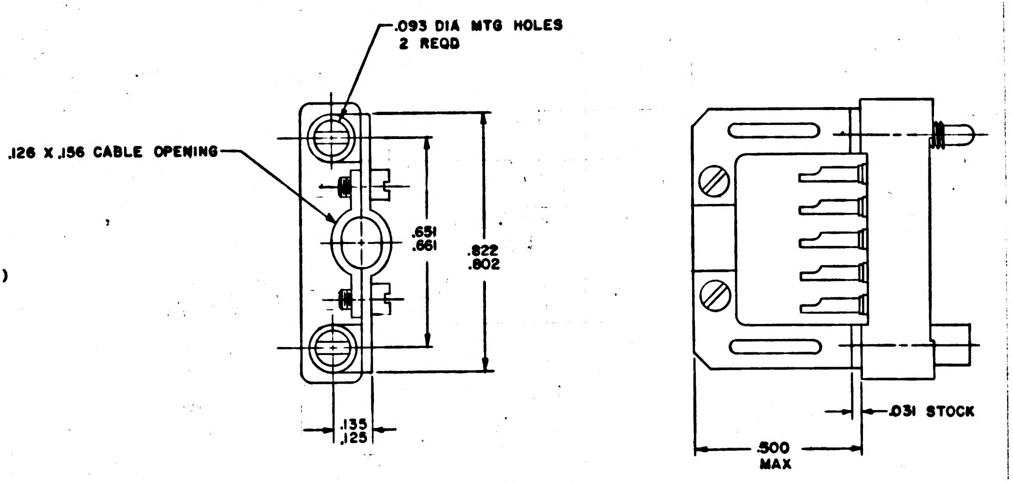


FIG I

REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       SCREWS; STAINLESS STEEL, PASSIVATED
       ~~BODY;~~ GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30(GREEN)
       BRACKET; ALUMINUM ALLOY, 5052-H32, QQ-A-318 - ANODIZED PER MIL-A-8625, TYPE II (FIG. 2, ONLY)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000222
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002



Ⓒ FIG 2
WITH CABLE BRACKET

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

DRAWING NO.	FIG NO.
1000221-1	1
1000221-2	2

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	D1.1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	1/17/63
CHECKED		
DRAWN	MORSE	1-11-63

APPROVED FOR MSC 5-28-63
W J Rh

MIT/IL APPROVAL	DATE
W Kupfer	23 May 63

CONNECTOR, ELECTRICAL
RECEPTACLE
9 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000221
SHEET 1 OF 1 SHEET

1000221 E

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03485	10-15-63	WK
	B	TDRR 05606	12-19-63	
	C	TDRR 05835	1-21-64	WK
	D	TDRR 05948	1-27-64	WK
	E	TDRR 06235	2-11-64	WK

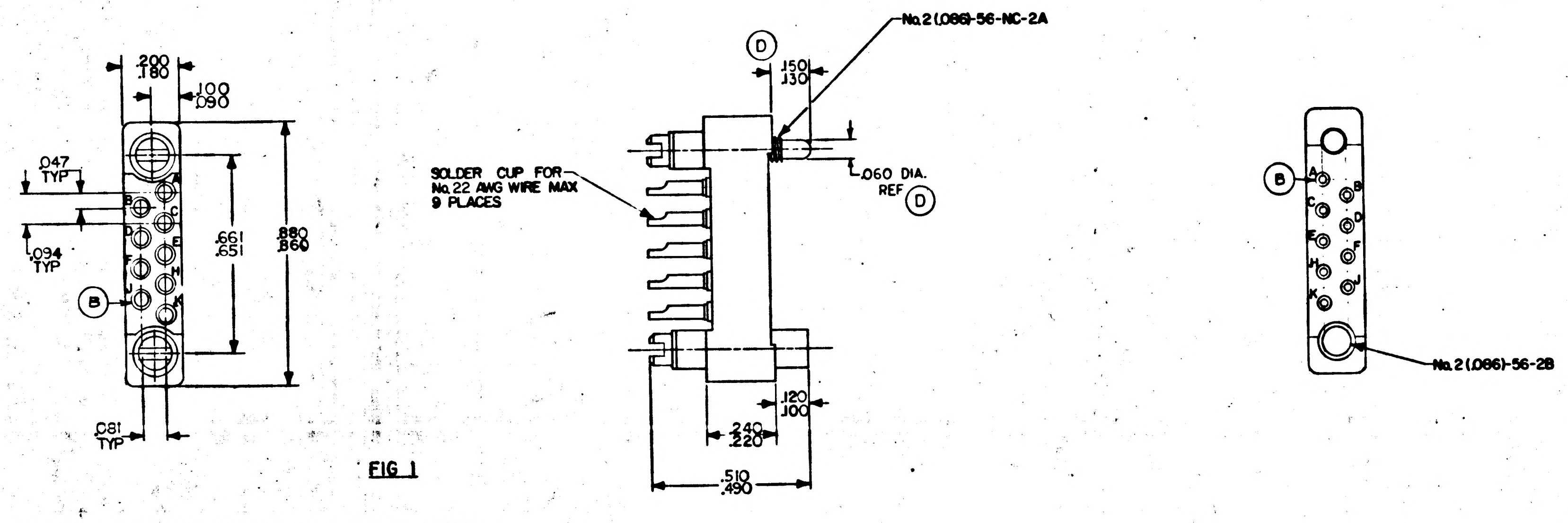


FIG 1

REQUIREMENTS:

1. GENERAL

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2

C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING.

D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.

E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING

2. INSPECTION & ACCEPTANCE

A. MECHANICAL REQUIREMENTS:

1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
SCREWS; STAINLESS STEEL, PASSIVATED
BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30(GREEN)
BRACKET; ALUMINUM ALLOY, 5052-H32, QQ-A-318 - ANODIZED PER MIL-A-8625, TYPE II (FIG. 2, ONLY)

2) DIMENSIONS: AS SHOWN ON DRAWING

3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000222.

B. ELECTRICAL REQUIREMENTS:

1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC

2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

3. DESIGN REQUIREMENTS:

A. SERVICE RATING; 530 VRMS AT SEA LEVEL
140 VRMS AT 70,000 FT

B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT

C. CONTACT RATINGS; 3 AMPS

D. CONTACT RESISTANCE; 20 MV AT 3 AMPS

E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR

F. CONTACT CENTER TO CENTER; 3/32 ± .002

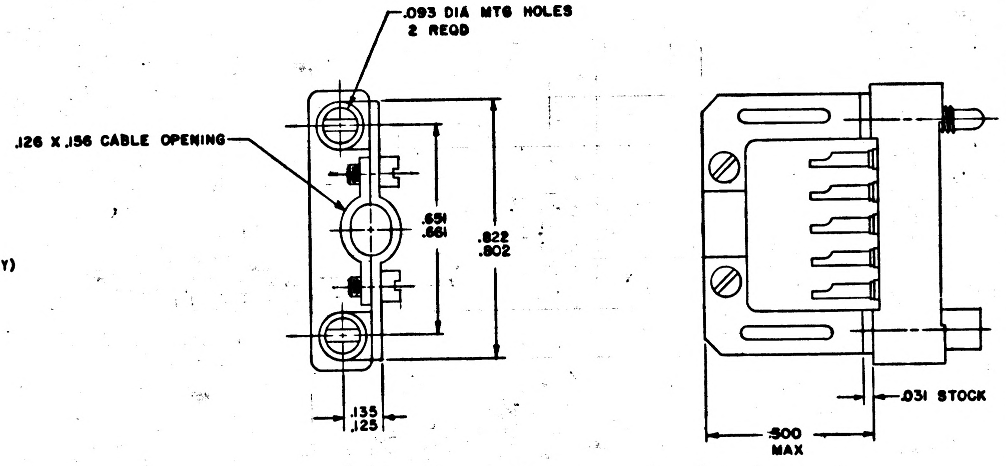


FIG 2

WITH CABLE BRACKET

MASTER

DRAWING NO.	FIG NO.
1000221-1	1
1000221-2	2

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		5-1-63
CHECKED		
DRAWN	MORSE	1-1-63
APPROVED FOR MSC		5-28-63
MIT/IL APPROVAL		DATE
		27 May 63

CONNECTOR, ELECTRICAL
RECEPTACLE
9 CONTACTS

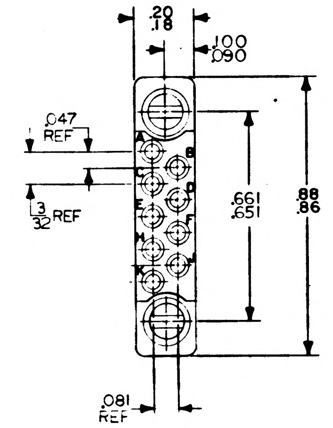
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000221
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01329				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


.20
.18
.100
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.047
REF
3/32 REF
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K
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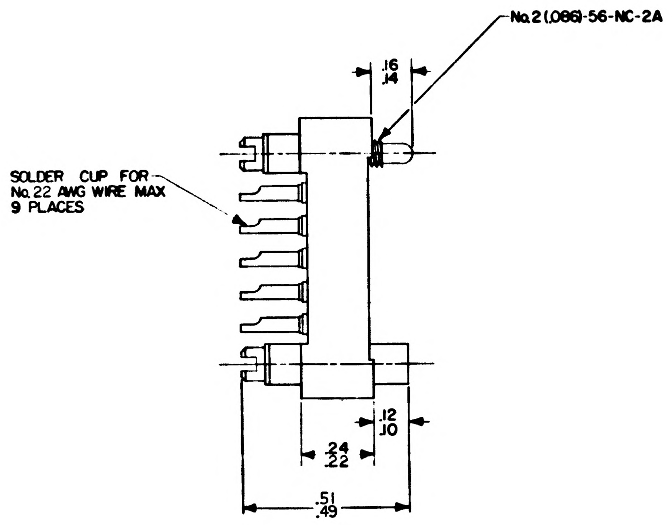
REF


No.2 (.086)-56-NC-2A
.16
.14
SOLDER CUP FOR No.22 AWG WIRE MAX 9 PLACES
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.22
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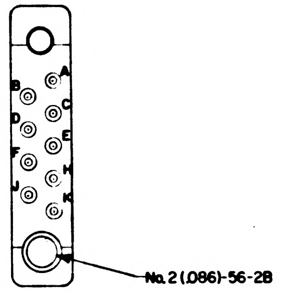
.49


A
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J
K
No.2 (.086)-56-2B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE 1000222
3. ~~—~~
4. MAT'L: GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19883 TYPE GDI-30
5. UNLESS OTHERWISE SPECIFIED ITEM TO MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN G&N SPEC ND 1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY

CONTINENTAL CONNECTOR CORP
34-63 56TH STREET
WOODSIDE 77, N.Y.

ITEM No. MM-9-22-SGDSL

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS — ANGLES —
MULTIPLE	DL1000201	DO NOT SCALE THIS DRAWING
USAGE	DL1000001	MATERIAL: SEE NOTE 4
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE
APPROVED C J Bogue	5/7/63
CHECKED	
DRAWN MORSE	1-11-63
APPROVED FOR MSC W J Rhine	5-28-63
MIT/IL APPROVAL	DATE
W. Griffin	27 May 63

CONNECTOR, ELECTRICAL RECEPTACLE 9 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

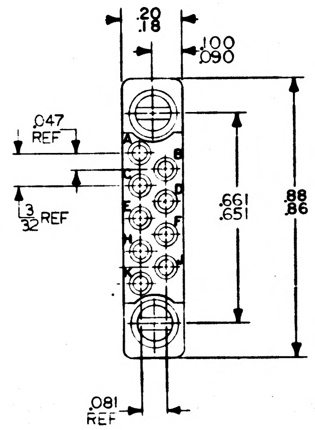
NASA DRAWING NO.
1000221

SHEET 1 OF 1 SHEET

1000221

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01322				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL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.18
.100
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REF
3/32 REF
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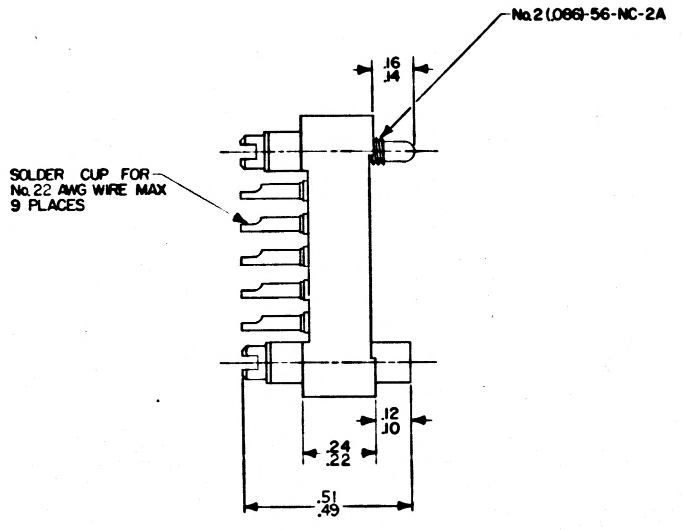
No.2 (.086)-56-NC-2A
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SOLDER CUP FOR
No. 22 AWG WIRE MAX
9 PLACES
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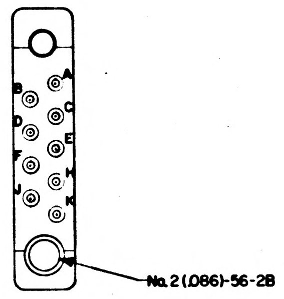
.51
.49


A
B
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D
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K
No. 2 (.086)-56-2B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE 1000222
3. ~~—~~
4. MAT'L: GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19883 TYPE GD1-30
5. UNLESS OTHERWISE SPECIFIED ITEM TO MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN G&N SPEC NO 1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY

CONTINENTAL CONNECTOR CORP
34-63 56TH STREET
WOODSIDE 77, N.Y.

ITEM No. MM-9-22-SGDSL

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS — ANGLES —	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	CONNECTOR, ELECTRICAL RECEPTACLE 9 CONTACTS	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
			APPROVED C. J. Boyce — DATE 5/17/63		DWG NO.
			CHECKED		MANNED SPACECRAFT CENTER HOUSTON TEXAS
MULTIPLE	DL1000201	DO NOT SCALE THIS DRAWING	DRAWN MORSE 1-11-63	SPECIFICATION CONTROL DRAWING	NASA DRAWING NO.
USAGE	DL1000001	MATERIAL: SEE NOTE 4	APPROVED FOR MSC 5-22-63 W. J. Rhine	SCALE 4/1 — UNIT WT. — CODE IDENT.	1000221
NEXT ASSY	USED ON		MIT/IL APPROVAL — DATE W. Goeffer 22 May 63		SHEET 1 OF 1 SHEET
APPLICATION					

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000221

REVISIONS TDRR 01328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
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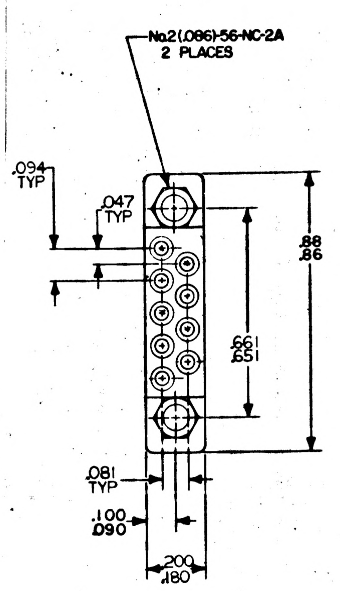
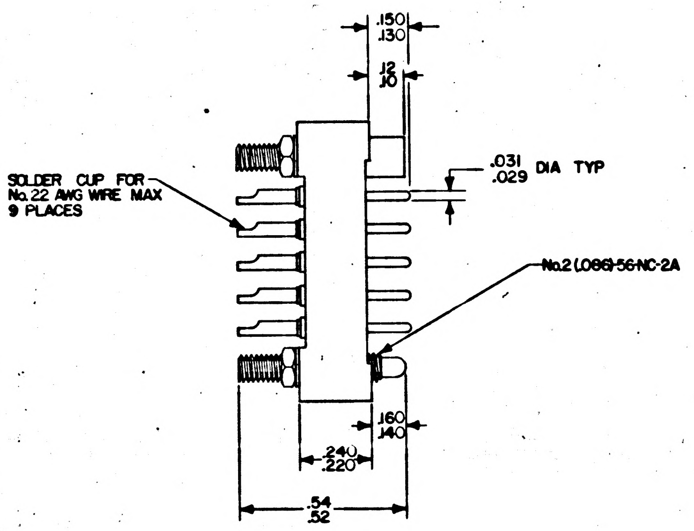
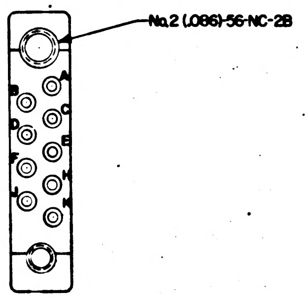






REQUIREMENTS:

1. GENERAL

   A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

   B. SUPPLIER ~~SHALL~~ CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2

   C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING

   D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.

   E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING.

2. INSPECTION & ACCEPTANCE

   A. MECHANICAL REQUIREMENTS:

      1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
         SCREWS; STAINLESS STEEL, PASSIVATED
         BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)

      2) DIMENSIONS: AS SHOWN ON DRAWING

      3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000221

   B. ELECTRICAL REQUIREMENTS:

      1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC

      2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL

3. DESIGN REQUIREMENTS:

   A. SERVICE RATING; 530 VRMS AT SEA LEVEL
      140 VRMS AT 70,000 FT

   B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT

   C. CONTACT RATINGS; 3 AMPS

   D. CONTACT RESISTANCE; 20 MV AT 3 AMPS

   E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR

   F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	5/17/63
CHECKED		
DRAWN	MORSE	1-16-63
APPROVED FOR MSC	W J Rhine	5-22-63
MIT/IL APPROVAL		DATE
W Kupfer 22 May 63.		

CONNECTOR, ELECTRICAL
PLUG
9 CONTACTS

SPECIFICATION CONTROL DRAWING

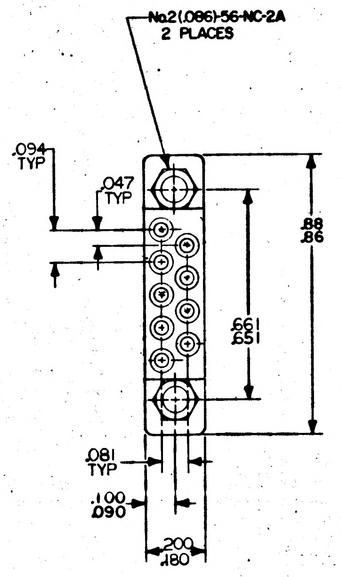
SCALE	UNIT WT.	CODE IDENT.
4/1		

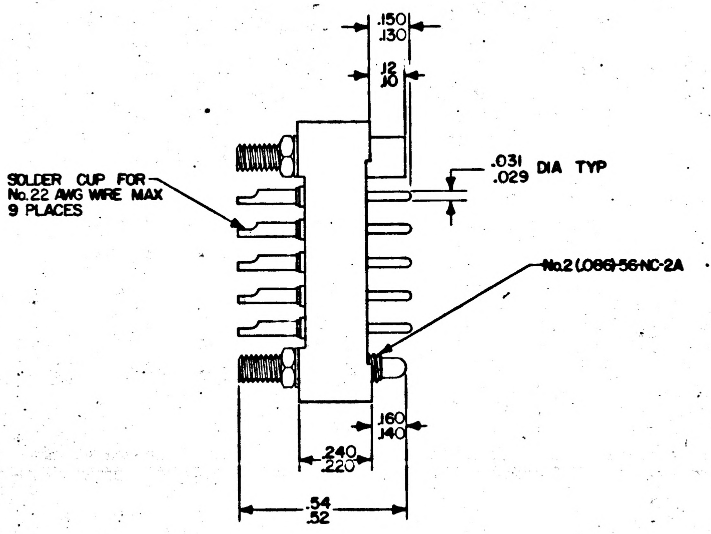
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000222
SHEET 1 OF 1

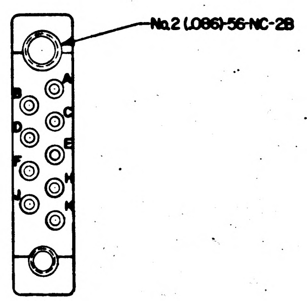
1000222

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 03486	10-15-63	WH







REQUIREMENTS:

1. GENERAL
    - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
    - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
    - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
    - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
    - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING.
2. INSPECTION & ACCEPTANCE
    - A. MECHANICAL REQUIREMENTS:
        - 1) MATERIAL: CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
          SCREWS; STAINLESS STEEL, PASSIVATED
          BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
        - 2) DIMENSIONS: AS SHOWN ON DRAWING
        - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000221
    - B. ELECTRICAL REQUIREMENTS:
        - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
        - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
    - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
      140 VRMS AT 70,000 FT
    - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
    - C. CONTACT RATINGS; 3 AMPS
    - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
    - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
    - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.002 ANGLES —	MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	CONNECTOR, ELECTRICAL PLUG 9 CONTACTS	MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
USAGE	DL1000001	DO NOT SCALE THIS DRAWING	APPROVED J. Boyce 5/17/63 CHECKED DRAWN MORSE 4-16-63	SPECIFICATION CONTROL DRAWING	DWG. NO. MANNED SPACECRAFT CENTER HOUSTON TEXAS
NEXT ASSY	USED ON	MATERIAL: SEE NOTE 2A1	APPROVED FOR MSC 5-28-63	SCALE 4/1	UNIT WT.
APPLICATION			MIT/IL APPROVAL DATE 22 May 63	CODE IDENT.	NASA DRAWING NO. 1000222 SHEET 1 OF 1

1000222

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
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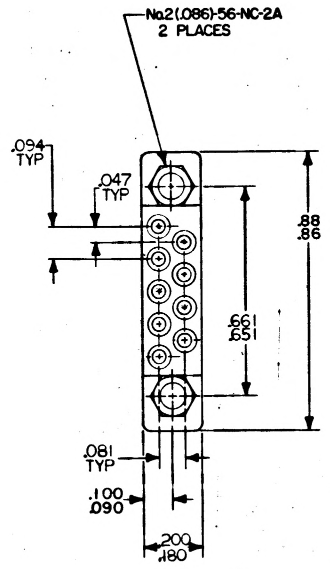
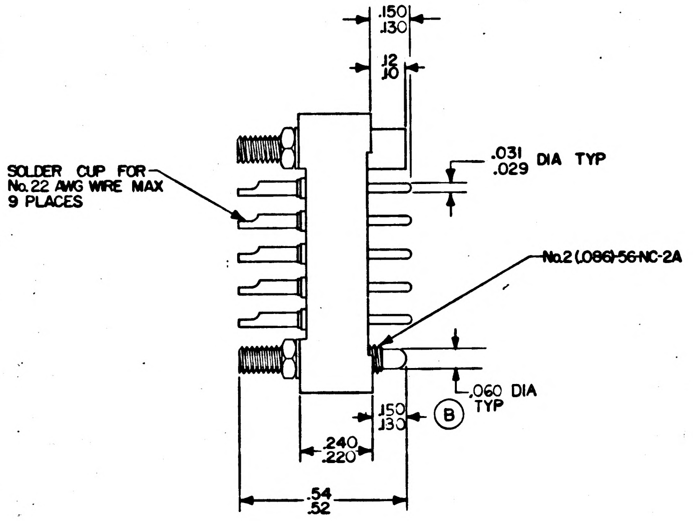
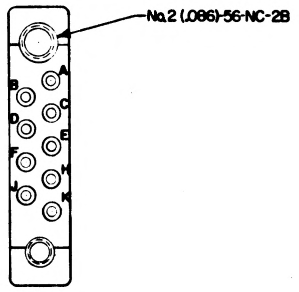
	B	TDRR 05948	2-3-64	sam WK







REQUIREMENTS:

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 2
   - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND1002052 UNLESS MODIFIED OR AMMENDED BY SECTION 3 (DESIGN REQUIREMENTS) OF THIS DRAWING
   - D. IDENTIFY USING DRAWING NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL OR NAME PER MIL-STD-130. MANUFACTURERS PART NUMBER MAY ALSO BE USED.
   - E. UNITS SHALL BE CAPABLE OF MEETING APPLICABLE REQUIREMENTS OF MIL-C-8384 UNLESS MODIFIED BY ND1002052 OR ELSEWHERE IN THIS DRAWING.
2. INSPECTION & ACCEPTANCE
   - A. MECHANICAL REQUIREMENTS:
     - 1) MATERIAL:
       - CONTACTS; PHOSPHOR, GOLD PLATED OVER SILVER PER MIL-G-45204, TYPE II, CLASS 2
       - SCREWS; STAINLESS STEEL, PASSIVATED
       - BODY; GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833, TYPE GDI-30 (GREEN)
     - 2) DIMENSIONS: AS SHOWN ON DRAWING
     - 3) CONNECTOR SHALL MATE WITH CONNECTOR, NASA PART NO.1000221
   - B. ELECTRICAL REQUIREMENTS:
     - 1) INSULATION RESISTANCE: 1000 MEGOHMS MIN AT 1000 VDC
     - 2) DIELECTRIC STRENGTH: 1600 VRMS AT SEA LEVEL
3. DESIGN REQUIREMENTS:
   - A. SERVICE RATING; 530 VRMS AT SEA LEVEL
     140 VRMS AT 70,000 FT
   - B. DIELECTRIC STRENGTH; 425 VRMS AT 70,000 FT
   - C. CONTACT RATINGS; 3 AMPS
   - D. CONTACT RESISTANCE; 20 MV AT 3 AMPS
   - E. INSERTION AND WITHDRAWAL FORCE; 2 TO 11 OZ/PIN WITH MATING CONNECTOR
   - F. CONTACT CENTER TO CENTER; 3/32 ± .002

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.002 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2A1

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		
CHECKED		
DRAWN	MORSE	1-16-63
APPROVED FOR MSC	5-28-63	
MIT/IL APPROVAL		DATE
		22 May 63

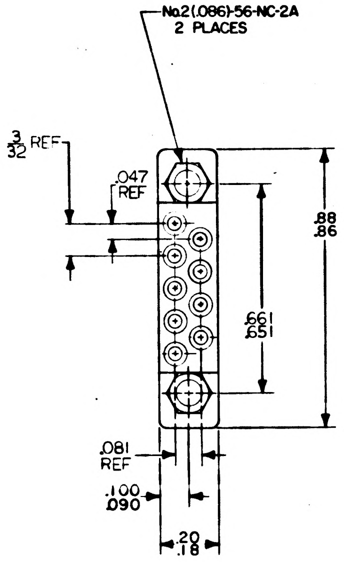
CONNECTOR, ELECTRICAL
PLUG
9 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000222
SHEET 1 OF 1

REVISIONS TDRR 0328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



No.2(.086)-56-NC-2A
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.88
.86
.661
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.081 REF
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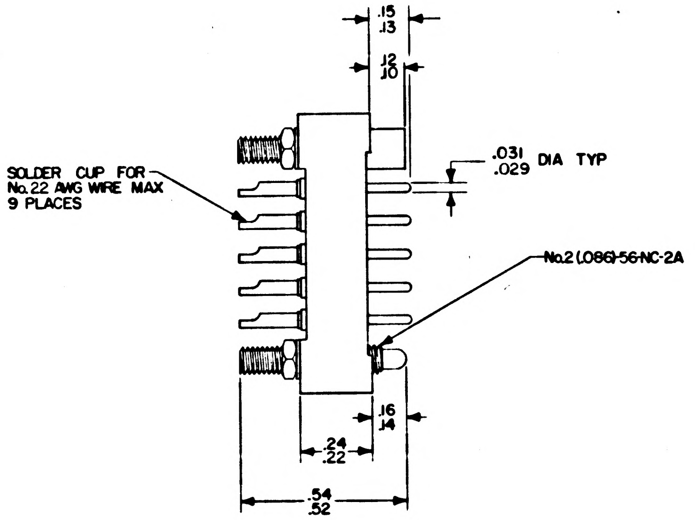
.18



.15
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SOLDER CUP FOR No.22 AWG WIRE MAX 9 PLACES
No.2(.086)-56-NC-2A
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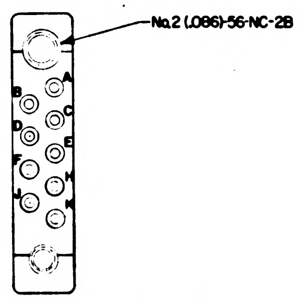
.52



No.2(.086)-56-NC-2B
A
B
C
D
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H
J
K

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000221
3. ~~—~~
4. GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833 TYPE GDI-30
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG No REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN G&N SPEC NO 1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY

CONTINENTAL CONNECTOR CORP
34-63 56TH STREET
WOODSIDE 77, N.Y.

ITEM No. MM-9-22 PGDS

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153 | DATE
APPROVED | 5/17/63
CHECKED
DRAWN MORSE | 1-16-63
APPROVED FOR MSC 5-28-63
W J Rhine
MIT/IL APPROVAL | DATE
22 May 63

CONNECTOR, ELECTRICAL
PLUG
9 CONTACTS

SPECIFICATION CONTROL DRAWING

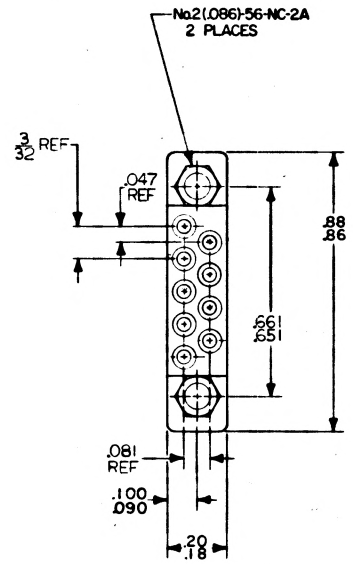
SCALE	UNIT WT.	CODE IDENT.
4/1		

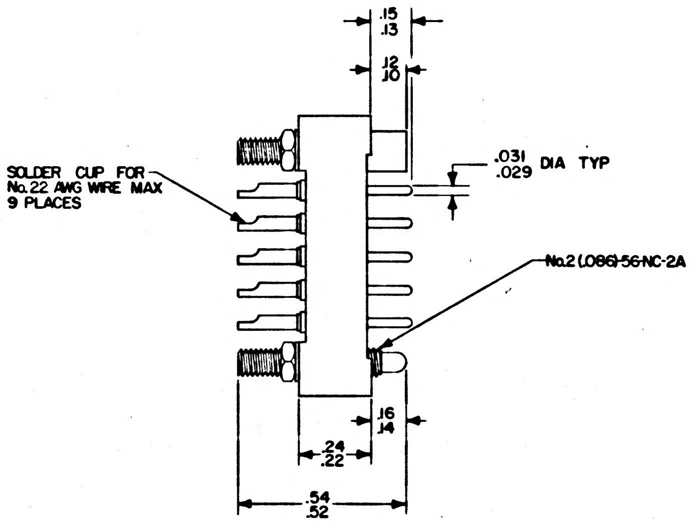
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000222
SHEET 1 OF 1

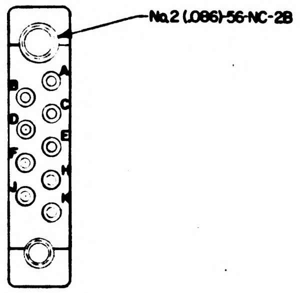
1000222

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR ○328				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


No.2 (.086)-56-NC-2A
2 PLACES
3/32 REF
.047 REF
.88
.86
.661
.651
.081 REF
.100
.090
.20
.18


.15
.13
.12
.10
SOLDER CUP FOR No.22 AWG WIRE MAX 9 PLACES
.031
.029 DIA TYP
No.2 (.086)-56-NC-2A
.16
.14
.24
.22
.54
.52


No.2 (.086)-56-NC-2B
A
B
C
D
E
F
H
J
K

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR MATING CONNECTOR SEE DWG 1000221
3. —#—
4. GLASS FILLED DIALLYL PHTHALATE PER MIL-M-19833 TYPE GDI-30
5. UNLESS OTHERWISE SPECIFIED ITEM MUST MEET REQUIREMENTS OF MIL-C-8384
6. IDENTIFY USING DWG No REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN G&N SPEC NO 1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY

CONTINENTAL CONNECTOR CORP
34-63 56th STREET
WOODSIDE 77, N.Y.

ITEM No. MM-9-22 PGDS

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

MULTIPLE	DL100020
USAGE	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED: A J Boyce DATE: 5/17/63
CHECKED:
DRAWN: MORSE DATE: 4-16-63
APPROVED FOR MSC: W J Rhine 5-20-63
MIT/IL APPROVAL: W Kupfer DATE: 22 May 63.

CONNECTOR, ELECTRICAL
PLUG
9 CONTACTS

SPECIFICATION CONTROL DRAWING

SCALE 4/1
UNIT WT.
CODE IDENT.

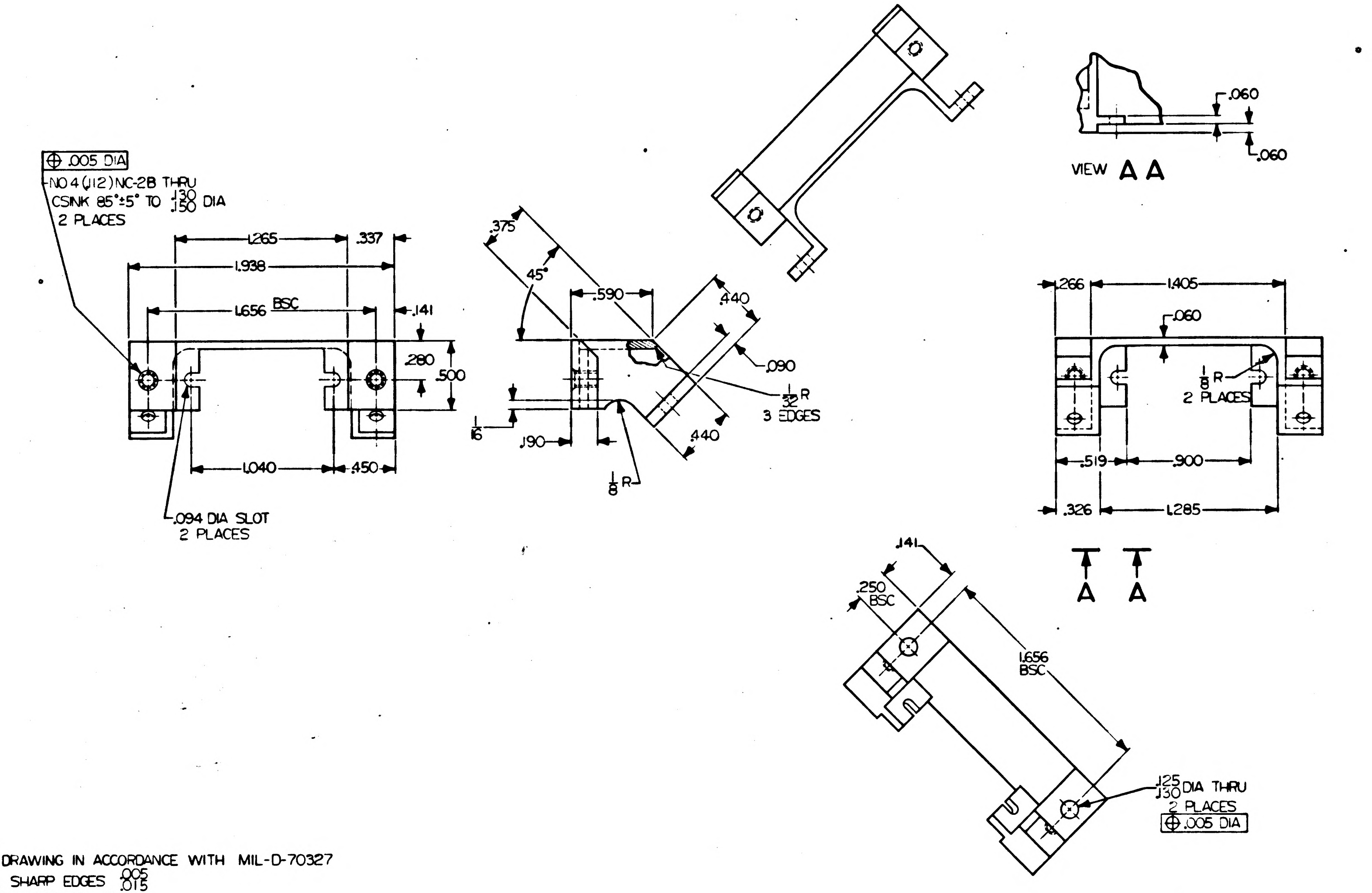
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000222
SHEET 1 OF 1

1000222

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 30761

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	REDESIGN	4-9-63	ajB	w/(



⊕ .005 DIA
NO 4 (.112) NC-2B THRU
CSINK 85°±5° TO .130/.150 DIA
2 PLACES
1.265
.337
1.938
1.656 BSC
.141
.280
.500
1.040
.450
.094 DIA SLOT
2 PLACES
.375
45°
.590
.440
.090
1/32 R
3 EDGES
1/16
.190
.440
1/8 R
.060
.060
VIEW A A
.266
1.405
.060
1/8 R
2 PLACES
.519
.900
.326
1.285
A
A
.141
.250 BSC
1.656 BSC
.125/.130 DIA THRU
2 PLACES
⊕ .005 DIA

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES .005/.015
3. 63∇ MACHINE FINISH ALL OVER
4. INSIDE RADII .010 R MAX
5. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130
6. MATERIAL - PLASTIC SHEET, LAMINATED, GLASS FIBER BASE, PER MIL-P-18177 TYPE GEE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000137	DL100010

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED A. J. Boyce DATE 4-9-63
CHECKED
DRAWN MORSE 4-3-63
APPROVED FOR MSC E. S. Swing 4/10/63
MIT/IL APPROVAL W. Lipper DATE 10 Apr 63

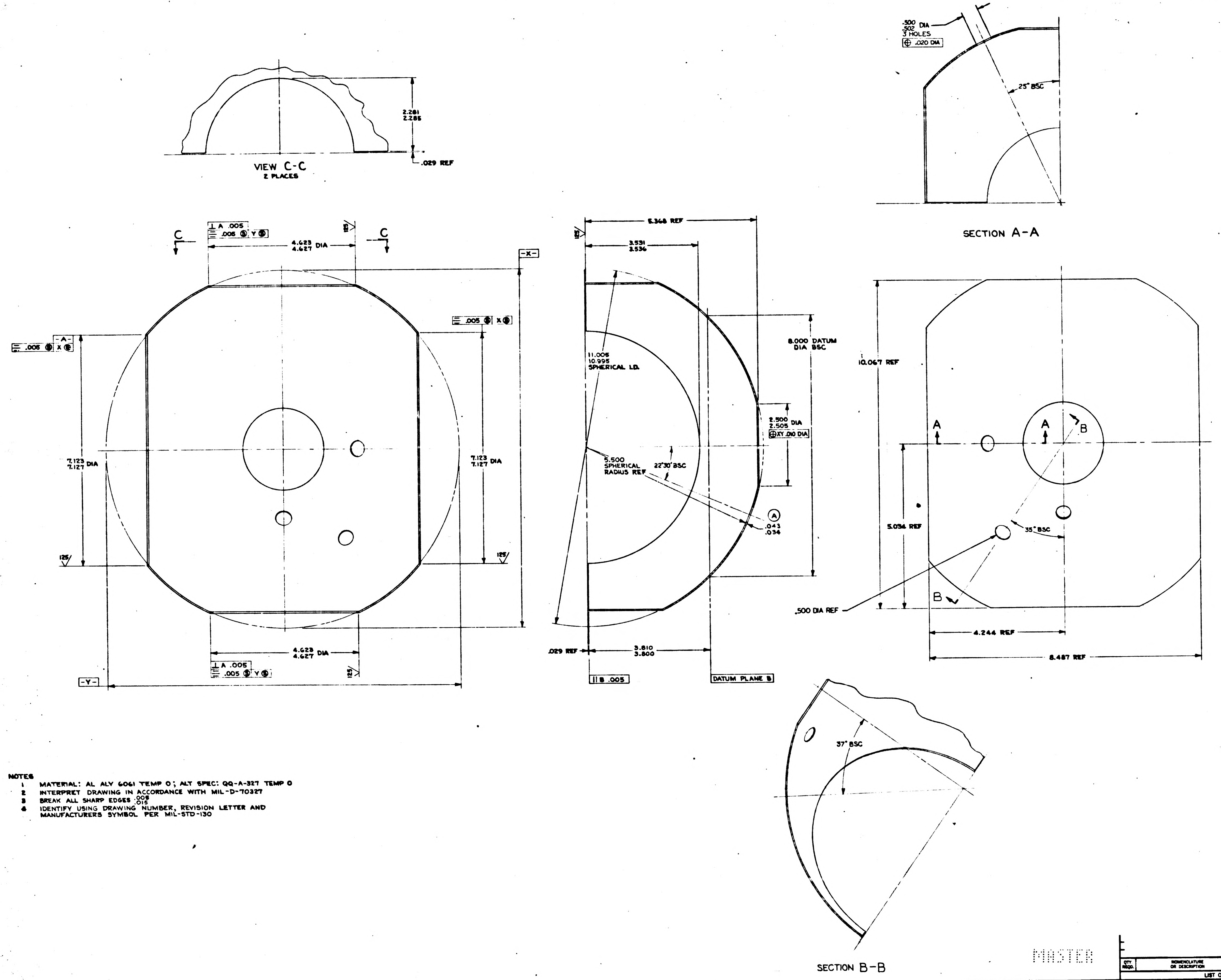
BRACKET, CONNECTOR
HARNESS ASSEMBLY

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000226
SHEET 1 OF 1 SHEET

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 00781	4-9-63	



2.281
2.285
.029 REF
C
C
⊥ A .005
═ .005 Ⓢ Y Ⓢ
4.623
4.627 DIA
125
-X-
═ .005 Ⓢ X Ⓢ
-A-
═ .005 Ⓢ X Ⓢ
7.123
7.127 DIA
7.123
7.127 DIA
125
125
4.623
4.627 DIA
⊥ A .005
═ .005 Ⓢ Y Ⓢ
125
-Y-
5.368 REF
125
3.531
3.536
11.005
10.995
SPHERICAL I.D.
8.000 DATUM
DIA BSC
2.500
2.505 DIA
⊕XY .010 DIA
5.500
SPHERICAL
RADIUS REF
22°30' BSC
Ⓐ
.043
.034
.029 REF
3.810
3.800
|| B .005
DATUM PLANE B
.500
.502 DIA
3 HOLES
⊕ .020 DIA
25° BSC
10.067 REF
A
A
B
5.034 REF
35° BSC
B
.500 DIA REF
4.244 REF
8.487 REF
37° BSC

VIEW C-C
2 PLACES

SECTION A-A

SECTION B-B

NOTES
1. MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O
2. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000066	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

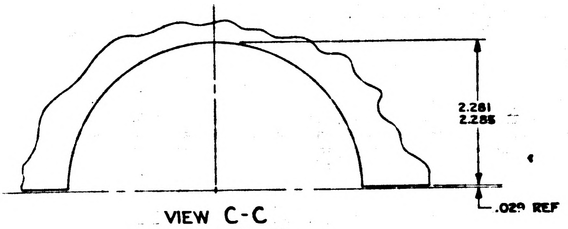
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED A J Boyce 3-20-63
CHECKED
DRAWN RES 1-14-63
APPROVED FOR MSC 4/2/63
MIT/IL APPROVAL DATE
20 March 63

HEMISPHERE
FIXED
OUTER GIMBAL

SCALE | UNIT WT. | CODE IDENT.

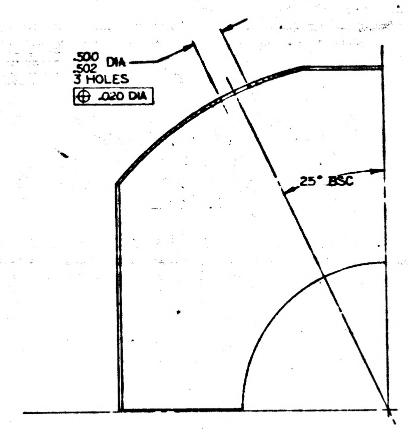
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000230
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00615				
	A	TDRR 00781	4-9-63	
	B	TDRR 04570	11-12-63	



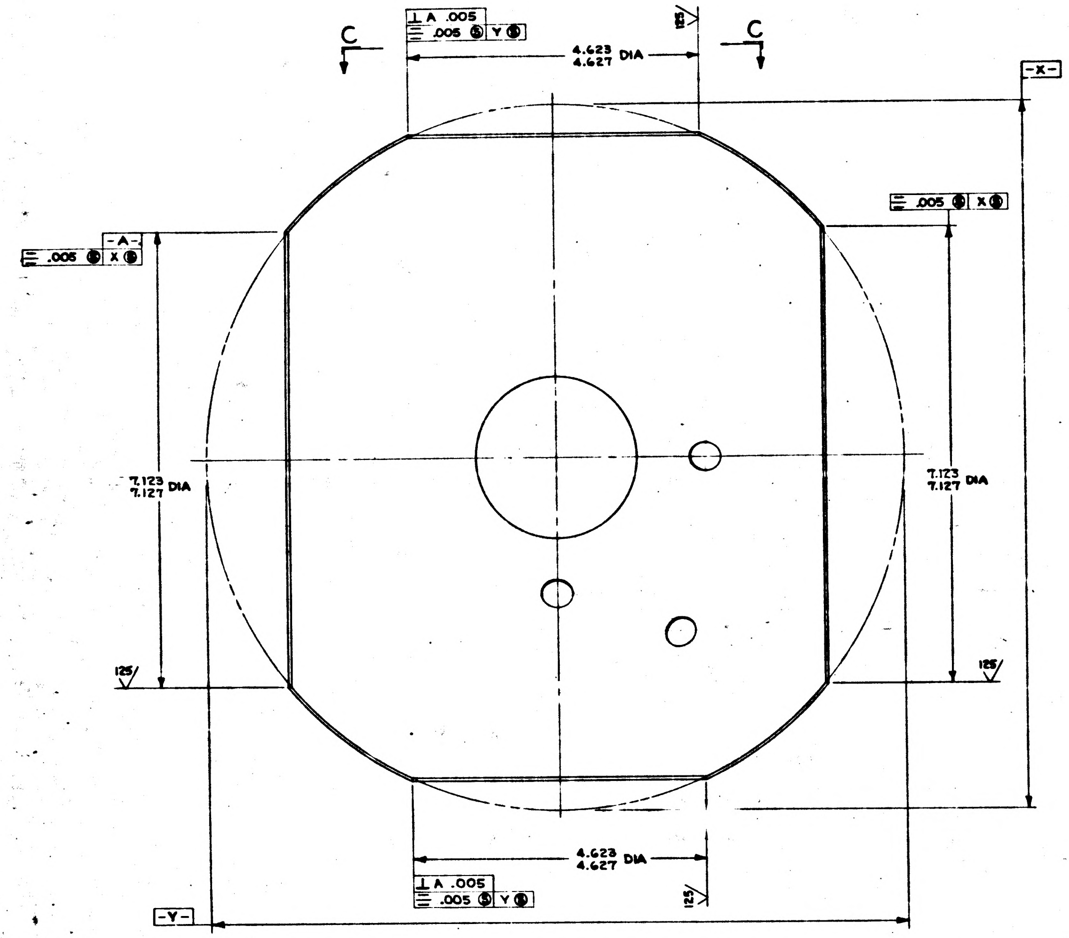
2.281
2.286
.029 REF

VIEW C-C
2 PLACES

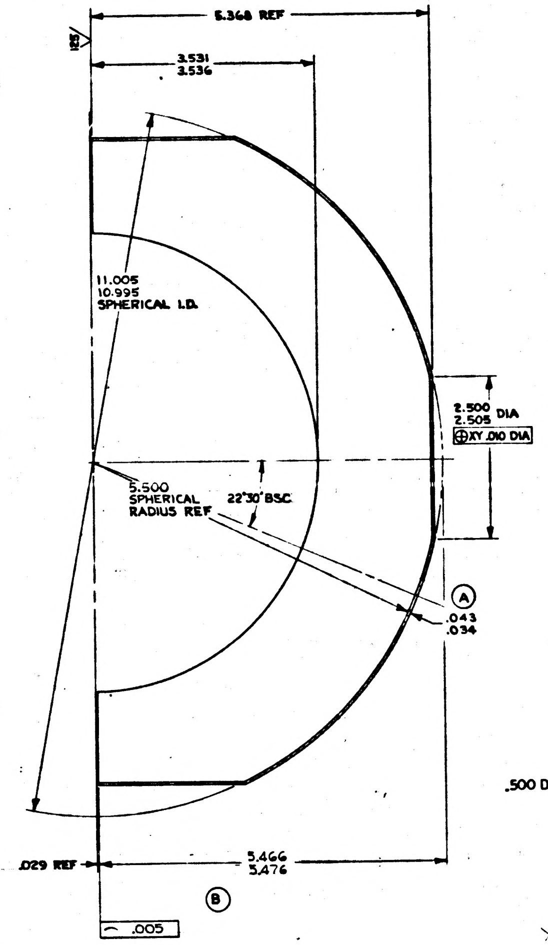


.500
.502 DIA
3 HOLES
⊕ .020 DIA
25° BSC

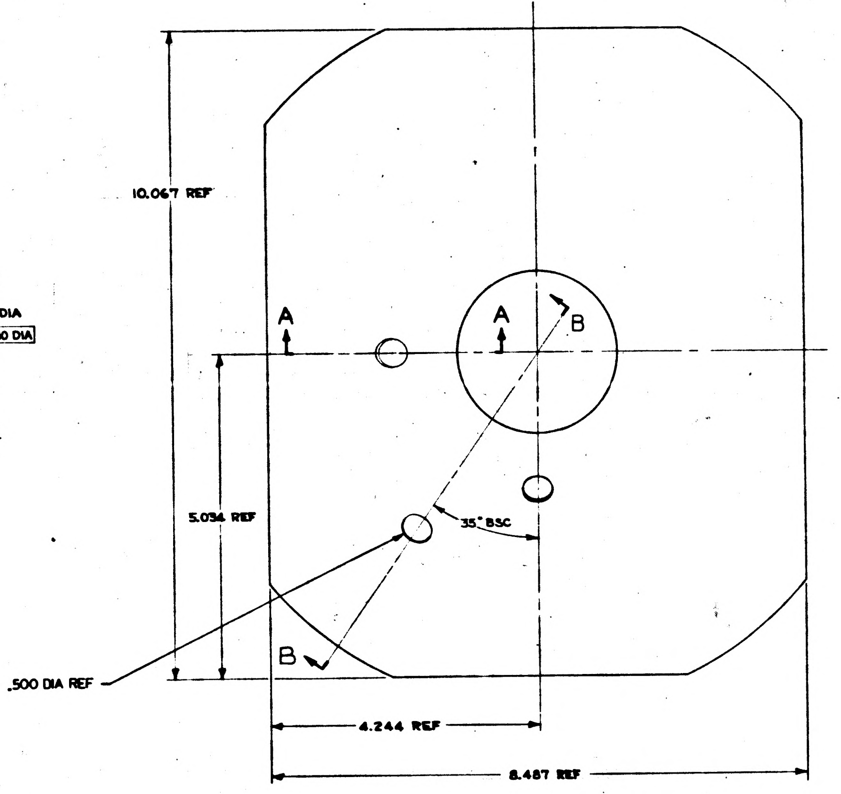
SECTION A-A



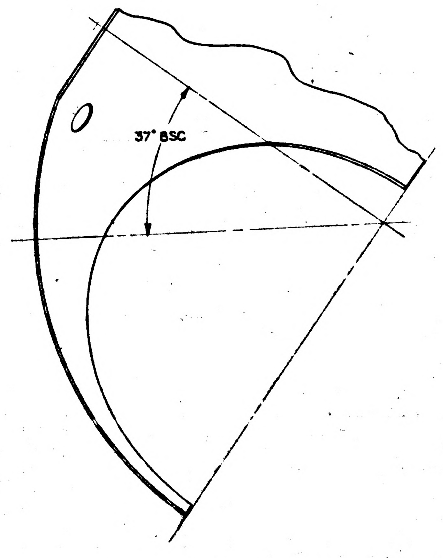
C
C
⊥ A .005
≡ .005 Ⓢ Y Ⓜ
4.623
4.627 DIA
125
-X-
≡ .005 Ⓢ X Ⓜ
-A-
≡ .005 Ⓢ X Ⓜ
7.123
7.127 DIA
7.123
7.127 DIA
125
125
4.623
4.627 DIA
⊥ A .005
≡ .005 Ⓢ Y Ⓜ
125
-Y-



5.368 REF
3.531
3.536
125
11.005
10.995
SPHERICAL I.D.
2.500
2.505 DIA
⊕ XY .010 DIA
5.500
SPHERICAL
RADIUS REF
22°30' BSC
Ⓐ
.043
.034
.029 REF
5.466
5.476
Ⓑ
⌒ .005



10.067 REF
A
A
B
5.034 REF
35° BSC
B
.500 DIA REF
4.244 REF
8.487 REF



SECTION B-B

NOTES
1 MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O
2 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3 BREAK ALL SHARP EDGES $^{.005}_{.015}$
Ⓑ 4 IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000066	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED		7-10-63
CHECKED		
DRAWN	RES	1-14-63
APPROVED FOR MSC		7/12/63
MIT/IL APPROVAL		DATE

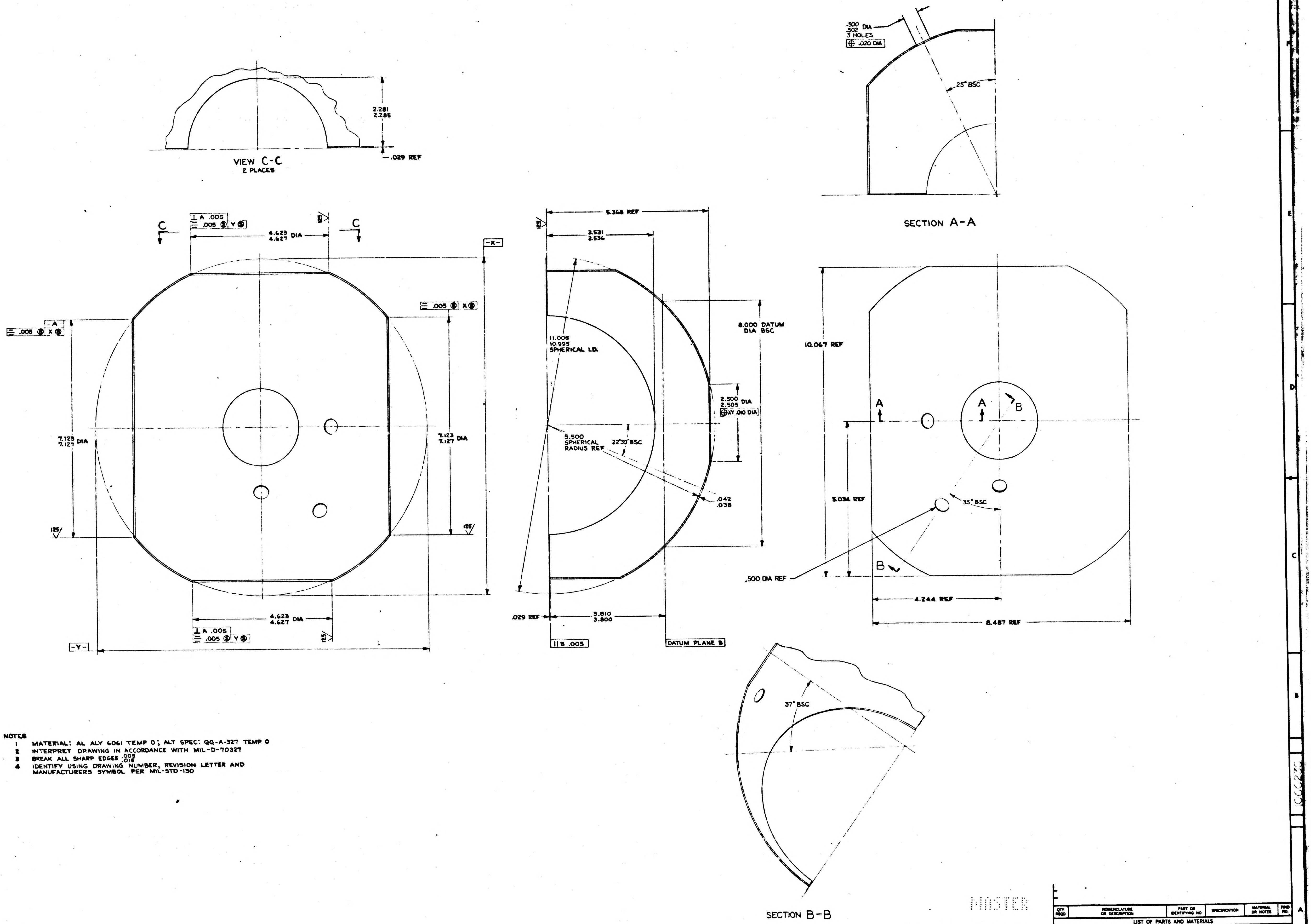
HEMISPHERE
FIXED
OUTER GIMBAL

SCALE | UNIT WT. | CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000230
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 30615				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



VIEW C-C
2 PLACES
2.281
2.285
.029 REF
.500 DIA
.502
3 HOLES
⊕ .020 DIA
25° BSC
SECTION A-A
C
C
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
4.623 DIA
4.627
-X-
-A-
≡ .005 Ⓢ X Ⓢ
≡ .005 Ⓢ X Ⓢ
7.123 DIA
7.127
7.123 DIA
7.127
125
4.623 DIA
4.627
⊥ A .005
≡ .005 Ⓢ Y Ⓢ
-Y-
5.368 REF
3.531
3.536
11.005
10.995
SPHERICAL I.D.
5.500
SPHERICAL
RADIUS REF
22°30' BSC
8.000 DATUM
DIA BSC
2.500 DIA
2.505
⊕ XY .010 DIA
.042
.038
.029 REF
3.810
3.800
∥ B .005
DATUM PLANE B
10.067 REF
A
A
B
5.034 REF
35° BSC
.500 DIA REF
B
4.244 REF
8.487 REF
37° BSC
SECTION B-B

NOTES
1 MATERIAL: AL ALY 6061 TEMP O; ALT SPEC: QQ-A-327 TEMP O
2 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
3 BREAK ALL SHARP EDGES $^{.005}_{.015}$
4 IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
	DL1000201	DO NOT SCALE THIS DRAWING
1000066	DL1000001	MATERIAL: SEE NOTE 1
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153	DATE	HEMISPHERE FIXED OUTER GIMBAL
APPROVED	7-20-63	
CHECKED		
DRAWN RES	1-14-63	
APPROVED FOR MSC	4/10/63	
MIT/IL APPROVAL	DATE	
	20 March 63	

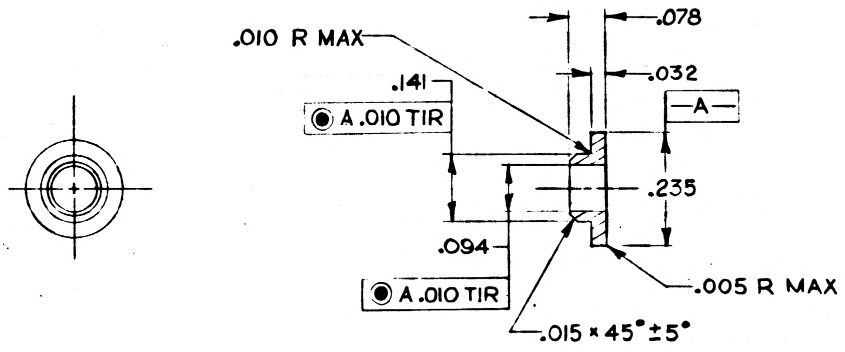
SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000230
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000231

REVISIONS TDRR 006'5				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
3. $\sqrt{}^{63}$ ALL OVER
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN. E-300
5. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS ±.005 ANGLES —
	DL 1000201	DO NOT SCALE THIS DRAWING
1000234	DL 1000001	MATERIAL: CRES 303 COND A FIN. COLD ALT: QQ-S-763 COND A FIN. COLD
NEXT ASSY	USED ON	
APPLICATION		

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	G Boyce	3/20/63
CHECKED		
DRAWN	D.M.WHITE	2-27-63
APPROVED FOR MSC		3/2/63
MIT/IL APPROVAL		DATE
W Kuffer		20 Mar 63

GUIDE, SPRING,
PRESSURE VALVE

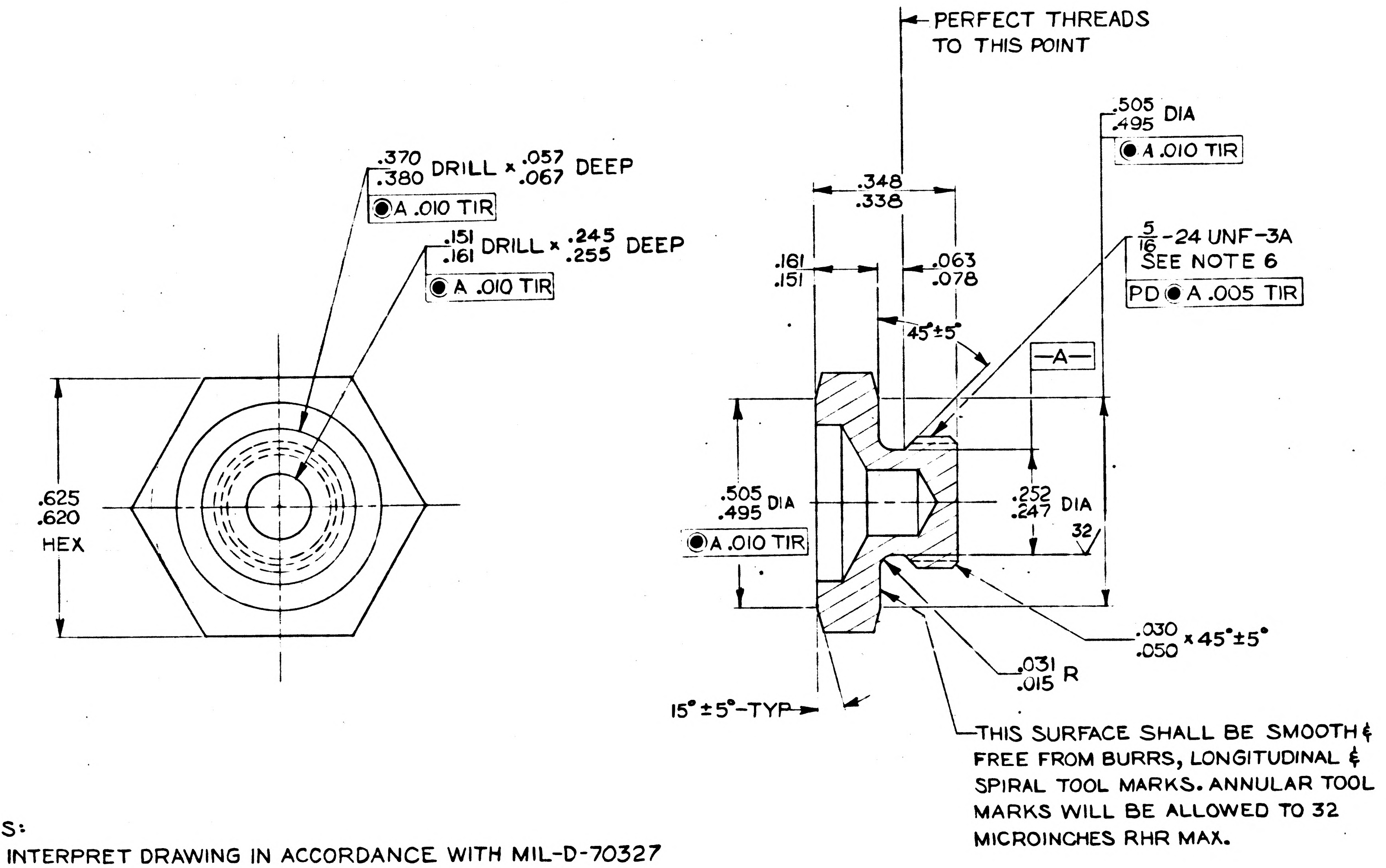
SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000231
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615

ZONE	SYM	DESCRIPTION	DATE	APPROVAL


PERFECT THREADS TO THIS POINT
.505 .495 DIA
● A .010 TIR
.370 .380 DRILL × .057 .067 DEEP
● A .010 TIR
.151 .161 DRILL × .245 .255 DEEP
● A .010 TIR
.348 .338
.161 .151
.063 .078
5/16-24 UNF-3A SEE NOTE 6
PD ● A .005 TIR
45°±5°
-A-
.625 .620 HEX
.505 .495 DIA
● A .010 TIR
.252 .247 DIA
32
.030 .050 × 45°±5°
.031 .015 R
15°±5°-TYP
THIS SURFACE SHALL BE SMOOTH & FREE FROM BURRS, LONGITUDINAL & SPIRAL TOOL MARKS. ANNULAR TOOL MARKS WILL BE ALLOWED TO 32 MICROINCHES RHR MAX.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES .005/.015
3. 63/ UNLESS OTHERWISE SPECIFIED
4. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 FIN. E-300
5. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
6. THREAD SPEC MIL-S-7742

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000234	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: CRES 303 COND A FIN. COLD ALT: QQ-S-763 COND A FIN. COLD

MIT INSTRUMENTATION LAB CONTRACT
NAS 9-153

		DATE
APPROVED	J Boyce	3-20-63
CHECKED		
DRAWN	D.M.WHITE	2-28-63
APPROVED FOR MSC		3/20/63
MIT/IL APPROVAL		DATE
	W Kupfer	20 Mar 63

PLUG,
PRESSURE VALVE

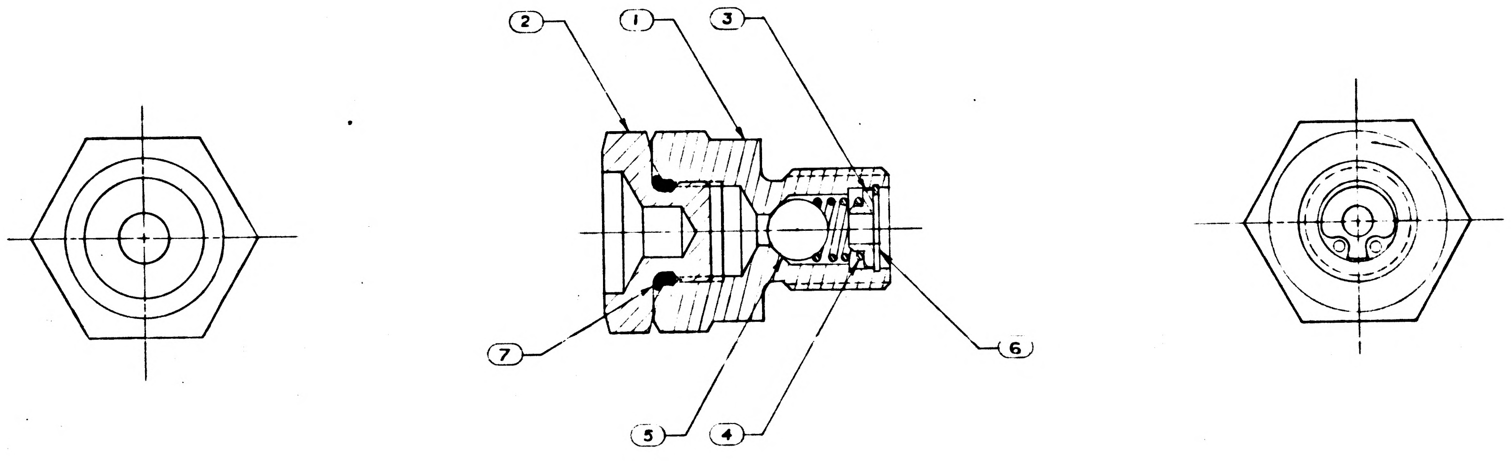
SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000232
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000232

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO. AND REVISION LETTER PER MIL-STD-130
3. LEAKAGE; NOT TO EXCEED 1.0×10^{-5} CC/SEC AIR AT 30 PSIG AND 68°F ± 5°F

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
1	O-RING	1000254			7
1	RING, RETAINING, INTERNAL	MS-16625-4025			6
1	BALL	MS-134354			5
1	SPRING	MS-24585-C38			4
1	GUIDE, SPRING	1000231			3
1	PLUG	1000232			2
1	BODY	1000233			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL 1000201
1000001	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	3-20-63
CHECKED		
DRAWN	D.M.WHITE	3-5-63
APPROVED FOR MSC		4 h d 63
MIT/IL APPROVAL	W Coffer	1 Ap 63

VALVE, PRESSURE,
ASSEMBLY

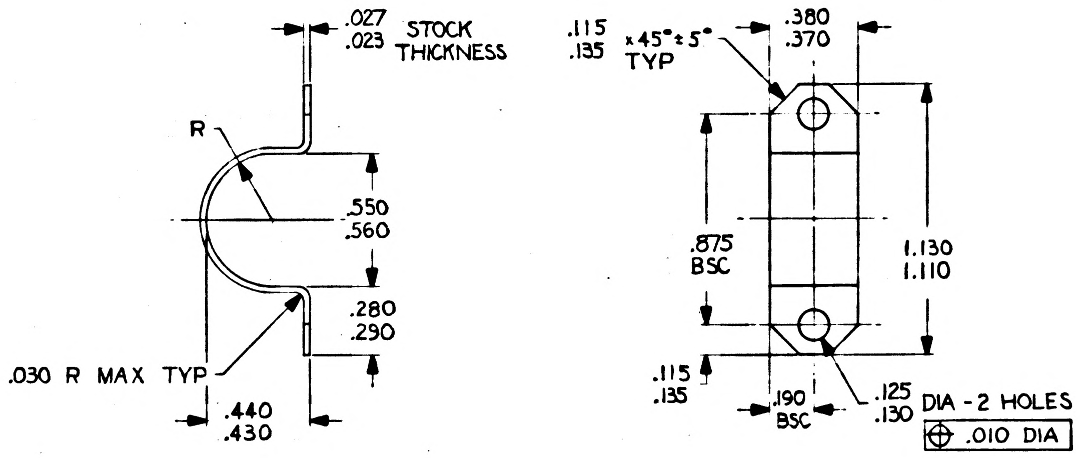
SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000234
SHEET 1 OF 1

1000234

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


.027
.023 STOCK THICKNESS
R
.550
.560
.280
.290
.030 R MAX TYP
.440
.430
.115
.135 x45°±5° TYP
.380
.370
.875 BSC
1.130
1.110
.115
.135
.190 BSC
.125
.130 DIA - 2 HOLES
⊕ .010 DIA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY 6061 TEMP T6. ALT SPEC QQ-A-327 TEMP T6.
3. UNLESS OTHERWISE SPECIFIED: SURFACE ROUGHNESS AS ROLLED. PUNCHED, CUT, OR MACHINED SURFACES TO HAVE 63√.
4. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
5. ANODIC COAT PER MIL-A-8625 TYPE 1, CLEAR.
6. IDENTIFY USING DWG NO, REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130.
7. APPROX. DEVELOPED LENGTH: 1.761 INCHES.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000202	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	3-20-63
CHECKED		
DRAWN	PALERMO	2-28-63
APPROVED FOR MSC	H Michael	3/6/63
MIT/IL APPROVAL		DATE
W Hopper		20 Mar 63

CLAMP, CAPACITOR
OUTER GIMBAL

SCALE	UNIT WT.	CODE IDENT.
2/1		

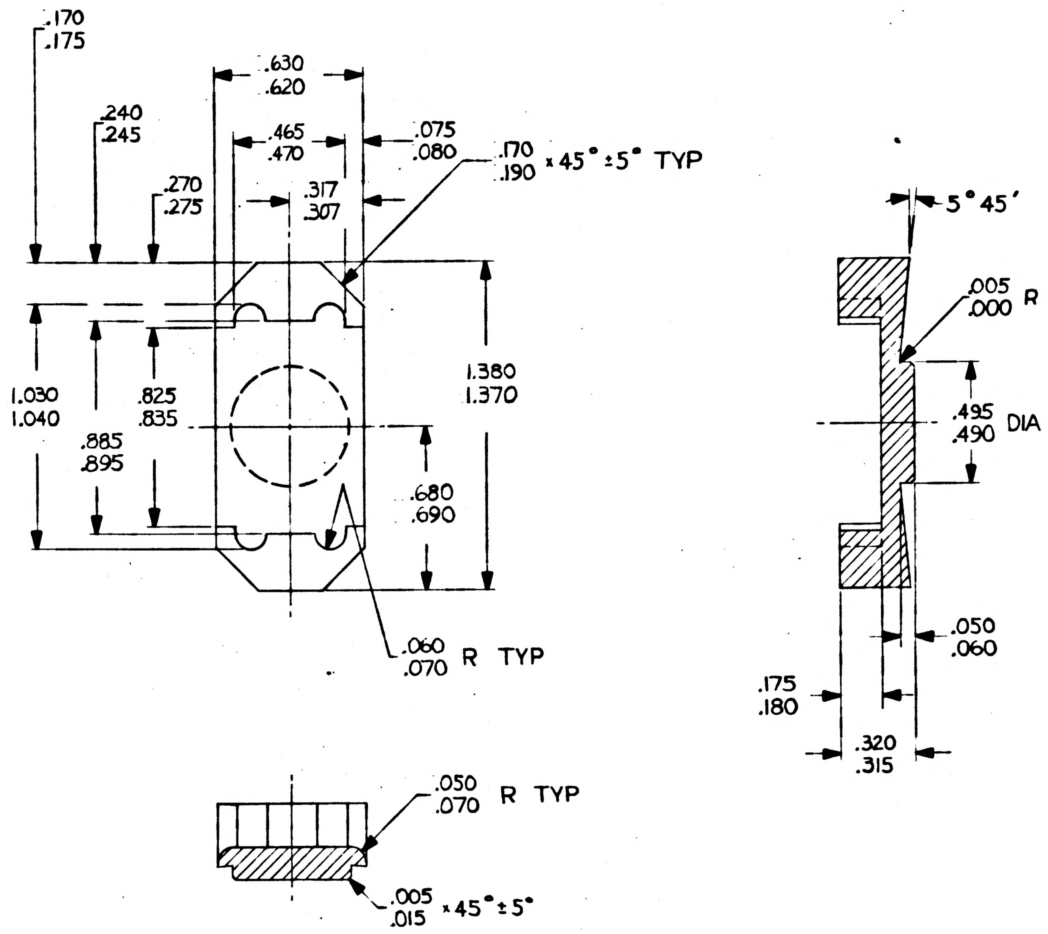
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000235
SHEET 1 OF 1

1000235

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



.170
.175
.630
.620
.240
.245
.465
.470
.075
.080
.170
.190 × 45° ± 5° TYP
.270
.275
.317
.307
1.030
1.040
.825
.835
.885
.895
1.380
1.370
.680
.690
.060
.070 R TYP
5° 45′
.005
.000 R
.495
.490 DIA
.050
.060
.175
.180
.320
.315
.050
.070 R TYP
.005
.015 × 45° ± 5°

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY 6061 TEMP T6. ALT SPEC QQ-A-325 TEMP T6 OR QQ-A-327 TEMP T6.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. INSIDE CORNERS .010 R MAX UNLESS OTHERWISE SPECIFIED.
5. IDENTIFY USING DWG NO, REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.
6. $\sqrt{63}$ ALL OVER.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000059	DL 1000201
1000066	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0° 15′
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	3-20-63
CHECKED		
DRAWN	PALERMO	2-28-63

APPROVED FOR MSC
K Michael 3/20/63
MIT/IL APPROVAL DATE
W Kupfer 20 Mar 63

MOUNT, CONNECTOR
OUTER GIMBAL

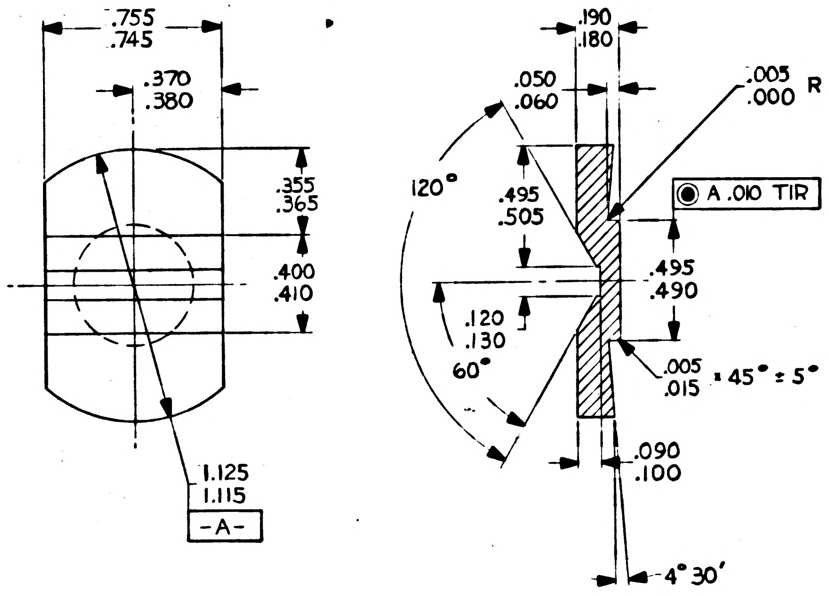
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000236
SHEET 1 OF 1

1000236

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY 6061 TEMP T6. ALT SPEC: QQ-A-325 TEMP T6 OR QQ-A-327 TEMP T6.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. INSIDE CORNERS .010 R UNLESS OTHERWISE SPECIFIED.
5. IDENTIFY USING DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130.
6. $\overset{63}{\surd}$ ALL OVER

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000059	DL1000201
1000066	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0° 15′
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJBoyce	3-20-63
CHECKED		
DRAWN	PALERMO	3-4-63
APPROVED FOR MSC		3/20/63
MIT/IL APPROVAL		DATE
W Kupfer 20 Mar 63		

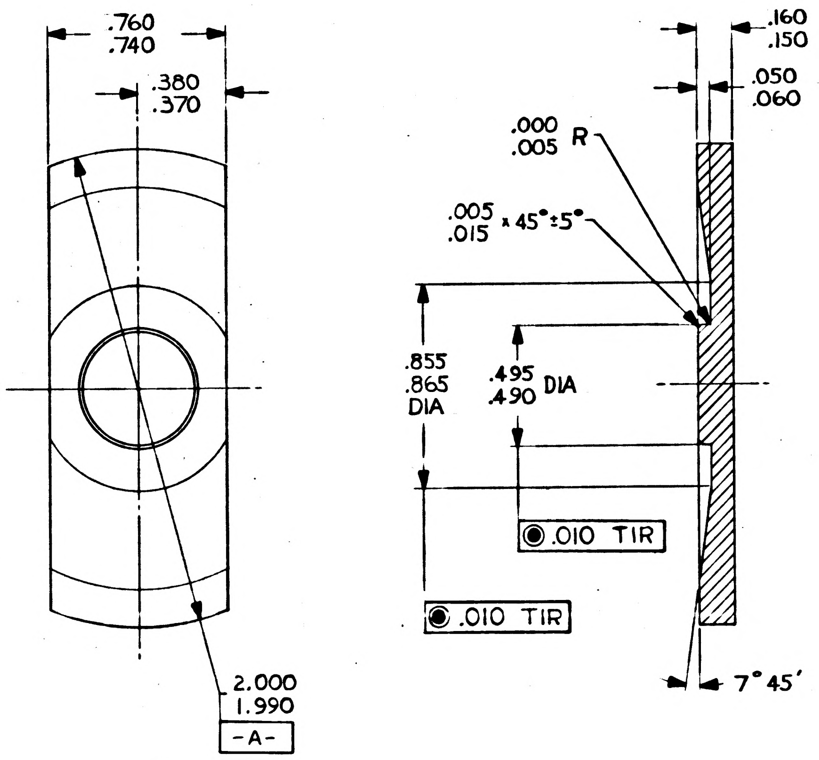
PLATE,
CAPACITOR MOUNTING
OUTER GIMBAL

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000237
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY TYPE 6061 TEMP T6. ALT SPEC QQ-A-325 TEMP T6 OR QQ-A-327 TEMP T6.
3. $\overset{63}{\vee}$ ALL OVER.
4. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
5. IDENTIFY USING DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000066	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS —— ANGLES ±0° 15′
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		3-20-63
CHECKED		
DRAWN	PALERMO	3-4-63
APPROVED FOR MSC		3/20/63
MIT/IL APPROVAL		DATE

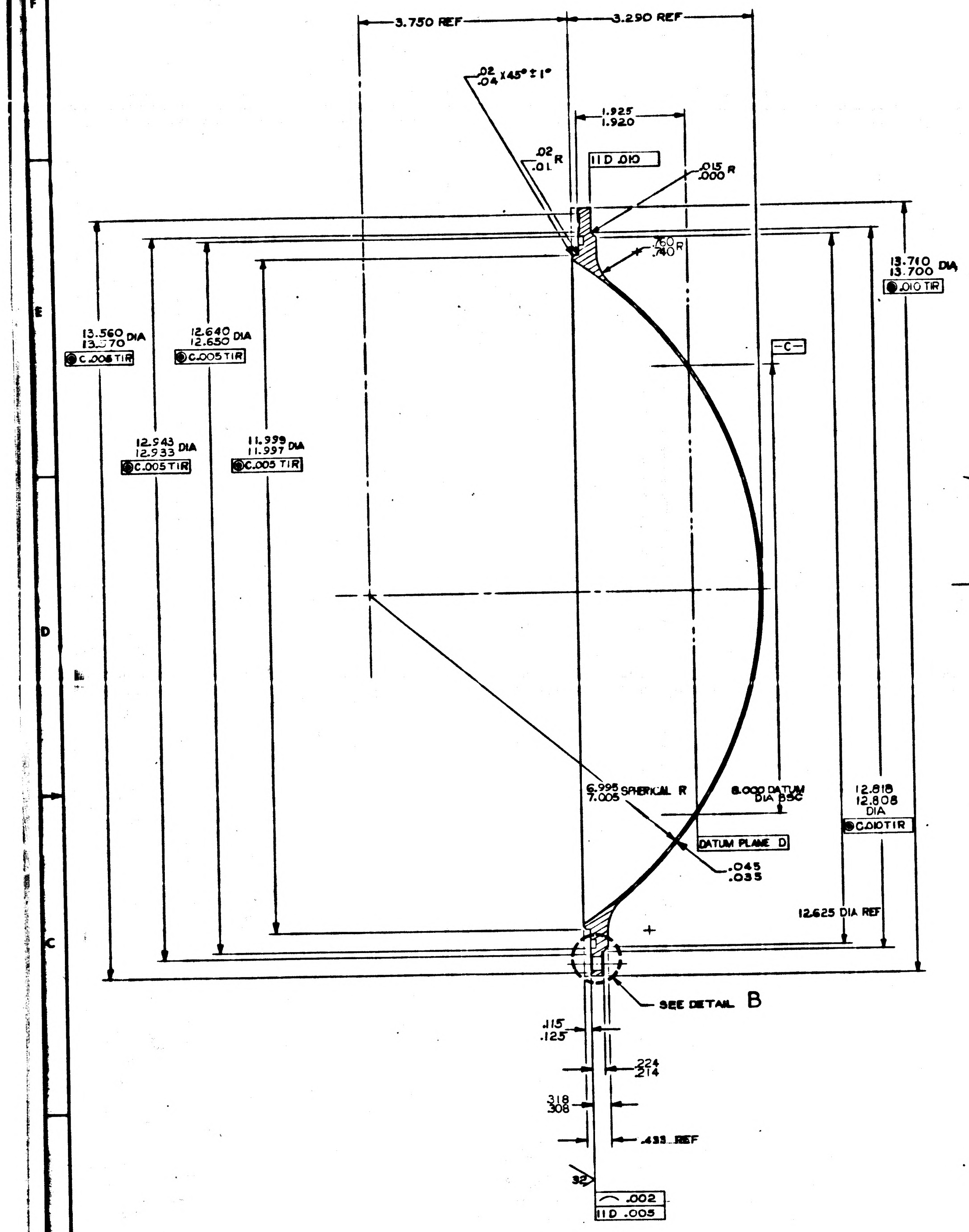
PLATE, MOUNTING
28 V REGULATOR
OUTER GIMBAL

SCALE	UNIT WT.	CODE IDENT.
2/1		

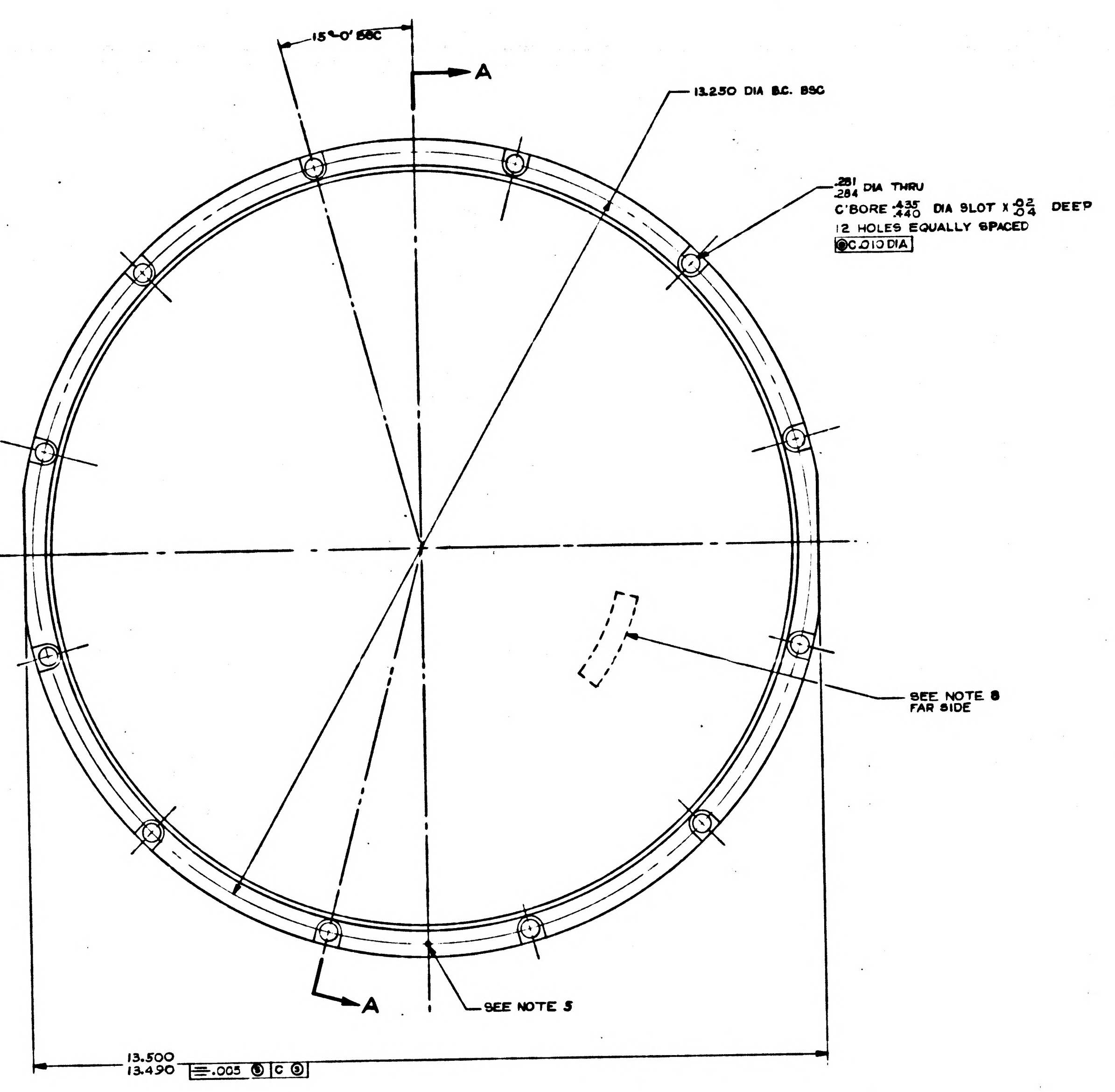
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000238
SHEET 1 OF 1

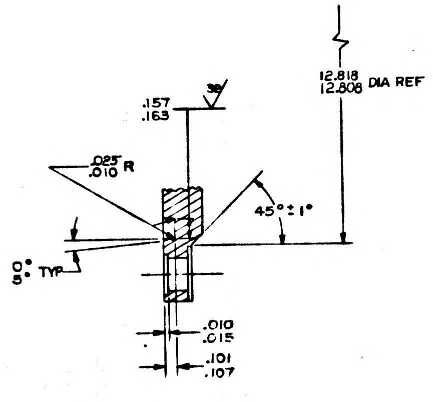
1000238

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY


3.750 REF
3.290 REF
.02 .04 X 45° ± 1°
1.925 1.920
.02 .01 R
11 D .010
.015 .000 R
.760 .740 R
13.710 13.700 DIA
.010 TIR
13.560 13.570 DIA
C .005 TIR
12.640 12.650 DIA
C .005 TIR
12.943 12.933 DIA
C .005 TIR
11.939 11.937 DIA
C .005 TIR
C
6.995 7.005 SPHERICAL R
8.000 DATUM DIA BSC
12.818 12.808 DIA
C .010 TIR
DATUM PLANE D
.045 .035
12.625 DIA REF
SEE DETAIL B
.115 .125
.224 .214
.318 .308
.433 REF
32
.002
11 D .005

SECTION A-A


15°-0' BSC
A
13.250 DIA B.C. BSC
.281 .284 DIA THRU
C'BORE .435 .440 DIA SLOT X .02 .04 DEEP
12 HOLES EQUALLY SPACED
C .010 DIA
SEE NOTE 8 FAR SIDE
A
SEE NOTE 5
13.500 13.490
.005 B C D


12.818 12.808 DIA REF
.157 .163
32
.025 .010 R
45° ± 1°
0° 5° TYP
.010 .015
.101 .107

DETAIL B
SCALE 2-1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $\genfrac{}{}{0pt}{}{.005}{.015}$
3. Ⓐ 63 MACHINE FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
4. ORDER OF OPERATIONS (PROCESS NON - MANDATORY)
   - A ROUGH MACHINE
   - B STRESS RELIEVE AT 325° F ± 10° FOR 6 HOURS ± 10 MIN
   - C FINISH MACHINE
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MINIMUM HARDNESS TO BE CHECKED AT INDICATED AREA ONLY
   - A SOLUTION HEAT TREAT AT 970° F ± 10° F FOR 2 HOURS ± 5 MINUTES AIR BLAST QUENCH
   - B AGE AT 350° F ± 10° F FOR 6 HOURS ± 10 MINUTES
6. ANODIC COAT PER MIL-A-8620 TYPE I CLEAR
7. PRESSURE TEST USING HELIUM LEAK DETECTOR ALLOWABLE LEAK RATE: 1.0×10^{-5} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
8. IDENTIFY USING DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

ZONE	SYM	REVISIONS DESCRIPTION	DATE	APPROVAL

QTY. REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000082	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: AL ALY PL6061 TEMP O, ALT SPEC QQ-A-327 TEMP O

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	E J Boyce	4-5-67
CHECKED		
DRAWN	RWC	3-8-63
APPROVED FOR MSC		
MIT/IL APPROVAL		DATE

CASE
COVER
MOVABLE

SCALE	UNIT WT.	CODE IDENT.
1-1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

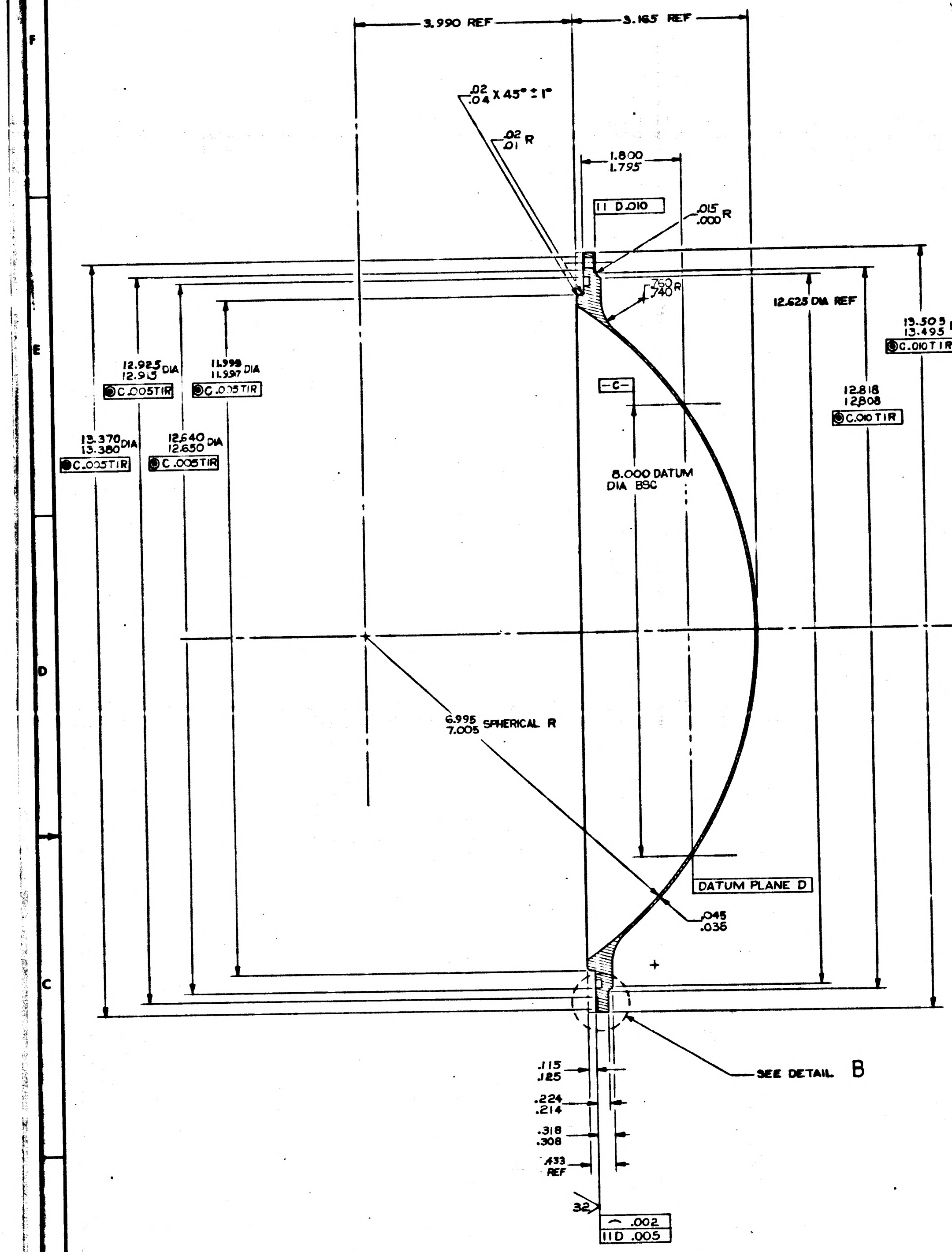
NASA DRAWING NO.
1000240

SHEET 1 OF

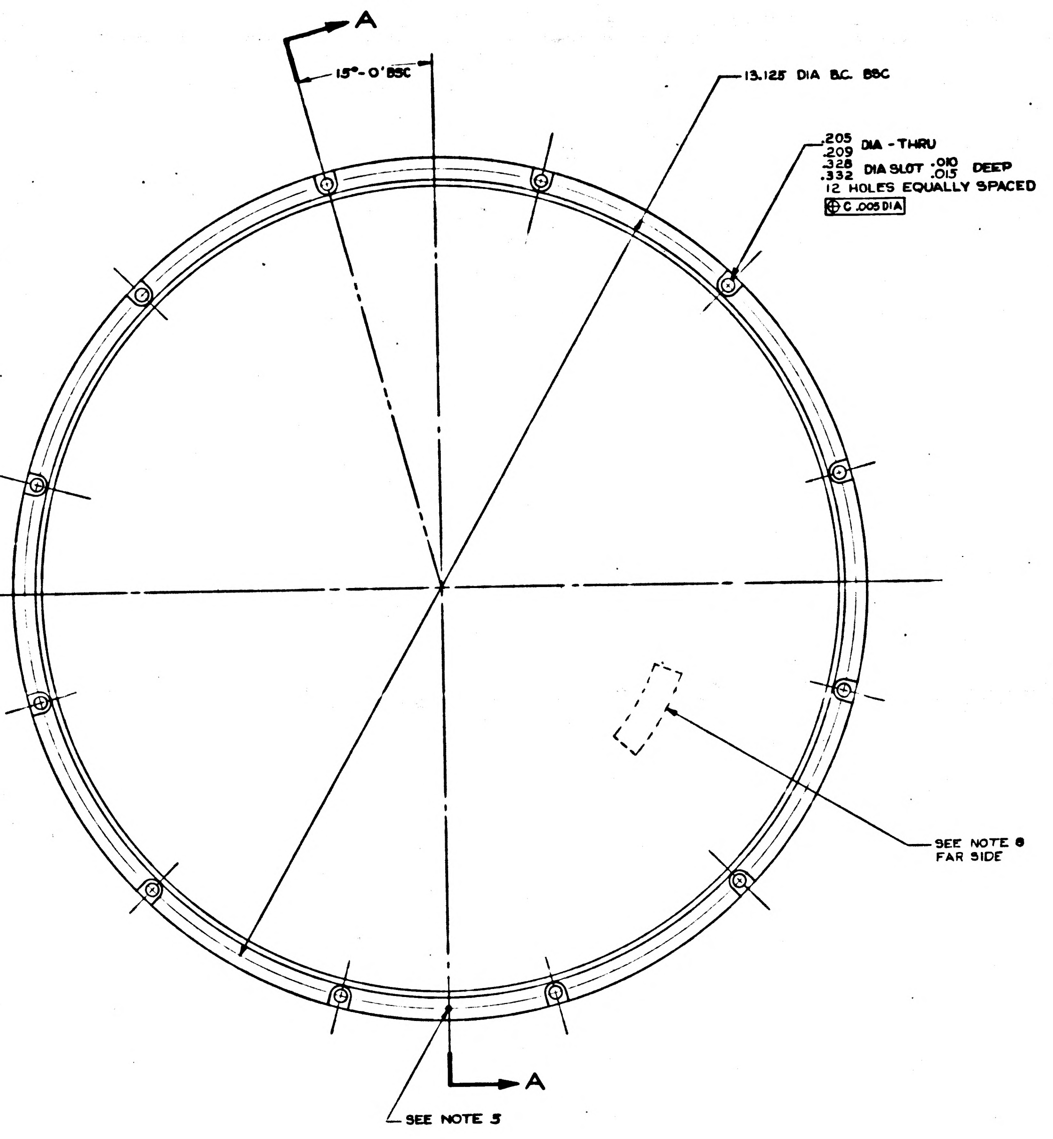
MASTER

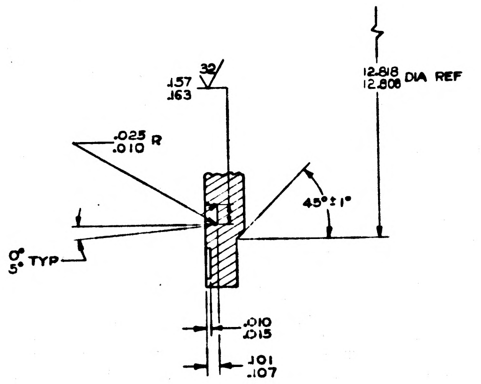
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR [illegible]				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


3.990 REF
3.165 REF
.02 .04 X 45° ± 1°
.02 .01 R
1.800 1.795
11 D.010
.015 .000 R
.760 .740 R
12.625 DIA REF
13.505 13.495 DIA
C.010 TIR
12.925 12.915 DIA
C.005TIR
11.998 11.997 DIA
C.005TIR
-C-
12.818 12.808
C.010 TIR
13.370 13.380 DIA
C.005TIR
12.640 12.650 DIA
C.005TIR
8.000 DATUM DIA BSC
6.995 7.005 SPHERICAL R
DATUM PLANE D
.045 .035
SEE DETAIL B
.115 .125
.224 .214
.318 .308
.433 REF
32
⌒ .002
11D .005

SECTION A-A


A
15°-0' BSC
13.125 DIA B.C. BSC
.205 .209 DIA - THRU
.328 .332 DIA SLOT .010 .015 DEEP
12 HOLES EQUALLY SPACED
C .005 DIA
SEE NOTE 8 FAR SIDE
SEE NOTE 5
A


.157 .163
32
12.818 12.808 DIA REF
.025 .010 R
45° ± 1°
0° 5° TYP
.010 .015
.101 .107

DETAIL B
SCALE 2-1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$
3. 63✓ MACHINE FINISH ALL OVER EXCEPT AS NOTED
4. ORDER OF OPERATIONS: (PROCESS NON-MANDATORY)
   - A ROUGH MACHINE
   - B STRESS RELIEVE AT 325°F ± 10°F FOR 6 HOURS ± 10 MIN.
   - C FINISH MACHINE
5. HEAT TREAT PER MIL-H-6088 TO BRINELL 70 MINIMUM HARDNESS TO BE CHECKED AT INDICATED AREA ONLY
6. ANODIC COAT PER MIL-A-8620 TYPE I CLEAR
7. PRESSURE TEST USING HELIUM LEAK DETECTOR
   ALLOWABLE LEAK RATE: 1.0×10^{-5} CC/SEC OF HELIUM @ 1 ATMOSPHERE PRESSURE DIFFERENTIAL
8. IDENTIFY USING DWG NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER MIL-STD-130

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY PL6061
TEMP O; ALT SPEC
QQ-A-327 TEMP O

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	RWC	3-8-63
APPROVED FOR MSC	[illegible]	4/10/63
MIT/IL APPROVAL	[illegible]	10-[illegible]-63

CASE
COVER
FIXED

SCALE 1-1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000241
SHEET 1 OF 1

1000241

INCHES
PHOTOGRAPHIC SCALE ONLY

1000242 A

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS TDRR 00761		
A	REVISED PER TDRR 05320	10 Dec 63	WN.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING: THE CONTAINER SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH MANUFACTURER'S NAME, IDENTIFYING NUMBER, ITEM NAME, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

DESIGN:

A. MATERIAL: COPPER OR COMMERCIAL BRONZE.

B. HARDNESS: ROCKWELL B-65 MAXIMUM.

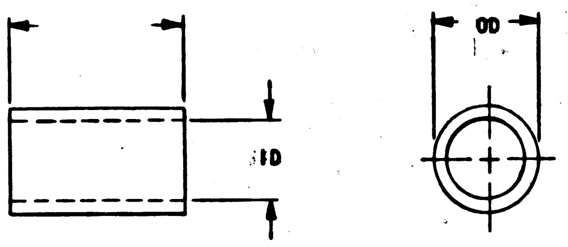
C. FINISH: ELECTRO-TIN PLATE PLUS WAX BASE OIL SOLUBLE DYE OR IRIDITE WITH CADMIUM UNDERCOAT.

±.005

TABLE I

DASH NO.	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH
	ID±.005	OD±.005				
-1	.101	.124	TIN	YOC 70	GSC 101	.265 .235
-2	.126	.154	BLUE	YOC 80	GSC 128	
-4	.149	.179	PURPLE	YOC 90	GSC 149	
-5	.156	.194	YELLOW	YOC 100	GSC 156	
-7	.175	.215	BLUE	YOC 112	GSC 175	
-8	.180	.204	BLUE	YOC 110		
-9	.187	.227	ORANGE	YOC 120	GSC 187	
-10	.194	.226	RED		GSC 194	
-11	.199	.235	TIN	YOC 128	GSC 199	
-12	.206	.244	YELLOW	YOC 130	GSC 205	
-14	.219	.250	GREEN	YOC 140	GSC 219	
-15	.225	.256	PURPLE		GSC 225	
-16	.233	.264	ORANGE	YOC 150	GSC 232	
-18	.261	.297	YELLOW	YOC 160	GSC 261	
-19	.275	.306	TIN		GSC 275	
-20	.281	.331	PURPLE	YOC 180	GSC 281	
-21	.287	.327	BLUE		GSC 287	
-22	.298	.335	GREEN	YOC 190	GSC 297	
-24	.312	.362	YELLOW	YOC 200	GSC 312	
-25	.327	.372	TIN		GSC 327	
-26	.346	.394	ORANGE	YOC 220	GSC 348	
-27	.359	.399	PURPLE		GSC 359	
-28	.375	.406	BLUE	YOC 240		
-29	.405	.453	RED	YOC 250	GSC 405	
-30	.460	.510	TIN		GSC 460	
-31	.415	.463	RED		GSC 415	
-32	.500	.550	GREEN		GSC 500	

DASH NO.	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH
	1D±.005	OD±.005				
-33	.580	.620	TIN	YOC 371G1		.265 .235
-34	.705	.755	TIN	YOC 370		
-35	.940	1.02	TIN	YOC 601		.455 .425



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kone DATE 15 MAR 63
CHECKED A. Lepese 19 MAR 63
APPROVAL A J Bloyes 9 APR 63
APPROVAL

NASA APPROVAL

MIT APPROVAL W Kupfer 10 Apr 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FERRULE, ELECTRICAL CONDUCTOR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1000242

SCALE NONE | WT | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

B 1000242

REVISIONS TDRR 00761			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 05320	20Dec63	WK
B	REVISED PER TDRR 07308	3/13/64	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING: THE CONTAINER SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH MANUFACTURER'S NAME, IDENTIFYING NUMBER, ITEM NAME, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

DESIGN:

A. MATERIAL: COPPER OR COMMERCIAL BRONZE.

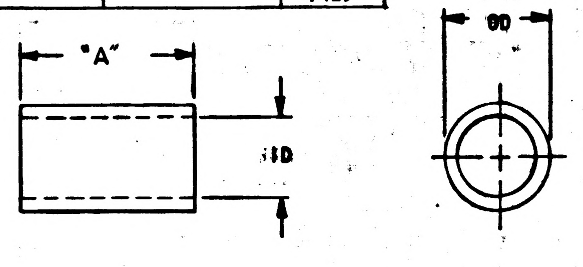
B. HARDNESS: ROCKWELL B-65 MAXIMUM.

C. FINISH: ELECTRO-TIN PLATE PLUS WAX BASE OIL SOLUBLE DYE. OR IRIDITE WITH CADMIUM UNDERCOAT.

TABLE I

DASH NO.	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH A
	ID±.005	OD±.005				
-1	.101	.124	TIN	YOC 70	GSC 101	.265 .235
-2	.126	.154	BLUE	YOC 80	GSC 128	
-4	.149	.179	PURPLE	YOC 90	GSC 149	
-5	.156	.194	YELLOW	YOC 100	GSC 156	
-7	.175	.215	BLUE	YOC 112	GSC 175	
-8	.180	.204	BLUE	YOC 110		
-9	.187	.227	ORANGE	YOC 120	GSC 187	
-10	.194	.226	RED		GSC 194	
-11	.199	.235	TIN	YOC 128	GSC 199	
-12	.206	.244	YELLOW	YOC 130	GSC 205	
-14	.219	.250	GREEN	YOC 140	GSC 219	
-15	.225	.256	PURPLE		GSC 225	
-16	.233	.264	ORANGE	YOC 150	GSC 232	
-18	.261	.297	YELLOW	YOC 160	GSC 261	
-19	.275	.306	TIN		GSC 275	
-20	.281	.331	PURPLE	YOC 180	GSC 281	
-21	.287	.327	BLUE		GSC 287	
-22	.298	.335	GREEN	YOC 190	GSC 297	
-24	.312	.362	YELLOW	YOC 200	GSC 312	
-25	.327	.372	TIN		GSC 327	
-26	.346	.394	ORANGE	YOC 220	GSC 348	
-27	.359	.399	PURPLE		GSC 359	
-28	.375	.406	BLUE	YOC 240		
-29	.405	.453	RED	YOC 250	GSC 405	
-30	.460	.510	TIN		GSC 460	
-31	.415	.463	RED		GSC 415	
-32	.500	.550	GREEN		GSC 500	

DASH NO.	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH A
	ID±.005	OD±.005				
-33	.580	.620	TIN	YOC 371G1		.265
-34	.705	.755	TIN	YOC 370		.235
-35	.940	1.02	TIN	YOC 601		.455 .425
-36	.590	.670	RED		GSC590	
-37	.710	.790	BLUE		GSC710	.455 .425
-38	.840	.920	GRAY		GSC840	
-39	1.010	1.090	BROWN		GSC1010	
-40	1.130	1.210	GREEN		GSC1130	
-41	1.250	1.330	PINK		GSC1250	
-42	1.332	1.412	ORANGE		GSC1332	
-43	1.440	1.520	PURPLE		GSC1440	
-44	1.563	1.643	YELLOW		GSC1563	.455 .425



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kone DATE 15 MAR 63
CHECKED A. Lessee 19 MAR 63
APPROVAL A J Blye 9 APR 63
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 10 Apr 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FERRULE, ELECTRICAL CONDUCTOR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. SIZE C NASA DRAWING NO. 1000242
SCALE NONE WT SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000242 C

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS TDRR 00761		
A	REVISED PER TDRR 05320	20 Dec 63	WK
B	REVISED PER TDRR 07308	3/13/64	WK
C	REVISED PER TDRR 07588	4/14/64	WK

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REQUIREMENTS:

GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING: THE CONTAINER SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH MANUFACTURER'S NAME, IDENTIFYING NUMBER, ITEM NAME, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

DESIGN:

A. MATERIAL: COPPER OR COMMERCIAL BRONZE.

B. HARDNESS: ROCKWELL B-65 MAXIMUM.

C. FINISH: ELECTRO-TIN PLATE PLUS WAX BASE OIL SOLUBLE DYE. OR IRIDITE WITH CADMIUM UNDERCOAT.

TABLE I

DASH NO.	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH A
	ID±.005	OD±.005				
-1	.101	.124	TIN	YOC 70	GSC 101	.265 .235
-2	.126	.154	BLUE	YOC 80	GSC 128	
-4	.149	.179	PURPLE	YOC 90	GSC 149	
-5	.156	.194	YELLOW	YOC 100	GSC 156	
-7	.175	.215	BLUE	YOC 112	GSC 175	
-8	.180	.204	BLUE	YOC 110		
-9	.187	.227	ORANGE	YOC 120	GSC 187	
-10	.194	.226	RED		GSC 194	
-11	.199	.235	TIN	YOC 128	GSC 199	
-12	.206	.244	YELLOW	YOC 130	GSC 205	
-14	.219	.250	GREEN	YOC 140	GSC 219	
-15	.225	.256	PURPLE		GSC 225	
-16	.233	.264	ORANGE	YOC 150	GSC 232	
-18	.261	.297	YELLOW	YOC 160	GSC 261	
-19	.275	.306	TIN		GSC 275	
-20	.281	.331	PURPLE	YOC 180	GSC 281	
-21	.287	.327	BLUE		GSC 287	
-22	.298	.335	GREEN	YOC 190	GSC 297	
-24	.312	.362	YELLOW	YOC 200	GSC 312	
-25	.327	.372	TIN		GSC 327	
-26	.346	.394	ORANGE	YOC 220	GSC 348	
-27	.359	.399	PURPLE		GSC 359	
-28	.375	.406	BLUE	YOC 240		
-29	.405	.453	RED	YOC 250	GSC 405	
-30	.460	.510	TIN		GSC 460	
-31	.415	.463	RED		GSC 415	
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DASH NO.	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH A
	1D±.005	OD±.005				
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-34	.705	.755	TIN	YOC 370		.235
-35	.940	1.02	TIN	YOC 601		.455 .425
-36	.590	.670	RED		GSC590	
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-38	.840	.920	GRAY		GSC840	
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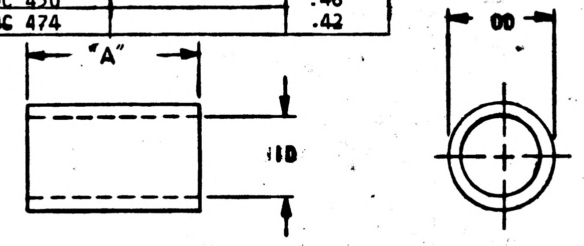
-42	1.332	1.412	ORANGE		GSC1332	
-43	1.440	1.520	PURPLE		GSC1440	.455
-44	1.563	1.643	YELLOW		GSC1563	.425
-45	.670	.750	TIN	YOC 430		.46
-46	.740	.820	TIN	YOC 474		.42



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTES
HEAT TREATMENT
NONE
FINAL FINISH
NONE

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DWG. NO. CONTRACT
DRAWN R. Kane DATE 15 MAR 63
CHECKED A. Reese 19 MAR 63
APPROVAL A J Boyce 9 APR 63
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 10 Apr 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FERRULE, ELECTRICAL CONDUCTOR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. — SIZE C NASA DRAWING NO. 1000242
SCALE NONE WT SHEET 1 OF 1

INCHES
0 1 2
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1000242

REVISIONS TDRR 00761

SYM	DESCRIPTION	DATE	APPROVAL

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REQUIREMENTS:

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C. MARKING: THE CONTAINER SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH MANUFACTURER'S NAME, IDENTIFYING NUMBER, ITEM NAME, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

DESIGN:

A. MATERIAL: COPPER OR COMMERCIAL BRONZE.

B. HARDNESS: ROCKWELL B-65 MAXIMUM.

C. FINISH: ELECTRO-TIN PLATE PLUS WAX BASE OIL SOLUBLE DYE OR IRIDITE WITH CADMIUM UNDERCOAT.

±.0e5

TABLE I

DASH NO.	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS
	ID±.005	OD±.005			
-1	.101	.124	TIN	YOC 70	GSC 101
-2	.126	.154	BLUE	YOC 80	GSC 128
-4	.149	.179	PURPLE	YOC 90	GSC 149
-5	.156	.194	YELLOW	YOC 100	GSC 156
-7	.175	.215	BLUE	YOC 112	GSC 175
-8	.180	.204	BLUE	YOC 110	
-9	.187	.227	ORANGE	YOC 120	GSC 187
-10	.194	.226	RED		GSC 194
-11	.199	.235	TIN	YOC 128	GSC 199
-12	.206	.244	YELLOW	YOC 130	GSC 205
-14	.219	.250	GREEN	YOC 140	GSC 219
-15	.225	.256	PURPLE		GSC 225
-16	.233	.264	ORANGE	YOC 150	GSC 232
-18	.261	.297	YELLOW	YOC 160	GSC 261
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-20	.281	.331	PURPLE	YOC 180	GSC 281
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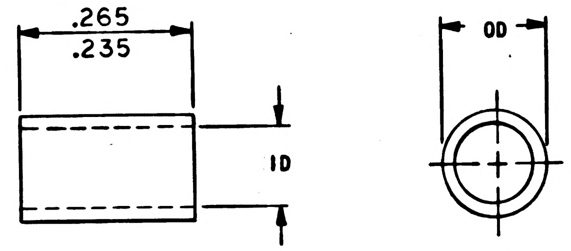
-26	.346	.394	ORANGE	YOC 220	GSC 348
-27	.359	.399	PURPLE		GSC 359
-28	.375	.406	BLUE	YOC 240	
-29	.405	.453	RED	YOC 250	GSC 405
-30	.460	.510	TIN		GSC 460
-31	.415	.463	RED		GSC 415
-32	.500	.550	GREEN		GSC 500



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

HEAT TREATMENT
NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kome DATE 15 MAR 63
CHECKED 19 MAR 63
APPROVAL 9 APR 63
APPROVAL

NASA APPROVAL

MIT APPROVAL 10 Apr 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FERRULE, ELECTRICAL CONDUCTOR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1000242

SCALE NONE | WT | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

4 3 2 1

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1000243 A

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REVISIONS TDRR 00761			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 05319	20Dec63	WK

REQUIREMENTS:

GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING: THE CONTAINER SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH MANUFACTURER'S NAME, IDENTIFYING NUMBER, ITEM NAME, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

DESIGN:

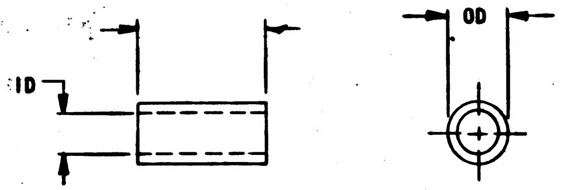
A. MATERIAL: BRASS OR COMMERCIAL BRONZE.

B. HARDNESS: ROCKWELL B70-90 (15 T 83.5-90).

C. FINISH: ELECTRO-TIN PLATE PLUS WAX BASE OIL SOLUBLE DYE OR IRIDITE WITH CADMIUM UNDERCOAT.

DASH NUMBER	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH
	ID±.005	OD±.005				
-1	.046	.070	TIN	Y1C 046	GSB 046	.327 .297
-2	.058	.083	YELLOW	Y1C 058	GSB 058	
-3	.063	.088	RED	Y1C 063	GSB 063	
-4	.071	.096	GREEN	Y1C 071	GSB 071	
-5	.080	.104	BLUE	Y1C 080	GSB 080	
-6	.090	.114	ORANGE	Y1C 090	GSB 090	
-7	.096	.119	PURPLE		GSB 096	
-8	.101	.124	YELLOW	Y1C 101	GSB 101	
-9	.109	.131	RED	Y1C 109	GSB 109	
-10	.115	.146	TIN	Y1C 115	GSB 124	
-11	.124	.145	GREEN	Y1C 124		
-12	.125	.156	YELLOW	Y1C 125		
-13	.128	.152	TIN		GSB 128	
-14	.134	.156	ORANGE	Y1C 134	GSB 134	
-15	.150	.181	BLUE	Y1C 150	GSB 149	
-16	.156	.193	RED	Y1C 156	GSB 156	
-17	.165	.194	TIN		GSB 165	
-18	.180	.204	GREEN	Y1C 180		
-19	.194	.226	BLUE	Y1C 194	GSB 194	
-20	.219	.250	TIN		GSB 219	
-21	.261	.297	BLUE	Y1C 261	GSB 261	
-22	.297	.335	RED	Y1C 297	GSB 297	
-23	.175	.215	GREEN		GSB 175	
-24	.187	.227	YELLOW		GSB 187	
-25	.205	.245	ORANGE		GSB 205	
-26	.225	.256	YELLOW		GSB 225	
-27	.232	.263	RED		GSB 232	
-28	.250	.281	GREEN		GSB 250	
-29	.266	.297	TIN		GSB 266	
-30	.275	.306	ORANGE		GSB 275	
-31	.281	.331	YELLOW		GSB 281	
-32	.287	.327	TIN		GSB 287	
-33	.312	.362	PURPLE		GSB 312	
-34	.375	.406	BLUE		GSB 375	
-35	.219	.243	TIN	Y1C 219		

DASH NUMBER	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH
	ID±.005	OD±.005				
-36	.495	.535	TIN	Y1C495G1		.327
-37	.472	.516	TIN	Y1C472G1		.297
-38	.670	.750	TIN	Y1C670		.615
-39	.810	.880	TIN	Y1C810		.585



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

HEAT TREATMENT
NONE

FINAL FINISH
NONE

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 15 MAR 63
CHECKED Al Bejere 19 MAR 63
APPROVAL C J Boyce 9 APR 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 10 Apr 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FERRULE, ELECTRICAL CONDUCTOR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 1000243
SCALE NONE WT SHEET 1 OF 1

4 3 2 1000243 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000243 B

REVISIONS TDRR 00761

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 05319	63	WK
B	REVISED PER TDRR 07316	3/31/64	WK.

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C. MARKING: THE CONTAINER SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH MANUFACTURER'S NAME, IDENTIFYING NUMBER, ITEM NAME, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

DESIGN:

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B. HARDNESS: ROCKWELL B70-90 (15 T 83.5-90).

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DASH NUMBER	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS	LENGTH L
	ID±.005	OD±.005				
-1	.046	.070	TIN	Y1C 046	GSB 046	.327 .297
-2	.058	.083	YELLOW	Y1C 058	GSB 058	
-3	.063	.088	RED	Y1C 063	GSB 063	
-4	.071	.096	GREEN	Y1C 071	GSB 071	
-5	.080	.104	BLUE	Y1C 080	GSB 080	
-6	.090	.114	ORANGE	Y1C 090	GSB 090	
-7	.096	.119	PURPLE		GSB 096	
-8	.101	.124	YELLOW	Y1C 101	GSB 101	
-9	.109	.131	RED	Y1C 109	GSB 109	
-10	.115	.146	TIN	Y1C 115	GSB 124	
-11	.124	.145	GREEN	Y1C 124		
-12	.125	.156	YELLOW	Y1C 125		
-13	.128	.152	TIN		GSB 128	
-14	.134	.156	ORANGE	Y1C 134	GSB 134	
-15	.150	.181	BLUE	Y1C 150	GSB 149	
-16	.156	.193	RED	Y1C 156	GSB 156	
-17	.165	.194	TIN		GSB 165	
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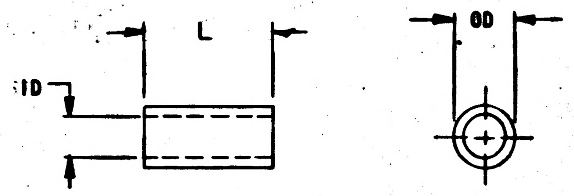
-38	.670	.750	TIN	Y1C670		.615
-39	.810	.880	TIN	Y1C810	GSB810	.585
-40	.430	.500	RED	Y1C430	GSB430	.615 .585
-41	.550	.620	BLUE	Y1C551	GSB550	
-42	.920	1.000	GREEN	Y1C920	GSB920	
-43	.990	1.120	PINK	Y1C990	GSB990	
-44	1.122	1.192	ORANGE	Y1C1122	GSB1122	
-45	1.224	1.294	PURPLE	Y1C1224	GSB1224	
-46	1.353	1.423	YELLOW		GSB1353	.615 .585



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY | USED ON

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NONE

FINAL FINISH
NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN R. Kane DATE 15 MAR 63
CHECKED 19 MAR 63
APPROVAL 9 APR 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 10 Apr 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FERRULE, ELECTRICAL CONDUCTOR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. | SIZE C | NASA DRAWING NO. 1000243

SCALE NONE | WT | SHEET 1 OF 1

1000243

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000243

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 00761			

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REQUIREMENTS:

GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3.

C. MARKING: THE CONTAINER SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH MANUFACTURER'S NAME, IDENTIFYING NUMBER, ITEM NAME, NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER.

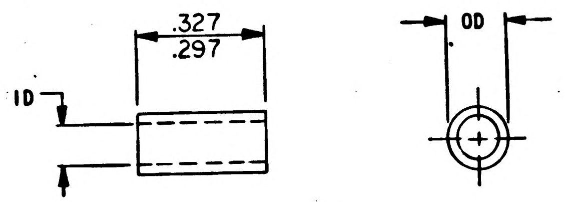
DESIGN:

A. MATERIAL: BRASS OR COMMERCIAL BRONZE.

B. HARDNESS: ROCKWELL B70-90 (15 T 83.5-90).

C. FINISH: ELECTRO-TIN PLATE PLUS WAX BASE OIL SOLUBLE DYE OR IRIDITE WITH CADMIUM UNDERCOAT.

DASH NUMBER	DIMENSIONS		COLOR	BURNDY	THOMAS & BETTS
	ID±.005	OD±.005			
-1	.046	.070	TIN	Y1C 046	GSB 046
-2	.058	.083	YELLOW	Y1C 058	GSB 058
-3	.063	.088	RED	Y1C 063	GSB 063
-4	.071	.096	GREEN	Y1C 071	GSB 071
-5	.080	.104	BLUE	Y1C 080	GSB 080
-6	.090	.114	ORANGE	Y1C 090	GSB 090
-7	.096	.119	PURPLE		GSB 096
-8	.101	.124	YELLOW	Y1C 101	GSB 101
-9	.109	.131	RED	Y1C 109	GSB 109
-10	.115	.146	TIN	Y1C 115	GSB 124
-11	.124	.145	GREEN	Y1C 124	
-12	.125	.156	YELLOW	Y1C 125	
-13	.128	.152	TIN		GSB 128
-14	.134	.156	ORANGE	Y1C 134	GSB 134
-15	.150	.181	BLUE	Y1C 150	GSB 149
-16	.156	.193	RED	Y1C 156	GSB 156
-17	.165	.194	TIN		GSB 165
-18	.180	.204	GREEN	Y1C 180	
-19	.194	.226	BLUE	Y1C 194	GSB 194
-20	.219	.250	TIN		GSB 219
-21	.261	.297	BLUE	Y1C 261	GSB 261
-22	.297	.335	RED	Y1C 297	GSB 297
-23	.175	.215	GREEN		GSB 175
-24	.187	.227	YELLOW		GSB 187
-25	.205	.245	ORANGE		GSB 205
-26	.225	.256	YELLOW		GSB 225
-27	.232	.263	RED		GSB 232
-28	.250	.281	GREEN		GSB 250
-29	.266	.297	TIN		GSB 266
-30	.275	.306	ORANGE		GSB 275
-31	.281	.331	YELLOW		GSB 281
-32	.287	.327	TIN		GSB 287
-33	.312	.362	PURPLE		GSB 312
-34	.375	.406	BLUE		GSB 375
-35	.219	.243	TIN	Y1C 219	



PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT NONE
FINAL FINISH NONE

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. Kane DATE 15 MAR 63
CHECKED Al Regere 19 MAR 63
APPROVAL C J Bligea 9 APR 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 10 Apr 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FERRULE, ELECTRICAL CONDUCTOR

SPECIFICATION CONTROL DRAWING

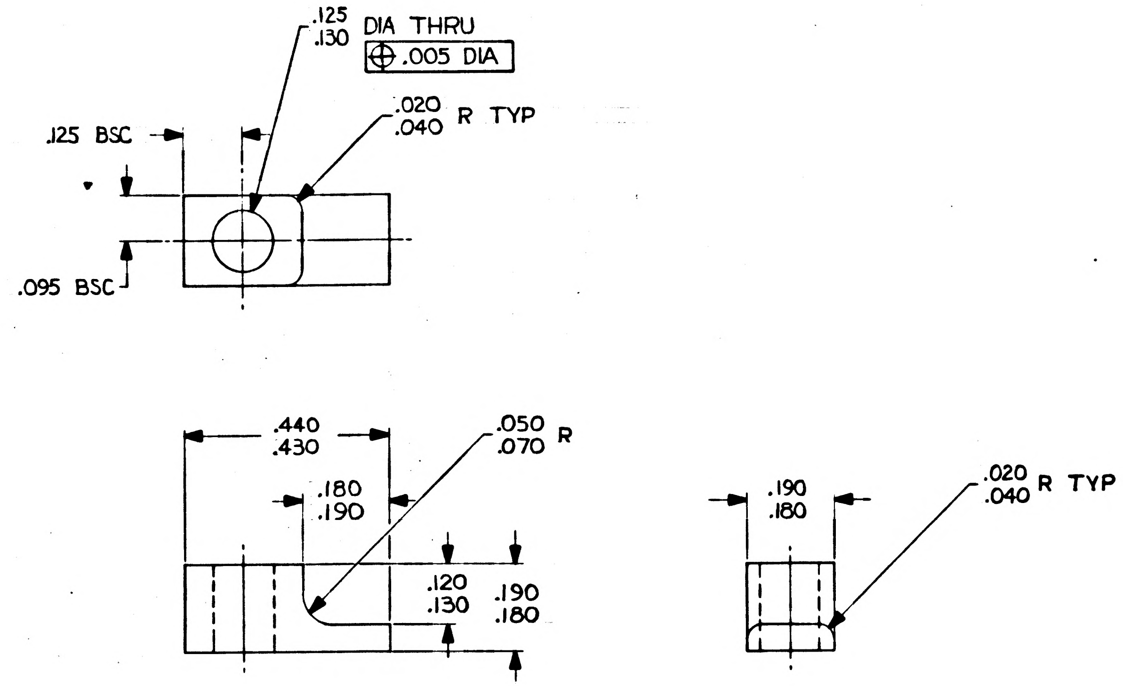
CODE IDENT NO. SIZE C NASA DRAWING NO. 1000243
SCALE NONE WT SHEET 1 OF 1

1000243

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
3. 63✓ ALL OVER.
4. MATERIAL: POLYAMIDE (NYLON) PLASTIC PER MIL-P-17091 TYPE I.
5. IDENTIFY USING DWG NO, REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000202	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		3-20-63
CHECKED		
DRAWN	PALERMO	3-5-63
APPROVED FOR MSC		8/2/63
MIT/IL APPROVAL		DATE
	20 Mar	63

CLIP
OUTER GIMBAL

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000244

SHEET 1 OF 1

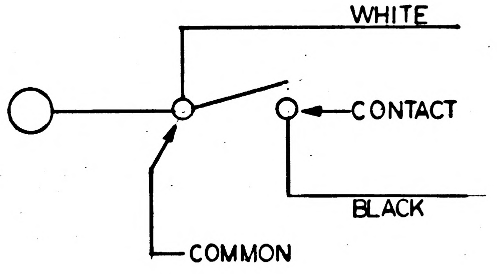
1000244

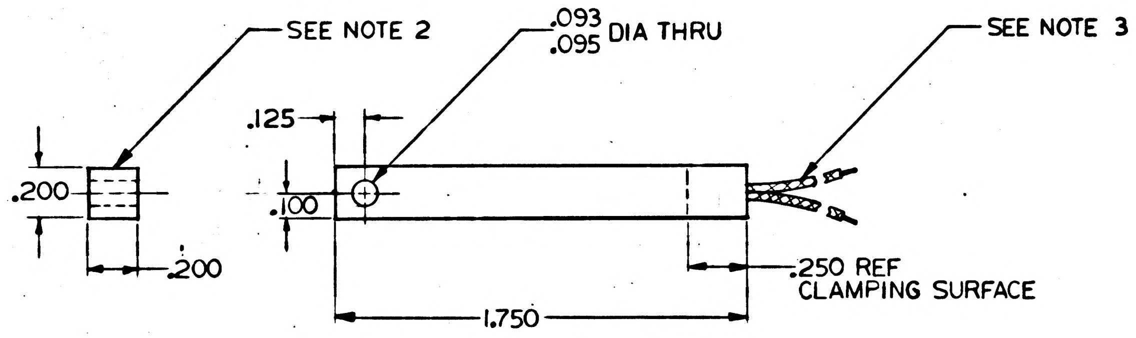
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00707	4-2-63	ajB	wk

M

WIRING DIAGRAM





NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DWG NUMBER, REVISION LETTER, SERIAL NUMBER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E-28
   LENGTH: 6 INCHES MIN
4. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND-1015404 CLASS 2
5. $\sqrt{63}$ ALL OVER
6. BREAK ALL SHARP EDGES .005 MAX
7. MATERIAL: HOUSING; AL ALY 2024 T4 ALT SPEC QQ-A-267 OR QQ-A-268
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR
9. OPERATING CHARACTERISTICS:
   CONTACT SETTING TEMP;
   MAX CLOSE 134°F
   MIN OPEN 132°F

   CONTACT RATING;
   100 MA AT 30VDC
   25 MA AT 115VAC

   AMBIENT TEMP RANGE;
   -65°F TO +150°F
   WITHOUT DAMAGE

ORIGINAL SOURCE OF SUPPLY
VAP-AIR DIV
VAPOR CORPORATION
6444 WEST HOWARD ST
CHICAGO 48, ILL
Ⓐ PART NO. 26320010-01

MASTER

1000245 A

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000247	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	J Boyce	3-20-63
CHECKED		
DRAWN	BMARTIN	3/7/63
APPROVED FOR MSC	Michael	3/20/63
MIT/IL APPROVAL	W Kupfer	20 May 63

THERMOSTAT, MERCURY
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

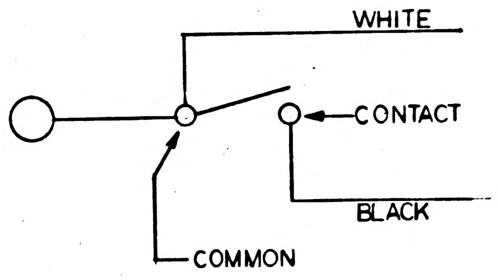
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000245
SHEET 1 OF 1

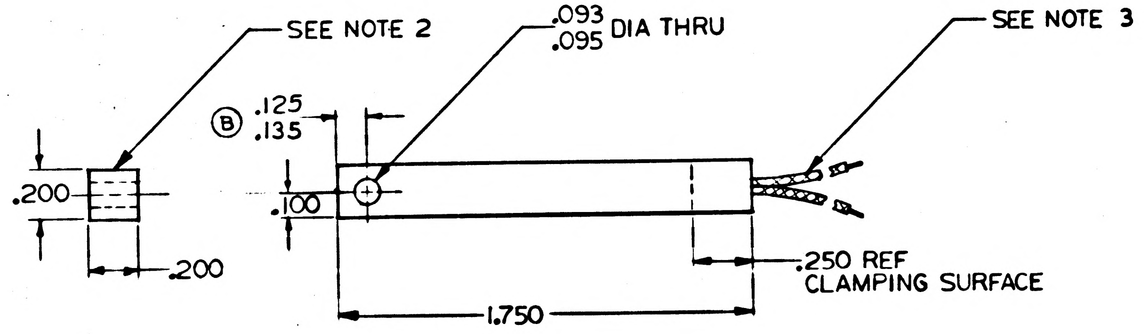
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00707	4-2-63	ajB	WK
	B	TDRR 01031	1MAY63	ajB	

WIRING DIAGRAM





NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DWG NUMBER, REVISION LETTER, SERIAL NUMBER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E-28
   LENGTH: 6 INCHES MIN
4. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND-1015404 CLASS 2
5. 63√ ALL OVER
6. BREAK ALL SHARP EDGES .005 MAX
7. MATERIAL: HOUSING; AL ALY 2024 T4 ALT SPEC QQ-A-267 OR QQ-A-268
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR
9. OPERATING CHARACTERISTICS:
   CONTACT SETTING TEMP;
   MAX CLOSE 134° F
   MIN OPEN 132° F
   CONTACT RATING;
   100 MA AT 30VDC
   25 MA AT 115VAC
   AMBIENT TEMP RANGE;
   -65°F TO +150°F
   WITHOUT DAMAGE

ORIGINAL SOURCE OF SUPPLY
VAP-AIR DIV
VAPOR CORPORATION
6444 WEST HOWARD ST
CHICAGO 48, ILL
Ⓐ PART NO. 26320010-01

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000247	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	J Boyce	3-20-63
CHECKED		
DRAWN	B MARTIN	3/7/63
APPROVED FOR MSC		3/20/63
MIT/IL APPROVAL		DATE
	W Kupfer	20 May 63

THERMOSTAT, MERCURY
SPECIFICATION CONTROL DRAWING

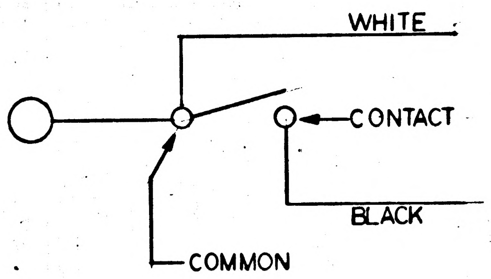
SCALE 2/1
UNIT WT.
CODE IDENT.

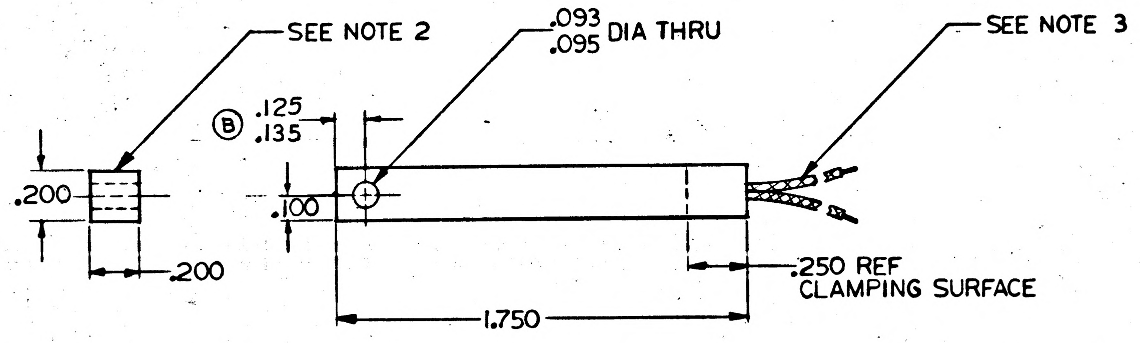
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000245
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00615					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 00707	4-2-63	ajB	WK
	B	TDRR 01031	1MAY63	ajB	
	C	TDRR 01805	1JULY63	ajB	WK

WIRING DIAGRAM





NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DWG NUMBER, REVISION LETTER, SERIAL NUMBER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E-28 LENGTH: 6 INCHES MIN
4. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND-1015404 CLASS 2
5. 63√ ALL OVER
6. BREAK ALL SHARP EDGES .005 MAX
7. MATERIAL: HOUSING; AL ALY 2024-T4 ALT SPEC QQ-A-267 OR QQ-A-268
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR
9. OPERATING CHARACTERISTICS:
   CONTACT SETTING TEMP;
   Ⓒ MAX CLOSE 130°F
   MIN OPEN 128°F

   Ⓒ CONTACT RATING;
   10 MA AT 30VDC

   AMBIENT TEMP RANGE;
   -65°F TO +150°F
   WITHOUT DAMAGE
10. Ⓒ THERMOSTAT SHALL BE FILLED WITH A MERCURY THALLIUM ALLOY - 8.5% THALLIUM BY WEIGHT
11. Ⓒ PRESSURIZE MERCURY-THALLIUM COLUMN TO 150 PSI MIN WITH WITH NITROGEN GAS
12. Ⓒ EACH THERMOSTAT SHALL BE SUBJECTED TO A 100 G SHOCK TEST ALONG ITS MAJOR AXIS BEFORE ASSEMBLY. THERE SHALL BE NO DAMAGE TO THE GLASS ENVELOPE, NO SEPARATION OF LIQUID METAL COLUMN AND NO CHANGE IN SET POINT.
13. Ⓒ EACH THERMOSTAT PRIOR TO ASSEMBLY SHALL BE VISUALLY INSPECTED WITH THE AID OF A MAGNIFYING DEVICE. THE COLUMN SHALL BE DIRT FREE AND THE GLASS SEAL SHALL BE FREE OF FLAWS.

Ⓒ PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000247	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:

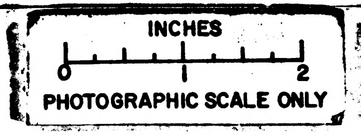
MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED C J Boyce 3-20-63
CHECKED
DRAWN B MARTIN 3/7/63
APPROVED FOR MSC
R G Michael 3/20/63
MIT/IL APPROVAL DATE
W Kupfer 10 May 63

THERMOSTAT, MERCURY
SPECIFICATION CONTROL DRAWING

SCALE 2/1
UNIT WT.
CODE IDENT.

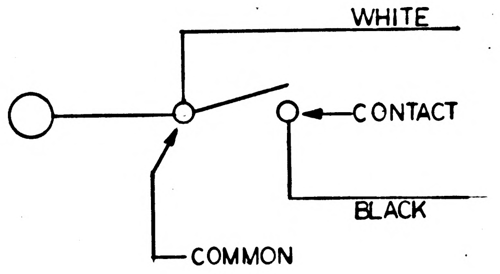
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000245
SHEET 1 OF 1

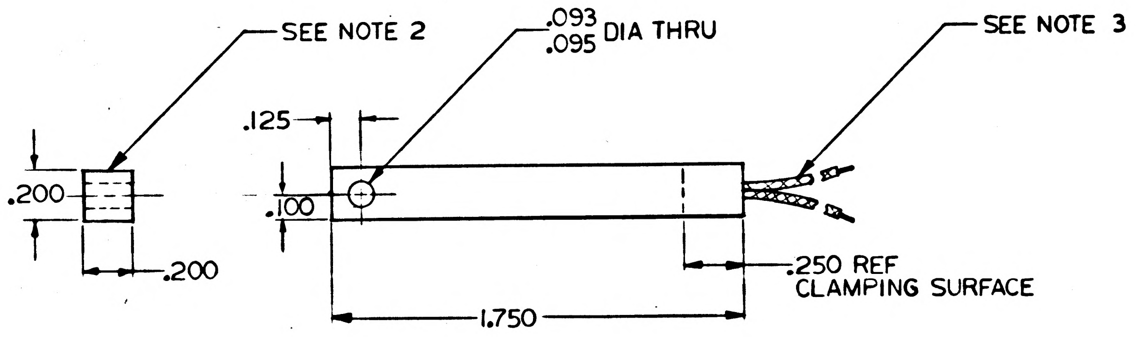
1000245



REVISIONS TDRR 00615				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

WIRING DIAGRAM





NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DWG NUMBER, REVISION LETTER, SERIAL NUMBER AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. LEADS: MIL-W-16878 TYPE E-28
   LENGTH: 6 INCHES MIN
4. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA SPECIFICATION ND-1015404 CLASS 2
5. $\sqrt{63}$ ALL OVER
6. BREAK ALL SHARP EDGES .005 MAX
7. MATERIAL: HOUSING; AL ALY 2024 T4 ALT SPEC QQ-A-267 OR QQ-A-268
8. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR
9. OPERATING CHARACTERISTICS:
   CONTACT SETTING TEMP;
   MAX CLOSE 134° F
   MIN OPEN 132° F
   CONTACT RATING;
   100 MA AT 30VDC
   25 MA AT 115VAC
   AMBIENT TEMP RANGE;
   -65°F TO +150°F
   WITHOUT DAMAGE

ORIGINAL SOURCE OF SUPPLY
VAP-AIR DIV
VAPOR CORPORATION
6444 WEST HOWARD ST
CHICAGO 48, ILL

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000247	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	J Boyce	3-20-63
CHECKED		
DRAWN	B.MARTIN	3/7/63
APPROVED FOR MSC	Michael	3/20/63
MIT/IL APPROVAL		DATE
	W Kupfer	20 May 63

THERMOSTAT, MERCURY
SPECIFICATION CONTROL DRAWING

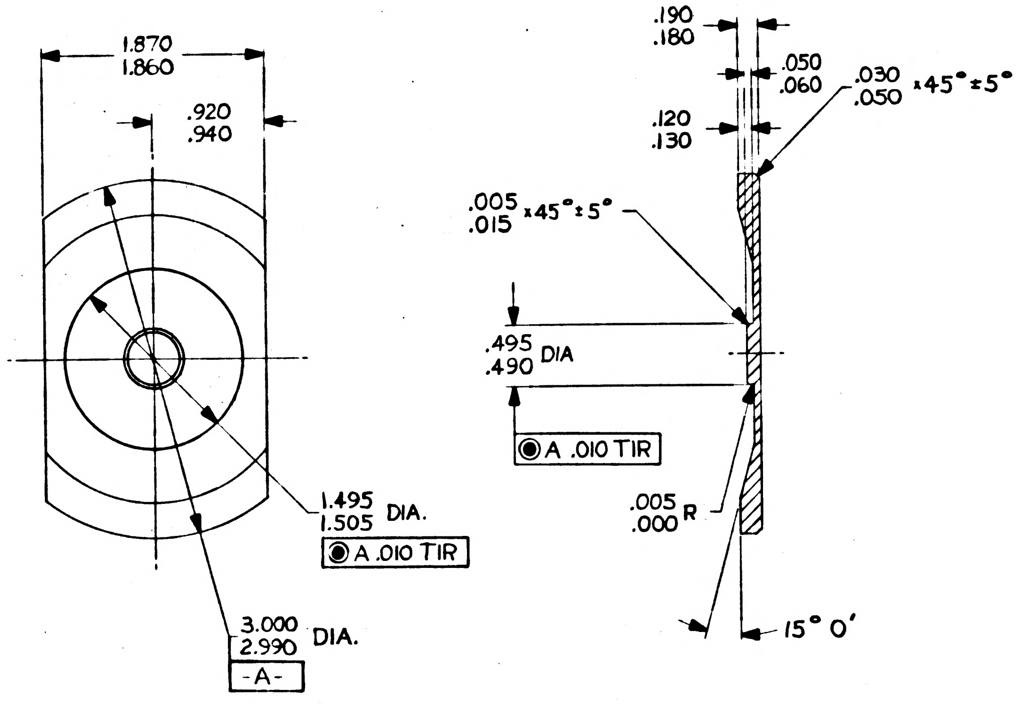
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000245
SHEET 1 OF 1

1000245

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	REVISIONS TDRR 00615 DESCRIPTION	DATE	APPROVAL


1.870
1.860
.920
.940
1.495
1.505 DIA.
◉ A .010 TIR
3.000
2.990 DIA.
-A-
.190
.180
.050
.060
.030
.050 ×45°±5°
.120
.130
.005
.015 ×45°±5°
.495
.490 DIA
◉ A .010 TIR
.005
.000 R
15° 0′

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY TYPE 6061 TEMP T6. ALT SPEC QQ-A-325 TEMP T6 OR QQ-A-327 TEMP T6.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. IDENTIFY USING DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130.
5. $\overset{63}{\vee}$ ALL OVER.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000059	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ——— ANGLES ±0° 15′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	3-20-63
CHECKED		
DRAWN	PALERMO	4-8-63

APPROVED FOR MSC 3/20/65
MIT/IL APPROVAL W I Copper — DATE 20 Mar 63

PLATE,
SPEED CONTROLLER MOUNTING
OUTER GIMBAL

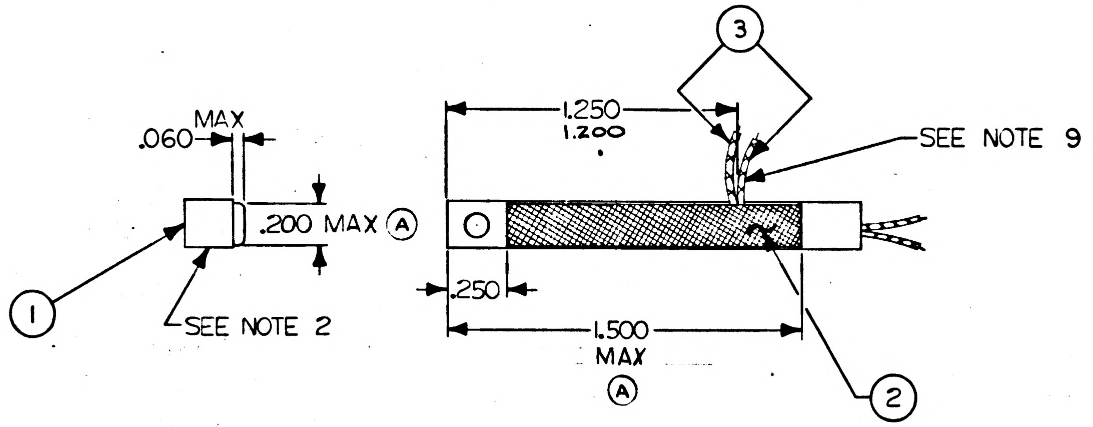
SCALE	UNIT WT.	CODE IDENT.
1/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000246
SHEET 1 OF 1

1000246

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01039	1 MAY 63	agb



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO. REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. HEATER SHALL MEET REQUIREMENTS OF ND1002115
4. HEATER SHALL HAVE FOLLOWING CHARACTERISTICS

RATED VOLTAGE	30 VDC
RESISTANCE	900Ω ±3% AT 130°F
RATED POWER	1.0 WATTS
HEATER WIRE TEMP COEFF	.000072 Ω/Ω °F MAX

5. HEATER SHALL BE CAPABLE OF WITHSTANDING 35VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE WITHOUT PERMANENT DAMAGE.
6. METHOD OF FABRICATING THE HEATER AND BONDING OF SAME TO THE THERMOSTAT IS A PROPRIETORY PROCESS OF

   COX & CO INC
   115 EAST 23RD STREET
   NEW YORK 1 N.Y.
7. MAX CONDUCTOR BREAKAGE NOT TO EXCEED 2 STRANDS PER LEAD
8. TEMPERATURE OF THE THERMOSTAT OR THE ASSEMBLY SHALL NOT EXCEED 145°F AT ANY TIME IN THE MANUFACTURING PROCESS
9. MINIMUM LEAD LENGTH; 6 INCHES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	WIRE, INSULATED E-28		MIL-W-16878	BLUE	3
1	HEATER			SEE NOTE 6	2
1	THERMOSTAT, MERCURY	1000245			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.020 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-21-63
APPROVED FOR MSC	W. J. Smith	4/10/63
MIT/IL APPROVAL		DATE
W		10 Apr 63

THERMOSTAT & HEATER ASSEMBLY

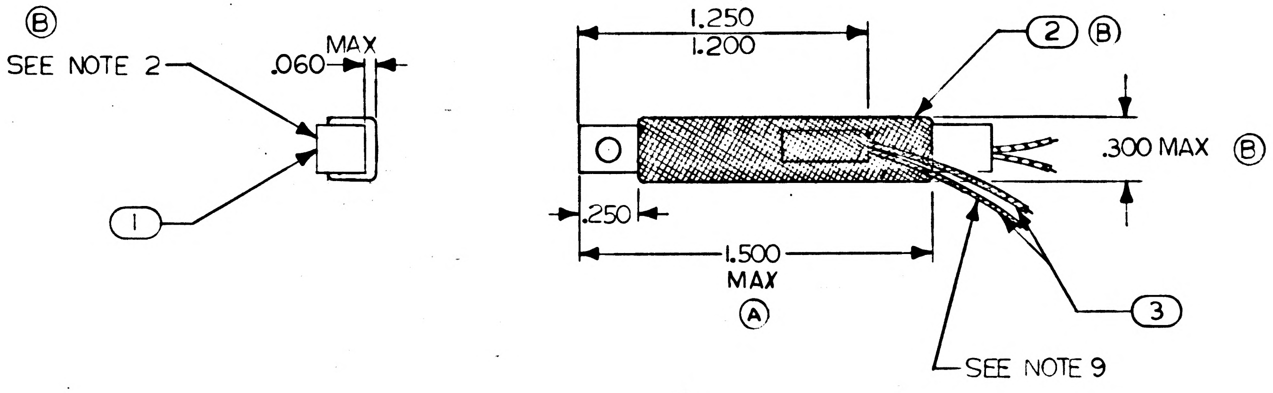
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000247
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000247 A

REVISIONS TDRR 00761					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01039	1 MAY63	agB	
	B	TDRR 01327	5-21-63	agB	WK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. HEATER SHALL MEET REQUIREMENTS OF ND1002115
4. HEATER SHALL HAVE FOLLOWING CHARACTERISTICS

RATED VOLTAGE	30 VDC
RESISTANCE	900 Ω ±3% AT 130°F
RATED POWER	1.0 WATTS
HEATER WIRE TEMP COEFF	.000072 Ω/Ω °F MAX

5. HEATER SHALL BE CAPABLE OF WITHSTANDING 35VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE WITHOUT PERMANENT DAMAGE.
6. METHOD OF FABRICATING THE HEATER AND BONDING OF SAME TO THE THERMOSTAT IS A PROPRIETORY PROCESS OF

   COX & CO INC
   115 EAST 23RD STREET
   NEW YORK 1 N.Y.

Ⓑ 7. NO CONDUCTOR BREAKAGE SHALL BE PERMITTED

8. TEMPERATURE OF THE THERMOSTAT OR THE ASSEMBLY SHALL NOT EXCEED 145°F AT ANY TIME IN THE MANUFACTURING PROCESS
9. MINIMUM LEAD LENGTH; 6 INCHES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	WIRE, INSULATED E-28		MIL-W-16878	BLUE	3
1	HEATER			SEE NOTE 6	2
1	THERMOSTAT, MERCURY	1000245			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL100020I
1000005	DL100000I

APPLICATION

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
~	±.020	~

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-21-63

APPROVED FOR MSC
W. L. [illegible] 4-10-63

MIT/IL APPROVAL	DATE
W [illegible]	10 Apr 63

THERMOSTAT & HEATER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
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DWG. NO.

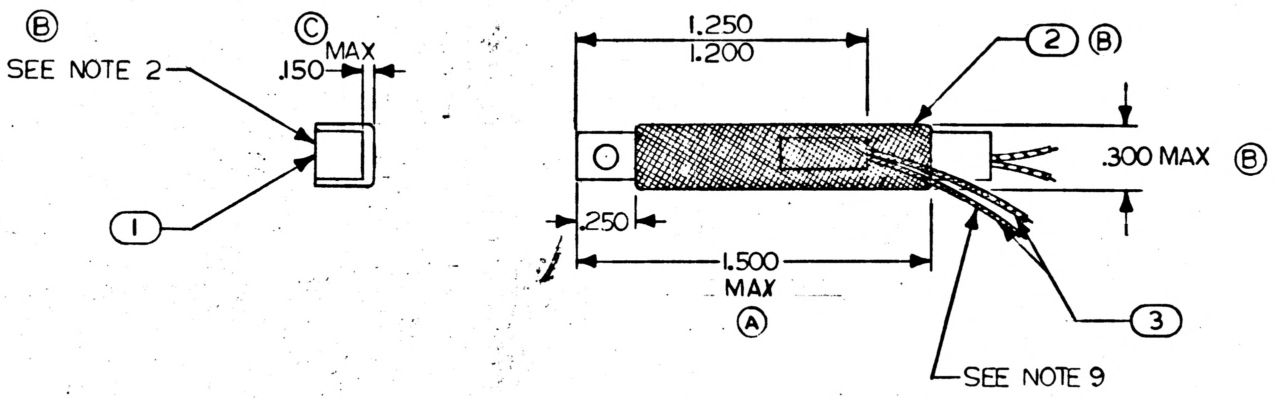
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000247

SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01039	1 MAY63	agB	
	B	TDRR 01327	5-21-63	agB	WK
	C	TDRR 01804	7-1-63	agB	WK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. HEATER SHALL MEET REQUIREMENTS OF ND1002115
4. HEATER SHALL HAVE FOLLOWING CHARACTERISTICS

Ⓒ

RATED VOLTAGE	30 VDC
RESISTANCE	900Ω ±3% AT 130°F
RATED POWER	1.0 WATT
HEATER WIRE TEMP COEFF	.000072 Ω/Ω°F MAX

5. HEATER SHALL BE CAPABLE OF WITHSTANDING 35VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE WITHOUT PERMANENT DAMAGE.
6. METHOD OF FABRICATING THE HEATER AND BONDING OF SAME TO THE THERMOSTAT IS A PROPRIETORY PROCESS OF

   COX & CO INC
   115 EAST 23RD STREET
   NEW YORK 1 N.Y.

Ⓑ 7. NO CONDUCTOR BREAKAGE SHALL BE PERMITTED

8. TEMPERATURE OF THE THERMOSTAT OR THE ASSEMBLY SHALL NOT EXCEED 145°F AT ANY TIME IN THE MANUFACTURING PROCESS
9. MINIMUM LEAD LENGTH; 6 INCHES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	WIRE, INSULATED E-28		MIL-W-16878	BLUE	3
1	HEATER			SEE NOTE 6	2
1	THERMOSTAT, MERCURY	1000245			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
~	±.020	~

DO NOT SCALE THIS DRAWING

MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-21-63
APPROVED FOR MSC	W. J. Smith	4-10-63
MIT/IL APPROVAL	W Wapfer	10 Apr 63

THERMOSTAT & HEATER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
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DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000247

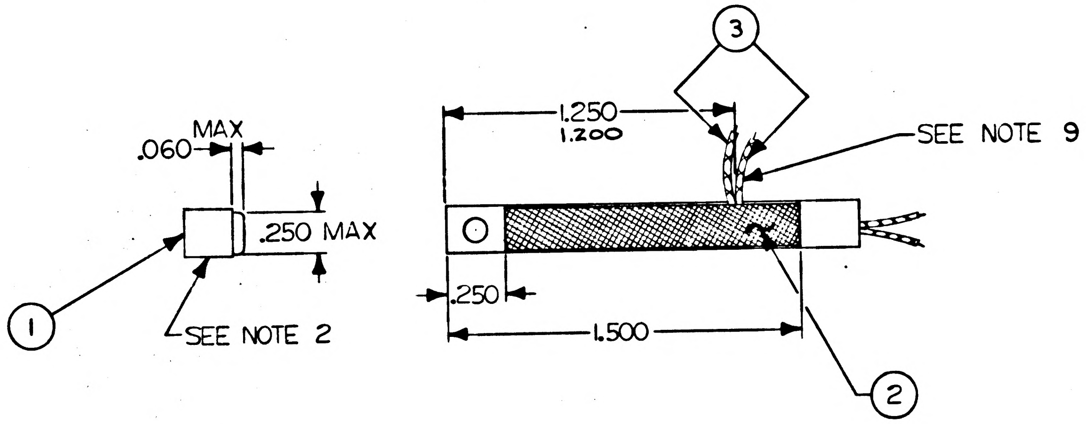
SHEET 1 OF 1 SHEET

1000247 C

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO, REVISION LETTER, AND MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. HEATER SHALL MEET REQUIREMENTS OF ND1002115
4. HEATER SHALL HAVE FOLLOWING CHARACTERISTICS

RATED VOLTAGE	30 VDC
RESISTANCE	900 Ω ±3% AT 130°F
RATED POWER	1.0 WATTS
HEATER WIRE TEMP COEFF	.000072 Ω/Ω°F MAX

5. HEATER SHALL BE CAPABLE OF WITHSTANDING 35VDC TRANSIENT VOLTAGES OF TWO MINUTES DURATION AT CONTROL TEMPERATURE WITHOUT PERMANENT DAMAGE.
6. METHOD OF FABRICATING THE HEATER AND BONDING OF SAME TO THE THERMOSTAT IS A PROPRIETORY PROCESS OF

   COX & CO INC
   115 EAST 23RD STREET
   NEW YORK 1 N.Y.
7. MAX CONDUCTOR BREAKAGE NOT TO EXCEED 2 STRANDS PER LEAD
8. TEMPERATURE OF THE THERMOSTAT OR THE ASSEMBLY SHALL NOT EXCEED 145°F AT ANY TIME IN THE MANUFACTURING PROCESS
9. MINIMUM LEAD LENGTH; 6 INCHES

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
A/R	WIRE, INSULATED E-28		MIL-W-16878	BLUE	3
1	HEATER			SEE NOTE 6	2
1	THERMOSTAT, MERCURY	1000245			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.020 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-21-63

APPROVED FOR MSC
W. J. Smith 4-10-63

MIT/IL APPROVAL	DATE
W Kupfer	10 Apr 63

THERMOSTAT & HEATER ASSEMBLY

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
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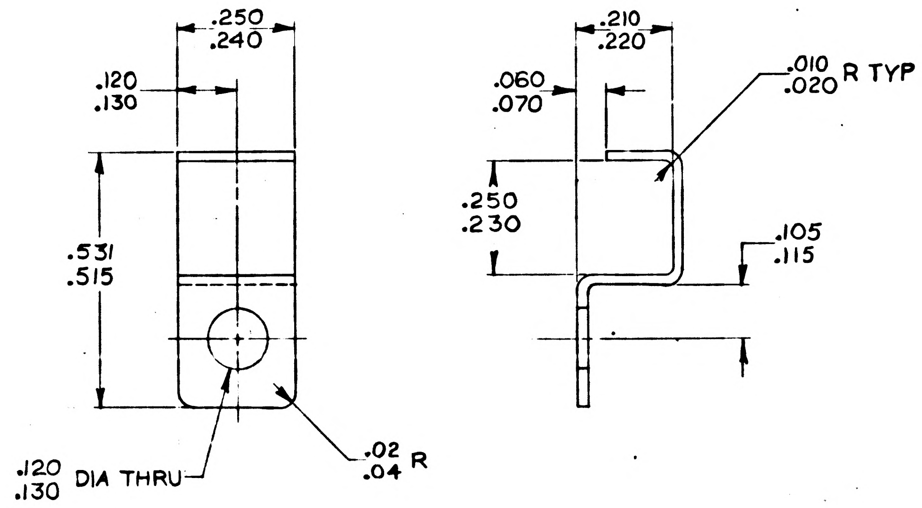
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000247
SHEET 1 OF 1 SHEET

1000247

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000248

REVISIONS	TDRR 00761			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SURFACE ROUGHNESS AS ROLLED. MACHINED SURFACES TO HAVE $\overset{63}{\vee}$
3. BREAK SHARP EDGES .005/.015
4. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
5. MATERIAL: AL ALY SH 6061-T6
   ALT SPEC: QQ-A-327 TEMP-T6
   THK $^{.015}_{.025}$
6. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-13-63
APPROVED FOR MSC	L. S. 4/11/63	
MIT/IL APPROVAL	W Kupfer 10 Apr	63

CLAMP,
MERCURY THEMOSTAT

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000248

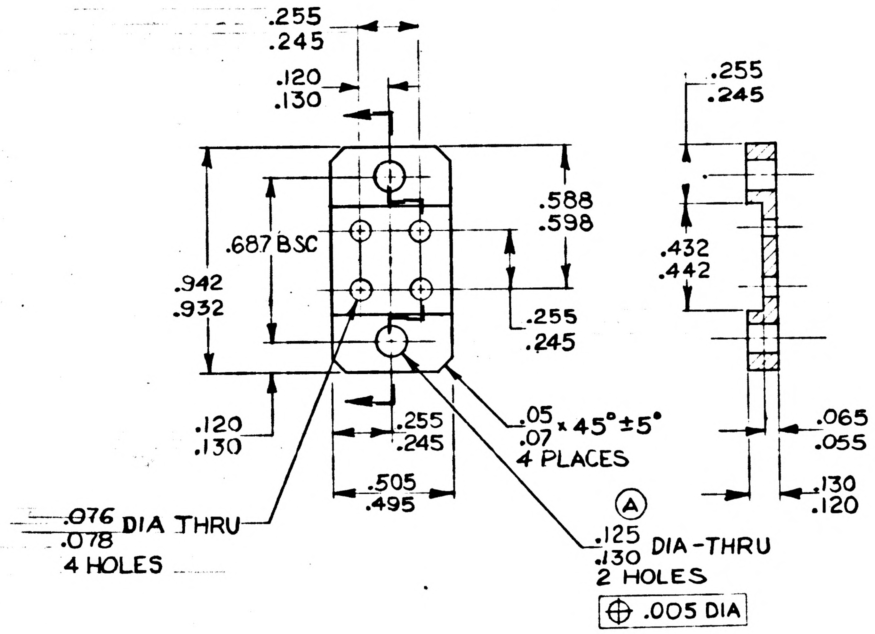
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000249 A

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01036	4-30-63	ajB WIC



.255
.245
.120
.130
.255
.245
.588
.598
.687 BSC
.942
.932
.432
.442
.255
.245
.120
.130
.255
.245
.05
.07 x 45°±5°
4 PLACES
.065
.055
.505
.495
.130
.120
.076
.078 DIA THRU
4 HOLES
A
.125
.130 DIA-THRU
2 HOLES
⊕ .005 DIA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES .005/.015
3. 63√ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
5. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS FIBER-BASE, EPOXY-RESIN PER MIL-P-18177C TYPE GEE

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

	DL 1000201
1000253	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-14-63

APPROVED FOR MSC
L. A. Swing 4/10/63

MIT/IL APPROVAL	DATE
W Koffer	10 Apr 63

BOARD, TERMINAL,
MERCURY THERMOSTAT

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000249

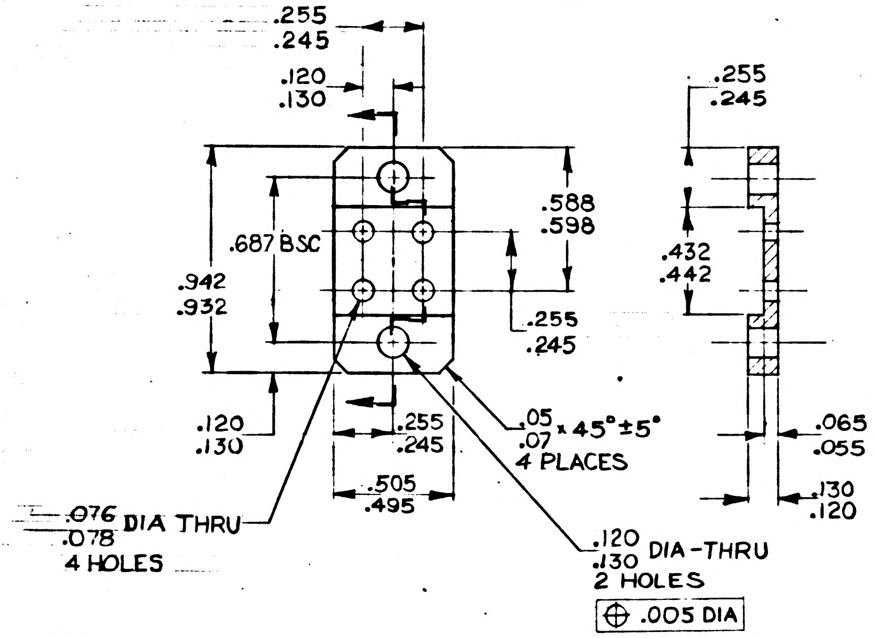
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000249

REVISIONS TDRR 00761

ZONE	SYM	DESCRIPTION	DATE	APPROVAL


.255
.245
.120
.130
.588
.598
.687 BSC
.942
.932
.255
.245
.120
.130
.255
.245
.05 x 45°±5°
.07
4 PLACES
.505
.495
.076 DIA THRU
.078
4 HOLES
.120 DIA-THRU
.130
2 HOLES
⊕ .005 DIA
.255
.245
.432
.442
.065
.055
.130
.120

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES .005/.015
3. 63√ ALL OVER
4. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
5. MATERIAL: PLASTIC SHEET, LAMINATED, GLASS FIBER-BASE, EPOXY-RESIN PER MIL-P-18177C TYPE GEE

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

	DL 1000201
1000253	DL 1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	C J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-14-63

APPROVED FOR MSC
L.D. Swift 4/10/63
MIL/IL APPROVAL DATE
W Buffer 10 Apr 63

BOARD, TERMINAL,
MERCURY THERMOSTAT

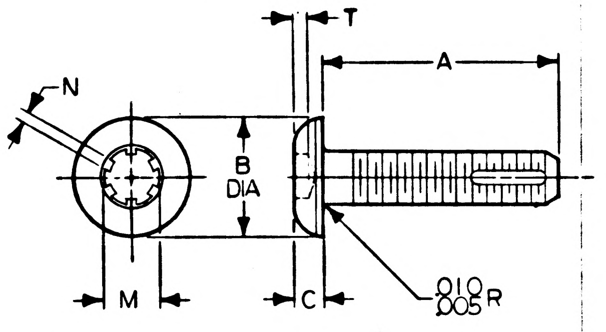
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000249
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01381	5-29-63	sah	WYC.

DASH NO	THREAD SIZE	LONG-LOK PART NUMBER	A DIM ±.015	B DIM MIN	B DIM MAX	C DIM MIN	C DIM MAX	M DIM MIN	M DIM MAX	N DIM MIN	N DIM MAX	T MIN		INSERT TYPE
1	2-56NC-3A	LP68B26K3HQ	.187	.154	.164	.038	.046	.061	.062	.013	.014	.061		SEE NOTE 4
2	↓	LP68B26K4HQ	.250	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
3	↓	LP68B26K5HQ	.312	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
4	↓	LP68B26K6HQ	.375	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
5	↓	LP68B26K7HQ	437	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
6	↓	LP68B26K8HQ	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
7														
8														
9														
10														
11														
12	4-40NC-3A	LP68B40K3HQ	.187	.201	.213	.051	.059	.073	.074	.015	.016	.073		SEE NOTE 3
13	↓	LP68B40K4HQ	.250	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
14	↓	LP68B40K5HQ	.312	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
15	↓	LP68B40K6HQ	.375	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
16	↓	LP68B40K7HQ	.437	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
17	↓	LP68B40K8HO	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
18														
19														
20														
21														
22														
23	6-32NC-3A	LP68B62K3HQ	.187	.250	.262	.063	.073	.097	.098	.021	.022	.097		SEE NOTE 3
24	↓	LP68B62K4HQ	.250	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
25	↓	LP68B62K5HQ	.312	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
26	↓	LP68B62K6HQ	.375	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
27	↓	LP68B62K7HQ	.437	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
28	↓	LP68B62K8HQ	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED SCREWS MUST MEET THE REQUIREMENTS OUTLINED IN FF-S-86 EXCEPT BUTTON HEAD, DIMENSIONED AS SHOWN
3. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B
4. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN NAS 1283 TYPE L
5. IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
6. FINISH: ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3 EXCEPT TO MEET 24 HOUR SALT SPRAY

Ⓐ 7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY

LONG-LOK CORPORATION
2601 COLORADO AVE.
SANTA MONICA, CALIFORNIA

LONG-LOK PART NO.-SEE TABLE

MASTER MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000101
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-13-63
APPROVED FOR MSC		4/10/63
MIT/IL APPROVAL		DATE
		10 Apr 63

SCREW, BUTTON HEAD
SELF-LOCKING
SOCKET, SPLINE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

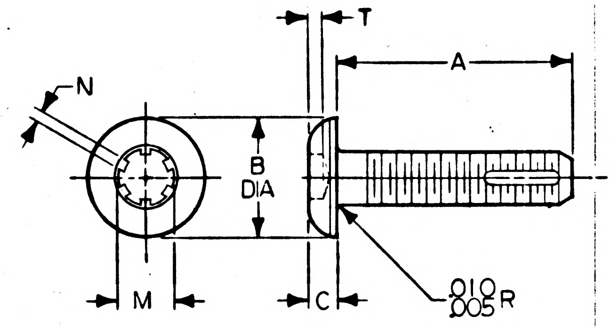
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000250
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01381	5-29-63	
	B	TDRR 02121	7-23-63	

DASH NO	THREAD SIZE	LONG-LOK PART NUMBER	A DIM ±.015	B DIM MIN	B DIM MAX	C DIM MIN	C DIM MAX	M DIM MIN	M DIM MAX	N DIM MIN	N DIM MAX	T MIN	T MAX	INSERT TYPE
1	2-56NC-3A	LP68B26K3HQ	.187	.154	.164	.038	.046	.061	.062	.013	.014	.028	.033	SEE NOTE 2C2
2		LP68B26K4HQ	.250											
3		LP68B26K5HQ	.312											
4		LP68B26K6HQ	.375											
5		LP68B26K7HQ	.437											
6		LP68B26K8HQ	.500											
7	↓	LP68B26K10HQ	.625	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
8														
9														
10														
11														
12	4-40NC-3A	LP68B40K3HQ	.187	.201	.213	.051	.059	.073	.074	.015	.016	.035	.040	SEE NOTE 2C1
13		LP68B40K4HQ	.250											
14		LP68B40K5HQ	.312											
15		LP68B40K6HQ	.375											
16		LP68B40K7HQ	.437											
17	↓	LP68B40K8HQ	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
18														
19														
20														
21														
22														
23	6-32NC-3A	LP68B62K3HQ	.187	.250	.262	.063	.073	.097	.098	.021	.022	.044	.049	SEE NOTE 2C1
24		LP68B62K4HQ	.250											
25		LP68B62K5HQ	.312											
26		LP68B62K6HQ	.375											
27		LP68B62K7HQ	.437											
28	↓	LP68B62K8HQ	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

Ⓑ



REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
   - C. IDENTIFY USING DRAWING NO., APPLICABLE DASH NO., REVISION LETTER AND MANUFACTUERS SYMBOL PER MIL-STD-130. MANUFACTUERS NAME AND PART NO. MAY ALSO BE USED.
   - D. SCREWS SHALL MEET ALL REQUIREMENTS OF FF-S-86 EXCEPT HEAD CONFIGURATION OR AS SPECIFIED BELOW
2. INSPECTION AND ACCEPTANCE:
   - A. MATERIAL: SCREW; ALLOY STEEL PER FF-S-86
     INSERT; GREEN POLYCAP NYLON PER QQ-Z-325
   - B. FINISH: SCREW; ZINC PLATE PER QQ-Z-325 TYPE II
     CLASS 3 EXCEPT TO MEET 24 HOUR SALT SPRAY
   - C. INSERT:
     1. SHALL MEET THE REQUIREMENTS OF MIL-F-18240 TYPE B
     2. SHALL MEET THE REQUIREMENTS OF NAS1283 TYPE L
   - D. DIMENSIONS: AS SHOWN ON DELINEATION AND CHART
   - E. SCREW SHALL BE FREE OF ALL BURRS
   - F. SCREW HEAD AND SOCKET TO BE FORMED BY COLD-HEADING. THREADS TO BE FORMED BY ROLLING.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

Ⓑ

MASTER MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
MULTIPLE	DL1000201
USAGE	DL1000101

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2A

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-13-63
APPROVED FOR MSC		4/10/63
MIT/IL APPROVAL		10 Apr 63

SCREW, BUTTON HEAD
SELF-LOCKING
SOCKET, SPLINE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000250
SHEET 1 OF 1 SHEET

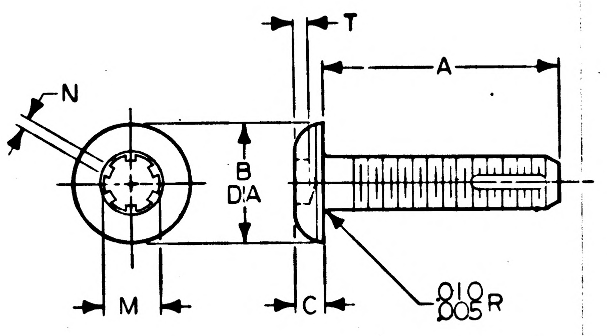
1000250 B

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761

ZONE	SYM	DESCRIPTION	DATE	APPROVAL

DASH NO	THREAD SIZE	LONG-LOK PART NUMBER	A DIM ±.015	B DIM MIN	B DIM MAX	C DIM MIN	C DIM MAX	M DIM MIN	M DIM MAX	N DIM MIN	N DIM MAX	T MIN		INSERT TYPE
1.	2-56NC-3A	LP68B26K3HQ	.187	.154	.164	.038	.046	.061	.062	.013	.014	.061		SEE NOTE 4
2		LP68B26K4HQ	.250											
3		LP68B26K5HQ	.312											
4		LP68B26K6HQ	.375											
5		LP68B26K7HQ	437											
6	↓	LP68B26K8HQ	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
7														
8														
9														
10														
11														
12	4-40NC-3A	LP68B40K3HQ	.187	.201	.213	.051	.059	.073	.074	.015	.016	.073		SEE NOTE 3
13		LP68B40K4HQ	.250											
14		LP68B40K5HQ	.312											
15		LP68B40K6HQ	.375											
16		LP68B40K7HQ	.437											
17	↓	LP68E40K8HO	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓
18														
19														
20														
21														
22														
23	6-32NC-3A	LP68B62K3HQ	.187	.250	.262	.063	.073	.097	.098	.021	.022	.097		SEE NOTE 3
24		LP68B62K4HQ	.250											
25		LP68B62K5HQ	.312											
26		LP68B62K6HQ	.375											
27		LP68B62K7HQ	.437											
28	↓	LP68B62K8HQ	.500	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED SCREWS MUST MEET THE REQUIREMENTS OUTLINED IN FF-S-86 EXCEPT BUTTON HEAD, DIMENSIONED AS SHOWN
3. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN MIL-F-18240, TYPE B
4. INSERT SHALL MEET THE REQUIREMENTS OUTLINED IN NAS 1283 TYPE L
5. IDENTIFY USING DRAWING NUMBER, APPLICABLE DASH NUMBER, REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
6. FINISH: ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3 EXCEPT TO MEET 24 HOUR SALT SPRAY
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN NASA DOCUMENT ND 1015405 CLASS 3

ORIGINAL SOURCE OF SUPPLY
LONG-LOK CORPORATION
2601 COLORADO AVE.
SANTA MONICA, CALIFORNIA
LONG-LOK PART NO.-SEE TABLE

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENT'FYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MULTIPLE	DL1000201
USAGE	DL1000101
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ~ ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3.13.63
APPROVED FOR MSC	E S [illegible]	4/10/63
MIT/IL APPROVAL		DATE
W[illegible]		10 Apr 63

SCREW, BUTTON HEAD
SELF-LOCKING
SOCKET, SPLINE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000250
SHEET 1 OF 1 SHEET

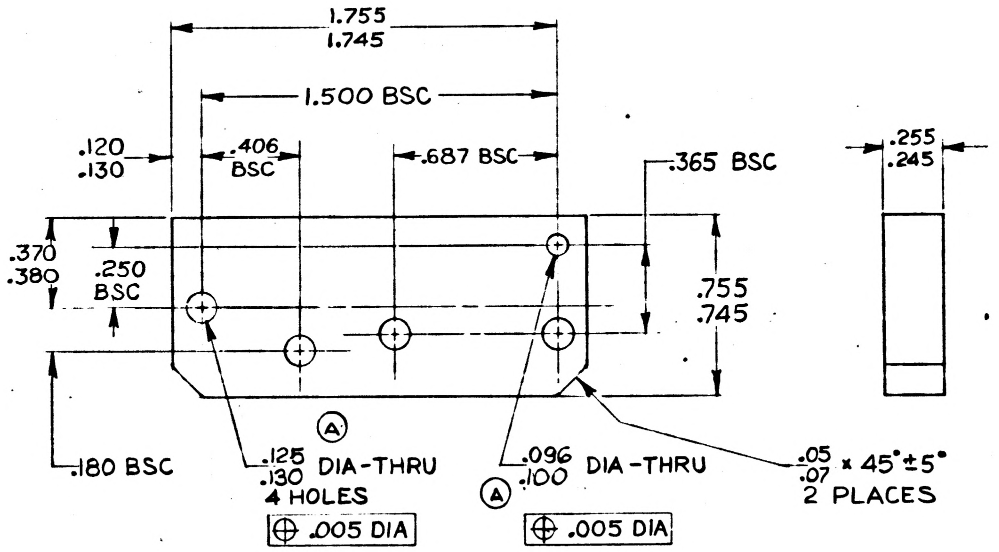
1000250

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000251 A

REVISIONS TDRR 00761

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01037	4-30-63	ajb



1.755
1.745
1.500 BSC
.120
.130
.406 BSC
.687 BSC
.365 BSC
.255
.245
.370
.380
.250 BSC
.755
.745
.180 BSC
A
.125
.130 DIA-THRU
4 HOLES
⊕ .005 DIA
A
.096
.100 DIA-THRU
⊕ .005 DIA
.05
.07 x 45°±5°
2 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\overset{63}{\vee}$ ALL OVER
3. BREAK SHARP EDGES .005/.015
4. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
5. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY 6061-T6
ALT SPEC: QQ-A-327
TEMP-T6

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-15-63
APPROVED FOR MSC		4/10/63
MIT/IL APPROVAL		DATE
	10 apr	63

PLATE, MOUNTING,
MERCURY THERMOSTAT

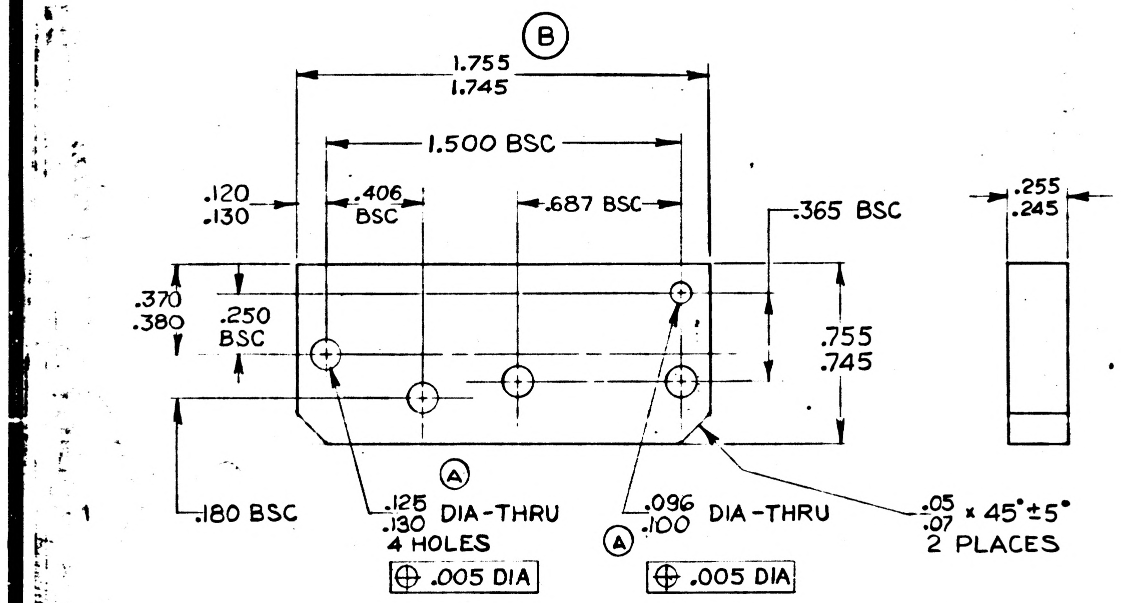
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000251
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

B | 1000251

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
		REVISIONS TDRR 00761			
	A	TDRR 01037	4-30-63	ajB	
	B	TDRR 01317	5-21-63	ajB	WK


Ⓑ
1.755
1.745
1.500 BSC
.120
.130
.406
BSC
.687 BSC
.365 BSC
.255
.245
.370
.380
.250
BSC
.755
.745
.180 BSC
Ⓐ
.125
.130 DIA-THRU
4 HOLES
⊕ .005 DIA
Ⓐ
.096
.100 DIA-THRU
⊕ .005 DIA
.05
.07 x 45°±5°
2 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√ ALL OVER
3. BREAK SHARP EDGES .005/.015
4. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
5. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL 1000201
1000005	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY 6061-T6
ALT SPEC: QQ-A-327
TEMP-T6

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	D. M. WHITE	3-15-63
APPROVED FOR MSC		4/10/63
MIT/IL APPROVAL	W	DATE 10 apr 63

PLATE, MOUNTING,
MERCURY THERMOSTAT

SCALE	UNIT WT.	CODE IDENT.
2/1		

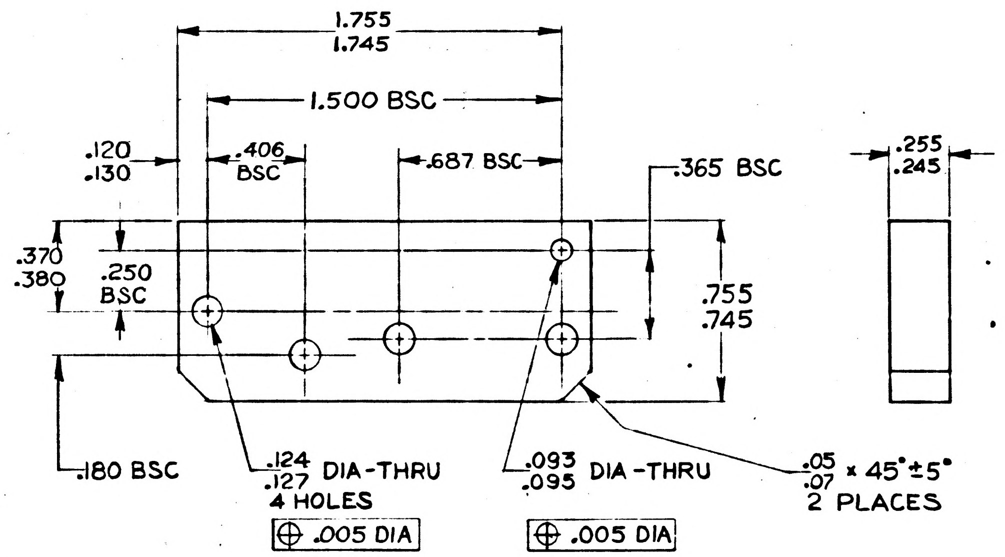
MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000251
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000251

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


1.755
1.745
1.500 BSC
.120
.130
.406
BSC
.687 BSC
.365 BSC
.255
.245
.370
.380
.250
BSC
.755
.745
.180 BSC
.124
.127 DIA-THRU
4 HOLES
⊕ .005 DIA
.093
.095 DIA-THRU
⊕ .005 DIA
.05
.07 × 45°±5°
2 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{}^{63}$ ALL OVER
3. BREAK SHARP EDGES .005/.015
4. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
5. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

		UNLESS OTHERWISE SPECIFIED
		DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES
	DL 1000201	DO NOT SCALE THIS DRAWING
1000005	DL 1000001	MATERIAL: AL ALY 6061-T6 ALT SPEC: QQ-A-327 TEMP-T6
NEXT ASSY	USED ON	
APPLICATION		

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-15-63
APPROVED FOR MSC	W. J. Sur Jr.	4/10/63
MIT/IL APPROVAL		DATE
W I Copper 10 apr		63

PLATE, MOUNTING,
MERCURY THERMOSTAT

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

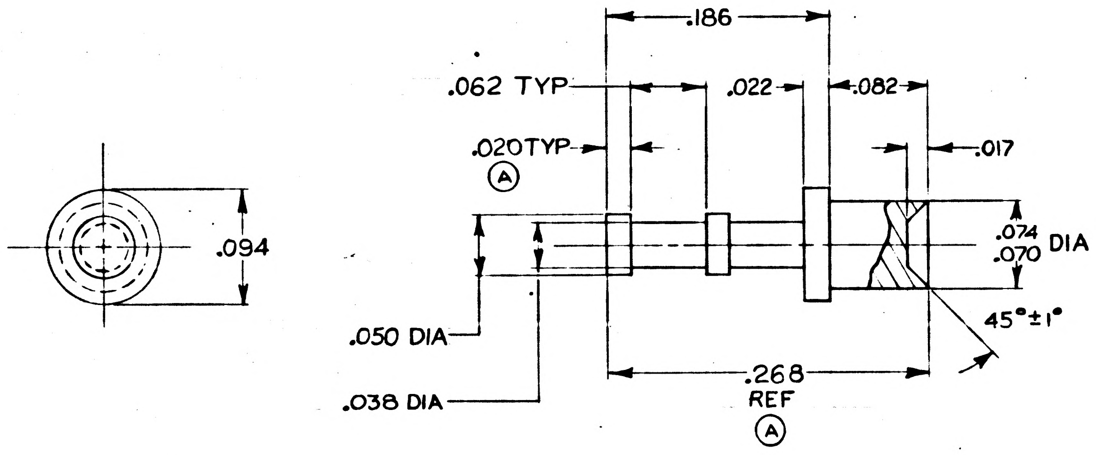
NASA DRAWING NO.
1000251

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000252 A

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01030	4-30-63	ajb WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES .005/.015
3. INSIDE CORNERS .010 R MAX
4. MATERIAL: BRASS PER QQ-B-611A COMP B, HALF-HARD
5. SILVER PLATE .0003 TO .0005 THK PER QQ-S-365 TYPE I
6. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND-1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY:
CAMBRIDGE THERMIONIC CORP
445 CONCORD AVENUE
CAMBRIDGE 38, MASSACHUSETTS
PART NO. X2043-B

MASTER

	DL 1000201
1000253	DL 1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 — ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-15-63

APPROVED FOR MSC
R. J. Smith 4/10/63

MIT/IL APPROVAL	DATE
W Trageser 10 Apr 63	

TERMINAL, SOLDER SWAGED SPECIFICATION CONTROL DRAWING

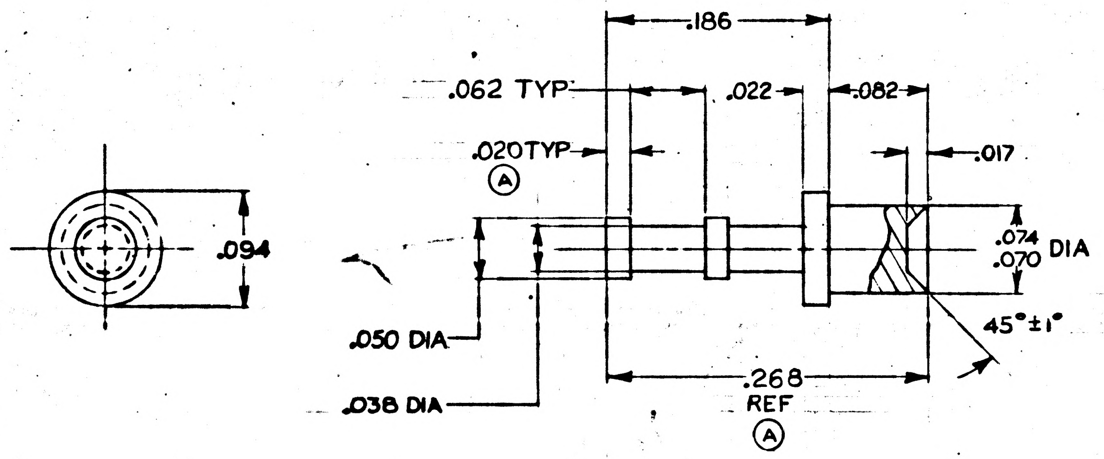
SCALE	UNIT WT.	CODE IDENT.
10/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000252
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

B 1000252

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01030	4-30-63	agb WK
	B	TDRR 01235	15 May 63	agb WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES .005/.015
3. INSIDE CORNERS .010 R MAX
4. Ⓑ MATERIAL: BRASS PER QQ-B-626 COMP 22, HALF-HARD
5. SILVER PLATE .0003 TO .0005 THK PER QQ-S-365 TYPE I
6. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND-1015404 CLASS 3

ORIGINAL SOURCE OF SUPPLY:
CAMBRIDGE THERMIONIC CORP
445 CONCORD AVENUE
CAMBRIDGE 38, MASSACHUSETTS
PART NO. X2043-B

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL 1000201
1000253	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
±.005
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 4

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-15-63
APPROVED FOR MSC		4/10/63
MIT/IL APPROVAL		10 Apr 63

TERMINAL,
SOLDER SWAGED
SPECIFICATION CONTROL
DRAWING

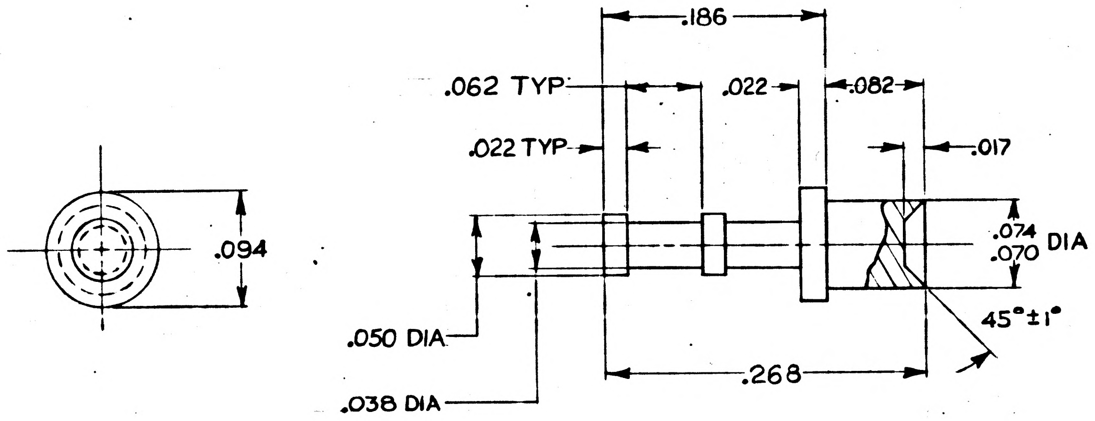
SCALE	UNIT WT.	CODE IDENT.
10/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000252
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

	1000252

REVISIONS	TDRR 00761			
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BREAK SHARP EDGES .005/.015
3. INSIDE CORNERS .010 R MAX
4. MATERIAL: BRASS PER QQ-B-611A COMP B, HALF-HARD
5. SILVER PLATE .0003 TO .0005 THK PER QQ-S-365 TYPE I
6. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND-1015404 CLASS 3

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

ORIGINAL SOURCE OF SUPPLY:
CAMBRIDGE THERMIONIC CORP
445 CONCORD AVENUE
CAMBRIDGE 38, MASSACHUSETTS
PART NO. X2043-B

MASTER

NEXT ASSY	USED ON
	DL 1000201
1000253	DL 1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
±.005
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	D.M.WHITE	3-15-63
APPROVED FOR MSC	L. J. Smith	4/10/63
MIT/IL APPROVAL		DATE
	W. Jaffer	10 Apr 63

TERMINAL,
SOLDER SWAGED
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
10/1		

M I T
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000252
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1. TAUT BAND METER WITH 1000Ω ±1% COIL RESISTANCE 10-0-10UA ±1% MOVEMENT WITH FACE AS PER MIT DWG C-94837

2. TAUT BAND METER WITH 1000Ω ±1% COIL RESISTANCE 20UA ±1% MOVEMENT WITH FACE AS PER MIT DWG C-94837

3. ALL 0.01% TOLERANCE RESISTORS TO HAVE A TEMPERATURE COEFFICIENT OF ±5PPM
ALL 0.1% TOLERANCE RESISTORS TO HAVE A TEMPERATURE COEFFICIENT OF ±10PPM

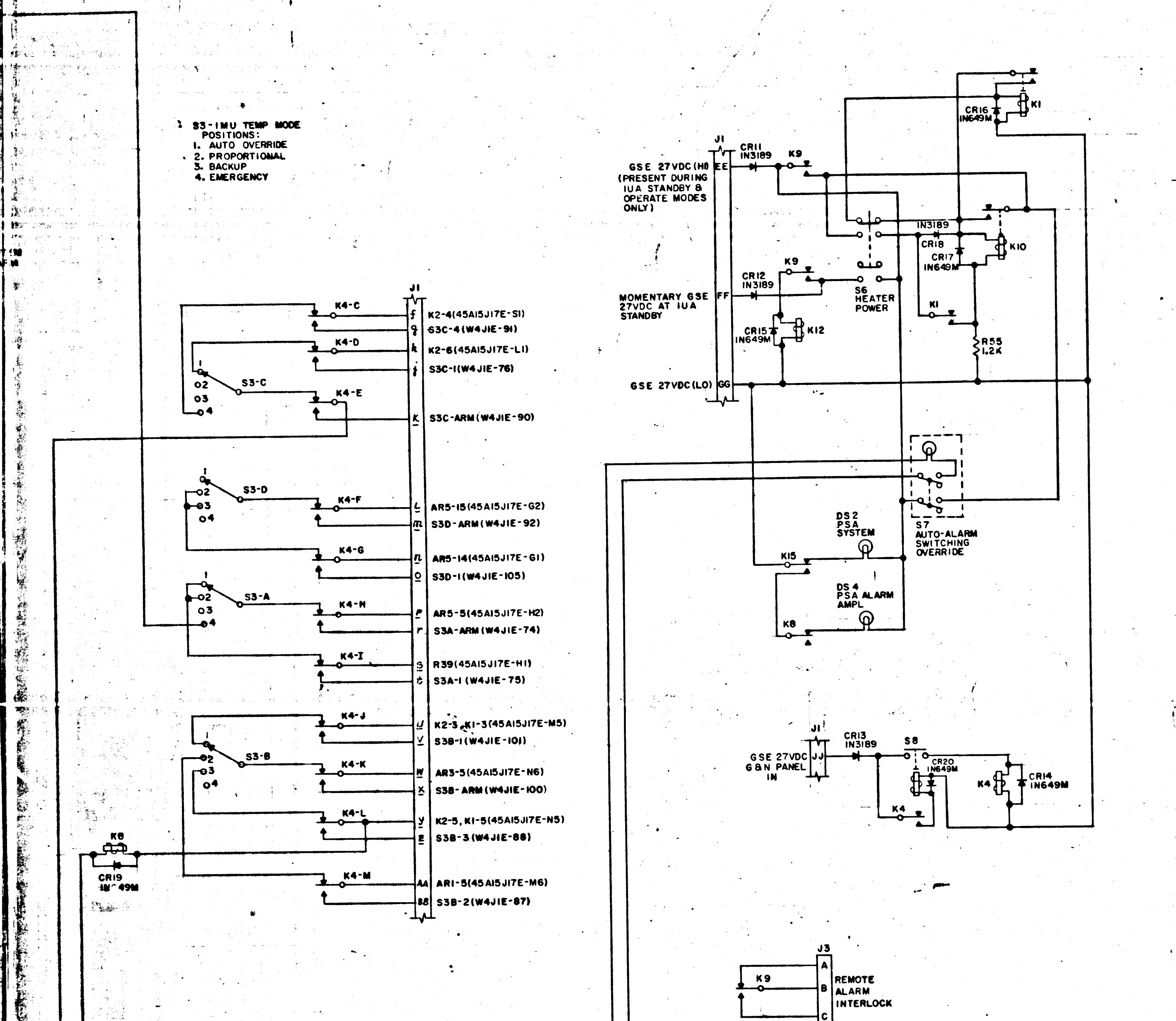
4. SWITCHES, FUSEHOLDERS AND LIGHTS SHOULD HAVE THE PROPER LEGEND ENGRAVED ON LENS AS PER MIT DWG D-94839 WHERE APPLICABLE

5. RESISTOR SUPPLIED WITH AMPLIFIER

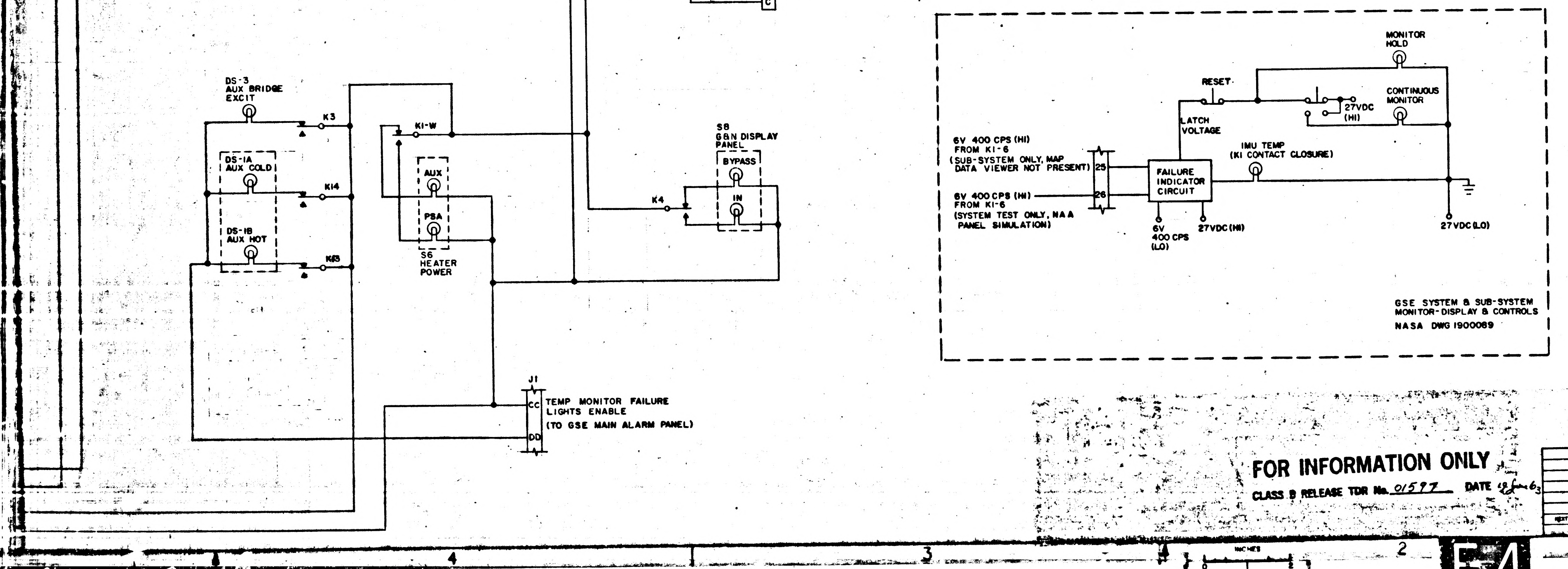
6. ALL LEGENDS FOR INDENTIFACTION OF METERS, POTS, SWITCHES AND SWITCH POSITIONS AS PER MIT DWG C-94839

7 ALL RESISTOR VALUES ARE IN OHMS
ALL CAPACITOR VALUES ARE IN MFD

8 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327



1 S3-IMU TEMP MODE POSITIONS:
1. AUTO OVERRIDE
2. PROPORTIONAL
3. BACKUP
4. EMERGENCY
S3-C
S3-D
S3-A
S3-B
K4-C
K4-D
K4-E
K4-F
K4-G
K4-H
K4-I
K4-J
K4-K
K4-L
K4-M
K6
CR19 1N649M
J1
K2-4(45A15J17E-S1)
S3C-4(W4J1E-91)
K2-6(45A15J17E-L1)
S3C-1(W4J1E-76)
S3C-ARM(W4J1E-90)
AR5-15(45A15J17E-G2)
S3D-ARM(W4J1E-92)
AR5-14(45A15J17E-G1)
S3D-1(W4J1E-105)
AR5-5(45A15J17E-H2)
S3A-ARM(W4J1E-74)
R39(45A15J17E-H1)
S3A-1(W4J1E-75)
K2-3, K1-3(45A15J17E-M5)
S3B-1(W4J1E-101)
AR3-5(45A15J17E-N6)
S3B-ARM(W4J1E-100)
K2-5, K1-5(45A15J17E-N5)
S3B-3(W4J1E-88)
AR1-5(45A15J17E-M6)
S3B-2(W4J1E-87)
GSE 27VDC (HI) (PRESENT DURING IUA STANDBY & OPERATE MODES ONLY)
MOMENTARY GSE 27VDC AT IUA STANDBY
GSE 27VDC (LO)
EE
FF
GG
CR11 1N3189
CR12 1N3189
CR15 1N649M
CR16 1N649M
CR17 1N649M
CR18
1N3189
K1
K9
K10
K12
S6 HEATER POWER
R55 1.2K
DS2 PSA SYSTEM
DS4 PSA ALARM AMPL
K15
K8
S7 AUTO-ALARM SWITCHING OVERRIDE
GSE 27VDC G&N PANEL IN
J1
JJ
CR13 1N3189
S8
CR20 1N649M
CR14 1N649M
K4



J3
K9
A
B
C
REMOTE ALARM INTERLOCK
DS-3 AUX BRIDGE EXCIT
DS-1A AUX COLD
DS-1B AUX HOT
K3
K14
K13
K1-W
AUX
PSA
S6 HEATER POWER
S8 G&N DISPLAY PANEL
BYPASS
IN
K4
J1
CC
DD
TEMP MONITOR FAILURE LIGHTS ENABLE (TO GSE MAIN ALARM PANEL)
6V 400 CPS (HI) FROM K1-6 (SUB-SYSTEM ONLY, MAP DATA VIEWER NOT PRESENT)
6V 400 CPS (HI) FROM K1-6 (SYSTEM TEST ONLY, NAA PANEL SIMULATION)
25
26
RESET
LATCH VOLTAGE
FAILURE INDICATOR CIRCUIT
IMU TEMP (K1 CONTACT CLOSURE)
MONITOR HOLD
CONTINUOUS MONITOR
27VDC (HI)
6V 400 CPS (LO)
27VDC (HI)
27VDC (LO)

GSE SYSTEM & SUB-SYSTEM MONITOR-DISPLAY & CONTROLS
NASA DWG 1900089

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING	MFG	TYPE
F1		FUSE			1A	BUSS	GLD
F2					1A	BUSS	GLD
F3					1A	BUSS	GLD
F4					1A	BUSS	GLD
F5					1A	BUSS	GLD
F6					3A	BUSS	AGC
F7					3A	BUSS	AGC
F8					8/10A	FUSETRON	MDL
F9					1/4 A	BUSS	AGC
XF1		FUSEHOLDER				MASTER SPECIALTIES	71-3;70-L-R-2-E
XF2						MASTER SPECIALTIES	71-3;70-L-R-2-E
XF3						MASTER SPECIALTIES	71-3;70-L-R-2-E
XF4						MASTER SPECIALTIES	71-3;70-L-R-2-E
XF5						MASTER SPECIALTIES	71-3;70-L-R-2-E
XF6						MASTER SPECIALTIES	72-4;70-L-R-2-E
XF7						MASTER SPECIALTIES	72-4;70-L-R-2-E
XF8						MASTER SPECIALTIES	71-3;70-L-R-1-E
XF9						MASTER SPECIALTIES	72-3;70-L-R-1-E
L1		INDUCTOR	110 MH			MAG CONTROLS	13664
T1	1015997	TRANSFORMER	115:30		2AMP		
T2			115:36, 24			BUSH	EJ-501
C1		CAPACITOR	200		50VDC	CORNEL-DUBILIER	TAN 24BJ 201 UP
CR1	1010362-3	DIODE	1N649M		600MW		
CR2	1010362-3		1N649M		600MW		
CR3	1010362-3		1N649M		600MW		
CR4	1010362-3		1N649M		600MW		
CR5	1015939-12		1N2989B		10W		
CR6	1010391		1N3189		3/4 A		
CR7	1010391		1N3189		3/4 A		
CR8	1010391		1N3189		3/4 A		
CR9	1010391		1N3189		3/4 A		
CR10	1010265-1		1N3016B		1W		
CR11	1010391		1N3189		3/4 A		
CR12	1010391		1N3189		3/4 A		
CR13	1010391		1N3189		3/4 A		
CR14	1010362-3		1N649M		600MW		
CR15	1010362-3		1N649M		600MW		
CR16	1010362-3		1N649M		600MW		
CR17	1010362-3		1N649M		600MW		
CR18	1010391		1N3189		3/4 A		
CR19	1010362-3		1N649M		600MW		
CR20	1010362-3		1N649M		600MW		
DS1		LAMP				MASTER SPECIALTIES	10C3-2-RA-X-E
DS2						MASTER SPECIALTIES	10C3-1-R-X-E
DS3						MASTER SPECIALTIES	10C3-1-R-X-E
DS4						MASTER SPECIALTIES	10C3-1-R-X-E
DS5						MASTER SPECIALTIES	10C3-1-G-X-E

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING	MFG	TYPE
AR1	1015840	MAG AMPL					
AR2	1015839						
AR3			115V 60CPS			HARREL	RA-100K
A1	1000287	SENSOR					
M1		METER	10-0-10UA	1%		HICKOCK	46HR NOTE 1
M2			20 UA	1%		HICKOCK	46HR NOTE 2
M3			20 UA	1%		HICKOCK	46HR NOTE 2
M4			20 UA	1%		HICKOCK	46HR NOTE 2
M5			20 UA	1%		HICKOCK	46HR NOTE 2
S1		SWITCH	12POS 4POLE			LANGEVIN	RS210-12-2 OR EQUIV
S2			8POS 8POLE			LANGEVIN	RS306-8-3 OR EQUIV
S3			4POS 4POLE			LANGEVIN	RS404-4-1 OR EQUIV
S4			4PDT			MASTER SPECIALTIES	10-A1-1-W-X-11-E
S5			2PDT			MASTER SPECIALTIES	10-A1-1-G-X-7-E
S6			2PDT			MASTER SPECIALTIES	10-A1-2-AB-X-7-E
S7			2PDT			MASTER SPECIALTIES	10-A1-1-R-X-9-E
S8			2PDT			MASTER SPECIALTIES	10-B2-2-GR-X-7-E
K1		RELAY	34 POLES			ELECTRONIC CONTROLS	808-34C-28
K2			6 POLE			ELECTRO-TECH CORP	950-211
K3			2 POLE			SIGMA	33-7800 VG/SIL
K4			24 POLES			ELECTRONIC CONTROLS	808-24C-28
K5			2 POLE			SIGMA	33-200VG/SIL
K6			2 POLE			SIGMA	33-200 VG/SIL
K7			4 POLE			HARREL	RE-100B
K8			2 POLE			SIGMA	33-3100VG/SIL
K9			6 POLE			ELECTRO-TECH CORP	950-211
K10			2 POLE			SIGMA	33-3100VG/SIL
K11			6 POLE			ELECTRO-TECH CORP	950-211
K12			2 POLE			SIGMA	33-3100VG/SIL
K13			6 POLE			ELECTRO-TECH CORP	950-211
K14			6 POLE			ELECTRO-TECH CORP	950-211
K15			6 POLE			ELECTRO-TECH CORP	950-211
K16			1POLE TD			GV CONTROLS	LT-3202
K17			6 POLE			ELECTRO-TECH CORP	950-211
R1		RESISTOR	50 POT	3%	1.5W	BECKMAN INST(HELIPOT DIV	7216
R2			735	0.01%	0.5W	JULIE RESEARCH LABS	R42
R3			5.402MEG	0.1%	0.5W	JULIE RESEARCH LABS	R48
R4			735	0.01%	0.5W	JULIE RESEARCH LABS	R42
R5			50 POT	3%	1.5W	BECKMAN INST(HELIPOT DIV	7216
R6			760.2	0.01%	0.5W	JULIE RESEARCH LABS	R42
R7			2308.8	0.01%	0.5W	JULIE RESEARCH LABS	R42
R8			2133.5	0.01%	0.5W	JULIE RESEARCH LABS	R42
R9			2504.5	0.01%	0.5W	JULIE RESEARCH LABS	R42
R10			2308.8	0.01%	0.5W	JULIE RESEARCH LABS	R42
R11			2308.8	0.01%	0.5W	JULIE RESEARCH LABS	R42
R12			2308.8	0.01%	0.5W	JULIE RESEARCH LABS	R42
R13			2365.3	0.01%	0.5W	JULIE RESEARCH LABS	R42
R14			2184.2	0.01%	0.5W	JULIE RESEARCH LABS	R42
R15			2567.8	0.01%	0.5W	JULIE RESEARCH LABS	R42
R16			400 POT	1%	1.5W	BECKMAN INST(HELIPOT DIV	7216
R17			2180	0.01%	0.5W	JULIE RESEARCH LABS	R42
R18			1560	0.01%	0.5W	JULIE RESEARCH LABS	R42
R19			1582	0.01%	0.5W	JULIE RESEARCH LABS	R42
R20			1538	0.01%	0.5W	JULIE RESEARCH LABS	R42
R21			1535	0.01%	0.5W	JULIE RESEARCH LABS	R42
R22			50 POT	1%	1.5W	BECKMAN INST(HELIPOT DIV	7216
R23			10K POT	5%	1W	BOURNS	224
R24			10K POT	5%	1W	BOURNS	224
R25						SEE NOTE 5	
R26			31	1%	50W	DALE	RHM-50
R27			31	1%	50W	DALE	RHM-50
R28			19K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R29			0.1	0.5%	1W	DALE	RS1A
R30			15445	0.1%	0.5W	JULIE RESEARCH LABS	R42
R31			16445	0.1%	0.5W	JULIE RESEARCH LABS	R42
R32			11955	0.1%	0.5W	JULIE RESEARCH LABS	R42
R33			3242	0.1%	0.5W	JULIE RESEARCH LABS	R42
R34			9K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R35			0.1	0.5%	1W	DALE	RS1A
R36			9K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R37			0.1	0.5%	1W	DALE	RS1A
R38			249.5K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R39			249K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R40			249K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R41			249K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R42			249K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R43			100K	1%	0.25W	ELECTRA	MF 1/4
R44			100K	1%	0.25W	ELECTRA	MF 1/4
R45			10K POT	5%	1W	BOURNS	224
R46			1K	1%	1W	ELECTRA	MF1
R47			1K POT	5%	1W	BOURNS	224
R48			1K POT	5%	1W	BOURNS	224
R49			0.1	0.5%	1W	DALE	RS1A
R50			1K	0.1%	0.5W	JULIE RESEARCH LABS	R42
R51			10955	0.1%	0.5W	JULIE RESEARCH LABS	R42
R52			2242	0.1%	0.5W	JULIE RESEARCH LABS	R42
R53			5.0	5%	2W	SPRAGUE	250E
R54			70	3%	10W	DALE	RSE-10
R55			1.2K	1%	1W	ELECTRA	MF1

MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 01597 DATE 19 Jun 63

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED | DATE
CHECKED WK
DRAWN LWK
APPROVED FOR MSC
W. A. PROVAL | DATE

APOLLO IMU
TEMPERATURE CONTROL
SYSTEM
MONITOR
(GSE)

SCALE | UNIT WT | CODE IDENT

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000255
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

F4
1000255

1000255 A

1. TAUT BAND METER WITH 1000Ω ±1% COIL RESISTANCE
10-0-10UA ±1% MOVEMENT WITH FACE AS PER MIT DWG C-94837

2. TAUT BAND METER WITH 1000Ω ±1% COIL RESISTANCE
20UA ±1% MOVEMENT WITH FACE AS PER MIT DWG C-94837

3. ALL 0.01% TOLERANCE RESISTORS TO HAVE A TEMPERATURE COEFFICIENT OF ±5PPM
ALL 0.1% TOLERANCE RESISTORS TO HAVE A TEMPERATURE COEFFICIENT OF ±10PPM

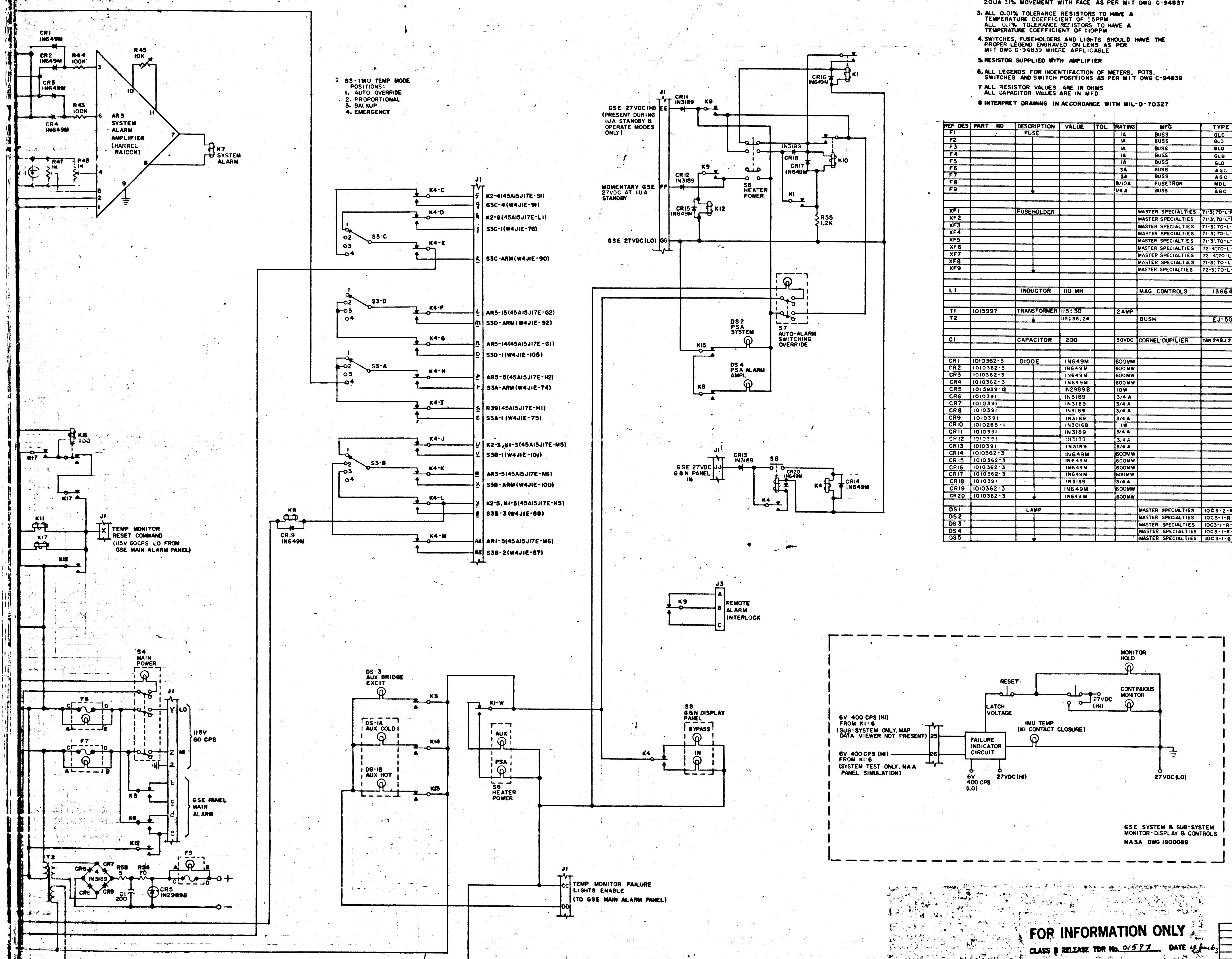
4. SWITCHES, FUSEHOLDERS AND LIGHTS SHOULD HAVE THE PROPER LEGEND ENGRAVED ON LENS AS PER MIT DWG D-94839 WHERE APPLICABLE

5. RESISTOR SUPPLIED WITH AMPLIFIER

6. ALL LEGENDS FOR INDENTIFACTION OF METERS, POTS, SWITCHES AND SWITCH POSITIONS AS PER MIT DWG C-94839

7 ALL RESISTOR VALUES ARE IN OHMS
ALL CAPACITOR VALUES ARE IN MFD

8 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327


CR1
IN649M
CR2
IN649M
R44
100K
R45
10K
CR3
IN649M
R43
100K
CR4
IN649M
AR3
SYSTEM
ALARM
AMPLIFIER
(HARREL
RA100K)
R47
1K
R48
1K
K7
SYSTEM
ALARM
K4-C
K4-D
S3-C
K4-E
J1
K2-4(45A15J17E-S1)
S3C-4(W4J1E-91)
K2-6(45A15J17E-L1)
S3C-1(W4J1E-76)
S3C-ARM(W4J1E-90)
S3-D
K4-F
AR5-15(45A15J17E-G2)
S3D-ARM(W4J1E-92)
K4-G
AR5-14(45A15J17E-G1)
S3D-1(W4J1E-105)
S3-A
K4-H
AR5-5(45A15J17E-H2)
S3A-ARM(W4J1E-74)
K4-I
R39(45A15J17E-H1)
S3A-1 (W4J1E-75)
K4-J
K2-3, K1-3(45A15J17E-M5)
S3B-1(W4J1E-101)
S3-B
K4-K
AR3-5(45A15J17E-N6)
S3B-ARM(W4J1E-100)
K4-L
K2-5, K1-5(45A15J17E-N5)
S3B-3(W4J1E-88)
K4-M
AR1-5(45A15J17E-M6)
S3B-2(W4J1E-87)
K8
CR19
IN649M
K16
TDO
K17
K11
K12
J1
TEMP MONITOR
RESET COMMAND
(115V 60CPS LO FROM
GSE MAIN ALARM PANEL)
S4
MAIN
POWER
F6
F7
115V
60 CPS
LO
HI
K9
GSE PANEL
MAIN
ALARM
T2
CR6
CR7
IN3189
CR8
CR9
R53
5
R54
70
C1
200
CR5
IN2989B
F9
GSE 27VDC (HI)
(PRESENT DURING
IUA STANDBY &
OPERATE MODES
ONLY)
CR11
IN3189
CR16
IN649M
K1
CR18
CR17
IN649M
K10
CR12
IN3189
S6
HEATER
POWER
MOMENTARY GSE
27VDC AT IUA
STANDBY
CR15
IN649M
K12
R55
1.2K
GSE 27VDC(LO)
S7
AUTO-ALARM
SWITCHING
OVERRIDE
DS2
PSA
SYSTEM
K15
DS4
PSA ALARM
AMPL
GSE 27VDC
G&N PANEL
IN
CR13
IN3189
S8
CR20
IN649M
K4
CR14
IN649M
J3
REMOTE
ALARM
INTERLOCK
DS-3
AUX BRIDGE
EXCIT
K3
DS-1A
AUX COLD
K14
DS-1B
AUX HOT
K13
K1-W
AUX
PSA
S6
HEATER
POWER
S8
G&N DISPLAY
PANEL
BYPASS
IN
J1
TEMP MONITOR FAILURE
LIGHTS ENABLE
(TO GSE MAIN ALARM PANEL)
MONITOR
HOLD
RESET
CONTINUOUS
MONITOR
LATCH
VOLTAGE
27VDC
(HI)
6V 400 CPS (HI)
FROM K1-6
(SUB-SYSTEM ONLY, MAP
DATA VIEWER NOT PRESENT)
25
26
6V 400 CPS (HI)
FROM K1-6
(SYSTEM TEST ONLY, NAA
PANEL SIMULATION)
FAILURE
INDICATOR
CIRCUIT
IMU TEMP
(K1 CONTACT CLOSURE)
6V
400 CPS
(LO)
27VDC(HI)
27VDC(LO)

S3 - IMU TEMP MODE
POSITIONS:
1. AUTO OVERRIDE
2. PROPORTIONAL
3. BACKUP
4. EMERGENCY

GSE SYSTEM & SUB-SYSTEM
MONITOR-DISPLAY & CONTROLS
NASA DWG 1900089

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING	MFG	TYPE
F1		FUSE			1A	BUSS	GLD
F2					1A	BUSS	GLD
F3					1A	BUSS	GLD
F4					1A	BUSS	GLD
F5					1A	BUSS	GLD
F6					3A	BUSS	AGC
F7					3A	BUSS	AGC
F8					8/10A	FUSETRON	MDL
F9					1/4 A	BUSS	AGC
XF1		FUSEHOLDER				MASTER SPECIALTIES	71-3; 70-L-R-2-E
XF2						MASTER SPECIALTIES	71-3; 70-L-R-2-E
XF3						MASTER SPECIALTIES	71-3; 70-L-R-2-E
XF4						MASTER SPECIALTIES	71-3; 70-L-R-2-E
XF5						MASTER SPECIALTIES	71-3; 70-L-R-2-E
XF6						MASTER SPECIALTIES	72-4; 70-L-R-2-E
XF7						MASTER SPECIALTIES	72-4; 70-L-R-2-E
XF8						MASTER SPECIALTIES	71-3; 70-L-R-1-E
XF9						MASTER SPECIALTIES	72-3; 70-L-R-1-E
L1		INDUCTOR	110 MH			MAG CONTROLS	13664
T1	1015997	TRANSFORMER	115:30		2 AMP		
T2			115:36, 24			BUSH	EJ-501
C1		CAPACITOR	200		50VDC	CORNEL-DUBILIER	TAN 24BJ 201 UP
CR1	1010362-3	DIODE	IN649M		600MW		
CR2	1010362-3		IN649M		600MW		
CR3	1010362-3		IN649M		600MW		
CR4	1010362-3		IN649M		600MW		
CR5	1015939-12		IN2989B		10W		
CR6	1010391		IN3189		3/4 A		
CR7	1010391		IN3189		3/4 A		
CR8	1010391		IN3189		3/4 A		
CR9	1010391		IN3189		3/4 A		
CR10	1010265-1		IN3016B		1W		
CR11	1010391		IN3189		3/4 A		
CR12	1010391		IN3189		3/4 A		
CR13	1010391		IN3189		3/4 A		
CR14	1010362-3		IN649M		600MW		
CR15	1010362-3		IN649M		600MW		
CR16	1010362-3		IN649M		600MW		
CR17	1010362-3		IN649M		600MW		
CR18	1010391		IN3189		3/4 A		
CR19	1010362-3		IN649M		600MW		
CR20	1010362-3		IN649M		600MW		
DS1		LAMP				MASTER SPECIALTIES	10C3-2-RA-X-E
DS2						MASTER SPECIALTIES	10C3-1-R-X-E
DS3						MASTER SPECIALTIES	10C3-1-R-X-E
DS4						MASTER SPECIALTIES	10C3-1-R-X-E
DS5						MASTER SPECIALTIES	10C3-1-G-X-E

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RAT
AR1	1015840	MAG AMPL			
AR2	1015839				
AR3			115V 60CPS		
A1	1000287	SENSOR			
M1		METER	10-0-10UA	1%	
M2			20 UA	%	
M3			20 UA	1%	
M4			20 UA	1%	
M5			20 UA	1%	
S1		SWITCH	POS 4POLE		
S2			8 POS 8POLE		
S3			4 POS 4POLE		
S4			PDT		
S5			PDT		
S6			PDT		
S7			PDT		
S8			PDT		
K1		RELAY	34 POLES		
K2			3 POLE		
K3			2 POLE		
K4			24 POLES		
K5			2 POLE		
K6			2 POLE		
K7			1 POLE		
K8			2 POLE		
K9			3 POLE		
K10			2 POLE		
K11			5 POLE		
K12			2 POLE		
K13			3 POLE		
K14			5 POLE		
K15			5 POLE		
K16			1 POLE TD		
K17			5 POLE		
R1		RESISTOR	50 POT	3%	1.5
R2			735	0.01%	0.5
R3			5.402MEG	0.1%	0.5
R4			735	0.01%	0.5
R5			50 POT	3%	1.5
R6			760.2	0.01%	0.5
R7			2308.8	0.01%	0.5
R8			2133.5	0.01%	0.5
R9			2504.5	0.01%	0.5
R10			2308.8	0.01%	0.5
R11			2308.8	0.01%	0.5
R12			2308.8	0.01%	0.5
R13			2365.3	0.01%	0.5
R14			2184.2	0.01%	0.5
R15			2567.8	0.01%	0.5
R16			400 POT	1%	1.5
R17			2180	0.01%	0.5
R18			1560	0.01%	0.5
R19			582	0.01%	0.5
R20			1538	0.01%	0.5
R21			1535	0.01%	0.5
R22			50 POT	1%	1.5
R23			10K POT	5%	1W
R24			10K POT	5%	1W
R25					
R26			31	1%	50
R27			31	1%	50
R28			19K	0.1%	0.5
R29			0.1	0.5%	1W
R30			15445	0.1%	0.5
R31			16445	0.1%	0.5
R32			11955	0.1%	0.5
R33			3242	0.1%	0.5
R34			9K	0.1%	0.5
R35			0.1	0.5%	1W
R36			9K	0.1%	0.5
R37			0.1	0.5%	1W
R38			249.5K	0.1%	0.5
R39			249K	0.1%	0.5
R40			249K	0.1%	[illegible]
R41			249K	0.1%	0.5
R42			249K	0.1%	0.5
R43			100K	1%	0.2
R44			100K	1%	0.2
R45			10K POT	5%	1W
R46			1K	1%	1W
R47			1K POT	5%	1W
R48			1K POT	[illegible]	[illegible]
R49			0.1	0.5%	[illegible]
R50			1K	0.1%	0.5
R51			10955	0.1%	[illegible]
R52			2212	[illegible]	[illegible]
R53			5.0	5%	[illegible]
R54			70	3%	10
R55			1.2K	1%	1

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MATERIAL
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USED ON
APPLICATION

MIT INSTRUMENTATION LAB
APPROVED
CHECKED
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TEMPER

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E3

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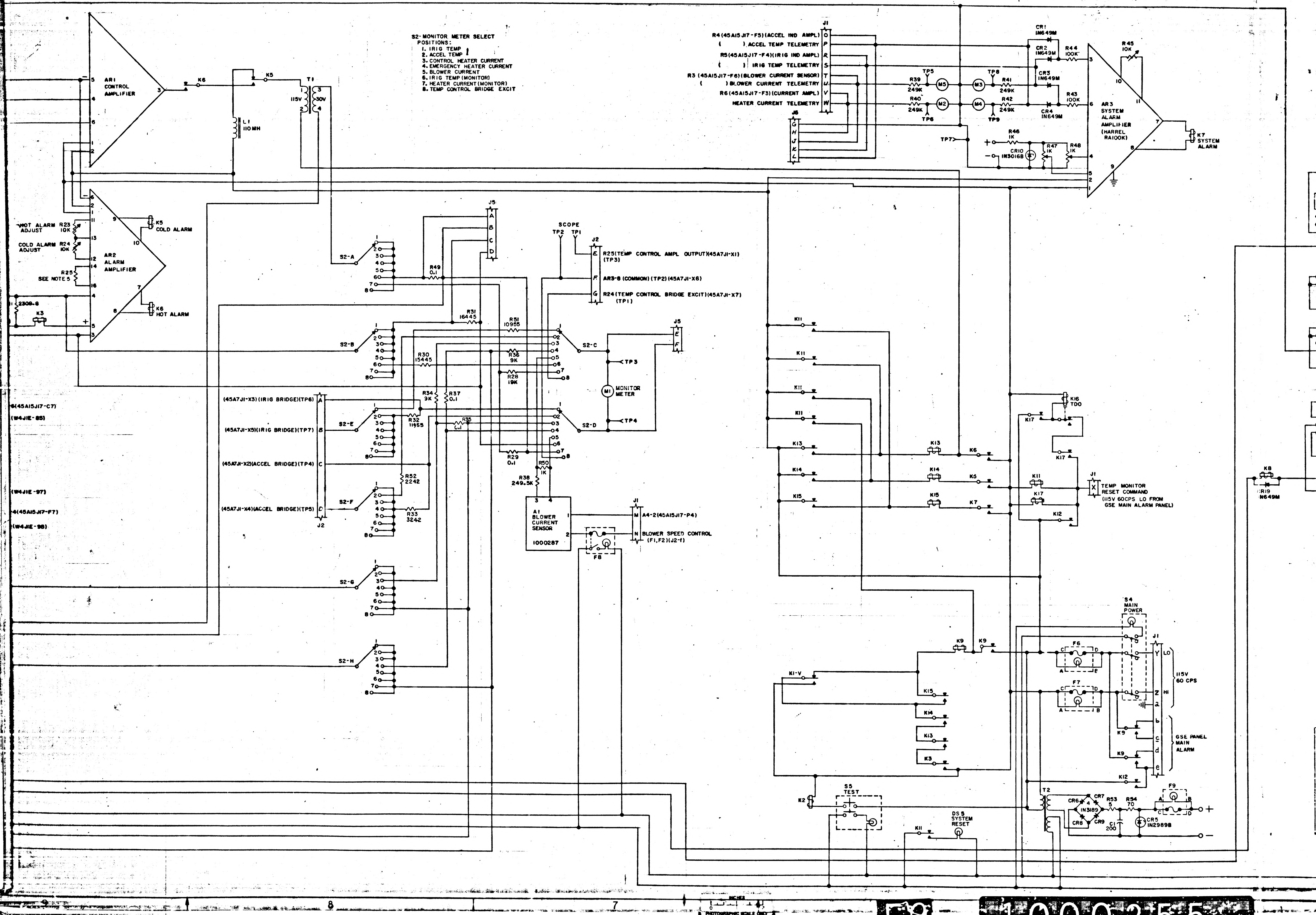
AR1 CONTROL AMPLIFIER
K6
K5
T1
115V
30V
L1 110MH
AR2 ALARM AMPLIFIER
K5 COLD ALARM
K6 HOT ALARM
HOT ALARM ADJUST R23 10K
COLD ALARM ADJUST R24 10K
R25 SEE NOTE 5
2309-8
K3
S2-MONITOR METER SELECT POSITIONS:
1. IRIG TEMP
2. ACCEL TEMP
3. CONTROL HEATER CURRENT
4. EMERGENCY HEATER CURRENT
5. BLOWER CURRENT
6. IRIG TEMP (MONITOR)
7. HEATER CURRENT (MONITOR)
8. TEMP CONTROL BRIDGE EXCIT
J5
S2-A
R49 0.1
SCOPE
TP2
TP1
J2
R25 (TEMP CONTROL AMPL OUTPUT)(45A7J1-X1) (TP3)
AR3-8 (COMMON) (TP2) (45A7J1-X6)
R24 (TEMP CONTROL BRIDGE EXCIT)(45A7J1-X7) (TP1)
S2-B
R31 16445
R51 10955
R30 15445
R36 9K
R28 19K
S2-C
TP3
M1 MONITOR METER
TP4
S2-D
(45A7J1-X3) (IRIG BRIDGE) (TP6)
(45A7J1-X5) (IRIG BRIDGE) (TP7)
(45A7J1-X2) (ACCEL BRIDGE) (TP4)
(45A7J1-X4) (ACCEL BRIDGE) (TP5)
J2
S2-E
R34 3K
R37 0.1
R32 11955
R35 0.1
R29 0.1
R50 1K
R38 249.5K
S2-F
R52 2242
R33 3242
A1 BLOWER CURRENT SENSOR 1000287
J1
A4-2 (45A15J17-P4)
BLOWER SPEED CONTROL (F1, F2)(J2-f)
F8
S2-G
S2-H
(45A15J17-C7)
(W4J1E-85)
(W4J1E-97)
(45A15J17-F7)
(W4J1E-98)
J1
R4 (45A15J17-F5)(ACCEL IND AMPL)
( ) ACCEL TEMP TELEMETRY
R5 (45A15J17-F4)(IRIG IND AMPL)
( ) IRIG TEMP TELEMETRY
R3 (45A15J17-F6)(BLOWER CURRENT SENSOR)
( ) BLOWER CURRENT TELEMETRY
R6 (45A15J17-F3)(CURRENT AMPL)
HEATER CURRENT TELEMETRY
J6
TP5
TP6
TP8
TP9
TP7
R39 249K
R40 249K
R41 249K
R42 249K
M5
M3
M2
M4
CR1 1N649M
CR2 1N649M
CR3 1N649M
CR4 1N649M
R44 100K
R43 100K
R45 10K
R46 1K
CR10 1N3016B
R47 1K
R48 1K
AR3 SYSTEM ALARM AMPLIFIER (HARREL RA100K)
K7 SYSTEM ALARM
K11
K13
K14
K15
K6
K5
K7
K16 TDO
K17
K12
J1
TEMP MONITOR RESET COMMAND (115V 60CPS LO FROM GSE MAIN ALARM PANEL)
K8
R19 1N649M
S4 MAIN POWER
F6
F7
115V 60 CPS
LO
HI
GSE PANEL MAIN ALARM
K9
K1-V
K3
K2
S5 TEST
DS5 SYSTEM RESET
T2
CR6
CR7
CR8
CR9
1N3189
R53 5
R54 70
C1 200
CR5 1N2989B
F9
9
8
7
INCHES
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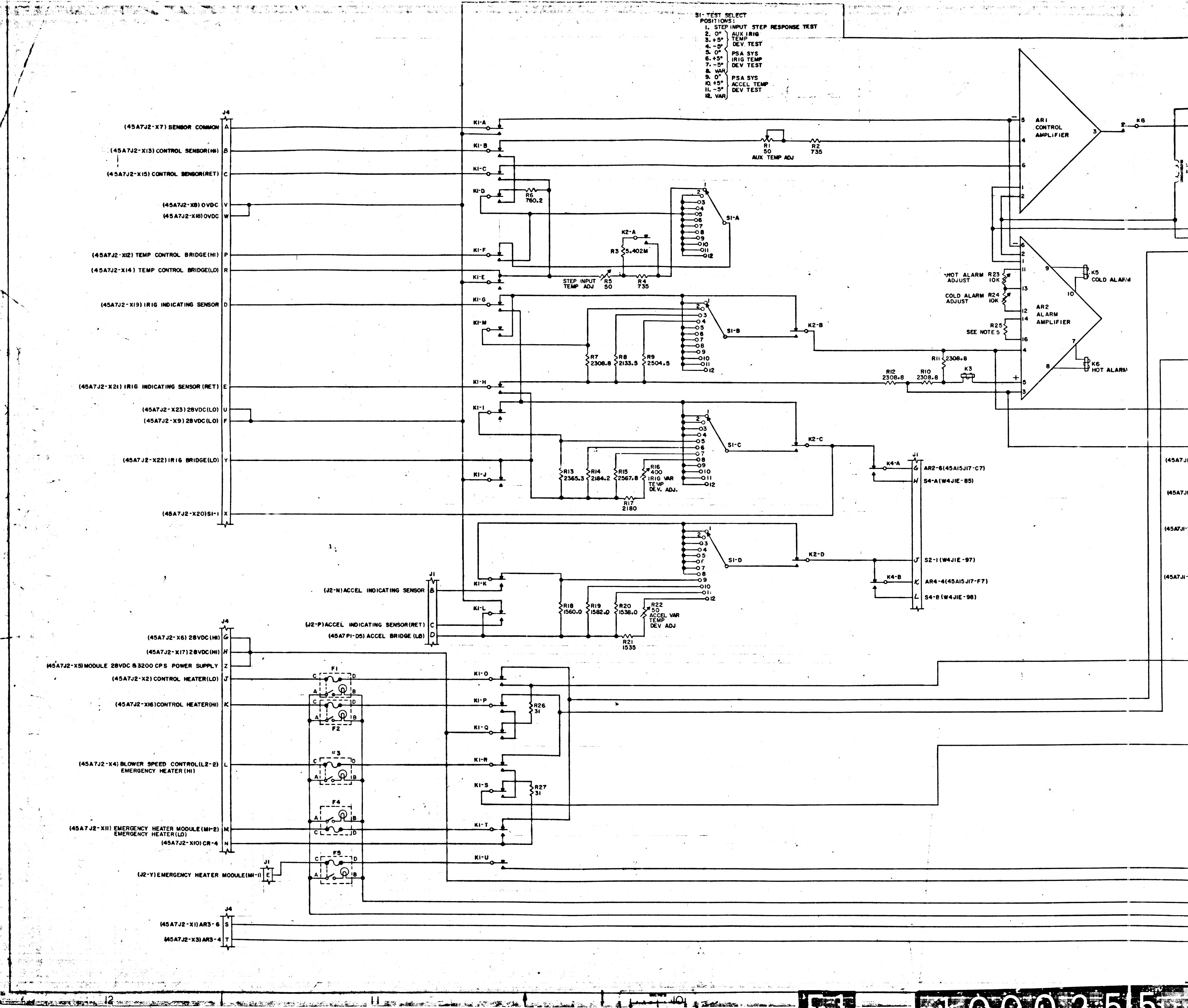

S1- TEST SELECT
POSITIONS:
1. STEP INPUT STEP RESPONSE TEST
2. 0° } AUX IRIG TEMP DEV. TEST
3. +5°
4. -5°
5. 0° } PSA SYS IRIG TEMP DEV TEST
6. +5°
7. -5°
8. VAR
9. 0° } PSA SYS ACCEL TEMP DEV TEST
10. +5°
11. -5°
12. VAR
J4
(45A7J2-X7) SENSOR COMMON A
(45A7J2-X13) CONTROL SENSOR(HI) B
(45A7J2-X15) CONTROL SENSOR(RET) C
(45A7J2-X8) OVDC V
(45A7J2-X18) OVDC W
(45A7J2-X12) TEMP CONTROL BRIDGE(HI) P
(45A7J2-X14) TEMP CONTROL BRIDGE(LO) R
(45A7J2-X19) IRIG INDICATING SENSOR D
(45A7J2-X21) IRIG INDICATING SENSOR (RET) E
(45A7J2-X23) 28VDC(LO) U
(45A7J2-X9) 28 VDC(LO) F
(45A7J2-X22) IRIG BRIDGE(LO) Y
(45A7J2-X20) S1-1 X
J1
(J2-N) ACCEL INDICATING SENSOR B
(J2-P) ACCEL INDICATING SENSOR(RET) C
(45A7P1-D5) ACCEL BRIDGE (LO) D
J4
(45A7J2-X6) 28VDC(HI) G
(45A7J2-X17) 28VDC(HI) H
(45A7J2-X5) MODULE 28VDC & 3200 CPS POWER SUPPLY Z
(45A7J2-X2) CONTROL HEATER(LO) J
(45A7J2-X16) CONTROL HEATER(HI) K
(45A7J2-X4) BLOWER SPEED CONTROL(L2-2) EMERGENCY HEATER (HI) L
(45A7J2-X11) EMERGENCY HEATER MODULE (M1-2) EMERGENCY HEATER(LO) M
(45A7J2-X10) CR-4 N
J1
(J2-Y) EMERGENCY HEATER MODULE(M1-1) E
J4
(45A7J2-X1) AR3-6 S
(45A7J2-X3) AR3-4 T
K1-A
K1-B
K1-C
K1-D
K1-F
K1-E
K1-G
K1-M
K1-H
K1-I
K1-J
K1-K
K1-L
K1-O
K1-P
K1-Q
K1-R
K1-S
K1-T
K1-U
R1 50 AUX TEMP ADJ
R2 735
R6 760.2
K2-A
R3 5.402M
STEP INPUT TEMP ADJ
R5 50
R4 735
S1-A
S1-B
S1-C
S1-D
K2-B
K2-C
K2-D
R7 2308.8
R8 2133.5
R9 2504.5
R13 2365.3
R14 2184.2
R15 2567.8
R16 400 IRIG VAR TEMP DEV. ADJ.
R17 2180
R18 1560.0
R19 1582.0
R20 1538.0
R22 50 ACCEL VAR TEMP DEV ADJ
R21 1535
R26 31
R27 31
F1
F2
F3
F4
F5
A B C D
K4-A
K4-B
J1
G AR2-6(45A15J17-C7)
H S4-A(W4J1E-85)
J S2-1(W4J1E-97)
K AR4-4(45A15J17-F7)
L S4-B(W4J1E-96)
AR1 CONTROL AMPLIFIER
AR2 ALARM AMPLIFIER
K6
HOT ALARM ADJUST R23 10K
COLD ALARM ADJUST R24 10K
R25 SEE NOTE 5
K5 COLD ALARM
K6 HOT ALARM
R11 2308.8
R12 2308.8
R10 2308.8
K3
(45A7J
(45A7J
(45A7J
(45A7J
12
11
10

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E1

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IT SELECT
ONS
AU
+5° IR TEMP
-5° DEV TEST
+5° SYSTEM
-5° IRIG TEMP
AR DEV TEST
+5° SYSTEM
+5° ACCEL TEMP
AR DEV TEST
TEP INPUT SYSTEM STEP RESPONSE TEST

ITOR METER
ONS
RIG TEMP
CCEL TEMP
ONTROL HEATER CURRENT
MERGENCY HEATER CURRENT
OWER CURRENT
RIG TEMP (MONITOR)
EATER CURRENT(MONITOR)
EMP CONTROL BRIDGE EXCIT

STEM MODE D&C SIMULATOR
IONS
UTO OVERRIDE
ROPORTIONAL
ACKUP
MERGENCY

ATER POWER SWITCH

S:
1 - HEATER POWER
2 - SYSTEM TEST
3 - MONITOR BRIDGE EXCIT FAILURE
4 - D&C PANEL IN-BYPASS
5 - COLD ALARM
6 - HOT ALARM
7 - SYSTEM ALARM
8 - SYSTEM ALARM SLAVE
9 - ALARM SUMMARY
10 - SYSTEM ALARM RELAY CHECK
11 - TIME DELAY SLAVE (TDO)
12 - TIME DELAY (TDO)
13 - HOT ALARM SLAVE
14 - COLD ALARM SLAVE
15 - SYSTEM ALARM SLAVE
16 - SYSTEM ALARM AMPLIFIER SLAVE
17 - J4 INTERLOCK
18 - HEATER POWER SLAVE

S
ONITOR
ELEMETRY
IG TEMP
CCEL TEMP
ELEMETRY

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MASTER

QTY REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

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MATERIAL

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED 6/12 DATE
CHECKED BR 6/12
DRAWN LWR 6-11
APPROVED FOR MSC
W J Rhine
MIT APPROVAL DATE
W Kupfer 19 Jun 63

APOLLO IMU
TEMPERATURE CONTROL
SYSTEM
MONITOR
(GSE)

SCALE | UNIT WT. | CODE IDENT.

M I T
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000255
SHEET 1 OF 1

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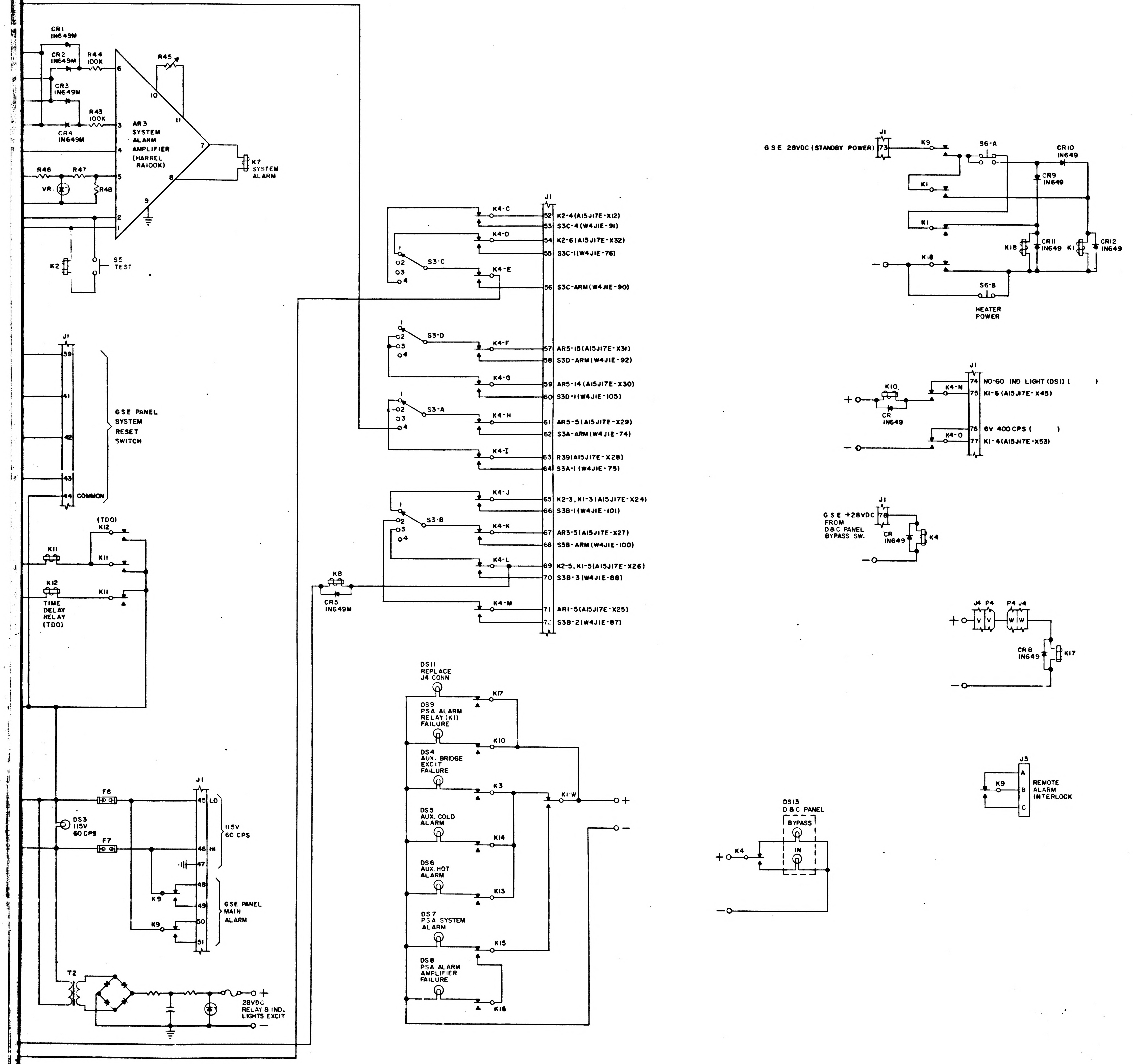
CR1 IN649M
CR2 IN649M
R44 100K
R45
CR3 IN649M
R43 100K
CR4 IN649M
AR3 SYSTEM ALARM AMPLIFIER (HARREL RA100K)
K7 SYSTEM ALARM
R46
R47
VR
R48
K2
S5 TEST
J1
39
41
42
43
44 COMMON
GSE PANEL SYSTEM RESET SWITCH
(TDO) K12
K11
K12 TIME DELAY RELAY (TDO)
F6
F7
DS3 115V 60 CPS
45 LO
46 HI
47
48
49
50
51
115V 60 CPS
K9
GSE PANEL MAIN ALARM
T2
28VDC RELAY & IND. LIGHTS EXCIT
K4-C
K4-D
S3-C
K4-E
S3-D
K4-F
K4-G
S3-A
K4-H
K4-I
K4-J
S3-B
K4-K
K4-L
K4-M
K8
CR5 IN649M
52 K2-4(A15J17E-X12)
53 S3C-4(W4J1E-91)
54 K2-6(A15J17E-X32)
55 S3C-1(W4J1E-76)
56 S3C-ARM(W4J1E-90)
57 AR5-15(A15J17E-X31)
58 S3D-ARM(W4J1E-92)
59 AR5-14(A15J17E-X30)
60 S3D-1(W4J1E-105)
61 AR5-5(A15J17E-X29)
62 S3A-ARM(W4J1E-74)
63 R39(A15J17E-X28)
64 S3A-1(W4J1E-75)
65 K2-3, K1-3(A15J17E-X24)
66 S3B-1(W4J1E-101)
67 AR3-5(A15J17E-X27)
68 S3B-ARM(W4J1E-100)
69 K2-5, K1-5(A15J17E-X26)
70 S3B-3(W4J1E-88)
71 AR1-5(A15J17E-X25)
72 S3B-2(W4J1E-87)
DS11 REPLACE J4 CONN
K17
DS9 PSA ALARM RELAY (K1) FAILURE
K10
DS4 AUX. BRIDGE EXCIT FAILURE
K3
K1-W
DS5 AUX. COLD ALARM
K14
DS6 AUX. HOT ALARM
K13
DS7 PSA SYSTEM ALARM
K15
DS8 PSA ALARM AMPLIFIER FAILURE
K16
GSE 28VDC (STANDBY POWER)
73
S6-A
CR10 IN649
CR9 IN649
K1
K18
CR11 IN649
CR12 IN649
S6-B
HEATER POWER
74 NO-GO IND LIGHT (DS1) ( )
75 K1-6 (A15J17E-X45)
76 6V 400CPS ( )
77 K1-4(A15J17E-X53)
K10
CR IN649
K4-N
K4-O
GSE +28VDC FROM D&C PANEL BYPASS SW.
78
CR IN649
K4
J4 P4
P4 J4
V
W
CR8 IN649
K17
J3
A
B
C
K9
REMOTE ALARM INTERLOCK
DS13 D&C PANEL
BYPASS
IN
K4

S1-TEST SELECT
POSITIONS
1. 0° } AUX IRIG TEMP DEV TEST
2. +5°
3. -5°
4. 0° } SYSTEM IRIG TEMP DEV TEST
5. +5°
6. -5°
7. VAR
8. 0° } SYSTEM ACCEL TEMP DEV TEST
9. +5°
10. -5°
11. VAR
12. STEP INPUT SYSTEM STEP RESPONSE TEST

S2-MONITOR METER
POSITIONS
1. IRIG TEMP
2. ACCEL TEMP
3. CONTROL HEATER CURRENT
4. EMERGENCY HEATER CURRENT
5. BLOWER CURRENT
6. IRIG TEMP (MONITOR)
7. HEATER CURRENT (MONITOR)
8. TEMP CONTROL BRIDGE EXCIT

S3-SYSTEM MODE D&C SIMULATOR
POSITIONS
1. AUTO OVERRIDE
2. PROPORTIONAL
3. BACKUP
4. EMERGENCY

S5-TEST

S6-HEATER POWER SWITCH

RELAYS:
K1 - HEATER POWER
K2 - SYSTEM TEST
K3 - MONITOR BRIDGE EXCIT FAILURE
K4 - D&C PANEL IN-BYPASS
K5 - COLD ALARM
K6 - HOT ALARM
K7 SYSTEM ALARM
K8 - SYSTEM ALARM SLAVE
K9 - ALARM SUMMARY
K10 - SYSTEM ALARM RELAY CHECK
K11 - TIME DELAY SLAVE (TDO)
K12 - TIME DELAY (TDO)
K13 - HOT ALARM SLAVE
K14 - COLD ALARM SLAVE
K15 - SYSTEM ALARM SLAVE
K16 - SYSTEM ALARM AMPLIFIER SLAVE
K17 - J4 INTERLOCK
K18 - HEATER POWER SLAVE

METERS:
M1 MONITOR
M2 TELEMETRY
M3 IRIG TEMP
M4 ACCEL TEMP
M5 TELEMETRY

FOR

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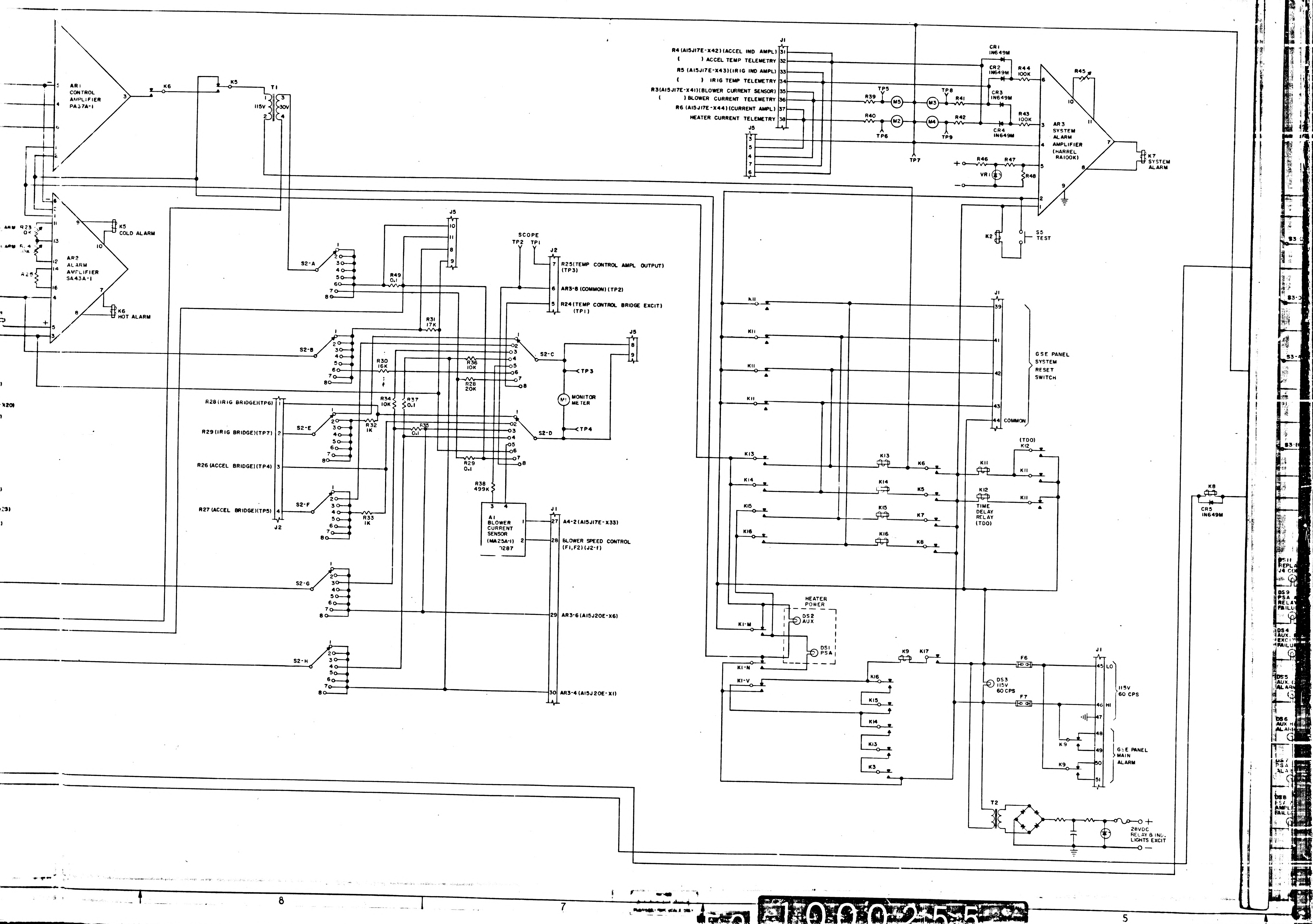
AR1
CONTROL
AMPLIFIER
PA37A-1
K6
K5
T1
115V
30V
AR2
ALARM
AMPLIFIER
SA43A-1
R23
0K
R 4
0K
R25
K5
COLD ALARM
K6
HOT ALARM
X20)
23)
S2-A
S2-B
S2-E
S2-F
S2-G
S2-H
S2-C
S2-D
J5
R49
0.1
R31
17K
R30
16K
R34
10K
R37
0.1
R32
1K
R35
0.1
R33
1K
R36
10K
R28
20K
R29
0.1
R38
499K
SCOPE
TP2
TP1
J2
R25(TEMP CONTROL AMPL OUTPUT)
(TP3)
AR3-8 (COMMON) (TP2)
R24(TEMP CONTROL BRIDGE EXCIT)
(TP1)
TP3
MONITOR
METER
TP4
R28 (IRIG BRIDGE)(TP6)
R29 (IRIG BRIDGE)(TP7)
R26 (ACCEL BRIDGE)(TP4)
R27 (ACCEL BRIDGE)(TP5)
A1
BLOWER
CURRENT
SENSOR
(MA25A-1)
0287
J1
A4-2 (A15J17E-X33)
BLOWER SPEED CONTROL
(F1,F2) (J2-f)
AR3-6 (A15J20E-X6)
AR3-4 (A15J20E-X1)
R4 (A15J17E-X42) (ACCEL IND AMPL)
( ) ACCEL TEMP TELEMETRY
R5 (A15J17E-X43) (IRIG IND AMPL)
( ) IRIG TEMP TELEMETRY
R3 (A15J17E-X41) (BLOWER CURRENT SENSOR)
( ) BLOWER CURRENT TELEMETRY
R6 (A15J17E-X44) (CURRENT AMPL)
HEATER CURRENT TELEMETRY
TP5
TP6
TP7
TP8
TP9
R39
R40
R41
R42
M5
M2
M3
M4
CR1
1N649M
CR2
1N649M
CR3
1N649M
CR4
1N649M
R44
100K
R43
100K
R45
AR3
SYSTEM
ALARM
AMPLIFIER
(HARREL
RA100K)
K7
SYSTEM
ALARM
R46
R47
R48
VR1
K2
S5
TEST
K11
GSE PANEL
SYSTEM
RESET
SWITCH
COMMON
K13
K14
K15
K16
K6
K5
K7
K8
(TDO)
K12
TIME
DELAY
RELAY
(TDO)
HEATER
POWER
DS2
AUX
DS1
PSA
K1-M
K1-N
K1-V
K9
K17
K3
DS3
115V
60 CPS
F6
F7
LO
HI
115V
60 CPS
GSE PANEL
MAIN
ALARM
T2
28VDC
RELAY & IND.
LIGHTS EXCIT
K8
CR5
1N649M
S3
DS11
REPLA
J4 CO
DS9
PSA
RELAY
FAILU
DS4
AUX.
EXCIT
FAILUR
DS5
AUX.
ALARM
DS6
AUX H
ALAR
DS7
PSA
ALA
DS8
PSA
AMPL
FAILU
8
7
5
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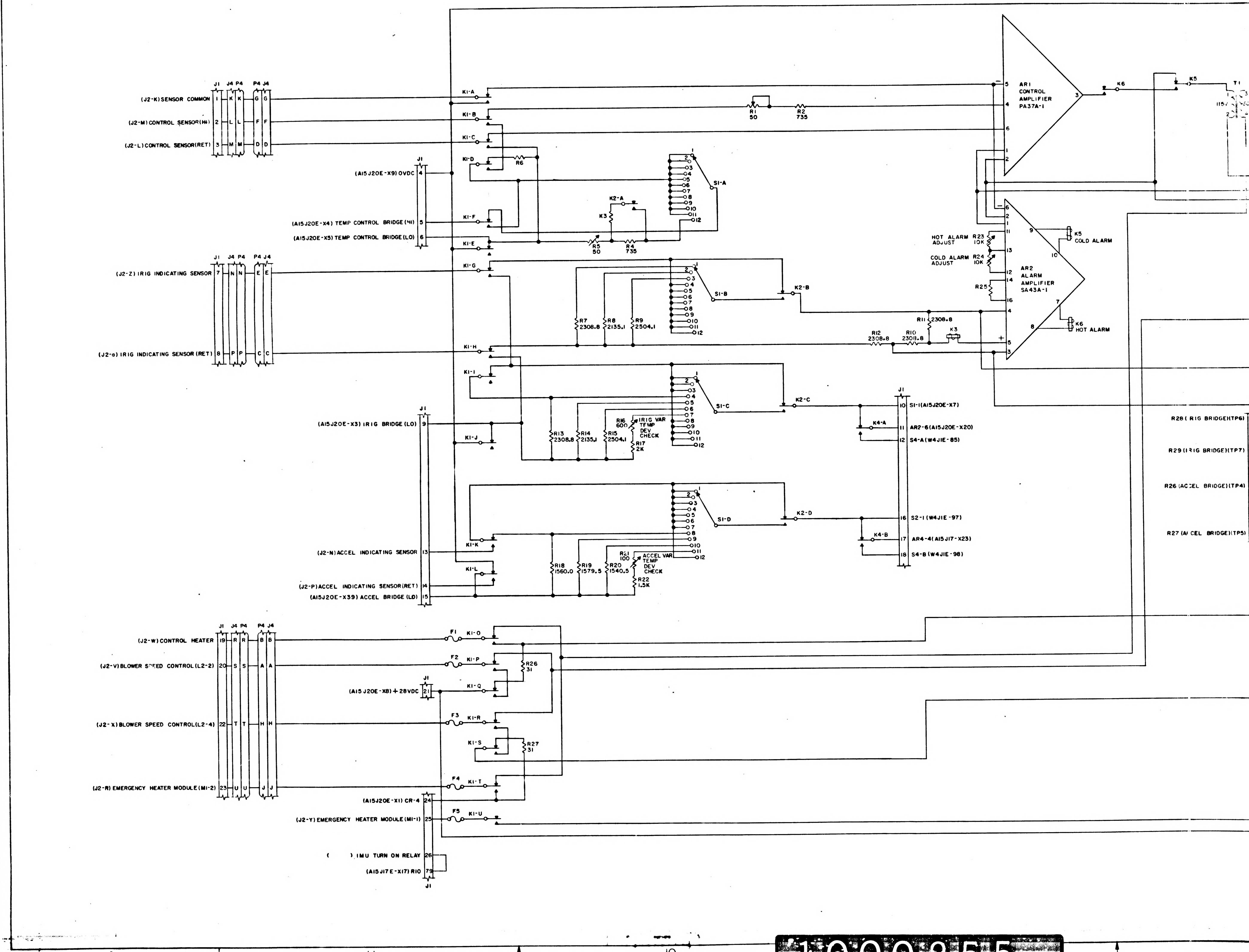
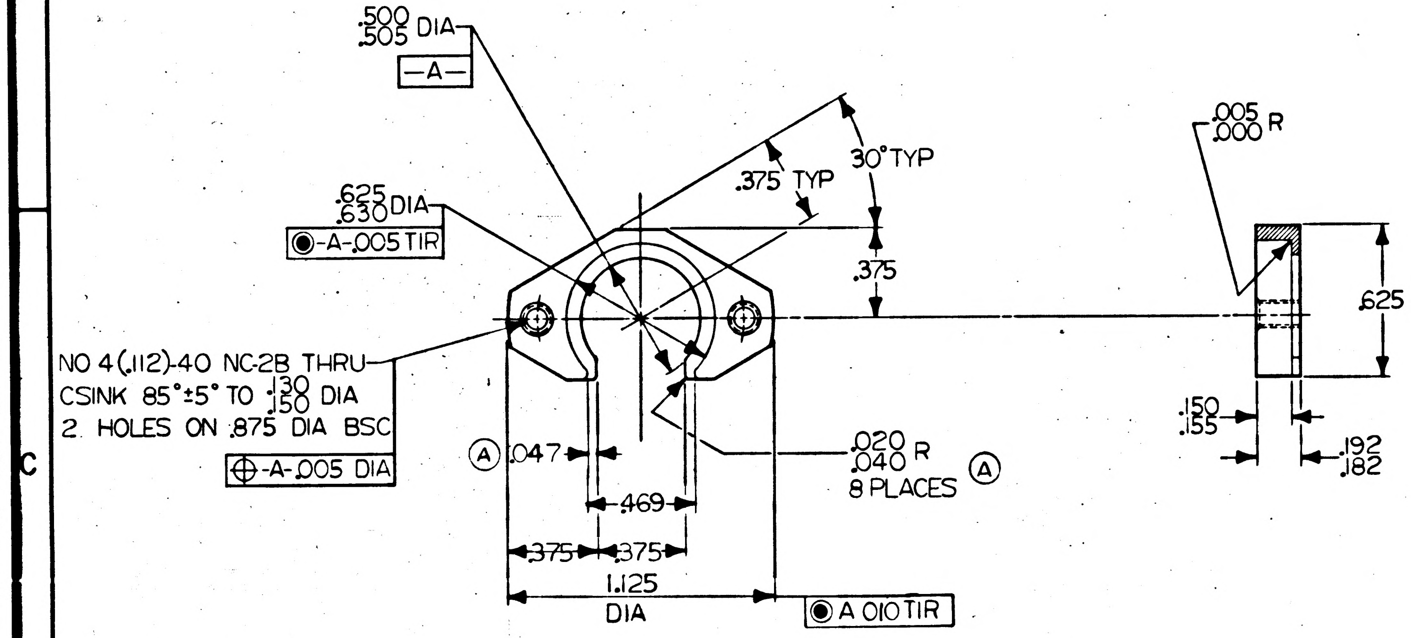

J1 J4 P4 P4 J4
(J2-K) SENSOR COMMON
(J2-M) CONTROL SENSOR (HI)
(J2-L) CONTROL SENSOR (RET)
(A15J20E-X9) OVDC
(A15J20E-X4) TEMP CONTROL BRIDGE (HI)
(A15J20E-X5) TEMP CONTROL BRIDGE (LO)
(J2-Z) IRIG INDICATING SENSOR
(J2-a) IRIG INDICATING SENSOR (RET)
(A15J20E-X3) IRIG BRIDGE (LO)
(J2-N) ACCEL INDICATING SENSOR
(J2-P) ACCEL INDICATING SENSOR (RET)
(A15J20E-X39) ACCEL BRIDGE (LO)
(J2-W) CONTROL HEATER
(J2-V) BLOWER SPEED CONTROL (L2-2)
(A15J20E-X8) +28VDC
(J2-X) BLOWER SPEED CONTROL (L2-4)
(J2-R) EMERGENCY HEATER MODULE (M1-2)
(A15J20E-X1) CR-4
(J2-Y) EMERGENCY HEATER MODULE (M1-1)
( ) IMU TURN ON RELAY
(A15J17E-X17) R10
K1-A
K1-B
K1-C
K1-D
K1-E
K1-F
K1-G
K1-H
K1-I
K1-J
K1-K
K1-L
K1-O
K1-P
K1-Q
K1-R
K1-S
K1-T
K1-U
F1
F2
F3
F4
F5
R1 50
R2 735
R4 735
R5 50
R6
K3
K2-A
K2-B
K2-C
K2-D
S1-A
S1-B
S1-C
S1-D
R7 2308.8
R8 2135.1
R9 2504.1
R13 2308.8
R14 2135.1
R15 2504.1
R16 600
IRIG VAR TEMP DEV CHECK
R17 2K
R18 1560.0
R19 1579.5
R20 1540.5
R21 100
ACCEL VAR TEMP DEV CHECK
R22 1.5K
R26 31
R27 31
AR1 CONTROL AMPLIFIER PA37A-1
AR2 ALARM AMPLIFIER SA43A-1
HOT ALARM ADJUST
R23 10K
COLD ALARM ADJUST
R24 10K
R25
R11 2308.8
R12 2308.8
R10 2308.8
K5 COLD ALARM
K6 HOT ALARM
K4-A
K4-B
10 S1-1 (A15J20E-X7)
11 AR2-6 (A15J20E-X20)
12 S4-A (W4J1E-85)
16 S2-1 (W4J1E-97)
17 AR4-4 (A15J17-X23)
18 S4-B (W4J1E-98)
K5
K6
T1
115V
R28 (IRIG BRIDGE) (TP6)
R29 (IRIG BRIDGE) (TP7)
R26 (ACCEL BRIDGE) (TP4)
R27 (ACCEL BRIDGE) (TP5)
12
11
10

	REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01042	1MAY63	ajb	wk



.500 .505 DIA
—A—
.625 .630 DIA
◉-A-.005 TIR
.375 TYP
30° TYP
.375
NO 4 (.112)-40 NC-2B THRU
CSINK 85°±5° TO .130 .150 DIA
2. HOLES ON .875 DIA BSC
⊕-A-.005 DIA
Ⓐ .047
.469
.375
.375
1.125
DIA
◉ A .010 TIR
.020 .040 R
8 PLACES Ⓐ
.005 .000 R
.625
.150 .155
.192 .182

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ MACHINE FINISH ALL OVER
3. BREAK ALL SHARP EDGES .005 .015
4. MATERIAL: ALUMINUM ALLOY 6061-T6
   ALT SPEC: QQ-A-325 TEMP-T6
   OR QQ-A-327 TEMP-T6
5. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
6. Ⓐ IDENTIFY USING DRAWING NO., REVISION LETTER, & MANFACTUERS SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

Ⓐ

1000205	DL1000201
1000007	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
~	±.010	±2°

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-19-63
APPROVED FOR MSC	L. J. Surif	4/10/63
MIT/IL APPROVAL	W Wuffer	10 Apr 63

CLAMP, TRANSDUCER
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

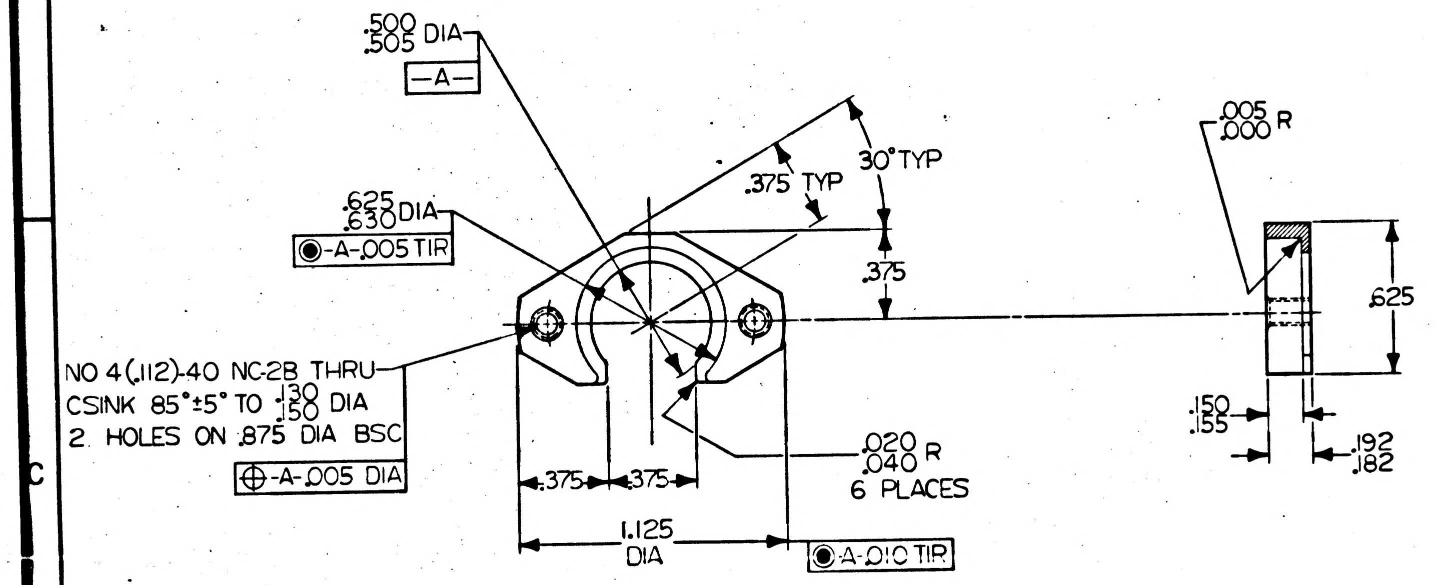
NASA DRAWING NO.
1000256

SHEET 1 OF 1 SHEET

1000256

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



.500 .505 DIA
—A—
.625 .630 DIA
◉-A-.005 TIR
30° TYP
.375 TYP
.375
NO 4 (.112)-40 NC-2B THRU
CSINK 85°±5° TO .130 .150 DIA
2 HOLES ON .875 DIA BSC
⊕-A-.005 DIA
.375
.375
1.125 DIA
◉-A-.010 TIR
.020 .040 R
6 PLACES
.005 .000 R
.625
.150 .155
.192 .182

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\overset{63}{\vee}$ MACHINE FINISH ALL OVER
3. BREAK ALL SHARP EDGES .005 .015
4. MATERIAL: ALUMINUM ALLOY 6061-T6
   ALT SPEC: QQ-A-325 TEMP-T6
   OR QQ-A-327 TEMP-T6
5. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

1000202	DL1000201
1000002	DL1000001
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.010 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3-19-63
APPROVED FOR MSC	W. J. Swing	4/10/63
MIT/IL APPROVAL	W Wuffer	10 Apr 63

CLAMP, TRANSDUCER
OUTER AXIS

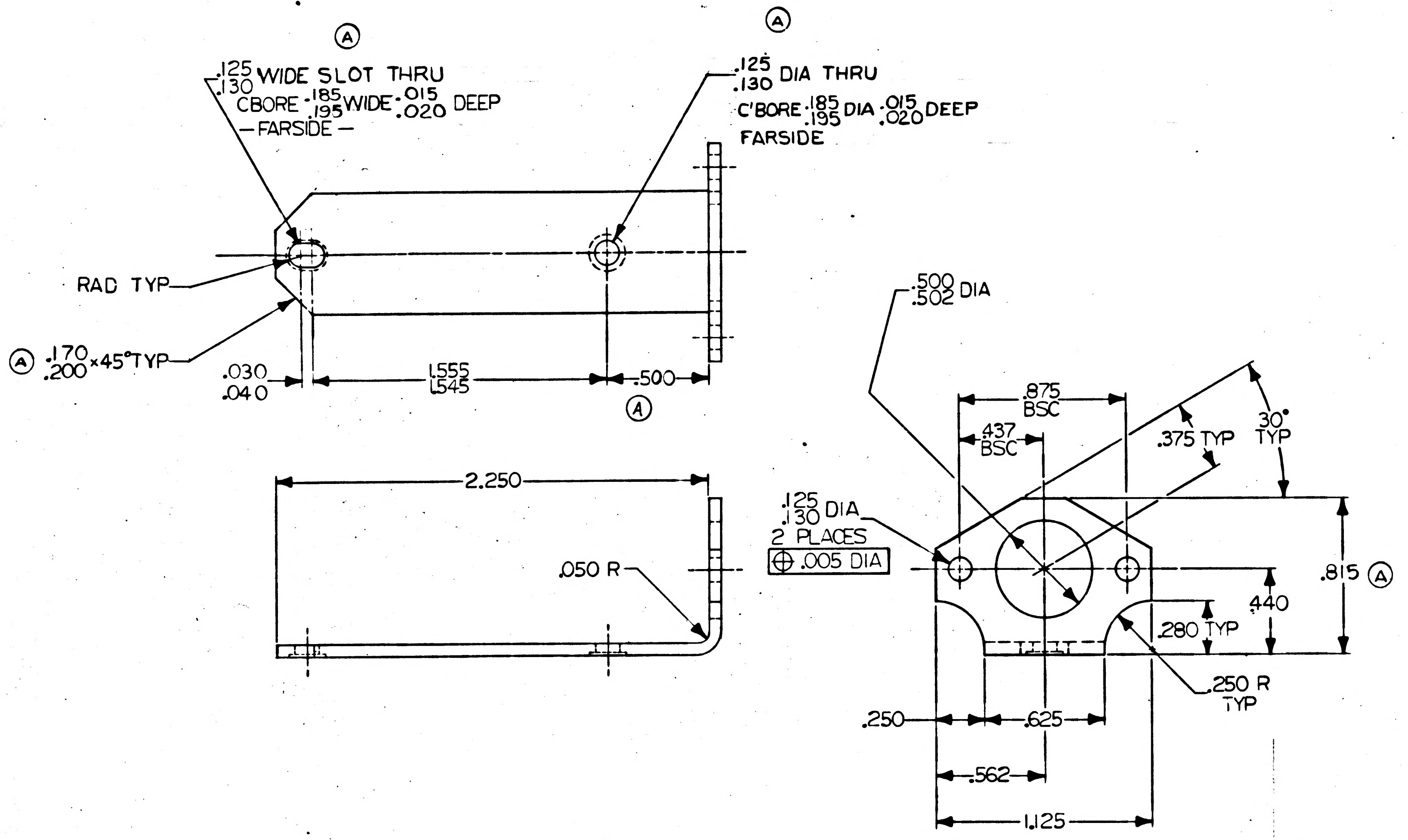
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000256
SHEET 1 OF 1 SHEET

1000256

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01040	1MAY63	ajb wk



Ⓐ
.125 .130 WIDE SLOT THRU
CBORE .185 .195 WIDE .015 .020 DEEP
— FARSIDE —
Ⓐ
.125 .130 DIA THRU
C'BORE .185 .195 DIA .015 .020 DEEP
FARSIDE
RAD TYP
Ⓐ .170 .200 ×45° TYP
.030 .040
1.555 1.545
.500
Ⓐ
2.250
.050 R
.500 .502 DIA
.875 BSC
.437 BSC
.375 TYP
30° TYP
.125 .130 DIA
2 PLACES
⊕ .005 DIA
.815 Ⓐ
.440
.280 TYP
.250 R TYP
.250
.625
.562
1.125

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SURFACE ROUGHNESS AS ROLLED— PUNCHED, CUT, OR MACHINED SURFACES TO HAVE 63√
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. MATERIAL: ALUMINUM ALLOY 6061-O
   ALT SPEC: QQ-A-327 TEMP-O
   THICKNESS $^{.068}_{.058}$
5. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR

Ⓐ 6. IDENTIFY USING DRAWING NO., REVISION LETTER, & MANFACTUERS SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

Ⓐ

NEXT ASSY	USED ON
1000205	DL1000201
1000007	DL1000G01

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
~	±.010	±2°

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 4

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3/20/63

APPROVED FOR MSC
W. J. Swing Jr 4/11/63

MIT/IL APPROVAL	DATE
W Kupfer	10 Apr 63

BRACKET, TRANSDUCER
OUTER AXIS

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

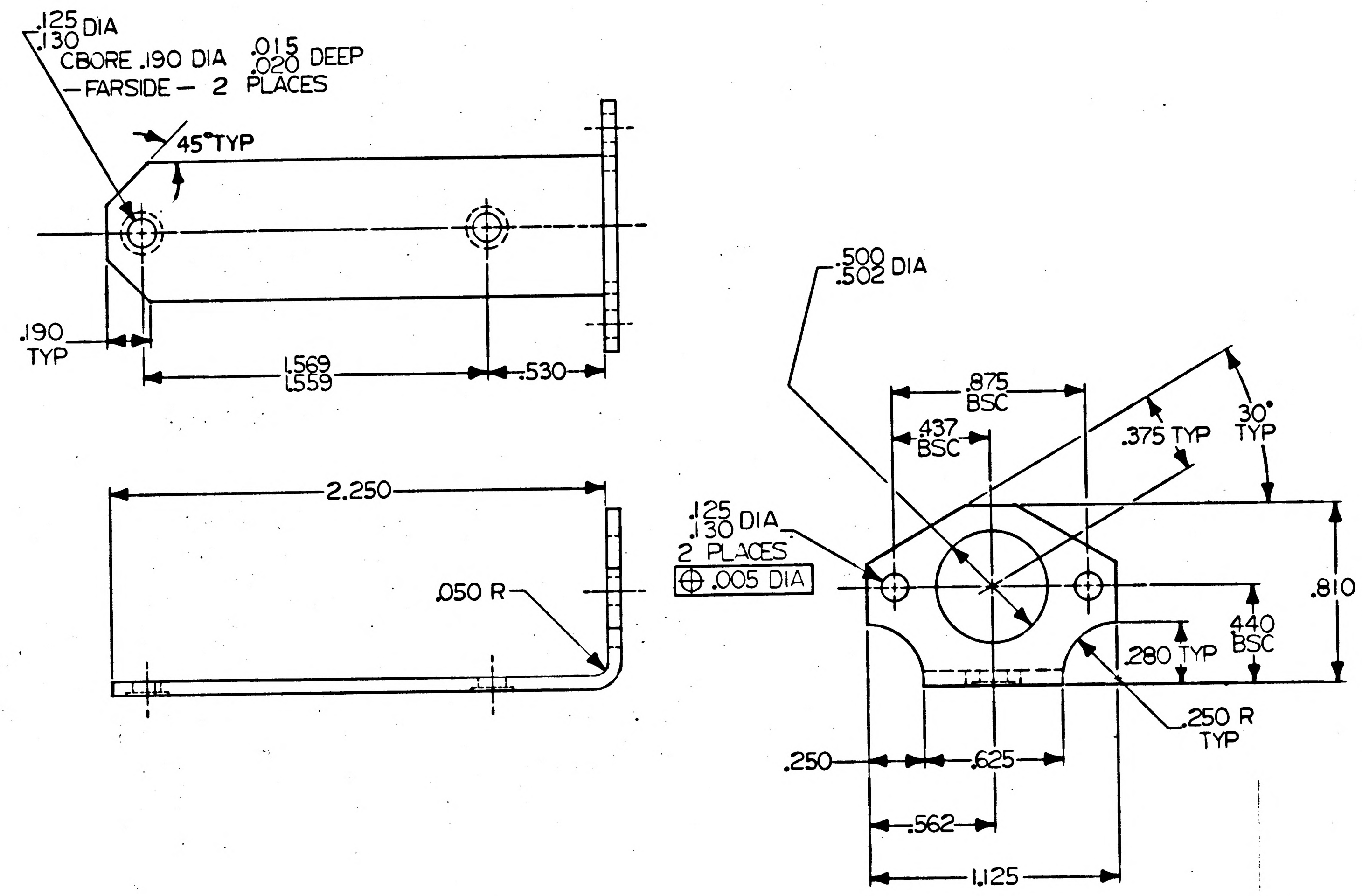
NASA DRAWING NO.
1000257

SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



.125 .130 DIA
CBORE .190 DIA .015 .020 DEEP
—FARSIDE— 2 PLACES
45° TYP
.190 TYP
1.569 1.559
.530
2.250
.050 R
.500 .502 DIA
.875 BSC
.437 BSC
.375 TYP
30° TYP
.125 .130 DIA
2 PLACES
⊕ .005 DIA
.810
.440 BSC
.280 TYP
.250 R TYP
.250
.625
.562
1.125

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SURFACE ROUGHNESS AS ROLLED— PUNCHED, CUT, OR MACHINED SURFACES TO HAVE 63✓
3. BREAK ALL SHARP EDGES .005 .015
4. MATERIAL: ALUMINUM ALLOY 6061-0
   ALT SPEC: QQ-A-327 TEMP-0
   THICKNESS .068 .058
5. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

1000202	DL1000201
1000002	DL1000601
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.010 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 4

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3/25/63
APPROVED FOR MSC	W. S. Swing Jr.	4/1/63
MIT/IL APPROVAL		DATE
W Kupfer		10 Apr 63

BRACKET, TRANSDUCER
OUTER AXIS

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000257
SHEET 1 OF 1 SHEET

1000257

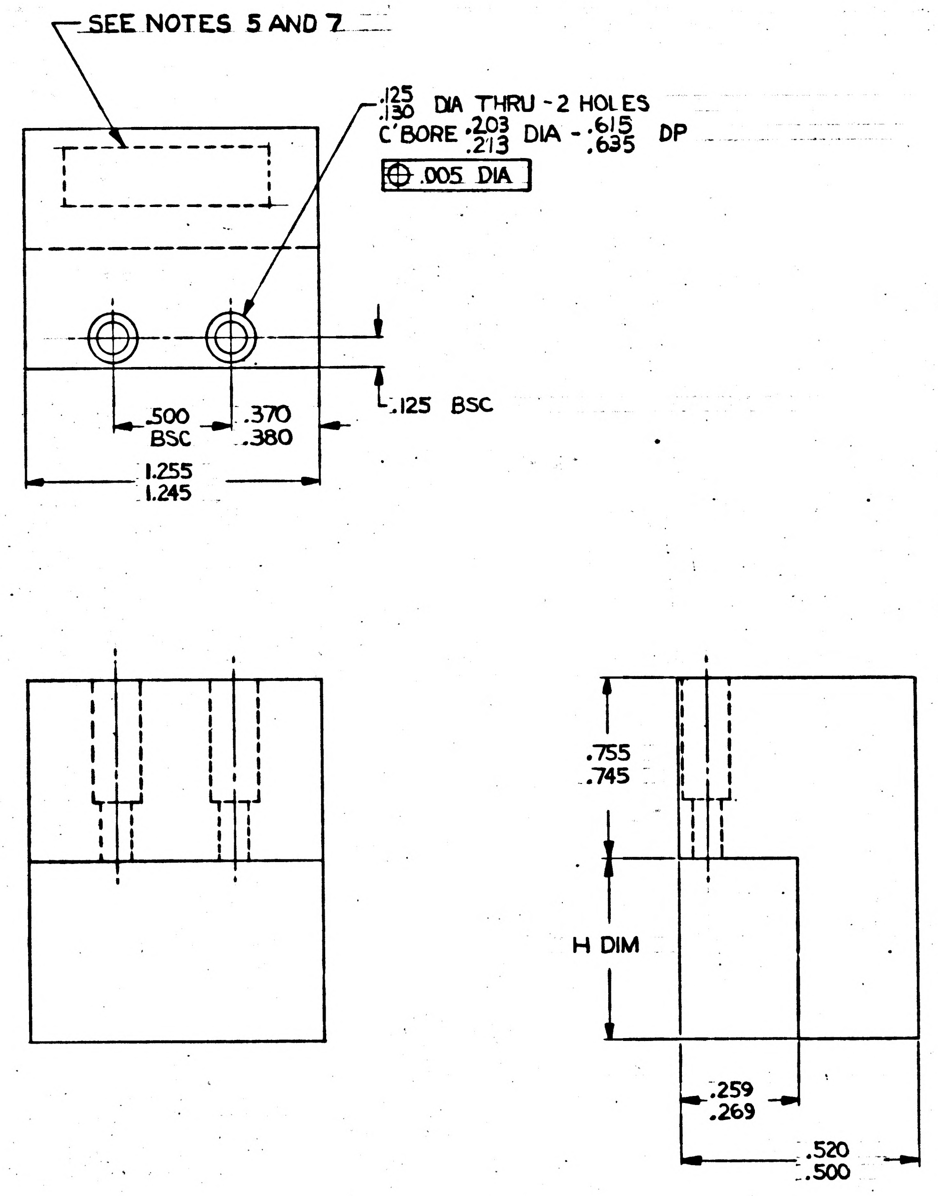
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	H DIM ±.005	WT OZ CALC.(REF.)
1000258-1	.125	4.66
1000258-2	.250	5.05
1000258-3	.375	5.44
1000258-4	.500	5.80
1000258-5	.625	6.19

Ⓐ

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	GJB WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
MALLORY METALLURGICAL CO.
3029 EAST WASHINGTON ST.
INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $\substack{.005\\.015}$
4. $250\surd$ FINISH ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II, CLASS 2
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	G J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-11-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Keyffer	1 Aug 63

WEIGHT, BALANCE
STABLE MEMBER

SCALE
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000258
SHEET 1 OF 1

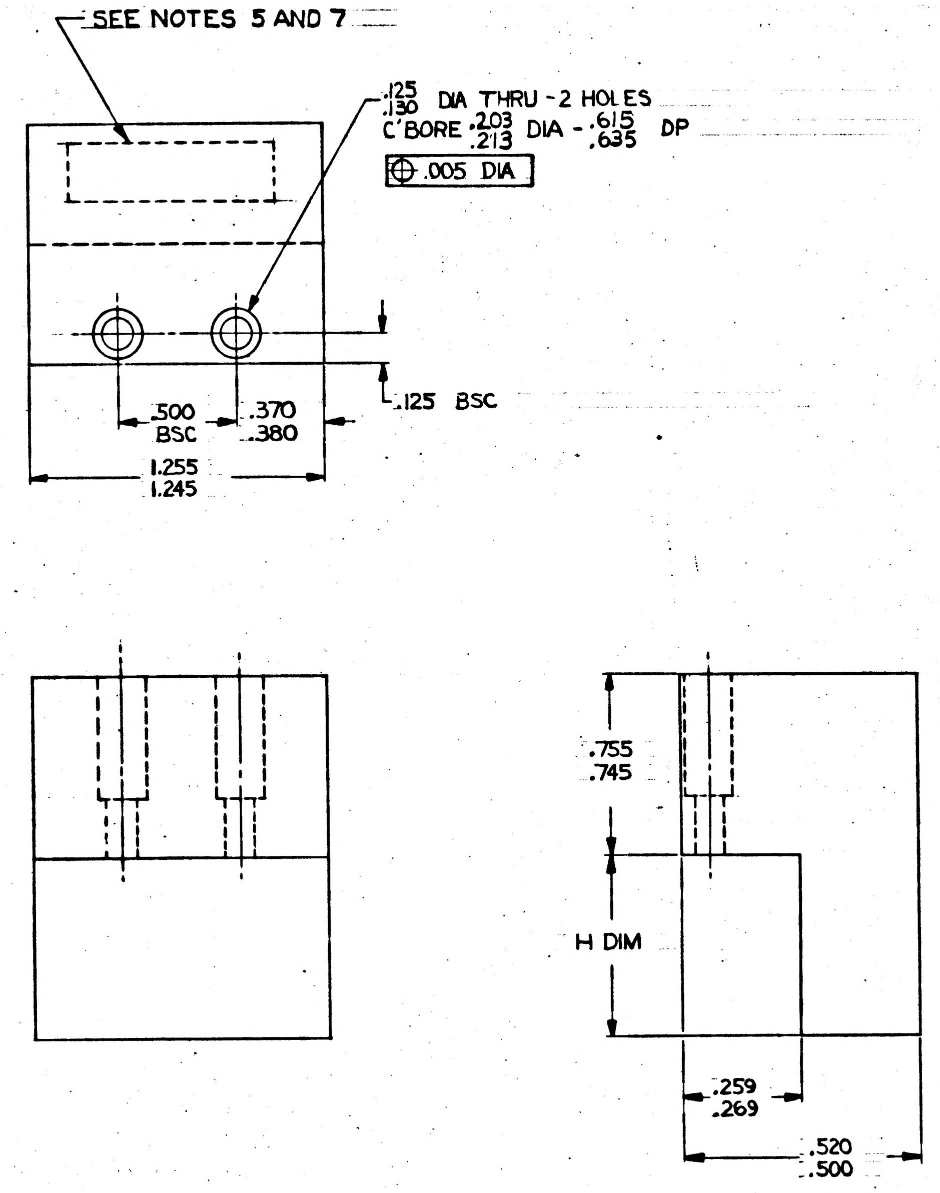
1000258 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	H DIM ±.005	WT OZ CALC (REF) Ⓐ
1000258-1	.125	4.66
1000258-2	.250	5.05
1000258-3	.375	5.44
1000258-4	.500	5.80
1000258-5	.625	6.19

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
Ⓜ	A	TDRR 01803	7-2-63	AJB WK
Ⓜ	B	TDRR 02509	8-14-63	AJB WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. $\overset{250}{\vee}$ FINISH ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II, CLASS 2
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-11-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 Aug 63

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000258

SHEET 1 OF 1

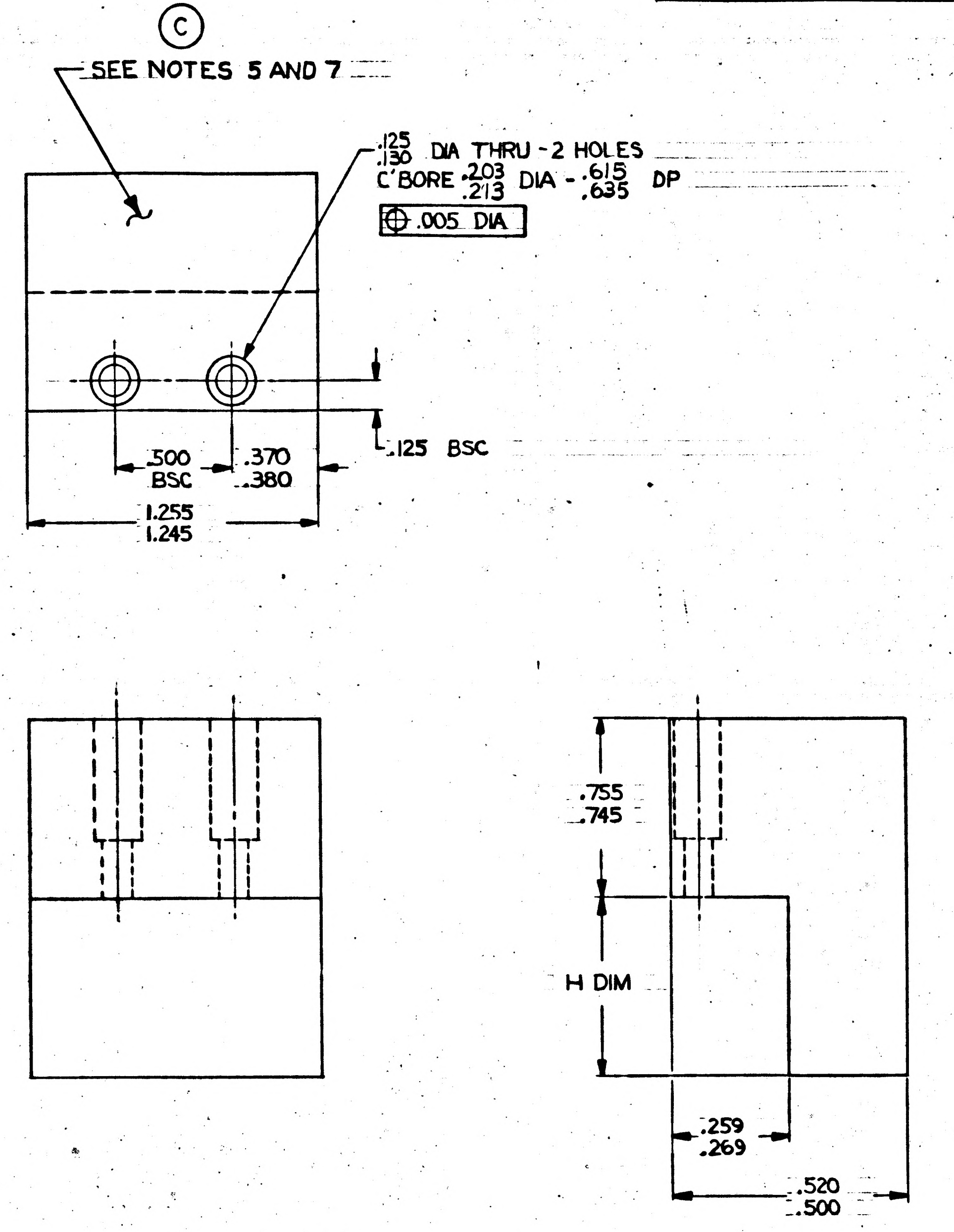
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	H DIM ±.005	WT OZ CALC(REF)
1000258-1	.125	4.66
1000258-2	.250	5.05
1000258-3	.375	5.44
1000258-4	.500	5.80
1000258-5	.625	6.19

Ⓐ

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	ajB	WK
	B	TDRR 02509	8-14-63	ajB	WK
	C	TDRR 05609	1-7-64	[illegible]	[illegible]



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. 250√ FINISH ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-1-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II, CLASS 2
7. Ⓒ IDENTIFY USING DRAWING NO., APPLICABLE DASH NO, & REVISION LETTER ON INDICATED SURFACE PER ND 1002019

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓑ	1001500	DL1001500
	1000201	DL1000201
	1000001	DL1000001
	NEXT ASSY	USED ON
	APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-11-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL		DATE
	W Kupfer	1 Aug 63

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

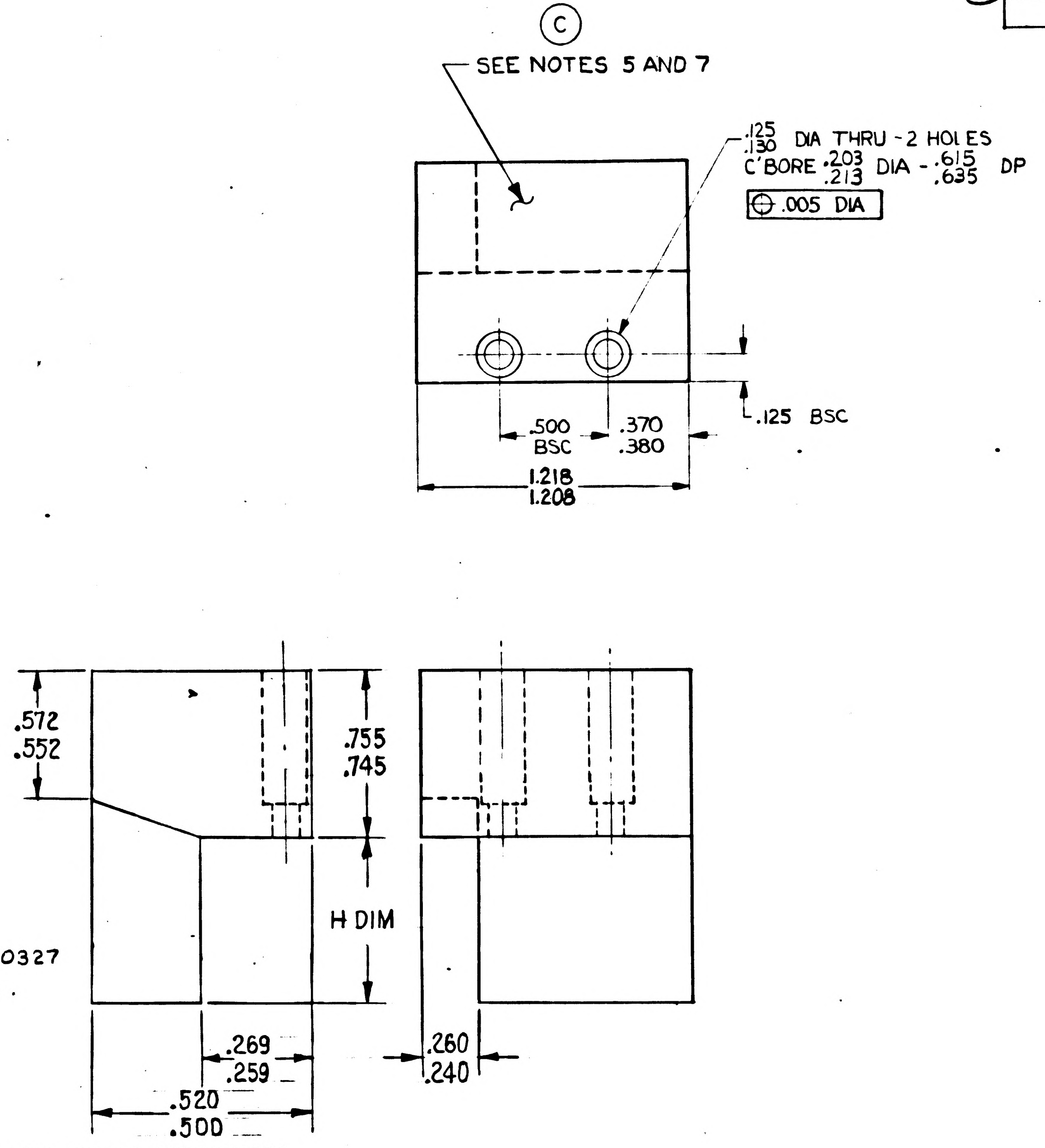
NASA DRAWING NO.
1000258

SHEET 1 OF 1

PART NO.	H DIM ±.005	WT OZ CALC.(REF.) Ⓐ
1000258-1	.125	4.52
1000258-2	.250	4.83
1000258-3	.375	5.14
1000258-4	.500	5.45
1000258-5	.625	5.76

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	AJB.	WK
	B	TDRR 02509	8-14-63	AJB	WK
	C	TDRR 05609	1-7-64	[illegible]	[illegible]
	D	REVISED PER TDRR 09934	16 JUN 64	JWP	RW76



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT).
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. 250√ FINISH ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II, CLASS 2
7. Ⓒ IDENTIFY USING DRAWING NO., APPLICABLE DASH NO, & REVISION LETTER ON INDICATED SURFACE PER ND 1002019

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2

M I T
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-11-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
WKupfer	1 May

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000258

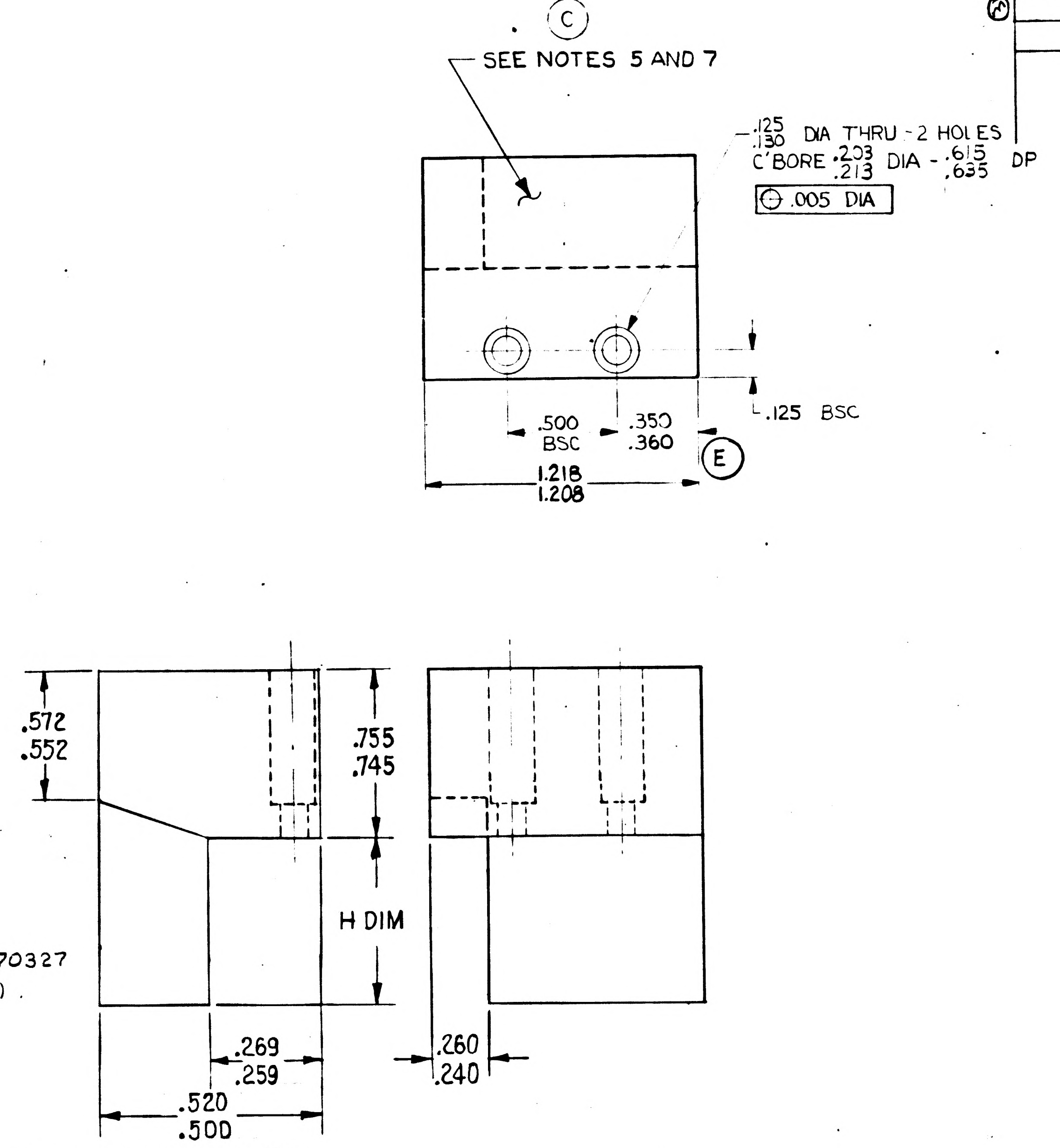
SHEET 1 OF 1

1000258 D

PART NO.	H DIM ±.005	WT OZ CALC (REF) Ⓐ
1000258-1	.125	4.52
1000258-2	.250	4.83
1000258-3	.375	5.14
1000258-4	.500	5.45
1000258-5	.625	5.76

REVISIONS TDRR 01025

	ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
M		A	TDRR 01803	7-2-63	ajB	WK
		B	TDRR 02509	8-14-63	ajB	WK
M		C	TDRR 05609	1-7-64		
		D	REVISED PER TDRR 09934	16 JUN 64	JWP	
		E	REVISED PER TDRR 15014	4-JAN 65	JWP	EF



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$
4. $250\surd$ FINISH ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II, CLASS 2
7. Ⓒ IDENTIFY USING DRAWING NO., APPLICABLE DASH NO, & REVISION LETTER ON INDICATED SURFACE PER ND 1002019

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	a j Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-11-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE

WEIGHT, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000258

SHEET 1 OF 1

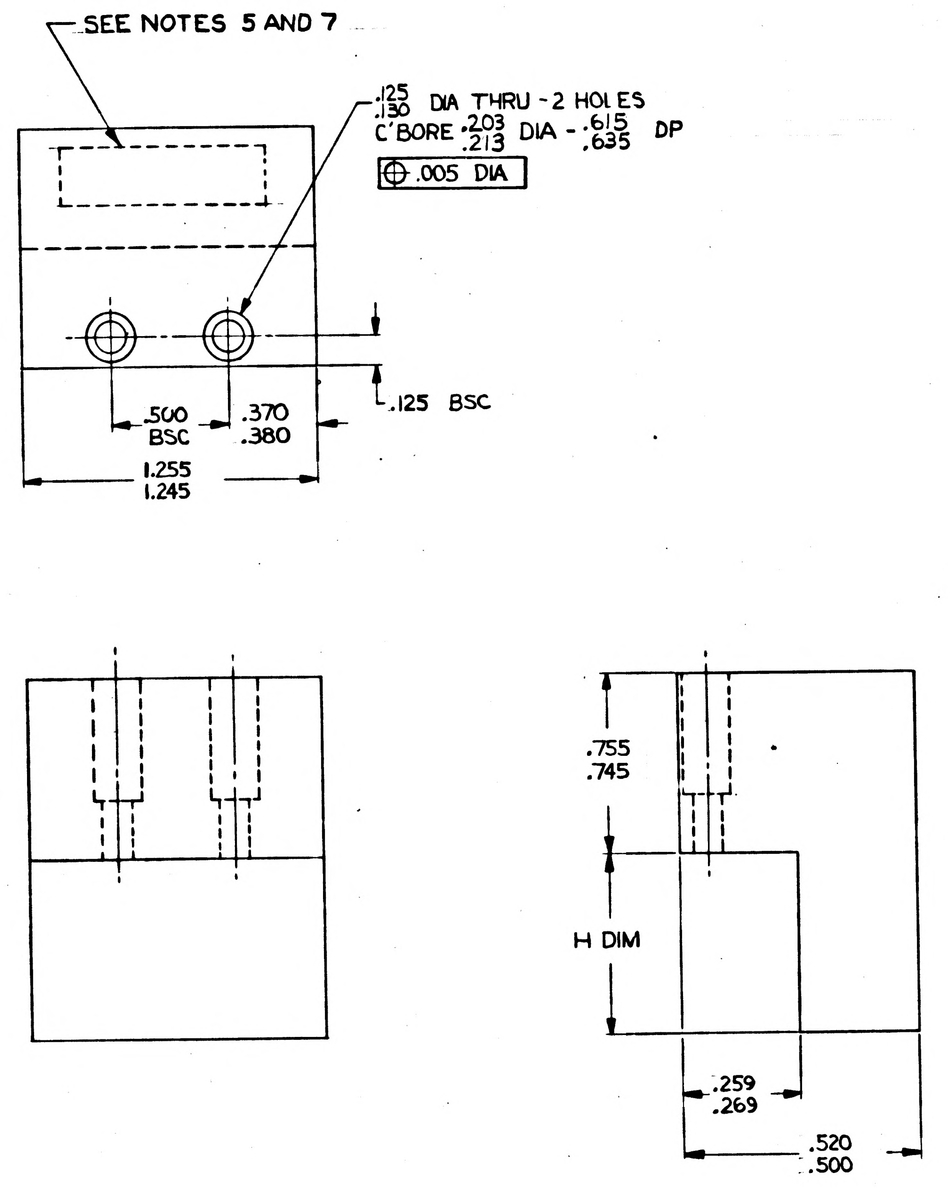
1000258 E

PART NO.	H DIM ±.005	WT OZ CALC
1000258-1	.125	4.66
1000258-2	.250	5.05
1000258-3	.375	5.44
1000258-4	.500	5.80
1000258-5	.625	6.19

REVISIONS TDRR 01025

Ⓜ

ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. $\overset{250}{\surd}$ FINISH ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. ZINC PLATE PER QQ-Z-325 TYPE II, CLASS 3
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-11-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL: W Keyffer — DATE: 1 Aug 63

WEIGHT, BALANCE
STABLE MEMBER

SCALE
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000258

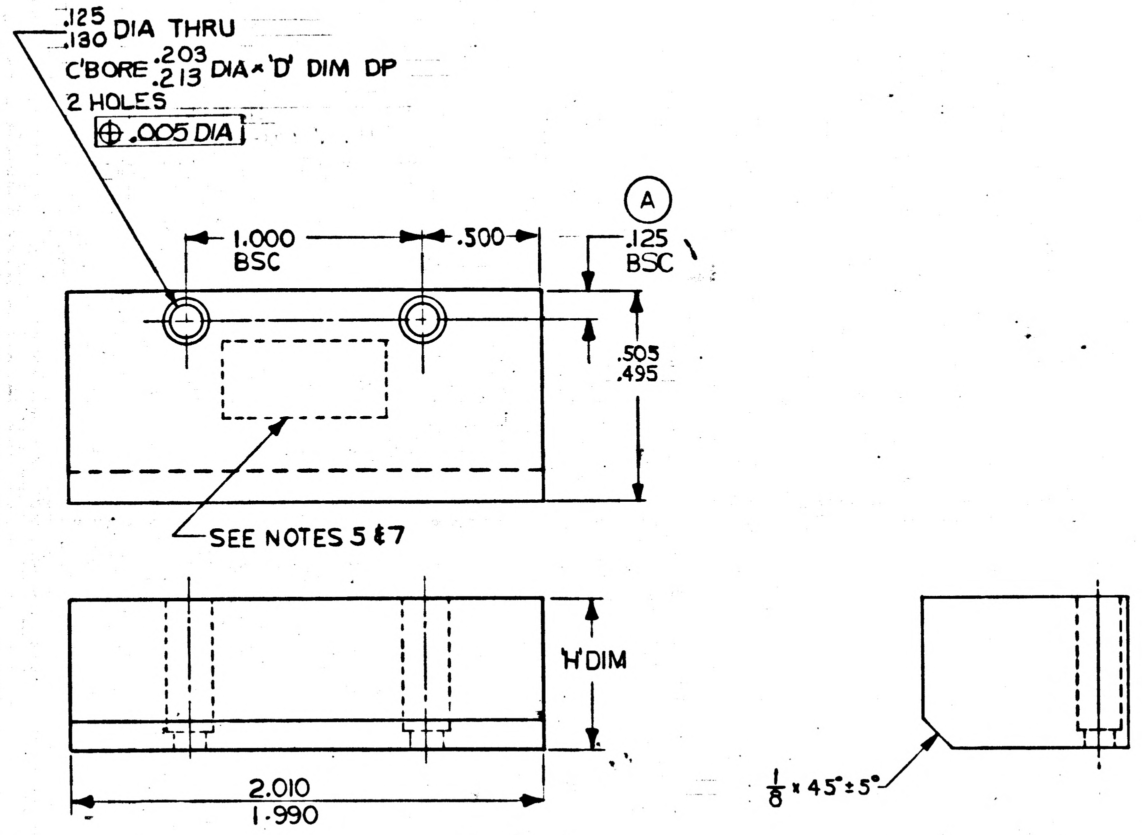
SHEET 1 OF 1

1000258

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	'H' DIM	'D' DIM	WGT. OZ. CALC. (REF.) Ⓐ
1000259-1	.937	.812	8.50
1000259-2	.875	.750	7.90
1000259-3	.750	.625	6.80
1000259-4	.625	.500	5.68
1000259-5	.500	.375	4.50

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	AJB WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6 INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. 250√ ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED AJBoyce DATE 4/30/63
CHECKED
DRAWN BMARTIN 4-2-63
APPROVED FOR MSC W J Rhine 5-1-63
MIT/IL APPROVAL WKupfer DATE 1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE — UNIT WT. CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000259
SHEET 1 OF 1

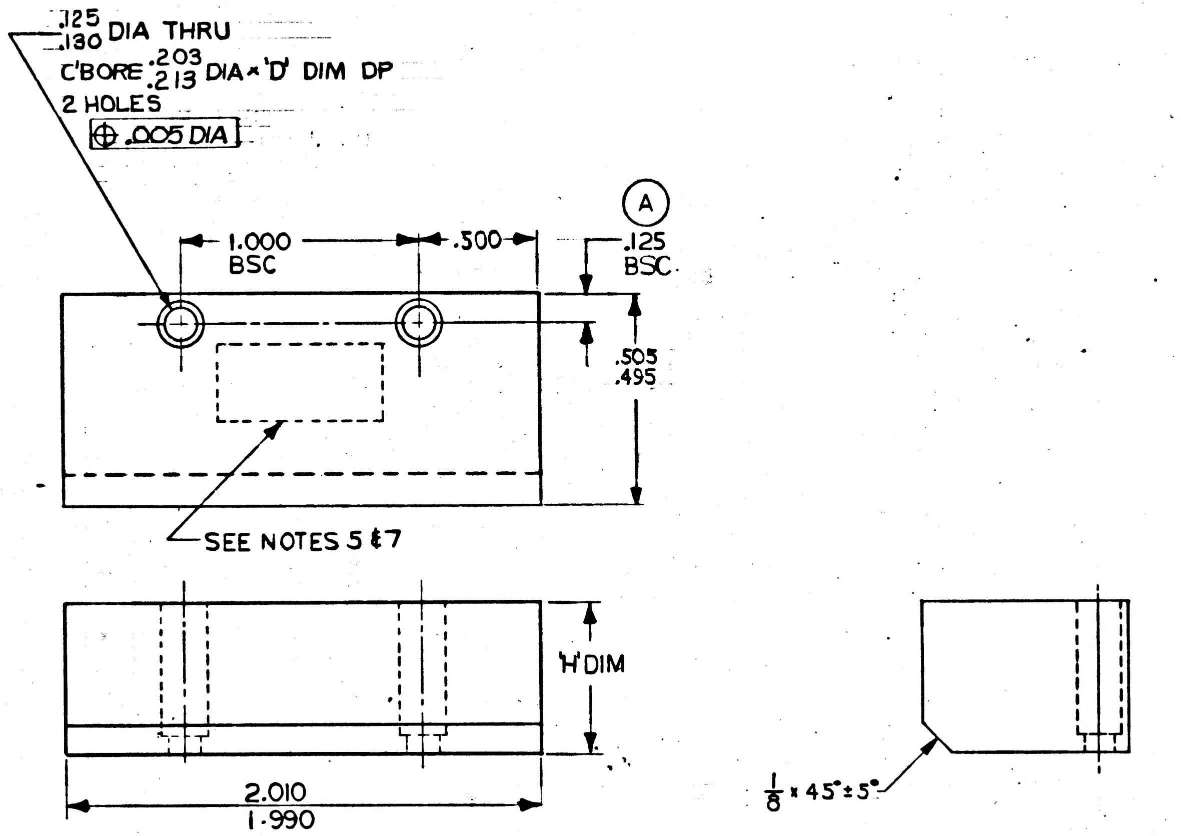
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000259

PART NO.	'H' DIM	'D' DIM	WGT. OZ. CALC. (REF) Ⓐ
1000259-1	.937	.812	8.50
1000259-2	.875	.750	7.90
1000259-3	.750	.625	6.80
1000259-4	.625	.500	5.68
1000259-5	.500	.375	4.50

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	AJB WK
	B	TDRR 02509	8-14-63	AJB WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6 INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. 250√ ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/64 DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	B MARTIN	4-2-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	WKoppe	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE —
UNIT WT.
CODE IDENT.

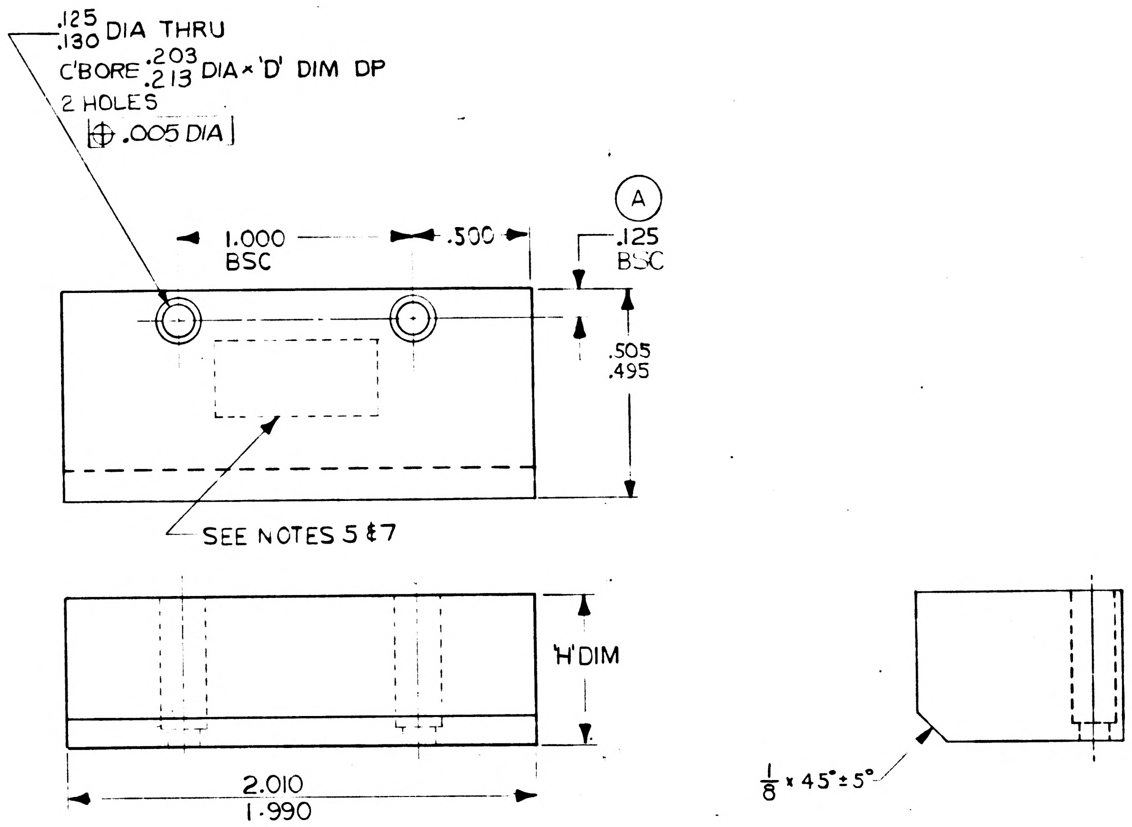
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000259
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	'H' DIM	'D' DIM	WGT. OZ. CALC. (REF) Ⓐ
1000259-1	.937	.812	8.50
1000259-2	.875	.750	7.90
1000259-3	.750	.625	6.80
1000259-4	.625	.500	5.68
1000259-5	.500	.375	4.50

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	AJB	WK
	B	TDRR 02509	8-14-63	AJB	WK
	C	REVISED PER TDRR 23588	8 NOV 65	JJJ	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. Ⓑ MATERIAL SHALL MEET THE REQUIREMENTS OF NASA DRAWING NO. 1010839.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. $^{250}\surd$ ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1001500 Ⓑ	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS $\pm\frac{1}{64}$ DECIMALS ±.010 ANGLES —

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	B MARTIN	4-2-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kayton	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
—		80230

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG NO

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

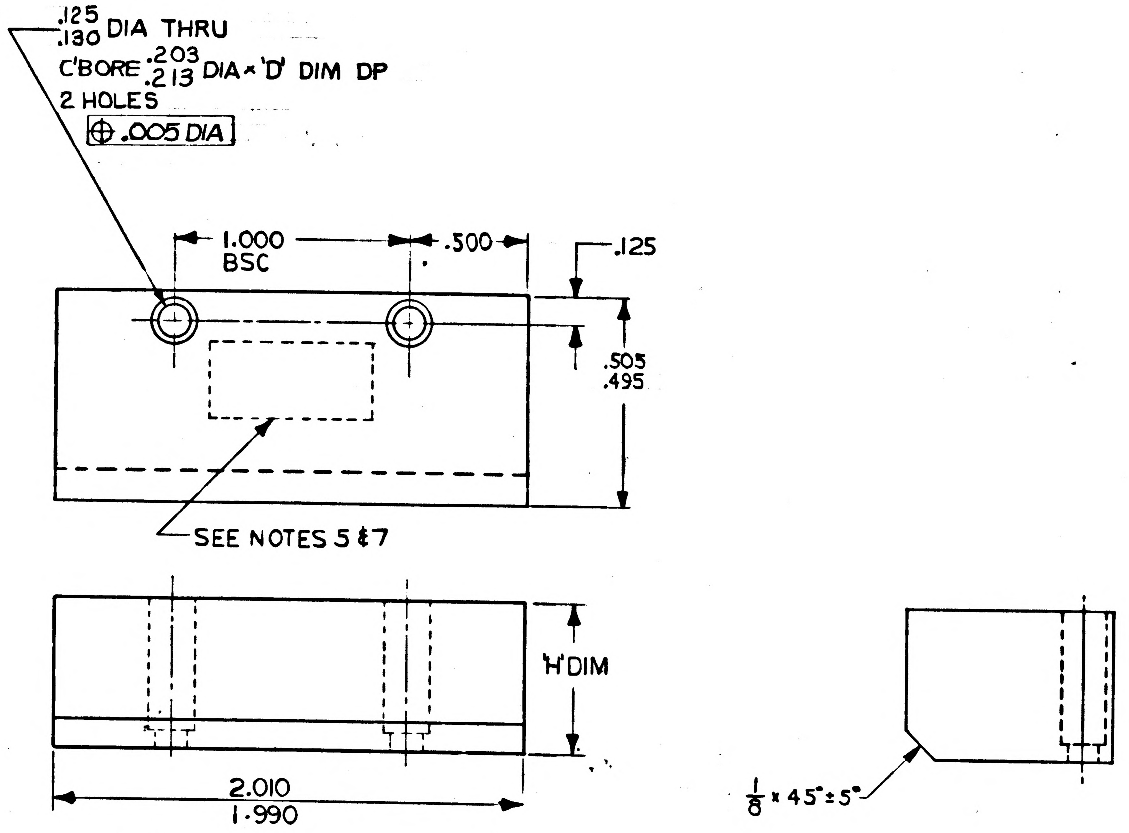
NASA DRAWING NO.
1000259

SHEET 1 OF 1

1000259 C

PART NO.	'H' DIM	'D' DIM	WGT. OZ. CALC.
1000259-1	.937	.812	8.50
1000259-2	.875	.750	7.90
1000259-3	.750	.625	6.80
1000259-4	.625	.500	5.68
1000259-5	.500	.375	4.50

ZONE	SYM	REVISIONS TDRR 01025 DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6 INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. 250√ ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3
7. IDENTIFY USING DWG NO, REVISION LETTER, MANUFACTURERS SYMBOL, AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130.

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

1000201	DL1000201
1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	B MARTIN	4-2-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
—		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000259
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	A DIM	B DIM	C DIM	CALC. (REF.) WT. OZ.	REMARKS
1000260-1	.750	.500	.017 .013	.02	
1000260-2	.750	.500	.032 .028	.05	
1000260-3	.750	.500	.062 .058	.10	
1000260-4	.750	.500	.252 .248	.34	
1000260-5	1.000	.500	.017 .013	.03	
1000260-6	1.000	.500	.032 .028	.07	
1000260-7	1.000	.500	.062 .058	.13	
1000260-8	1.000	.500	.252 .248	.50	
1000260-9	1.500	1.000	.017 .013	.05	
1000260-10	1.500	1.000	.032 .028	.10	
1000260-11	1.500	1.000	.062 .058	.21	
1000260-12	1.500	1.000	.252 .248	.82	
1000260-13	2.000	1.000	.017 .013	.07	
1000260-14	2.000	1.000	.032 .028	.14	
1000260-15	2.000	1.000	.062 .058	.28	
1000260-16	2.000	1.000	.252 .248	1.12	

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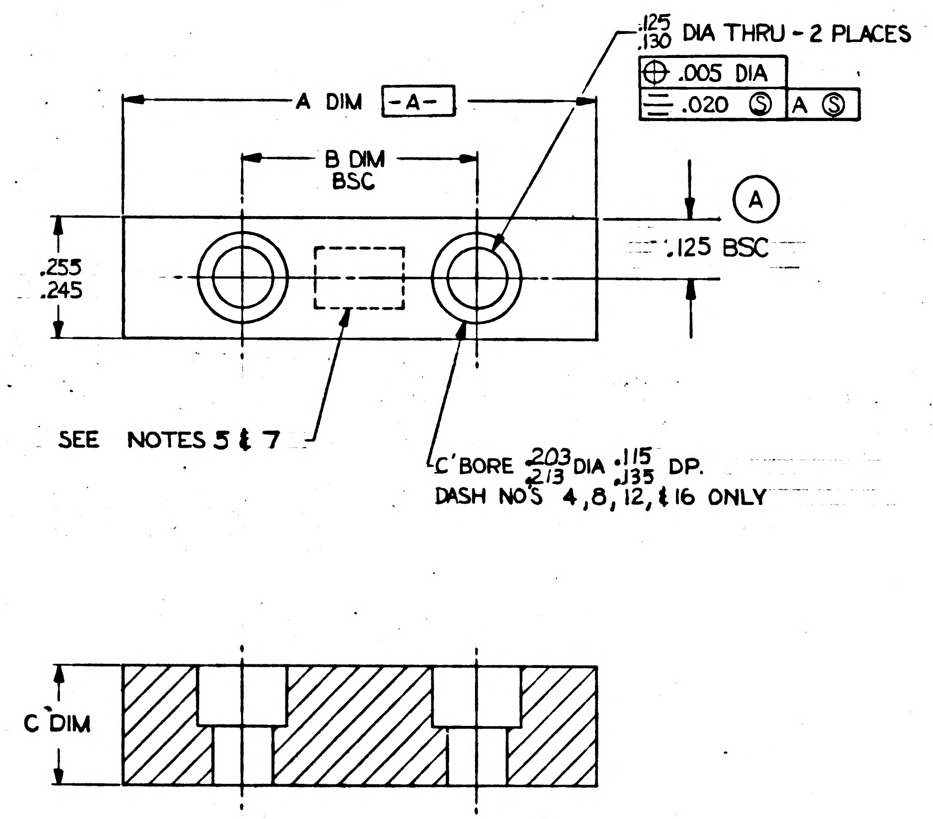
REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	GJB WK


.125/.130 DIA THRU - 2 PLACES
⊕ .005 DIA
⌯ .020 Ⓢ A Ⓢ
A DIM -A-
B DIM BSC
Ⓐ
.125 BSC
.255/.245
SEE NOTES 5 & 7
C'BORE .203/.213 DIA .115/.135 DP.
DASH NO'S 4, 8, 12, & 16 ONLY
C DIM

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. 250√ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.010 ANGLES ———
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
———		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

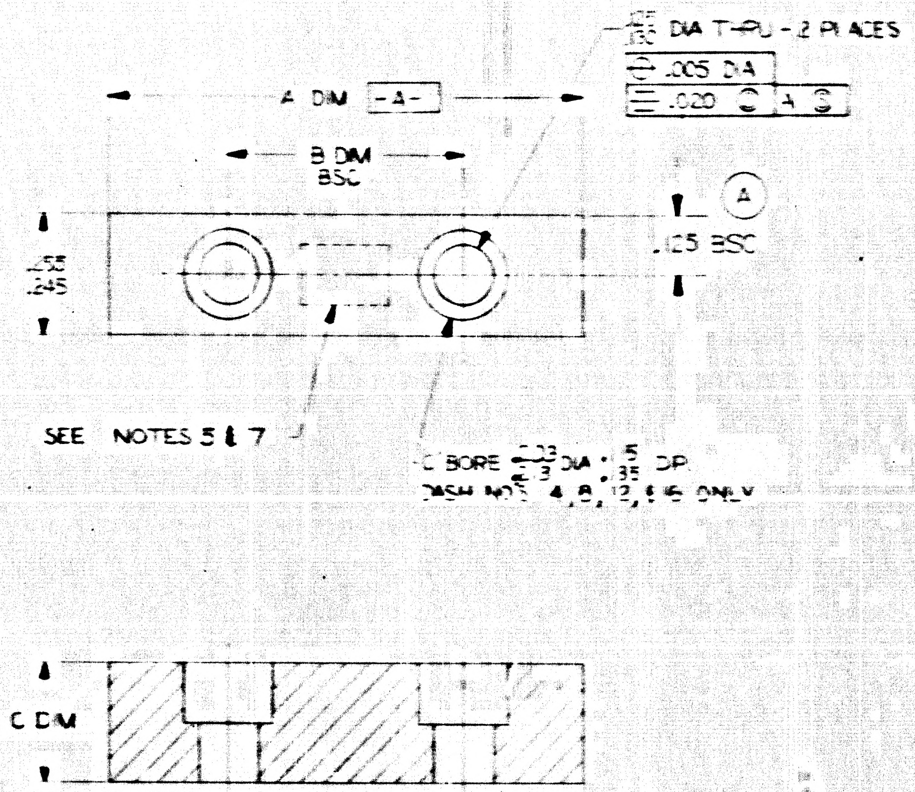
NASA DRAWING NO.
1000260

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS T.D.R.R. 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	G.B.

PART NO.	A DIM	B DIM	C DIM	REF WT. OZ.	REMARKS
000260-1	.750	.500	.017 .013	.02	
000260-2	.750	.500	.032 .028	.05	
000260-3	.750	.500	.062 .058	.10	
1000260-4	.750	.500	.252 .248	.34	
1000260-5	1.000	.500	.017 .013	.03	
1000260-6	1.000	.500	.032 .028	.07	
1000260-7	1.000	.500	.062 .058	.13	
000260-8	1.000	.500	.252 .248	.50	
000260-9	1.500	1.000	.017 .013	.05	
1000260-10	1.500	1.000	.032 .028	.10	
000260-11	1.500	1.000	.062 .058	.21	
000260-12	1.500	1.000	.252 .248	.82	
000260-13	2.000	1.000	.017 .013	.07	
000260-14	2.000	1.000	.032 .028	.14	
000260-15	2.000	1.000	.062 .058	.28	
000260-16	2.000	1.000	.252 .248	1.12	



.138 .135 DIA THRU - 2 PLACES
.005 DIA
.020 A S
A DIM -A-
B DIM BSC
A
.125 BSC
.255 .245
SEE NOTES 5 & 7
C'BORE .203 .193 DIA × .15 .135 DP.
DASH NOS. 4, 8, 12, & 16 ONLY
C DIM

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES .005/.015.
4. 250 ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. (A) ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2.
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

QTY REQD	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO	SPECIFICATION	MATERIAL OR NOTES	FIND NO

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
000201	DL100020
1000001	DL 00000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
±.010
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2

M.I.T.
INSTRUMENTATION LAB
CONTRACT
NAS 9-153
APPROVED
CHECKED
DRAWN PALERMO 4-5-63
APPROVED FOR MSC
W J Kline 5-1-63
MIT/IL APPROVAL DATE 4-63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE
UNIT WT.
CODE IDENT

M.I.T.
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS
DWG NO
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO
1000260
SHEET OF

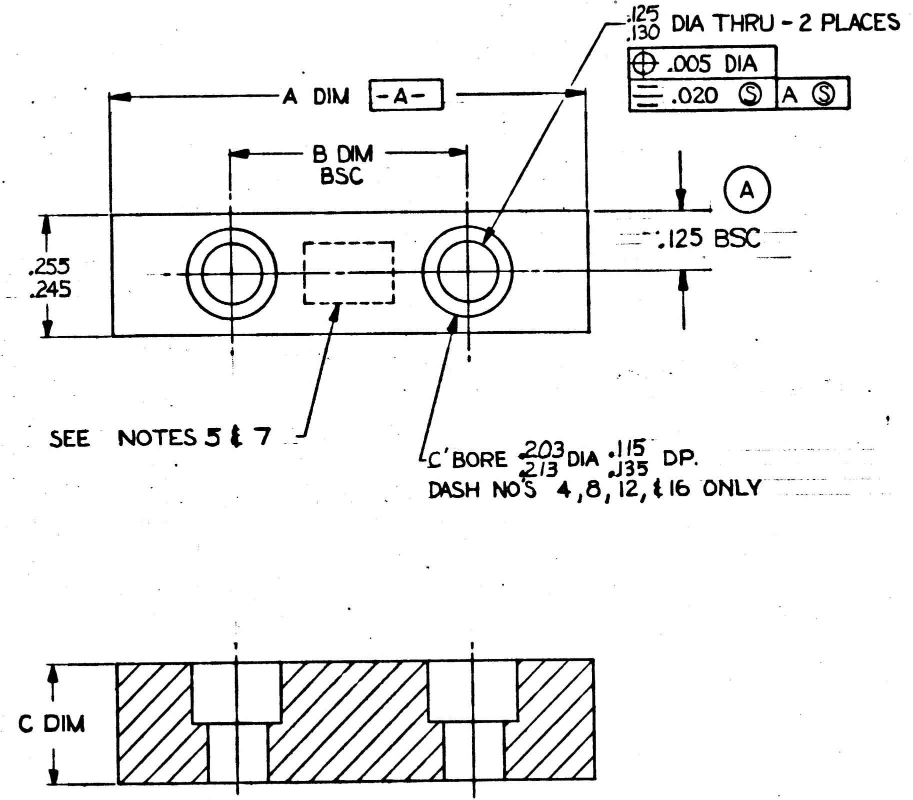
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	A DIM	B DIM	C DIM	CALC. (REF.) WT. OZ.	REMARKS
1000260-1	.750	.500	.017 .013	.02	
1000260-2	.750	.500	.032 .028	.05	
1000260-3	.750	.500	.062 .058	.10	
1000260-4	.750	.500	.252 .248	.34	
1000260-5	1.000	.500	.017 .013	.03	
1000260-6	1.000	.500	.032 .028	.07	
1000260-7	1.000	.500	.062 .058	.13	
1000260-8	1.000	.500	.252 .248	.50	
1000260-9	1.500	1.000	.017 .013	.05	
1000260-10	1.500	1.000	.032 .028	.10	
1000260-11	1.500	1.000	.062 .058	.21	
1000260-12	1.500	1.000	.252 .248	.82	
1000260-13	2.000	1.000	.017 .013	.07	
1000260-14	2.000	1.000	.032 .028	.14	
1000260-15	2.000	1.000	.062 .058	.28	
1000260-16	2.000	1.000	.252 .248	1.12	

Ⓐ

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	ajB	WK
	B	TDRR 02509	8-14-63	ajB	WK


.125 .130 DIA THRU - 2 PLACES
⊕ .005 DIA
.020 Ⓢ A Ⓢ
A DIM
-A-
B DIM BSC
Ⓐ
.125 BSC
.255 .245
SEE NOTES 5 & 7
C'BORE .203 .213 DIA .115 .135 DP.
DASH NO'S 4, 8, 12, & 16 ONLY
C DIM

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\sqrt{}^{250}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.010 ANGLES ———
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	ajBoyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
———		

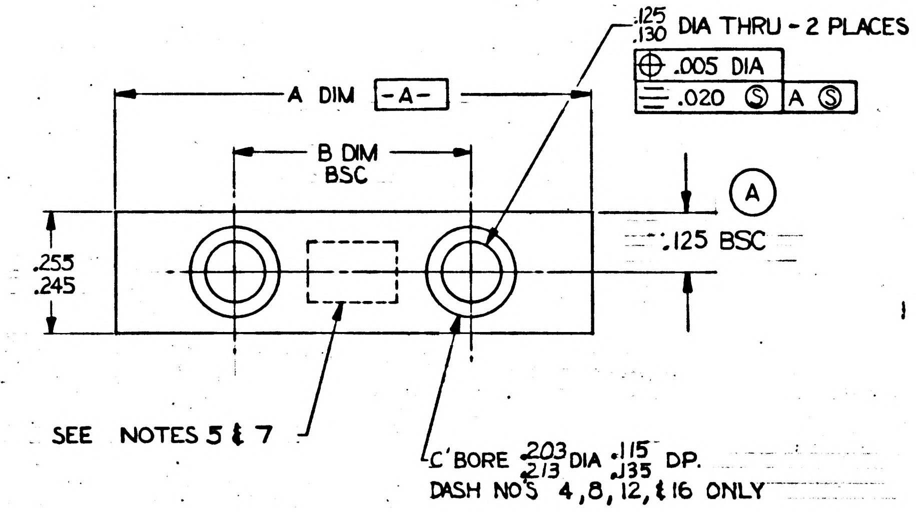
MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000260
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

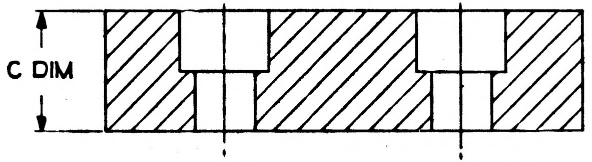
PART NO.	A DIM	B DIM	C DIM	CALC. (REF.) WT. OZ.	REMARKS	Ⓐ
1000260-1	.750	.500	.017 .013	.02		
1000260-2	.750	.500	.032 .028	.05		
1000260-3	.750	.500	.063 .057	.10		Ⓑ
1000260-4	.750	.500	.252 .248	.34		
1000260-5	1.000	.500	.017 .013	.03		
1000260-6	1.000	.500	.032 .028	.07		
1000260-7	1.000	.500	.063 .057	.13		Ⓑ
1000260-8	1.000	.500	.252 .248	.50		
1000260-9	1.500	1.000	.017 .013	.05		
1000260-10	1.500	1.000	.032 .028	.10		
1000260-11	1.500	1.000	.063 .057	.21		Ⓑ
1000260-12	1.500	1.000	.252 .248	.82		
1000260-13	2.000	1.000	.017 .013	.07		
1000260-14	2.000	1.000	.032 .028	.14		
1000260-15	2.000	1.000	.063 .057	.28		Ⓑ
1000260-16	2.000	1.000	.252 .248	1.12		

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	AJB	WK
	B	TDRR 02509	8-14-63	AJB	WK
	C	TDRR 03028	9-9-63		WK



.125 .130 DIA THRU - 2 PLACES
⊕ .005 DIA
⌯ .020 Ⓢ A Ⓢ
A DIM
-A-
B DIM BSC
Ⓐ
.125 BSC
.255 .245
SEE NOTES 5 & 7
C'BORE .203 .213 DIA .115 .135 DP.
DASH NO'S 4, 8, 12, & 16 ONLY



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
Ⓑ 2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
MALLORY METALLURGICAL CO.
3029 EAST WASHINGTON ST
INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\surd}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
Ⓐ 6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63
APPROVED FOR MSC	WJ Rhine 5-1-63	
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE — UNIT WT. CODE IDENT.

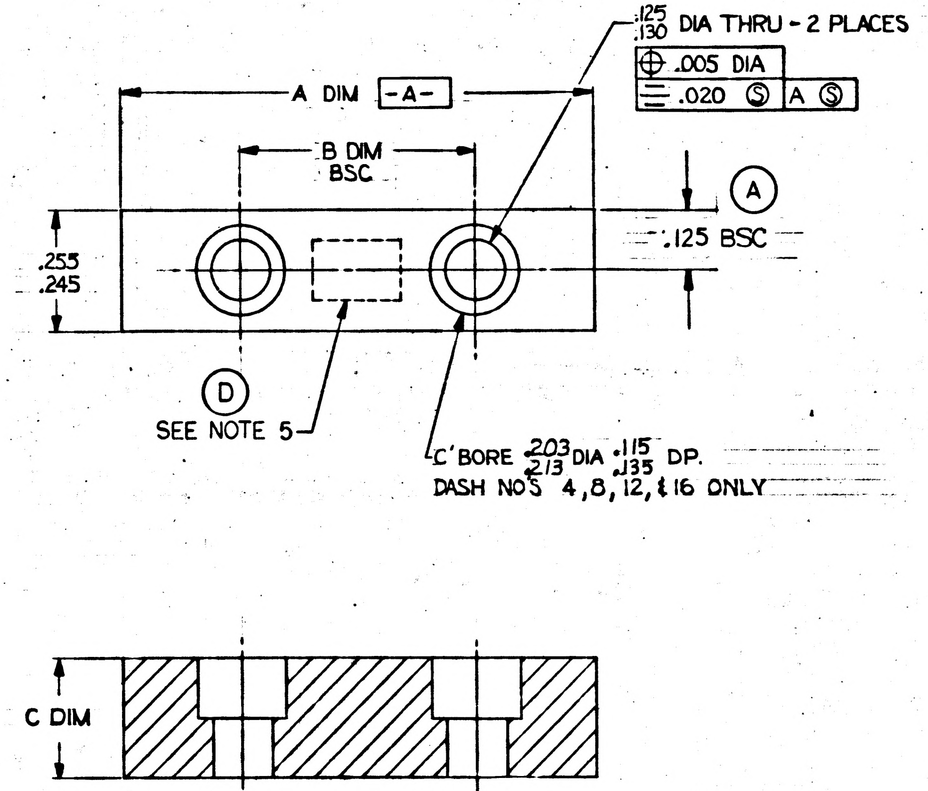
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000260
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	A DIM	B DIM	C DIM	CALC. (REF.) WT. OZ.	REMARKS	
						Ⓐ
1000260-1	.750	.500	.017 .013	.02		
1000260-2	.750	.500	.032 .028	.05		
1000260-3	.750	.500	.063 .057	.10		Ⓑ
1000260-4	.750	.500	.252 .248	.34		
1000260-5	1.000	.500	.017 .013	.03		
1000260-6	1.000	.500	.032 .028	.07		
1000260-7	1.000	.500	.063 .057	.13		Ⓑ
1000260-8	1.000	.500	.252 .248	.50		
1000260-9	1.500	1.000	.017 .013	.05		
1000260-10	1.500	1.000	.032 .028	.10		
1000260-11	1.500	1.000	.063 .057	.21		Ⓑ
1000260-12	1.500	1.000	.252 .248	.82		
1000260-13	2.000	1.000	.017 .013	.07		
1000260-14	2.000	1.000	.032 .028	.14		
1000260-15	2.000	1.000	.063 .057	.28		Ⓑ
1000260-16	2.000	1.000	.252 .248	1.12		

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	QJB WK
	B	TDRR 02509	8-14-63	QJB WK
	C	TDRR 03028	9-9-63	[illegible] WK
	D	TDRR 05611	1-7-64	[illegible]



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. Ⓑ MATERIAL: COML MALLORY 3000 (OR EQUIVALENT)
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $\frac{.005}{.015}$.
4. $\overset{250}{\checkmark}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ~~ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2~~
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO.
   Ⓓ PER ND 1002019

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	QJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

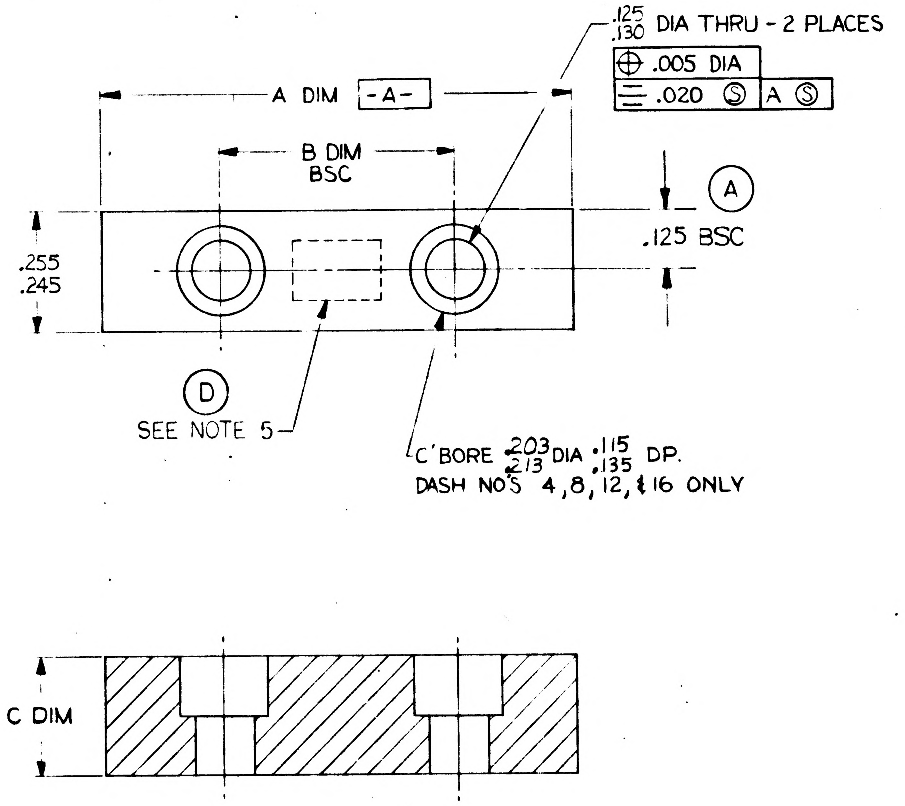
SCALE	UNIT WT.	CODE IDENT.
—		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000260
SHEET 1 OF 1

PART NO.	A DIM	B DIM	C DIM	(REF.) WT. OZ.	REMARKS	Ⓐ
1000260-1	.750	.500	.017 .013	.02		
1000260-2	.750	.500	.032 .028	.05		
000260-3	.750	.500	.063 .057	.10		Ⓑ
1000260-4	.750	.500	.252 .248	.34		
1000260-5	1.000	.500	.017 .013	.03		
1000260-6	1.000	.500	.032 .028	.07		
1000260-7	1.000	.500	.063 .057	.13		Ⓑ
1000260-8	1.000	.500	.252 .248	.50		
000260-9	1.500	1.000	.017 .013	.05		
1000260-10	1.500	1.000	.032 .028	.10		
1000260-11	1.500	1.000	.063 .057	.21		Ⓑ
1000260-12	1.500	1.000	.252 .248	.82		
000260-13	2.000	1.000	.017 .013	.07		
1000260-14	2.000	1.000	.032 .028	.14		
000260-15	2.000	1.000	.063 .057	.28		Ⓑ
1000260-16	2.000	1.000	.252 .248	1.12		

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	AJB	WK
	B	TDRR 02509	8-14-63	AJB	WK
	C	TDRR 03028	9-9-63		WK
	D	TDRR 05611	1-7-64		
	E	REVISED PER TDRR 23588	8 NOV 65	J J J	



.125 .130 DIA THRU - 2 PLACES
⊕ .005 DIA
⌯ .020 Ⓢ A Ⓢ
A DIM -A-
B DIM BSC
Ⓐ
.125 BSC
.255 .245
Ⓓ
SEE NOTE 5
C'BORE .203 .213 DIA .115 .135 DP.
DASH NO'S 4, 8, 12, & 16 ONLY
C DIM

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. Ⓑ MATERIAL SHALL MEET THE REQUIREMENTS OF NASA DRAWING NO. 1010839.
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\sqrt{}^{250}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. Ⓓ IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO. PER ND 1002019

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓑ 1001500	DL1001500
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.010 ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

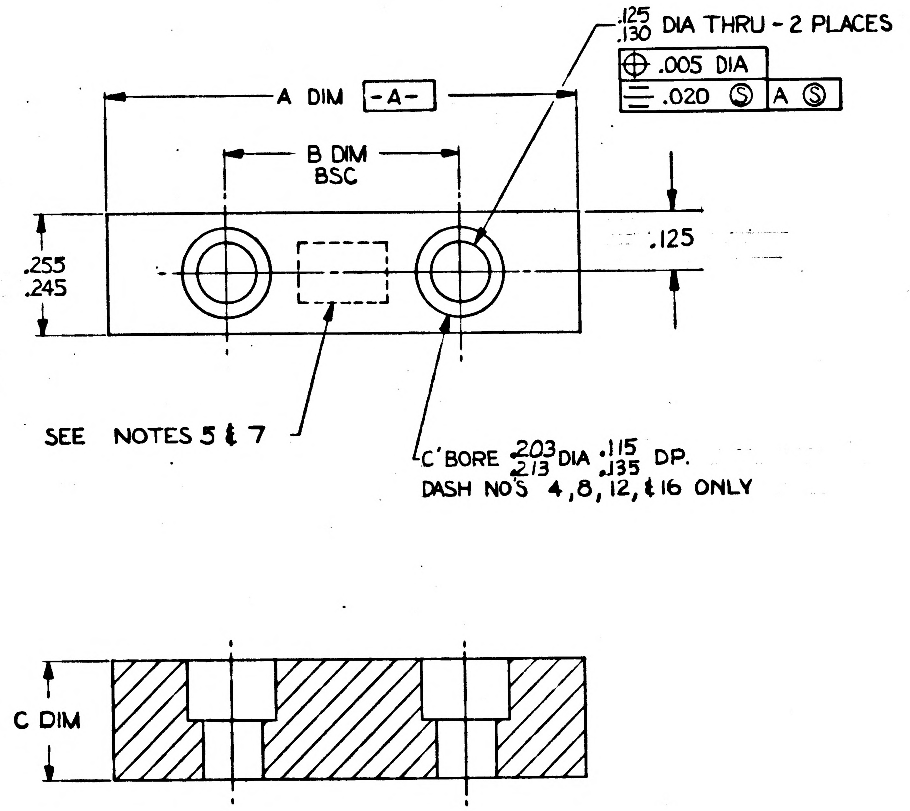
SCALE	UNIT WT.	CODE IDENT.
—		80230

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000260
SHEET 1 OF 1

1000260 E

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

PART. NO.	A DIM	B DIM	C DIM	CALC WT. OZ.	REMARKS
1000260-1	.750	.500	.017 .013	.02	
1000260-2	.750	.500	.032 .028	.05	
1000260-3	.750	.500	.062 .058	.10	
1000260-4	.750	.500	.252 .248	.34	
1000260-5	1.000	.500	.017 .013	.03	
1000260-6	1.000	.500	.032 .028	.07	
1000260-7	1.000	.500	.062 .058	.13	
1000260-8	1.000	.500	.252 .248	.50	
1000260-9	1.500	1.000	.017 .013	.05	
1000260-10	1.500	1.000	.032 .028	.10	
1000260-11	1.500	1.000	.062 .058	.21	
1000260-12	1.500	1.000	.252 .248	.82	
1000260-13	2.000	1.000	.017 .013	.07	
1000260-14	2.000	1.000	.032 .028	.14	
1000260-15	2.000	1.000	.062 .058	.28	
1000260-16	2.000	1.000	.252 .248	1.12	


.125 .130 DIA THRU - 2 PLACES
⊕ .005 DIA
═ .020 Ⓢ A Ⓢ
A DIM -A-
B DIM BSC
.125
.255 .245
SEE NOTES 5 & 7
C'BORE .203 .213 DIA .115 .135 DP.
DASH NO'S 4, 8, 12, & 16 ONLY
C DIM

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\bigtriangledown}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL1000201
1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.010 ANGLES ——
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63

APPROVED FOR MSC W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHTS, BALANCE
STABLE MEMBER

SCALE	UNIT WT.	CODE IDENT.
——		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000260
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

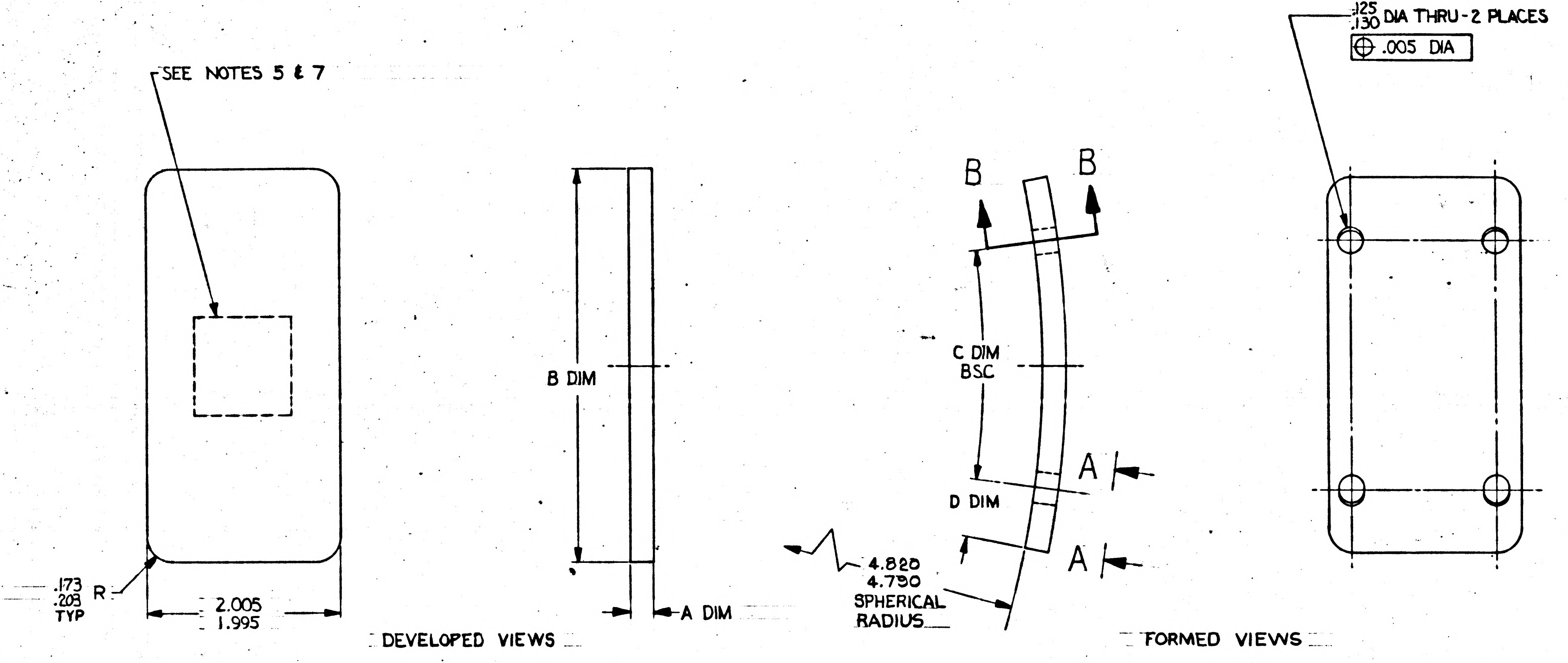
PART NO	A DIM ±.002	B DIM ±.010	C DIM	D ± DIM	E DIM	F DIM	WT OZ CALC (REF)
1000261-1	.015	3.500	30°	6°0'	18°	3°0'	1.03
1000261-2	.030	3.500	30°	6°0'	18°	3°0'	2.06
1000261-3	.060	3.500	30°	6°0'	18°	3°0'	4.13

Ⓐ

Ⓜ

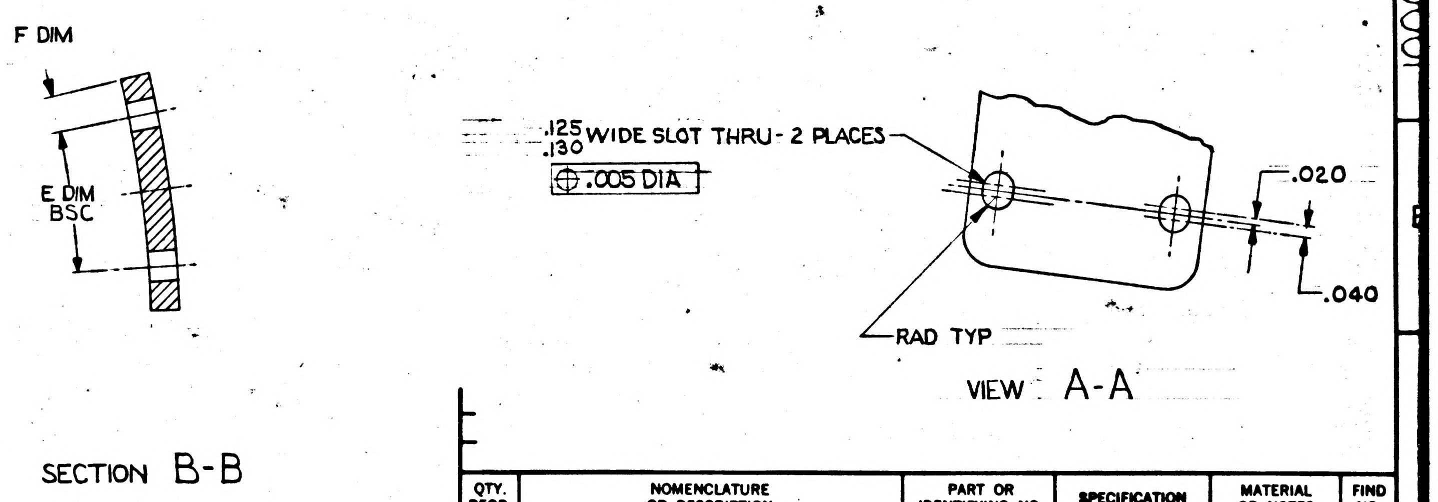
REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	AJB WK


SEE NOTES 5 & 7
.173 .203 R TYP
2.005 1.995
B DIM
A DIM
DEVELOPED VIEWS
B
B
C DIM BSC
D DIM
A
A
4.820 4.790 SPHERICAL RADIUS
.125 .130 DIA THRU - 2 PLACES
⊕ .005 DIA
FORMED VIEWS

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\vee}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REV LETTER, AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130


F DIM
E DIM BSC
SECTION B-B
.125 .130 WIDE SLOT THRU - 2 PLACES
⊕ .005 DIA
.020
.040
RAD TYP
VIEW A-A

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
—— ±.005 ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-10-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHT, BALANCE
MIDDLE GIMBAL

SCALE —— | UNIT WT. | CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000261
SHEET 1 OF 1

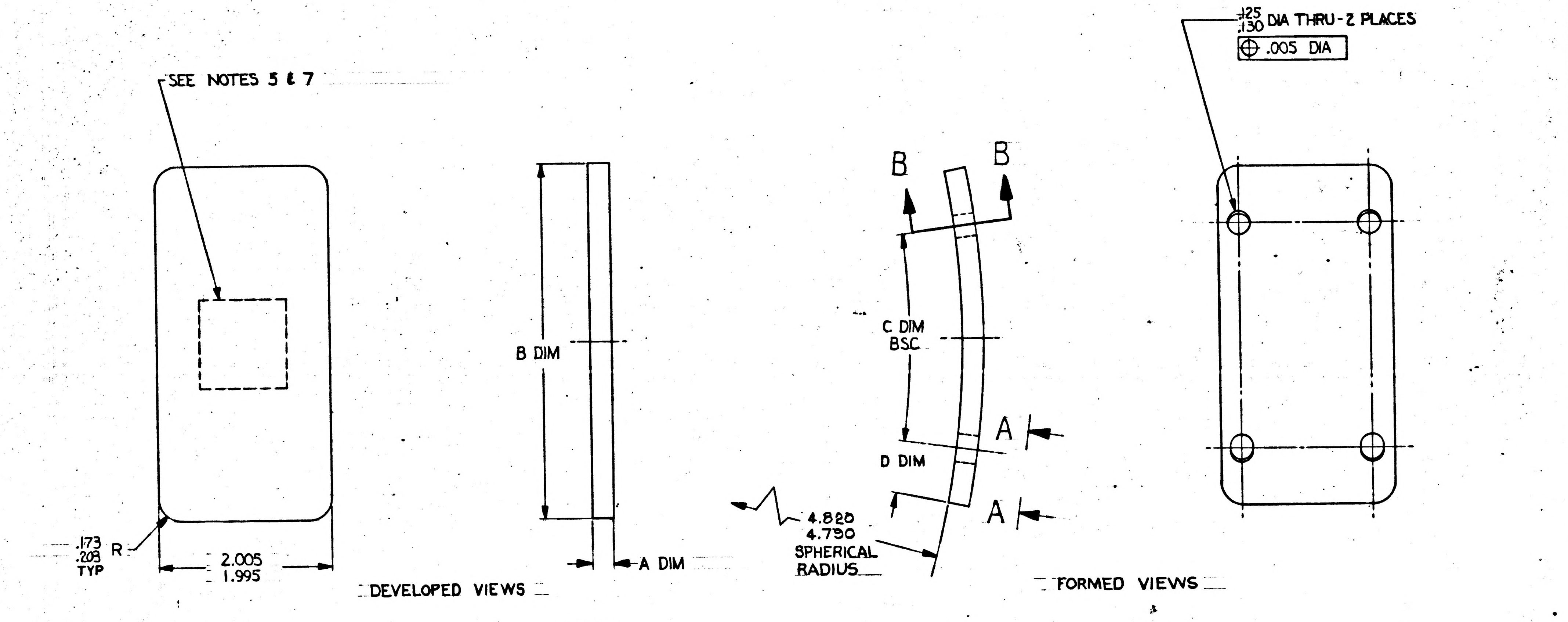
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	A DIM ±.003	B DIM ±.010	C DIM	D DIM	E DIM	F DIM	WT OZ CALC.(REF) Ⓐ
1000261-1	.015	3.500	30°	6°0'	18°	3°0'	1.03
1000261-2	.030	3.500	30°	6°0'	18°	3°0'	2.06
1000261-3	.060	3.500	30°	6°0'	18°	3°0'	4.13

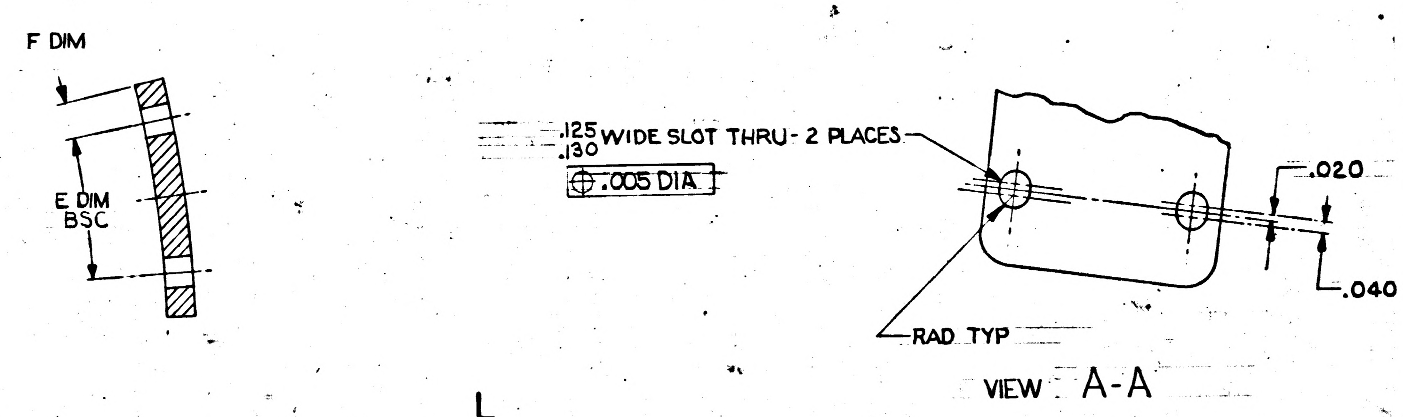
Ⓑ

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	AJB	WK
	B	TDRR 03027	9-9-63		WK



.125
.130 DIA THRU-2 PLACES
⊕ .005 DIA
SEE NOTES 5 & 7
B
B
B DIM
C DIM
BSC
A
A
D DIM
.173
.203 R
TYP
2.005
1.995
A DIM
4.820
4.780
SPHERICAL
RADIUS
DEVELOPED VIEWS
FORMED VIEWS



F DIM
E DIM
BSC
.125
.130 WIDE SLOT THRU- 2 PLACES
⊕ .005 DIA
.020
.040
RAD TYP

SECTION B-B

VIEW A-A

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\sqrt{250}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REV LETTER, AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-10-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHT, BALANCE
MIDDLE GIMBAL

SCALE ——
UNIT WT.
CODE IDENT.

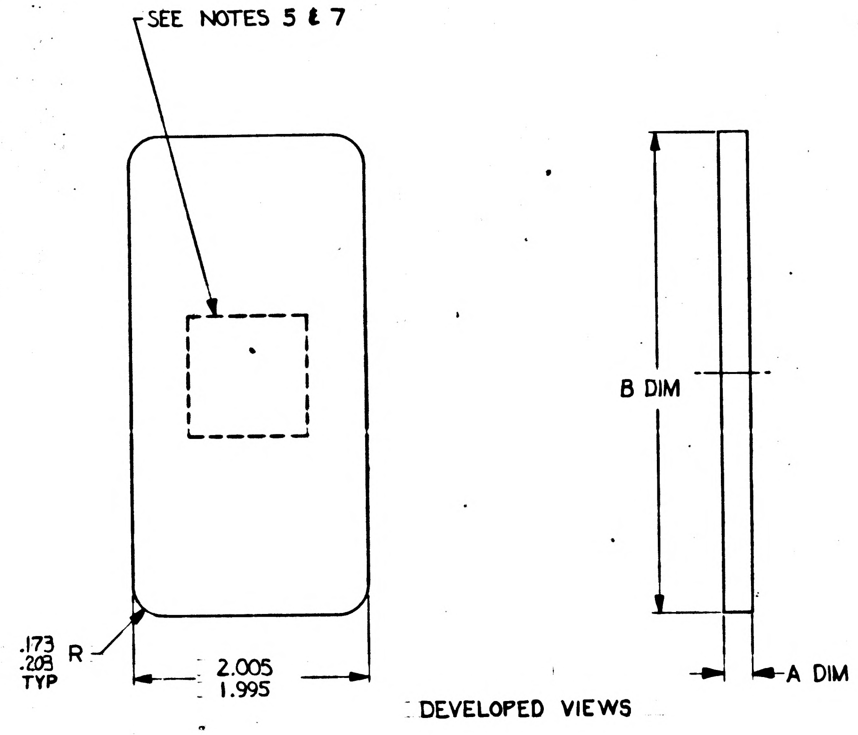
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000261
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

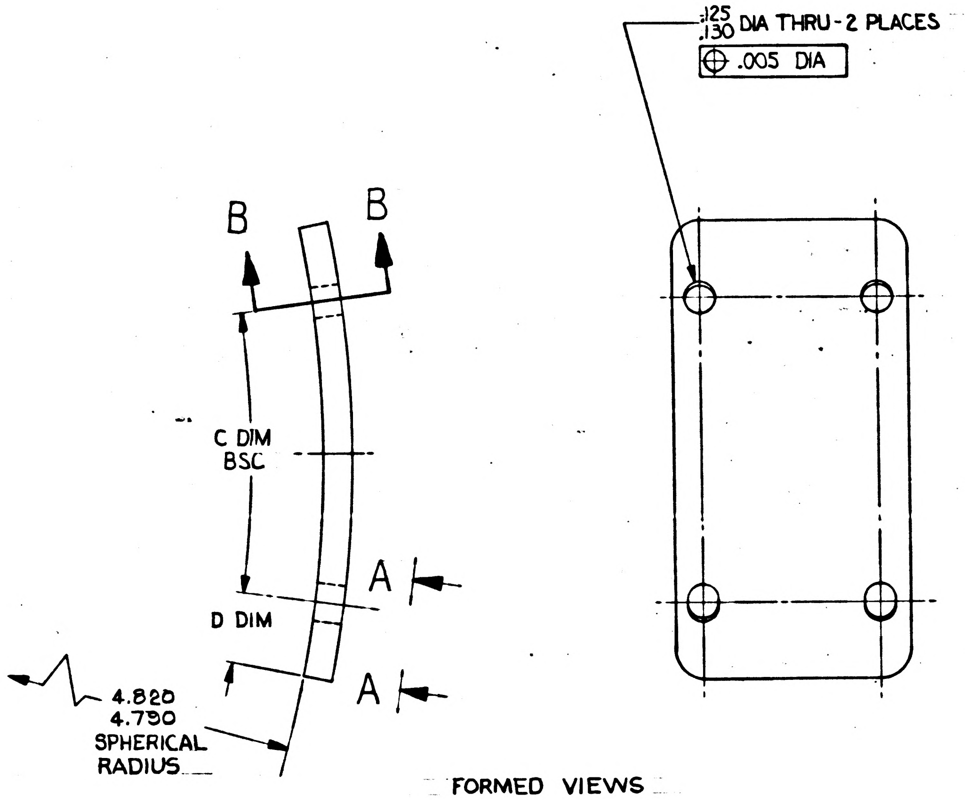
PART NO	A DIM ±.002	B DIM ±.010	C DIM	D DIM	E DIM	F DIM	WT OZ CALC
1000261-1	.015	3.500	30°	6°0′	18°	3°0′	1.03
1000261-2	.030	3.500	30°	6°0′	18°	3°0′	2.06
1000261-3	.060	3.500	30°	6°0′	18°	3°0′	4.13

Ⓜ

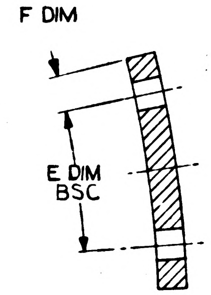
REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL


SEE NOTES 5 & 7
B DIM
.173
.203 R
TYP
2.005
1.995
A DIM

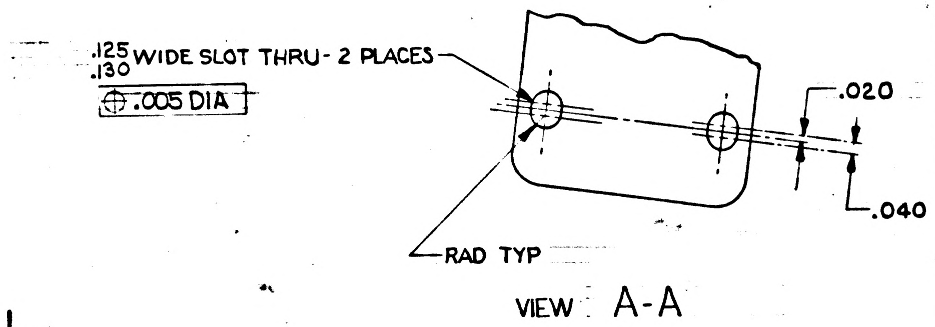
DEVELOPED VIEWS


.125
.130 DIA THRU - 2 PLACES
⊕ .005 DIA
B
B
C DIM
BSC
A
D DIM
A
4.820
4.780
SPHERICAL
RADIUS

FORMED VIEWS


F DIM
E DIM
BSC

SECTION B-B


.125
.130 WIDE SLOT THRU - 2 PLACES
⊕ .005 DIA
.020
.040
RAD TYP

VIEW A-A

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\surd}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3
7. IDENTIFY USING DWG NO, REV LETTER, AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL1000201
1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-10-63
APPROVED FOR MSC	W J Rhine 5-1-63	
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHT, BALANCE
MIDDLE GIMBAL

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000261
SHEET 1 OF 1

MASTER

1000261

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

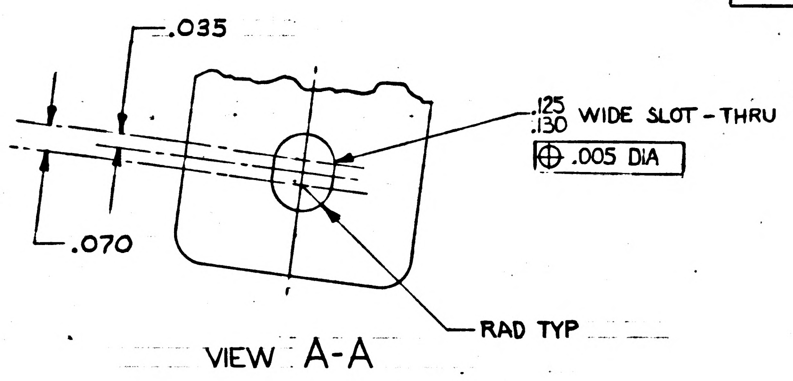
4 3 2 1

PART NO.	A DIM ±.002	B DIM ±.010	C DIM	D DIM	WT. OZ CALC (REF)
1000262-1	.015	2.000	18°	3°0′	.14
1000262-2	.030	2.000	18°	3°0′	.28
1000262-3	.060	2.000	18°	3°0′	.57
1000262-4	.015	3.500	30°	6°0′	.26
1000262-5	.030	3.500	30°	6°0′	.50
1000262-6	.060	3.500	30°	6°0′	1.02
1000262-7	.015	4.000	30°	9°0′	.29
1000262-8	.030	4.000	30°	9°0′	.57
1000262-9	.060	4.000	80°	9°0′	1.16

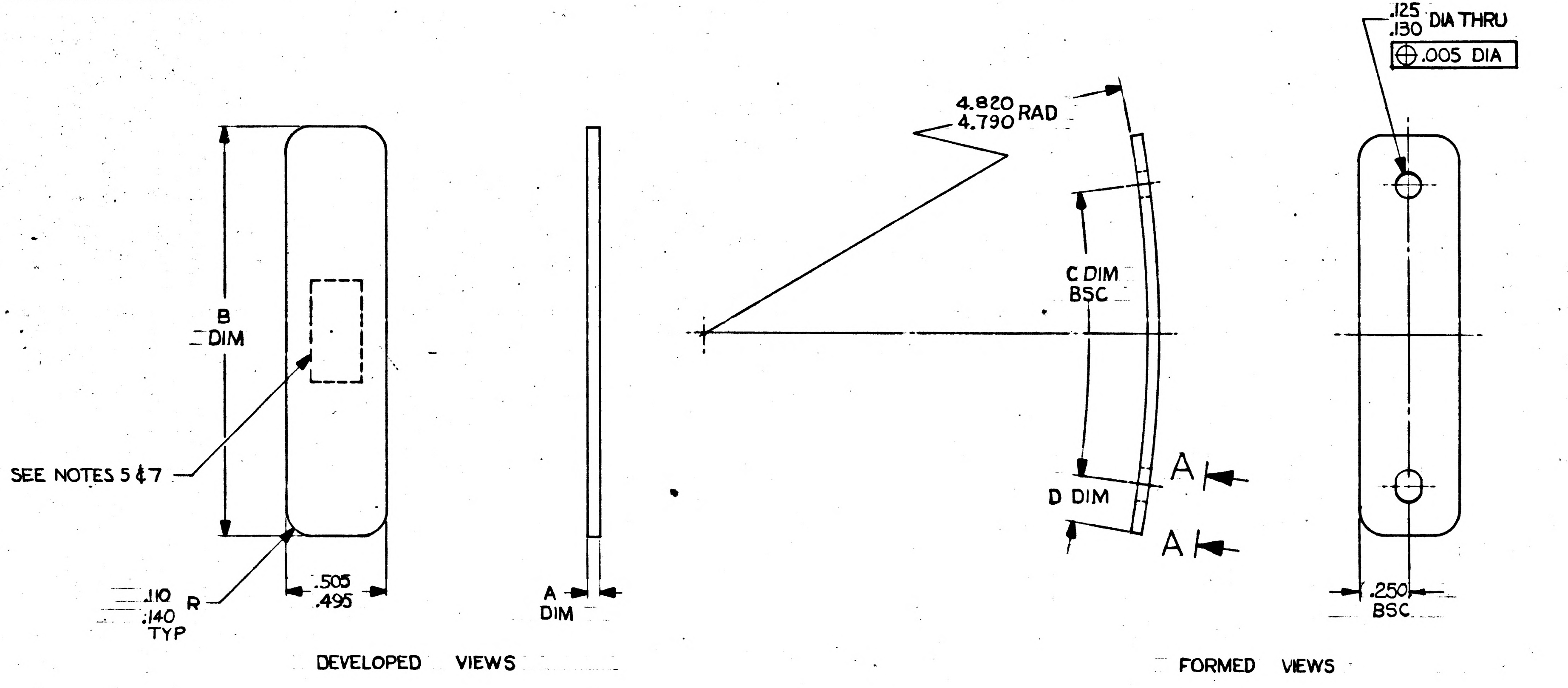
Ⓐ

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	ajB wK



VIEW A-A



DEVELOPED VIEWS

FORMED VIEWS

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $^{250}\!\checkmark$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
——— ±.005 ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHT, BALANCE
MIDDLE GIMBAL

SCALE ——— | UNIT WT. | CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000262
SHEET 1 OF 1

4 3 2 1

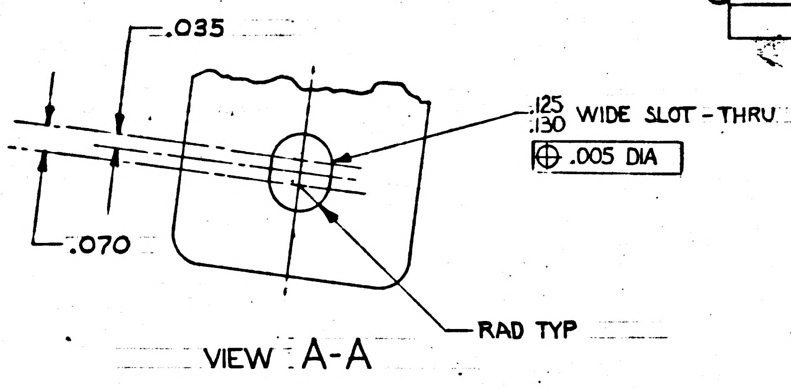
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	A DIM ±.003	B DIM ±.010	C DIM	D DIM	WT. OZ. CALC. (REF.)
1000262-1	.015	2.000	18°	3°0′	.14
1000262-2	.030	2.000	18°	3°0′	.28
1000262-3	.060	2.000	18°	3°0′	.57
1000262-4	.015	3.500	30°	6°0′	.26
1000262-5	.030	3.500	30°	6°0′	.50
1000262-6	.060	3.500	30°	6°0′	1.02
1000262-7	.015	4.000	30°	9°0′	.29
1000262-8	.030	4.000	30°	9°0′	.57
1000262-9	.060	4.000	30°	9°0′	1.16

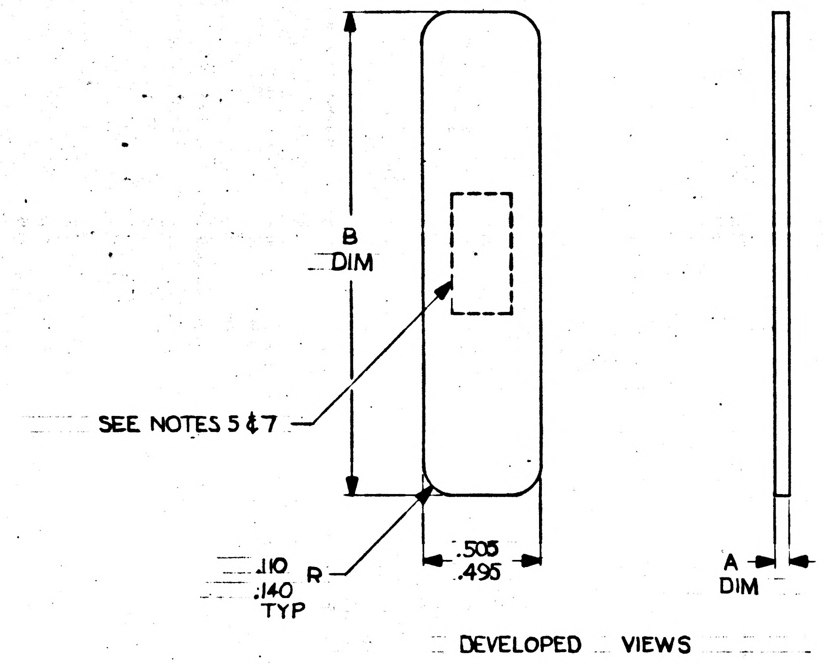
Ⓐ Ⓑ

REVISIONS TDRR 01025

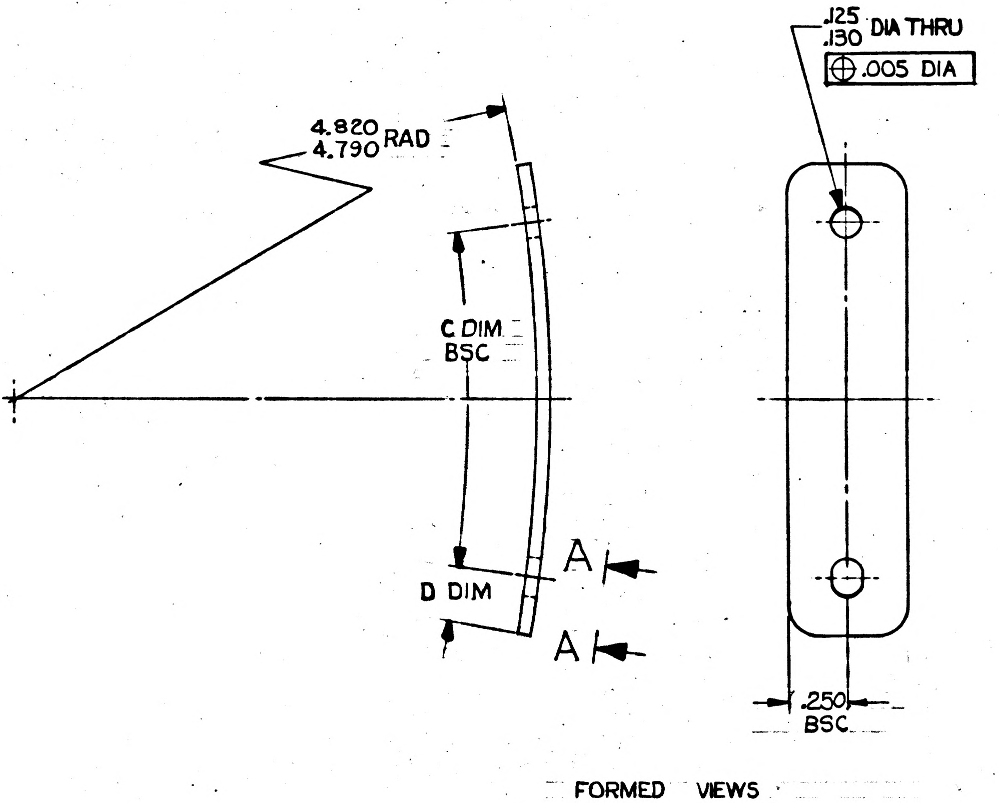
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	AJB WH
	B	TDRR 03027	9-9-63	WH



VIEW A-A



DEVELOPED VIEWS



FORMED VIEWS

NOTES:

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2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
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7. IDENTIFY USING DWG NO, REVISION LETTER, AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
——— ±.005 ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63
APPROVED FOR MSC	W J Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHT, BALANCE
MIDDLE GIMBAL

SCALE	UNIT WT.	CODE IDENT.
———		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000262
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	A DIM ±.002	B DIM ±.010	C DIM	D DIM	WT. OZ. CAL.
1000262-1	.015	2.000	18°	3°0′	.14
1000262-2	.030	2.000	18°	3°0′	.28
1000262-3	.060	2.000	18°	3°0′	.57
1000262-4	.015	3.500	30°	6°0′	.26
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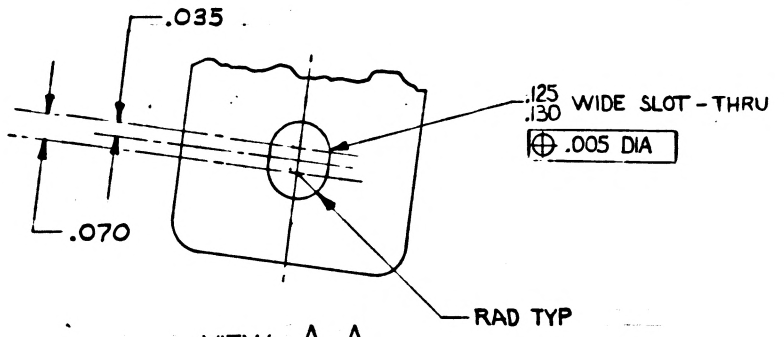
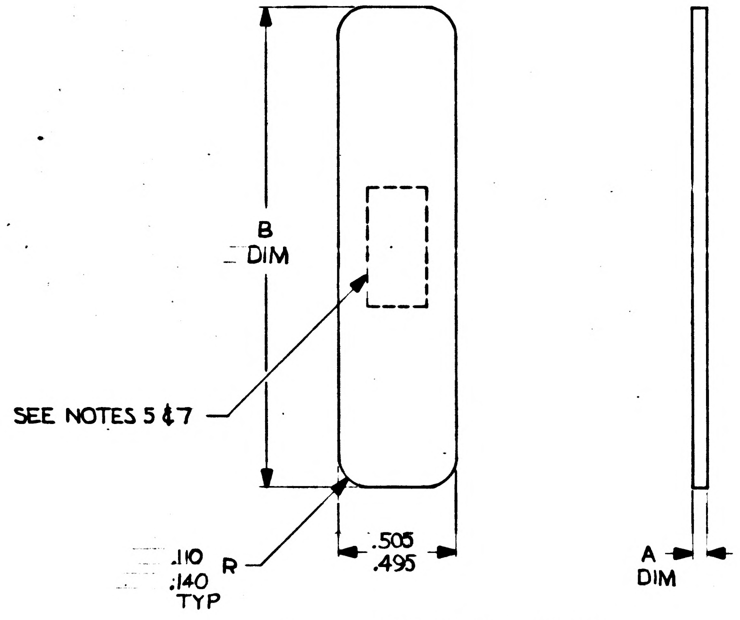
1000262-6	.060	3.500	30°	6°0′	1.02
1000262-7	.015	4.000	30°	9°0′	.29
1000262-8	.030	4.000	30°	9°0′	.57
1000262-9	.060	4.000	80°	9°0′	1.16

REVISIONS TDRR 01025

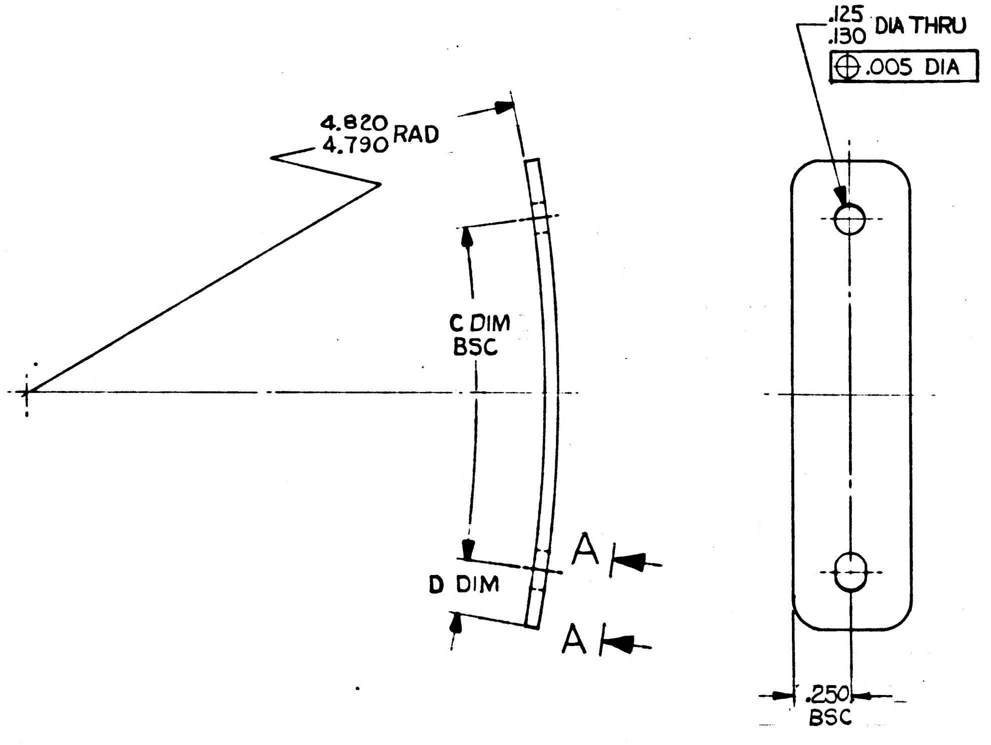
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



VIEW A-A



DEVELOPED VIEWS



FORMED VIEWS

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
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MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-8-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHT, BALANCE
MIDDLE GIMBAL

SCALE	UNIT WT.	CODE IDENT.
——		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

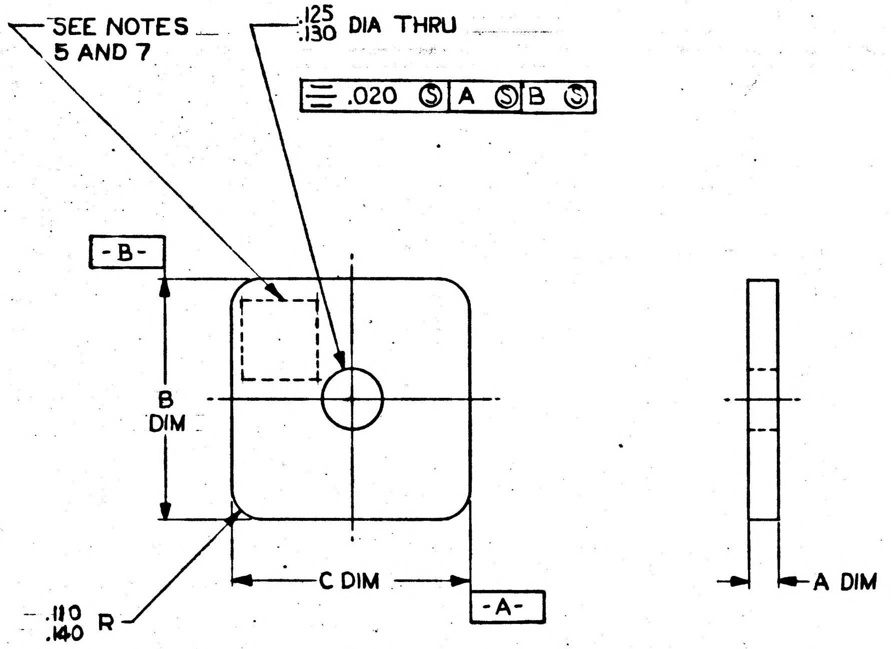
NASA DRAWING NO.
1000262

SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	A DIM ±.002	B DIM ±.010	C DIM ±.010	WT OZ CALC (REF) Ⓐ
1000263-1	.015	.500	.500	.03
1000263-2	.030	.500	.500	.07
1000263-3	.060	.500	.500	.13

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	CJB WK.



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
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   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\checkmark}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE.
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	CJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-9-63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHT, BALANCE
OUTER AND MIDDLE GIMBAL

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000263
SHEET 1 OF 1

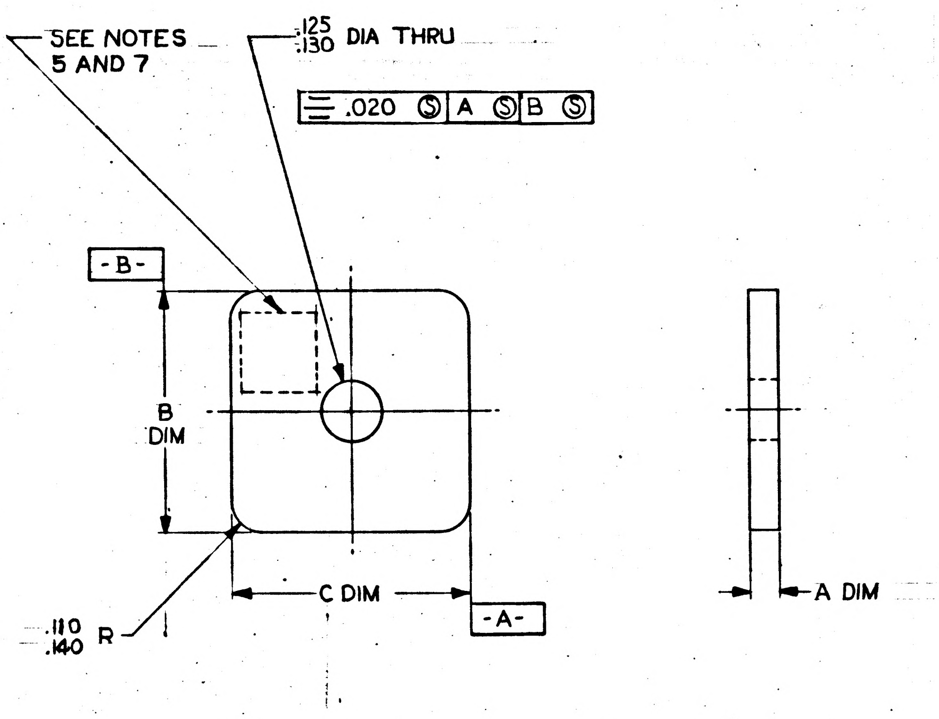
1000263 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	A DIM ±.003	B DIM ±.019	C DIM ±.010	WT OZ CALC.(REF.) Ⓐ
1000263-1	.015	.500	.500	.03
1000263-2	.030	.500	.500	.07
1000263-3	.060	.500	.500	.13

Ⓑ

REVISIONS TDRR 01025					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	AJB	WK.
	B	TDRR 03027	9-9-63		WK



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $\substack{.005\\.015}$.
4. $\sqrt{}^{250}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE.
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

1000263 B

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-9-63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHT, BALANCE
OUTER AND MIDDLE GIMBAL

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000263

SHEET 1 OF 1

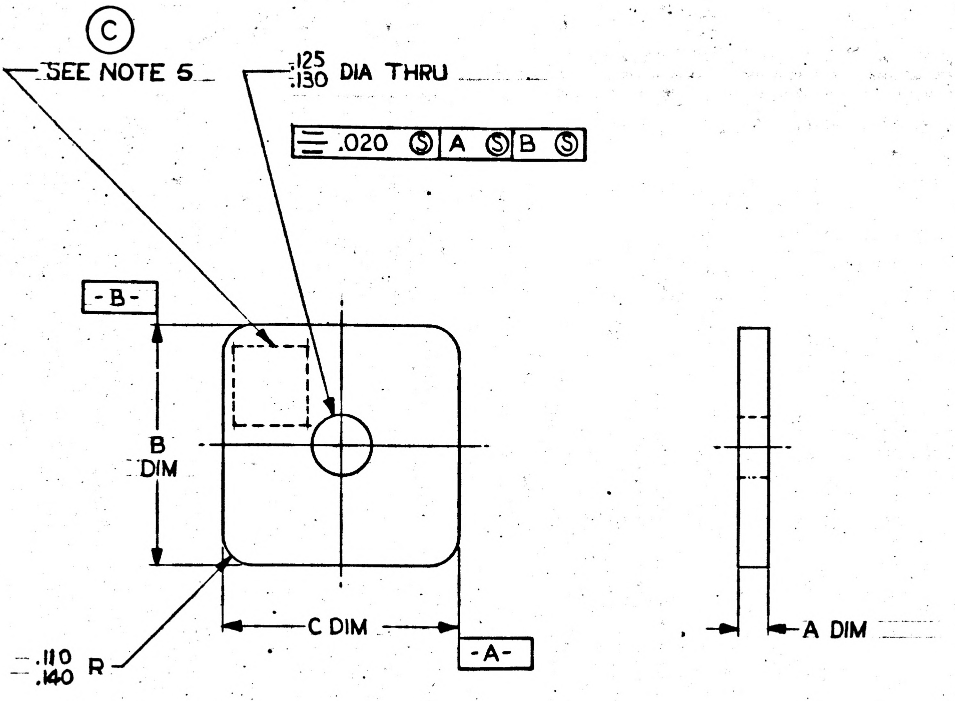
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	A DIM ±.003	B DIM ±.010	C DIM ±.010	WT OZ CALC (REF) Ⓐ
1000263-1	.015	.500	.500	.03
1000263-2	.030	.500	.500	.07
1000263-3	.060	.500	.500	.13

Ⓑ

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	AJB	WK.
	B	TDRR 03027	9-9-63		WK
	C	TDRR 05608	1-7-64		



NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
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6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. Ⓒ IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO PER ND 1002019

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER Ⓒ

1001500	DL1001500
1000201	DL1000201
1000001	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-9-63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

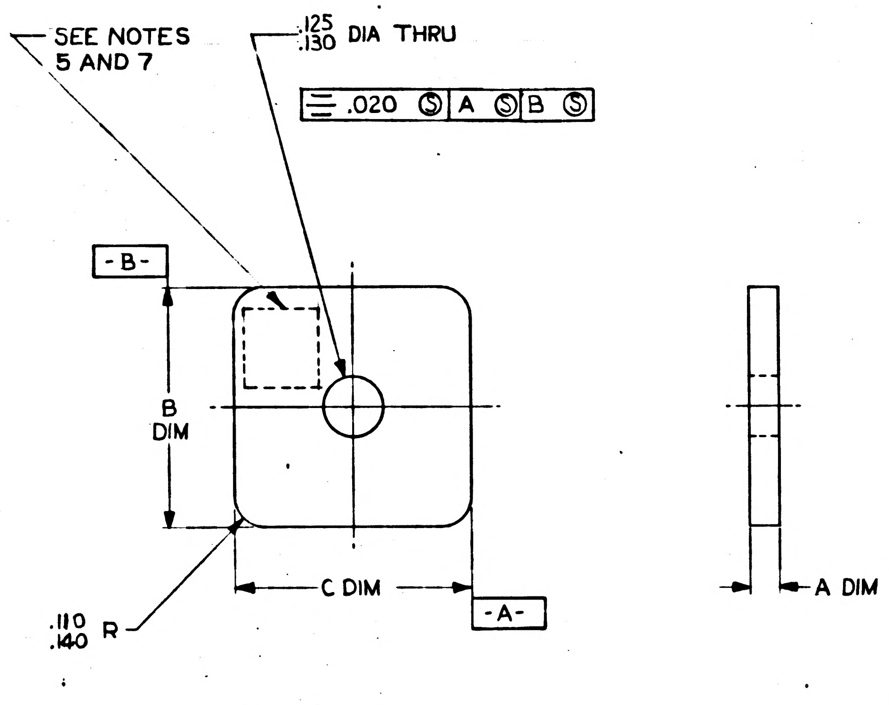
WEIGHT, BALANCE
OUTER AND MIDDLE GIMBAL

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000263
SHEET 1 OF 1

PART NO	A DIM ±.002	B DIM ±.010	C DIM ±.010	WT OZ CALC
1000263-1	.015	.500	.500	.03
1000263-2	.030	.500	.500	.07
1000263-3	.060	.500	.500	.13

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

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2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
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   INDIANAPOLIS 6, INDIANA
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7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000201	DL1000201	
1000001	DL1000001	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-9-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHT, BALANCE
OUTER AND MIDDLE GIMBAL

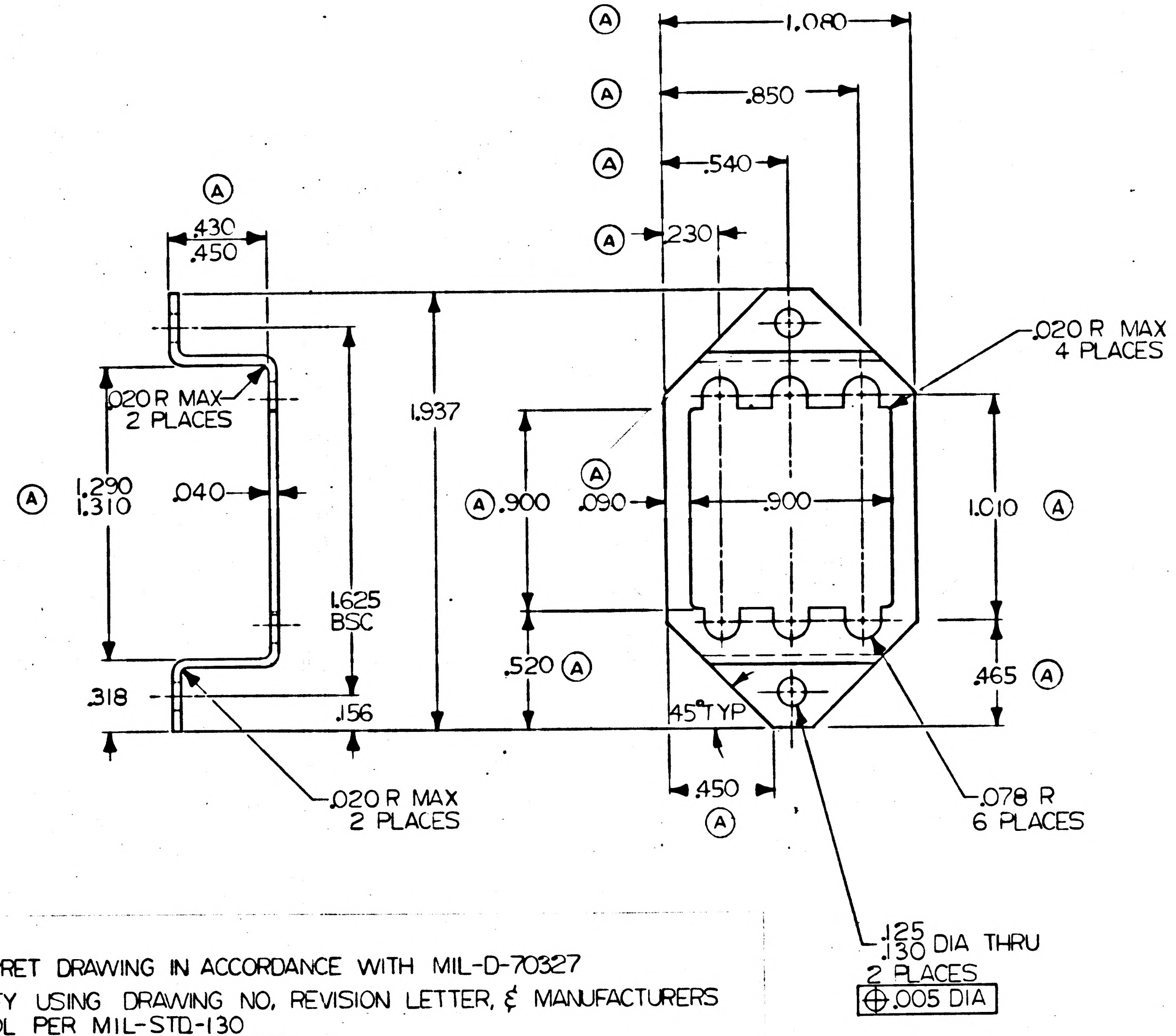
SCALE	UNIT WT.	CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000263
SHEET 1 OF 1

1000263

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

		REVISIONS TDRR 00761		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01027	1 MAY 63	aJB WK



Ⓐ 1.080
Ⓐ .850
Ⓐ .540
Ⓐ .230
Ⓐ .430 .450
.020 R MAX 2 PLACES
Ⓐ 1.290 1.310
.040
1.937
1.625 BSC
.318
.156
.020 R MAX 2 PLACES
Ⓐ .900
Ⓐ .090
.900
1.010 Ⓐ
.520 Ⓐ
.465 Ⓐ
45° TYP
.450 Ⓐ
.020 R MAX 4 PLACES
.078 R 6 PLACES
.125 .130 DIA THRU 2 PLACES
⌖ .005 DIA

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. Ⓐ IDENTIFY USING DRAWING NO, REVISION LETTER, & MANUFACTURERS SYMBOL PER MIL-STD-130
3. BREAK ALL SHARP EDGES .005 .015
4. SURFACE ROUGHNESS, AS ROLLED—PUNCHED, CUT, OR MACHINED SURFACES TO HAVE 63√
5. ANODIC COAT PER MIL-A-8625 TYPE 1 CLEAR

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

Ⓐ

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: AL ALY SHT-6061 TEMP-T6
ALT SPEC: QQ-A-327 TEMP-T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	a J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3/29/63
APPROVED FOR MSC	L. S. Swing	4/10/63
MIT/IL APPROVAL		DATE
	W. Kupfer	10 Apr 63

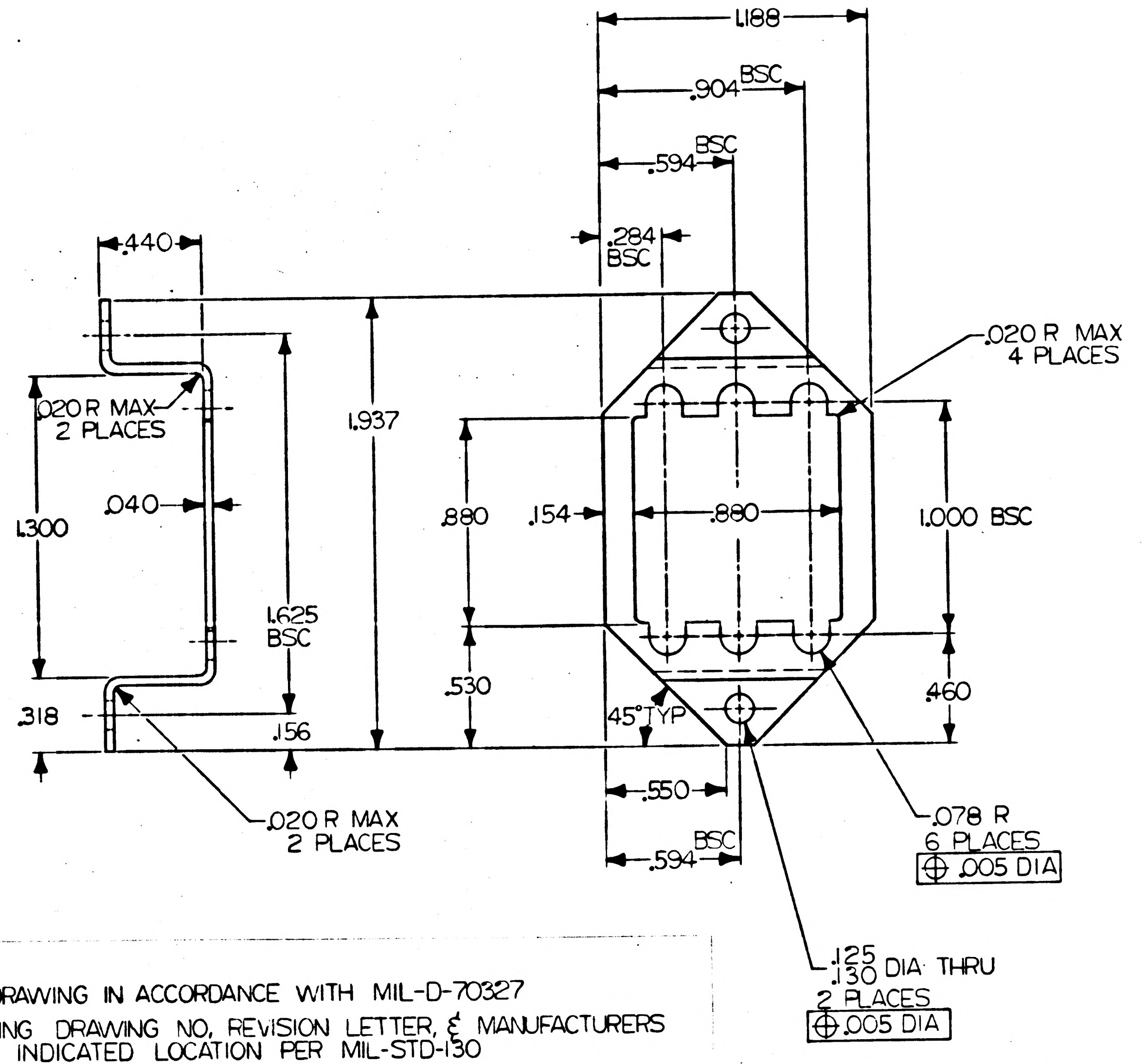
COVER,
BRACKET, CONNECTOR,
26 PIN

SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT
INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000265
SHEET 1 OF 1 SHEET

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 00761		


1.188
.904 BSC
.594 BSC
.284 BSC
.440
.020 R MAX 4 PLACES
.020 R MAX 2 PLACES
1.937
.040
1.300
.880
.154
.880
1.000 BSC
1.625 BSC
.530
.460
.318
.156
45° TYP
.550
.594 BSC
.020 R MAX 2 PLACES
.078 R 6 PLACES
⊕ .005 DIA
.125 .130 DIA THRU 2 PLACES
⊕ .005 DIA

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO, REVISION LETTER, & MANUFACTURERS SYMBOL AT INDICATED LOCATION PER MIL-STD-130
3. BREAK ALL SHARP EDGES .005 .015
4. SURFACE ROUGHNESS, AS, ROLLED, PUNCHED, CUT, OR MACHINED SURFACES TO HAVE 63√
5. ANODIC COAT PER MIL-A-8625 TYPE 1 CLEAR

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ±0°15'
DO NOT SCALE THIS DRAWING
MATERIAL:
AL ALY SHT-6061 TEMP-T6
ALT SPEC: QQ-A-327 TEMP-T6

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	3/29/63
APPROVED FOR MSC	D. S. Swingle	4/11/63
MIT/IL APPROVAL	W Kupfer	10 Apr 63

COVER,
BRACKET, CONNECTOR,
26 PIN

SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000265
SHEET 1 OF 1 SHEET

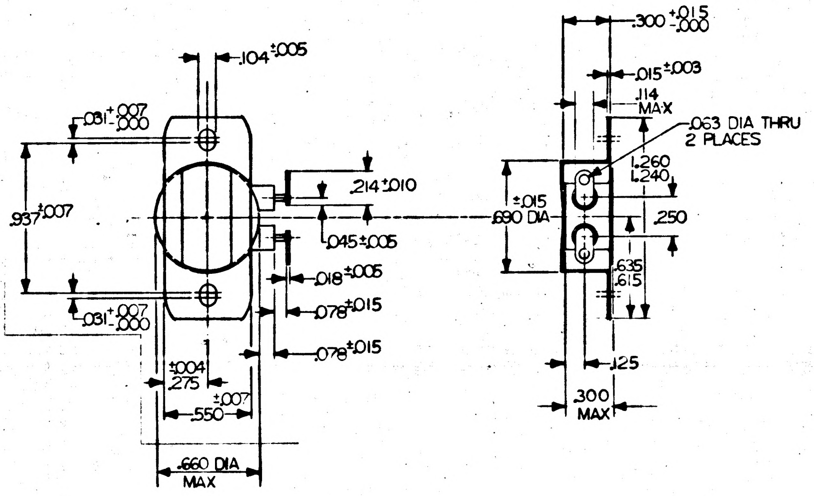
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000265

④

REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	PER TDRR 01700	6/26/63	WK



REQUIREMENTS

1. GENERAL
    - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
    - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPEC ND1015404 CLASS 2
    - C. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO., & MANUFACTURERS SYMBOL AT PER MIL-STD-130 MANUFACTURERS NAME AND PART NO. ~~MAY BE~~ INCLUDED
2. INSPECTION & ACCEPTANCE (100%)
    - A. ELECTRICAL REQUIREMENTS
        - 1. ELECTRICAL RATING- 2 AMPS ● 30VDC/120VAC
        - 2. SWITCH ACTION-SPST OPENS ON TEMPERATURE RISE
        - 3. TEMPERATURE SETTING: 140°F OPENING CIRCUIT
        - 4. TEMPERATURE SETTING TOLERANCE: ±3°F
        - 5. TEMPERATURE DIFFERENTIAL: 2°-5°F
    - B. MECHANICAL REQUIREMENTS
        - 1. ALL DIMENSIONS MUST MEET REQUIREMENTS CONTAINED ON THIS DRAWING
        - 2. BREAK ALL SHARP EDGES
3. DESIGN REQUIREMENTS
    - Ⓐ A. CONTACTS-SILVER PER MIL-S-19424
    - Ⓐ B. THERMOSTAT HOUSING CADMIUM PLATED PER QQ-P-416, TYPE I, CLASS A
    - C. MINIMUM OPERATING LIFE AT OPERATING CONDITIONS; 250,000 CYCLES
    - D. MOUNTING BRACKET & THERMOSTAT MAY BE SEPARABLE
    - Ⓐ E. UNITS SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING ENVIRONMENTAL STRESSES
        - 1. TEMPERATURE: -65°F TO 340°F (NON-OPERATING)
        - 2. VIBRATION: (5-2000 CPS AT 10G OR (5-500 CPS AT 15G (OPERATING)
        - ~~3. SHOCK: MIL-E-5272C PARAGRAPH 4.15.5.1 (NON-OPERATING)~~
        - ~~4. ACCELERATION: MIL-E-5272C PARAGRAPH 4.16.3 (NON-OPERATING)~~

PROCURE ONLY FROM APPROVED
SOURCES LISTED ON ND1002034
FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153
APPROVED A J Boyce DATE 4/30/63
CHECKED
DRAWN MORSE 4-9-63
APPROVED FOR MSC W J Rhine 5-1-63
MIT/IL APPROVAL W Kupfer DATE

THERMOSTAT,
SAFETY
SPECIFICATION CONTROL DRAWING

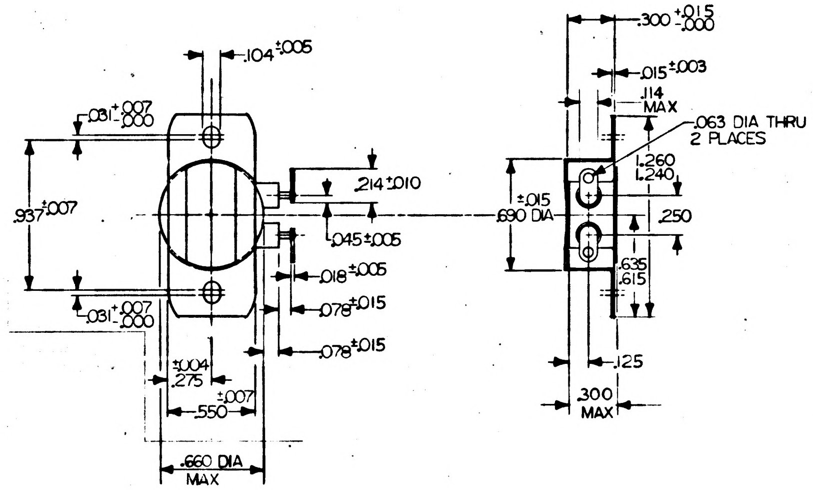
SCALE 2/1
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000266
SHEET 1 OF 1 SHEET

1000266 A

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	PER TDRR 01700	6/26/63	AJB WK
	B	TDRR 02126	7-23-63	AJB WK



REQUIREMENTS

1. GENERAL
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPEC ND1015404 CLASS 2
   - C. IDENTIFY USING DRAWING NO, REVISION LETTER, SERIAL NO., & MANUFACTURERS SYMBOL AT PER MIL-STD-130 MANUFACTURERS NAME AND PART NO. ~~MAY BE~~ INCLUDED
2. INSPECTION & ACCEPTANCE (100%)
   - A. ELECTRICAL REQUIREMENTS
     - 1. ELECTRICAL RATING- 2 AMPS @ 30 VDC/120VAC
     - 2. SWITCH ACTION-SPST OPENS ON TEMPERATURE RISE
     - Ⓑ 3. TEMPERATURE SETTING: 137°F CLOSING TEMPERATURE
     - 4. TEMPERATURE SETTING TOLERANCE: ±3°F
     - 5. TEMPERATURE DIFFERENTIAL: 2-5° F
   - B. MECHANICAL REQUIREMENTS
     - 1. ALL DIMENSIONS MUST MEET REQUIREMENTS CONTAINED ON THIS DRAWING
     - 2. BREAK ALL SHARP EDGES
3. DESIGN REQUIREMENTS
   - Ⓐ A. CONTACTS-SILVER PER MIL-S-19424
   - Ⓐ B. THERMOSTAT HOUSING CADMIUM PLATED PER QQ-P-416, TYPE I, CLASS A
   - C. MINIMUM OPERATING LIFE AT OPERATING CONDITIONS; 250,000 CYCLES
   - D. MOUNTING BRACKET & THERMOSTAT MAY BE SEPARABLE
   - Ⓐ E. UNITS SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING ENVIRONMENTAL STRESSES
     - 1. TEMPERATURE: -65°F TO 340°F (NON-OPERATING)
     - 2. VIBRATION: (5-2000 CPS AT 10G OR (5-500 CPS AT 15G (OPERATING)
     - 3. SHOCK: MIL-E-5272C PARAGRAPH 4.15.5.1 (NON-OPERATING)
     - 4. ACCELERATION: MIL-E-5272C PARAGRAPH 4.16.3 (NON-OPERATING)

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

NEXT ASSY	USED ON
	DL1000201
1000005	DL1000001
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	IMORSE	4-9-63
APPROVED FOR MSC	W J Rhine 5-1-63	
MIT/IL APPROVAL	W Kupfer	

THERMOSTAT, SAFETY
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
2/1		

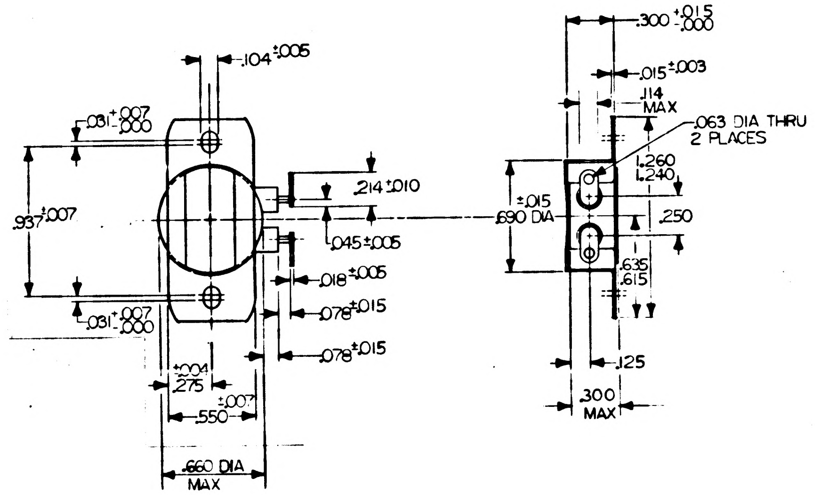
MIT INSTRUMENTATION LABORATORY CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER HOUSTON TEXAS
NASA DRAWING NO. 1000266
SHEET 1 OF 1 SHEET

1000266 A

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

④

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



REQUIREMENTS

1. GENERAL
    - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
    - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPEC ND10 5404 CLASS 2
    - C. IDENTIFY USING DRAWING NO., REVISION LETTER, SERIAL NO., & MANUFACTURERS SYMBOL AT PER MIL-STD-130 MANUFACTURERS NAME AND PART NO. ~~MAY BE~~ INCLUDED
2. INSPECTION & ACCEPTANCE (100%)
    - A. ELECTRICAL REQUIREMENTS
        - 1. ELECTRICAL RATING- 2 AMPS @ 30 VDC/120VAC
        - 2. SWITCH ACTION-SPST OPENS ON TEMPERATURE RISE
        - 3. TEMPERATURE SETTING: 140°F OPENING CIRCUIT
        - 4. TEMPERATURE SETTING TOLERANCE: ±3°F
        - 5. TEMPERATURE DIFFERENTIAL: 2°-5°F
    - B. MECHANICAL REQUIREMENTS
        - 1. ALL DIMENSIONS MUST MEET REQUIREMENTS CONTAINED ON THIS DRAWING
        - 2. BREAK ALL SHARP EDGES
3. DESIGN REQUIREMENTS
    - A. CONTACTS-SILVER
    - B. THERMOSTAT HOUSING CADMIUM PLATED
    - C. MINIMUM OPERATING LIFE AT OPERATING CONDITIONS; 250,000 CYCLES
    - D. MOUNTING BRACKET & THERMOSTAT MAY BE SEPARABLE

ORIGINAL SOURCE OF SUPPLY
TEXAS INSTRUMENTS INC.
METALS & CONTROLS INC. DIVISION
ATTLEBORO, MASS.

M&C P/N M224L140030511

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

	DL1000201
1000005	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ~ DECIMALS ±.005 ANGLES ~
DO NOT SCALE THIS DRAWING
MATERIAL: ~

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	C. J. Boyce	4/30/63
CHECKED		
DRAWN	MORSE	4-9-63
APPROVED FOR MSC	W J Rhine 5-1-63	
MIT/IL APPROVAL		DATE

THERMOSTAT, SAFETY
SPECIFICATION CONTROL DRAWING

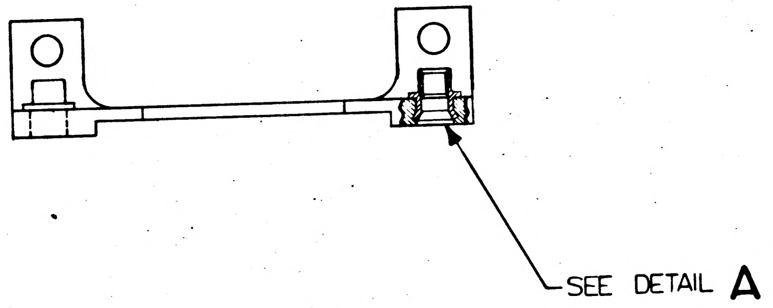
SCALE	UNIT WT.	CODE IDENT.
2/1		

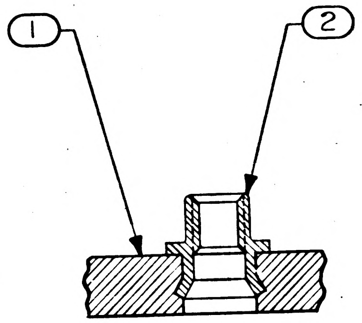
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000266
SHEET 1 OF 1 SHEET

1000266

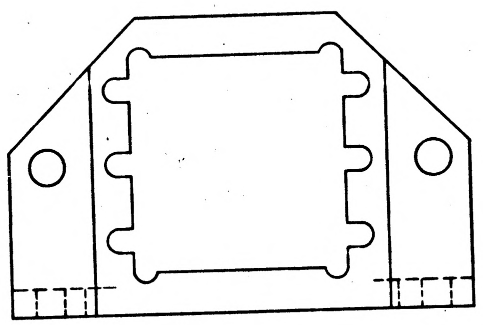
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 00761				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL





DETAIL A
SCALE: 4X ACTUAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER MIL-STD-130

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
2	NUT, CLINCH, FLUSH MOUNTED	1000076-3			2
1	BRACKET, CONNECTOR	1000264			1

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	DL100020l
1000005	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL: ~

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	A J Boyce	4-9-63
CHECKED		
DRAWN	MORSE	4-5-63

APPROVED FOR MSC
[illegible] 4/10/63

MIT/IL APPROVAL DATE
W Kupfer 10 Apr 63

BRACKET, CONNECTOR
ASSEMBLY

SCALE 1/1
UNIT WT.
CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000267

SHEET 1 OF 1 SHEET

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1000267

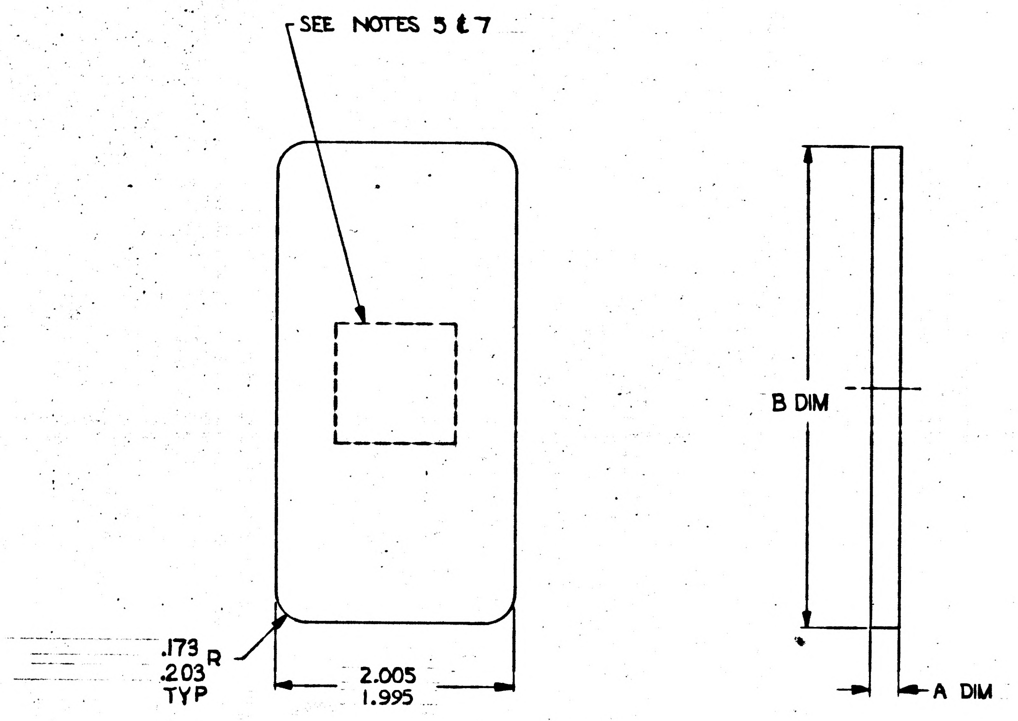
PART NO	A DIM ±.002	B DIM ±.010	C DIM	D DIM	E DIM	F DIM	WT OZ CALC.(REF)
1000268-1	.015	4.000	25°	8°0'	15°	3°0'	1.18
1000268-2	.030	4.000	25°	8°0'	15°	3°0'	2.35
1000268-3	.060	4.000	25°	8°0'	15°	3°0'	4.70

Ⓐ

REVISIONS TDRR 01025

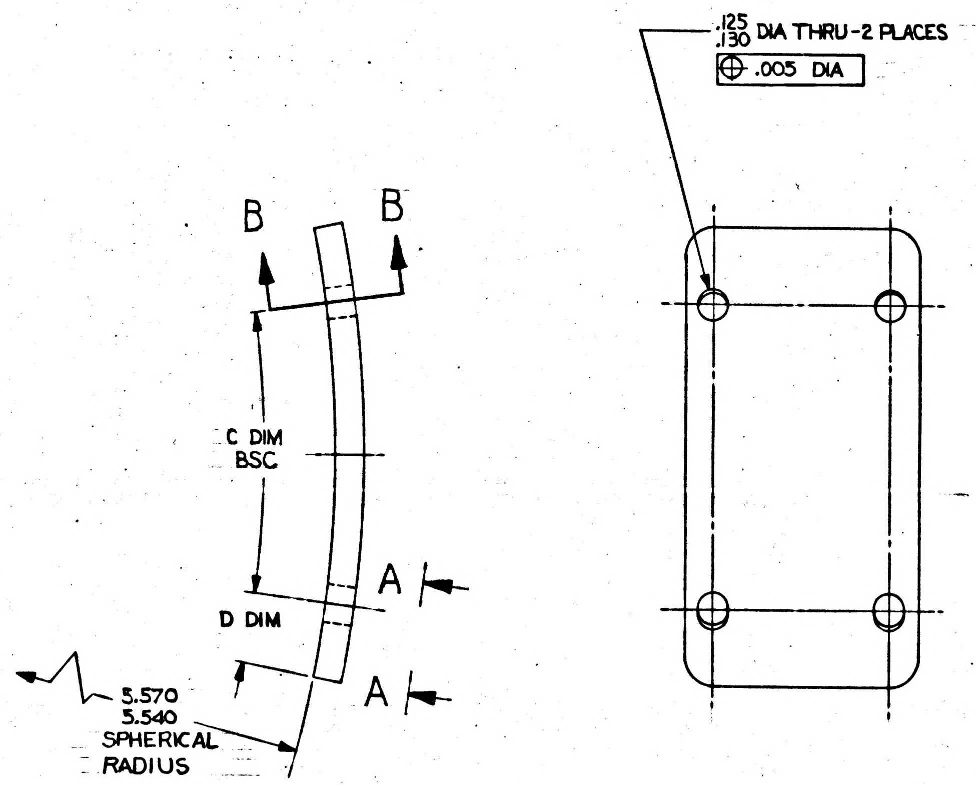
Ⓜ

ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	CJB	WKC



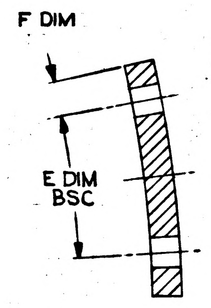
SEE NOTES 5 & 7
B DIM
.173
.203 R
TYP
2.005
1.995
A DIM

DEVELOPED VIEWS



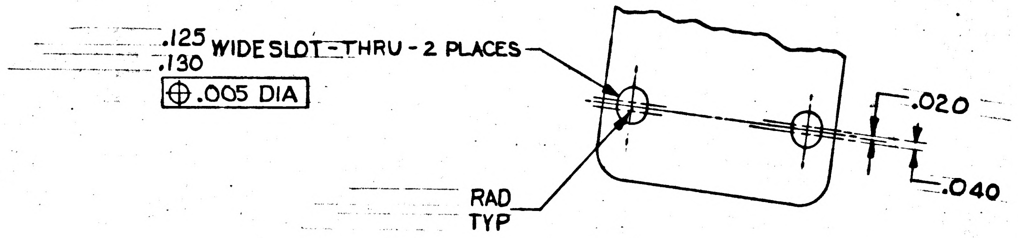
B
B
C DIM
BSC
D DIM
A
A
5.570
5.540
SPHERICAL
RADIUS
.125
.130 DIA THRU-2 PLACES
⊕ .005 DIA

FORMED VIEWS



F DIM
E DIM
BSC

SECTION B-B



.125
.130 WIDE SLOT-THRU-2 PLACES
⊕ .005 DIA
.020
.040
RAD
TYP

VIEW A-A

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\checkmark}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REV LETTER, AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.005 ANGLES ±0°30'

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	CJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-10-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHT, BALANCE
OUTER GIMBAL

SCALE ——— UNIT WT. CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000268

SHEET 1 OF 1

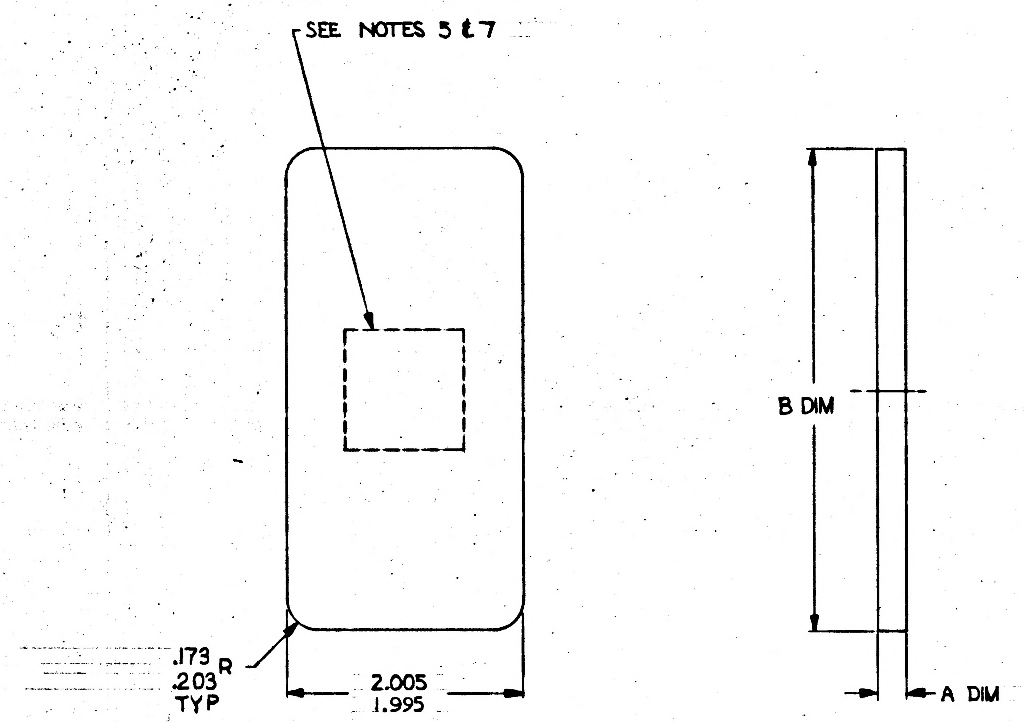
1000268 A

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	A DIM ±.003	B DIM ±.010	C DIM	D DIM	E DIM	F DIM	WT OZ CALC.(REF) (A)
1000268-1	.015	4.000	25°	8°0'	15°	3°0'	1.18
1000268-2	.030	4.000	25°	8°0'	15°	3°0'	2.35
1000268-3	.060	4.000	25°	8°0'	15°	3°0'	4.70

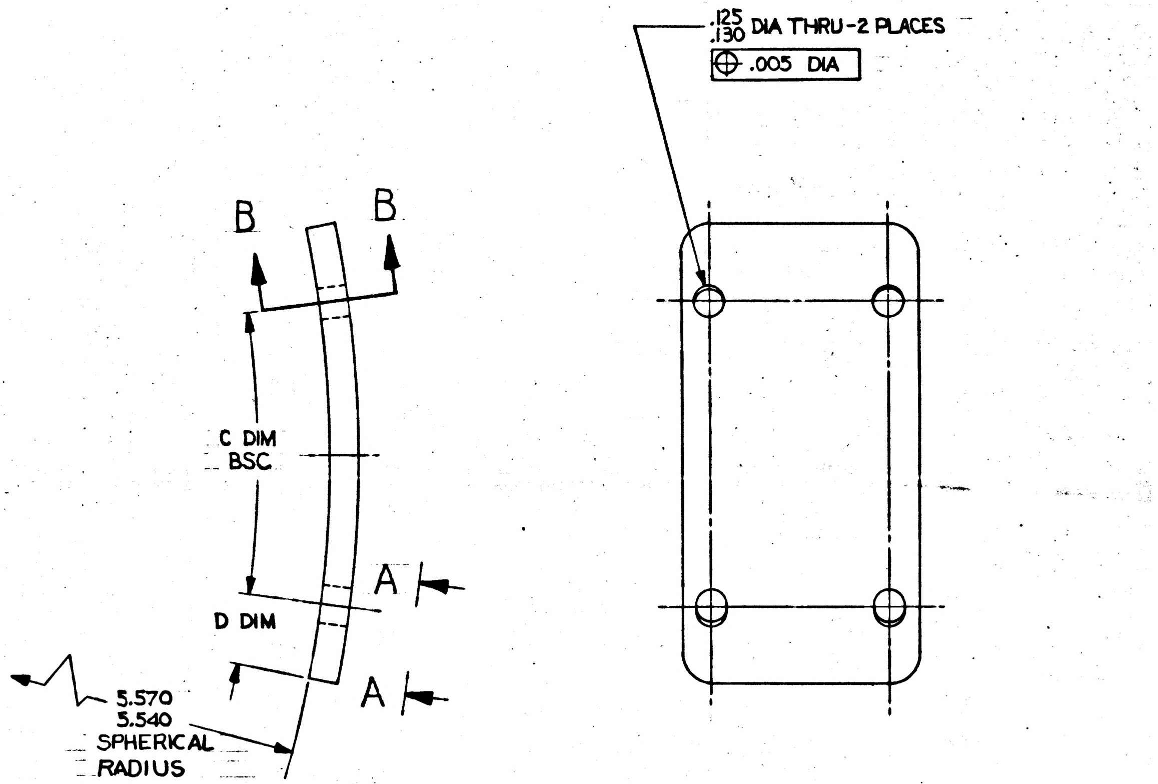
(B)

REVISIONS TDRR 01025					
ZONE	SYM	DESCRIPTION	DATE	APPROVAL	
	A	TDRR 01803	7-2-63	CJB	WK
	B	TDRR 03027	9-9-63		WK



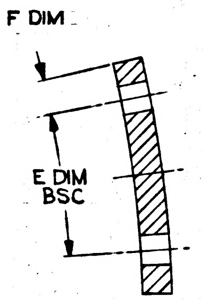
SEE NOTES 5 & 7
B DIM
.173
.203 R
TYP
2.005
1.995
A DIM

DEVELOPED VIEWS



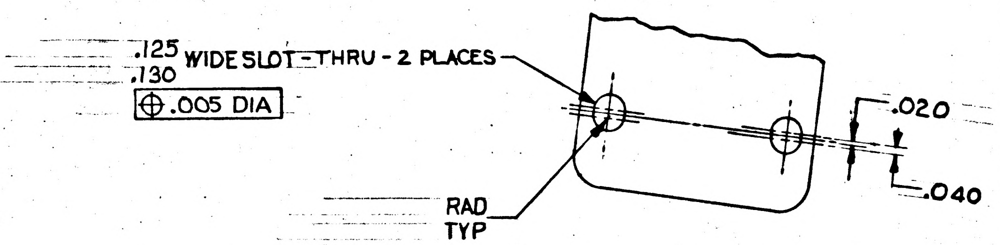
.125
.130 DIA THRU-2 PLACES
⊕ .005 DIA
B
B
C DIM
BSC
D DIM
A
A
5.570
5.540
SPHERICAL
RADIUS

FORMED VIEWS



F DIM
E DIM
BSC

SECTION B-B



.125
.130 WIDE SLOT-THRU-2 PLACES
⊕ .005 DIA
.020
.040
RAD
TYP

VIEW A-A

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\surd}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. (A) ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DWG NO, REV LETTER, AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	CJ Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-10-63
APPROVED FOR MSC	WJ Rhine	5-1-63
MIT/IL APPROVAL	W Kupfer	1 May 63

WEIGHT, BALANCE
OUTER GIMBAL

SCALE	UNIT WT.	CODE IDENT.

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000268
SHEET 1 OF 1

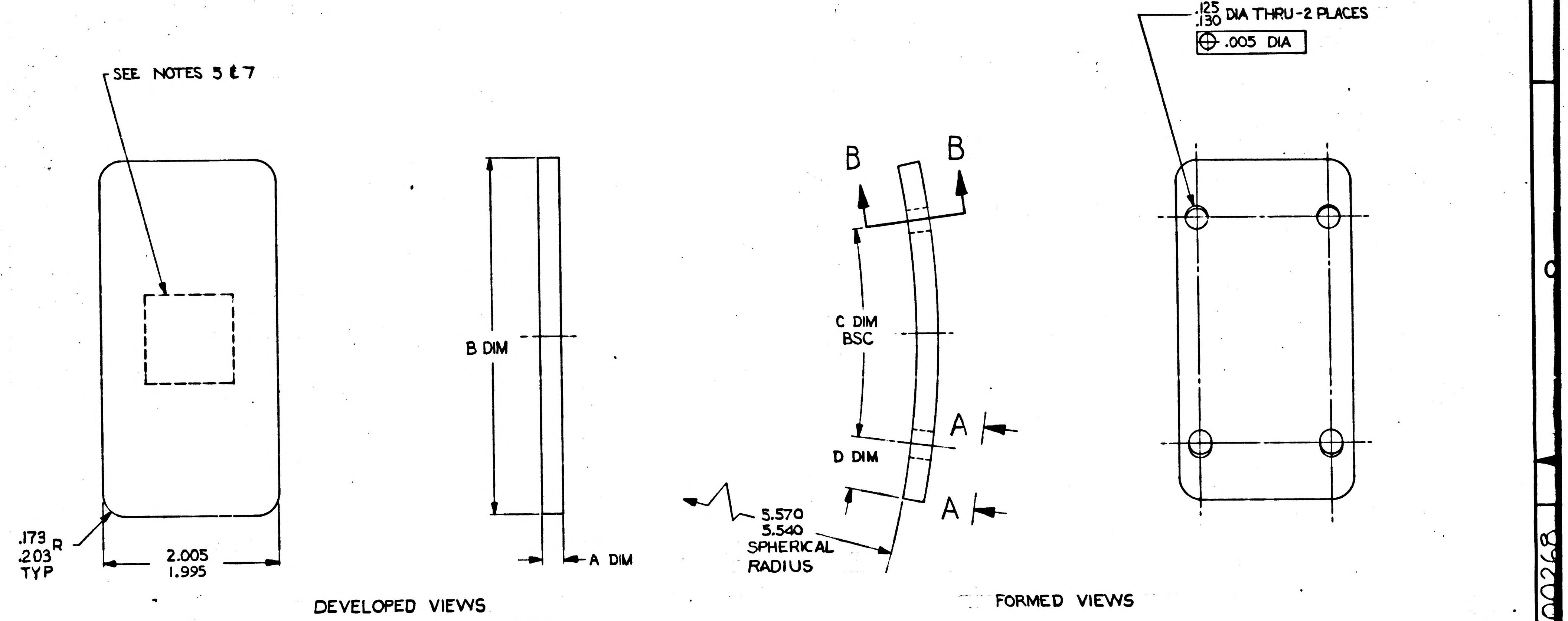
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

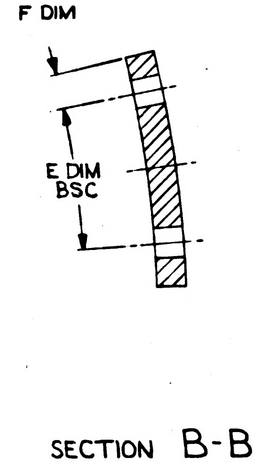
PART NO	A DIM ±.002	B DIM ±.010	C DIM	D DIM	E DIM	F DIM	WT OZ CALC
1000268-1	.015	4.000	25°	8°0′	15°	3°0′	1.18
1000268-2	.030	4.000	25°	8°0′	15°	3°0′	2.35
1000268-3	.060	4.000	25°	8°0′	15°	3°0′	4.70

Ⓜ

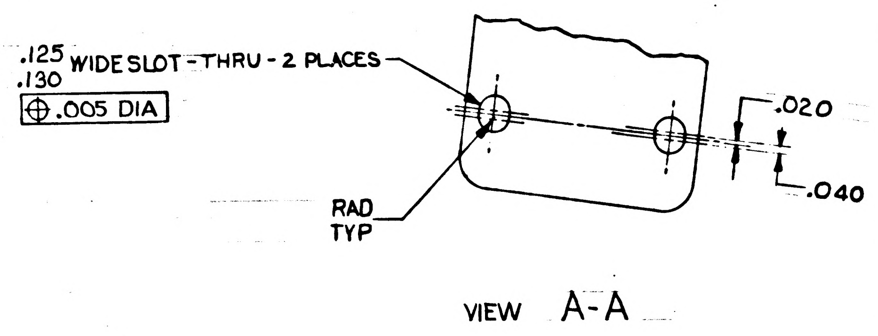
REVISIONS TDRR 01025

ZONE	SYM	DESCRIPTION	DATE	APPROVAL


SEE NOTES 5 & 7
.173
.203 R
TYP
2.005
1.995
B DIM
A DIM
DEVELOPED VIEWS
B
B
C DIM
BSC
D DIM
A
A
5.570
5.540
SPHERICAL
RADIUS
.125
.130 DIA THRU - 2 PLACES
⊕ .005 DIA
FORMED VIEWS


F DIM
E DIM
BSC

SECTION B-B


.125
.130 WIDE SLOT - THRU - 2 PLACES
⊕ .005 DIA
RAD
TYP
.020
.040

VIEW A-A

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
MALLORY METALLURGICAL CO.
3029 EAST WASHINGTON ST
INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$.
4. $\overset{250}{\surd}$ ALL OVER.
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019. WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3
7. IDENTIFY USING DWG NO, REV LETTER, AND APPLICABLE DASH NO. AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ——— DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	PALERMO	4-10-63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHT, BALANCE
OUTER GIMBAL

SCALE	UNIT WT.	CODE IDENT.
———		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000268
SHEET 1 OF 1

1000268

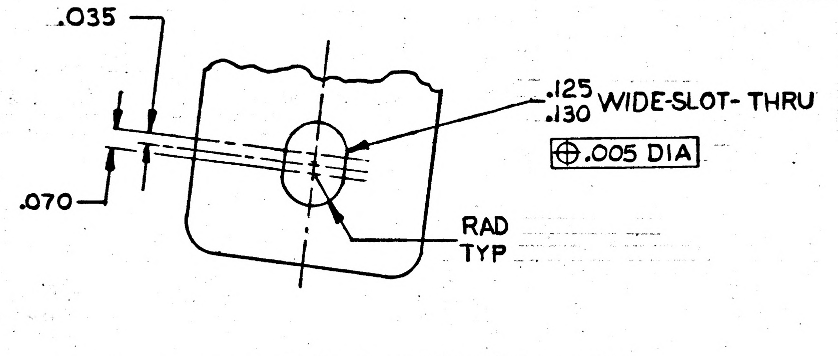
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	A DIM ±.002	B DIM ±.010	C DIM	D DIM	WT. OZ. CALC (REF)
1000270-1	.015	2.000	15°	3°0′	.14
1000270-2	.030	2.000	15°	3°0′	.28
1000270-3	.060	2.000	15°	3°0′	.57
1000270-4	.015	3.500	25°	5°30′	.26
1000270-5	.030	3.500	25°	5°30′	.50
1000270-6	.060	3.500	25°	5°30′	1.02
1000270-7	.015	4.000	25°	8°0′	.29
1000270-8	.030	4.000	25°	8°0′	.58
1000270-9	.060	4.000	25°	8°0′	1.16

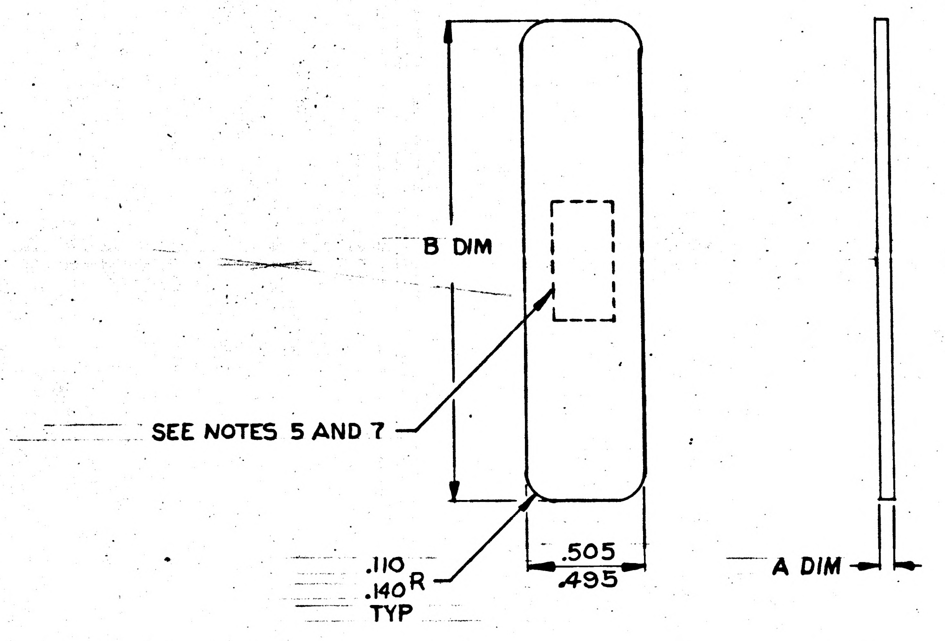
Ⓐ

REVISIONS TDRR 01025

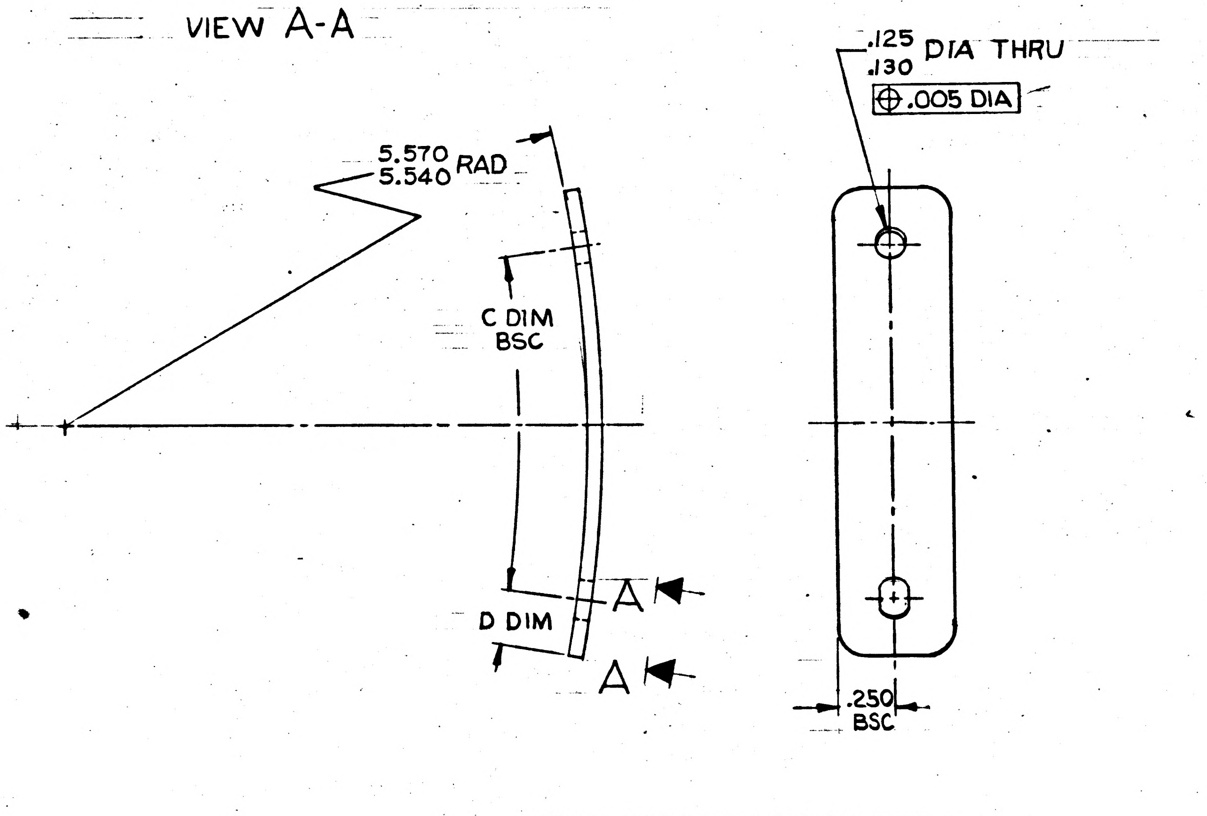
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	GJB WK



VIEW A-A



DEVELOPED VIEWS



FORMED VIEWS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. 250√ ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. Ⓐ ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/22/63

APPROVED FOR MSC W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHT, BALANCE
OUTER GIMBAL

SCALE
UNIT WT.
CODE IDENT.

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000270
SHEET 1 OF 1

1000270

35

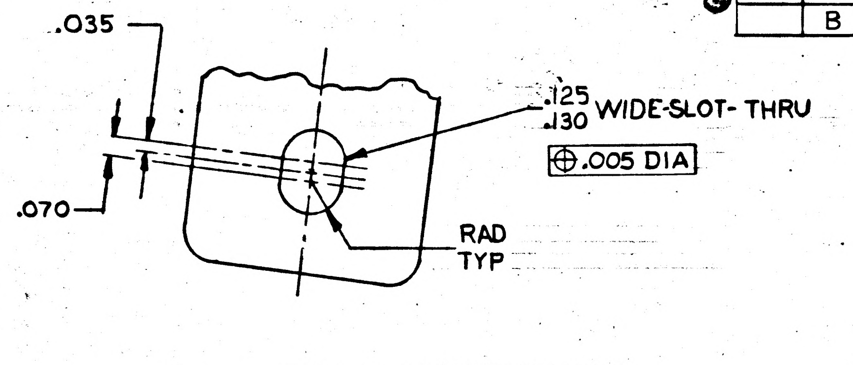
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO	A DIM ±.003	B DIM ±.010	C DIM	D DIM	WT. OZ. CALC (REF)
1000270-1	.015	2.000	15°	3°0′	.14
1000270-2	.030	2.000	15°	3°0′	.28
1000270-3	.060	2.000	15°	3°0′	.57
1000270-4	.015	3.500	25°	5°30′	.26
1000270-5	.030	3.500	25°	5°30′	.50
1000270-6	.060	3.500	25°	5°30′	1.02
1000270-7	.015	4.000	25°	8°0′	.29
1000270-8	.030	4.000	23°	8°0′	.58
1000270-9	.060	4.000	25°	8°0′	1.16

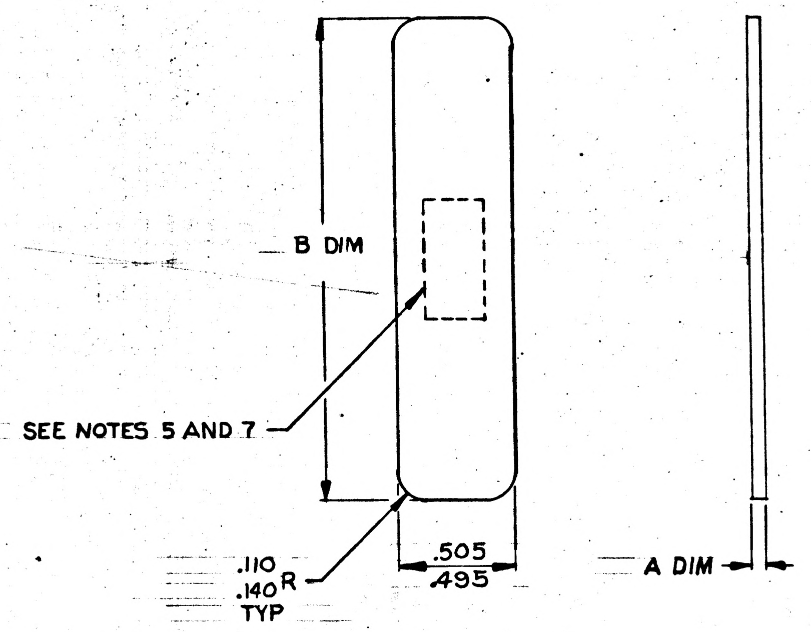
(A) (B)

REVISIONS TDRR 01025

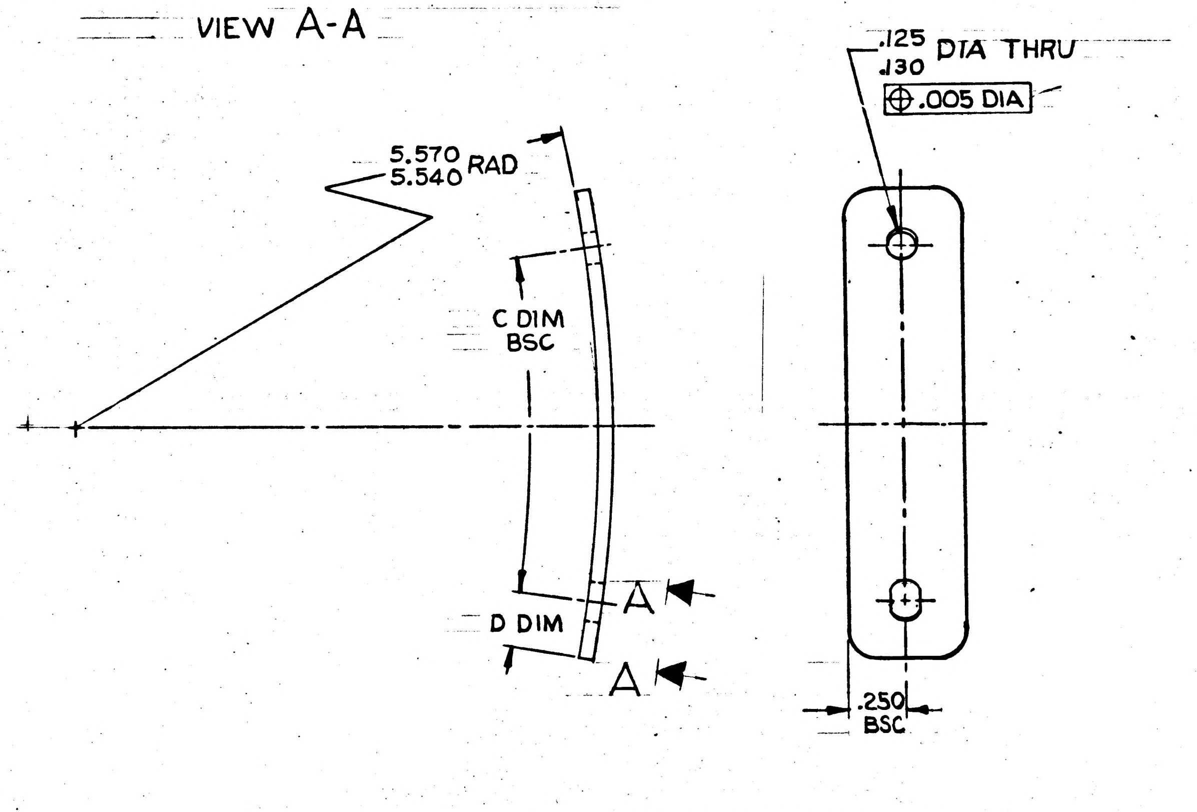
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01803	7-2-63	GJB WK
	B	TDRR 03027	9-9-63	Sam WK



VIEW A-A



DEVELOPED VIEWS



FORMED VIEWS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. $\overset{250}{\checkmark}$ ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. (A) ZINC PLATE PER QQ-Z-325 TYPE II CLASS 2
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153
APPROVED AJ Bryce DATE 4/30/63
CHECKED
DRAWN MARTIN 4/22/63
APPROVED FOR MSC W J Rhine 5-1-63
MIT/IL APPROVAL W Kupfer DATE 1 May 63

WEIGHT, BALANCE
OUTER GIMBAL

SCALE —
UNIT WT.
CODE IDENT.

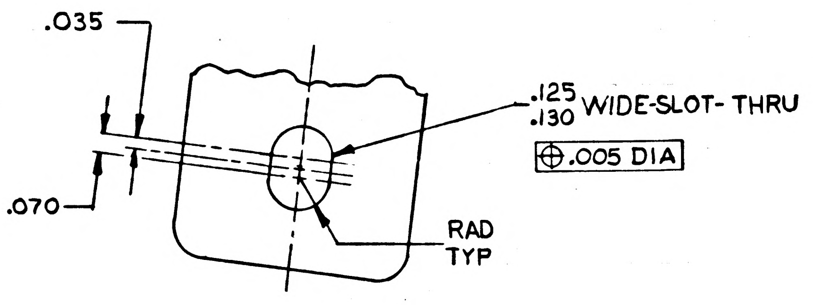
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO. 1000270
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

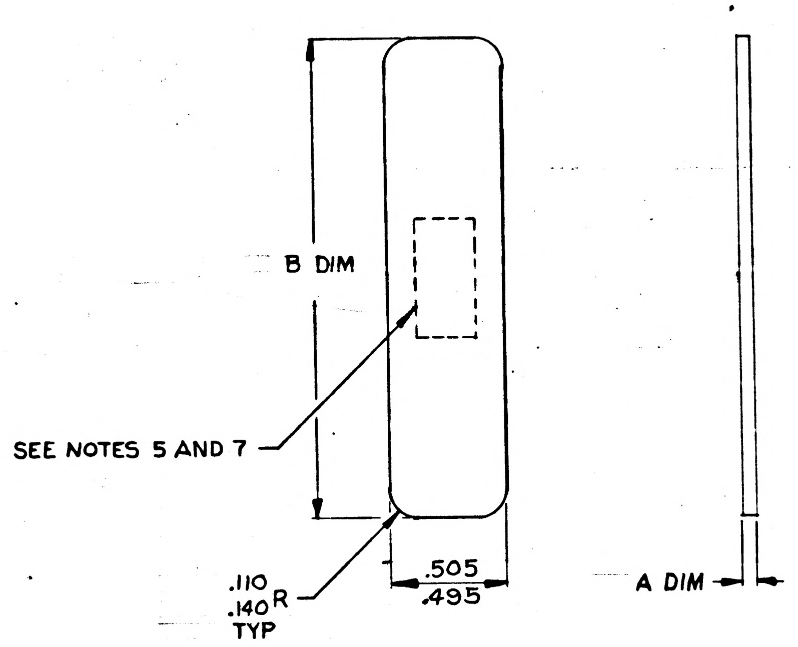
PART NO	A DIM ±.002	B DIM ±.010	C DIM	D DIM	WT. OZ. CALC.
1000270-1	.015	2.000	15°	3°0′	.14
1000270-2	.030	2.000	15°	3°0′	.28
1000270-3	.060	2.000	15°	3°0′	.57
1000270-4	.015	3.500	25°	5°30′	.26
1000270-5	.030	3.500	25°	5°30′	.50
1000270-6	.060	3.500	25°	5°30′	1.02
1000270-7	.015	4.000	25°	6°0′	.29
1000270-8	.030	4.000	25°	8°0′	.58
1000270-9	.060	4.000	25°	8°0′	1.16

Ⓜ

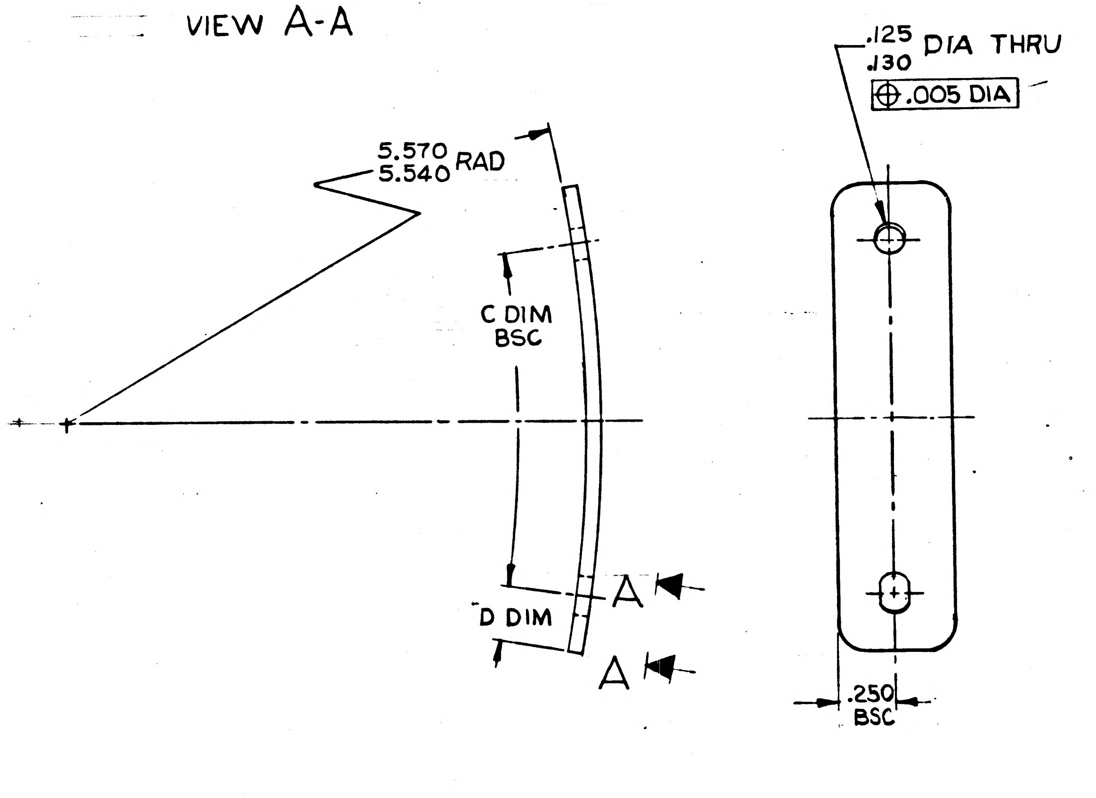
REVISIONS		TDRR 01025		
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



VIEW A-A



DEVELOPED VIEWS



FORMED VIEWS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: COML MALLORY 3000 (OR EQUIVALENT) ANNEALED
   MALLORY METALLURGICAL CO.
   3029 EAST WASHINGTON ST.
   INDIANAPOLIS 6, INDIANA
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. 250√ ALL OVER
5. WEIGHT TO BE MARKED ON EACH PIECE WITH .12 HIGH GOTHIC CHARACTERS USING BLACK INK PER TT-I-558, TO MEET REQUIREMENTS OF ND 1002019 WEIGHT TO BE MEASURED TO NEAREST .01 OUNCE
6. ZINC PLATE PER QQ-Z-325 TYPE II CLASS 3
7. IDENTIFY USING DRAWING NO., REVISION LETTER AND APPLICABLE DASH NO AT THE INDICATED LOCATION PER MIL-STD-130

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000201	DL1000201
1000001	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS —— DECIMALS ±.005 ANGLES ±0°30′
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 2

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	MARTIN	4/22/63

APPROVED FOR MSC
WJ Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	1 May 63

WEIGHT, BALANCE

OUTER GIMBAL

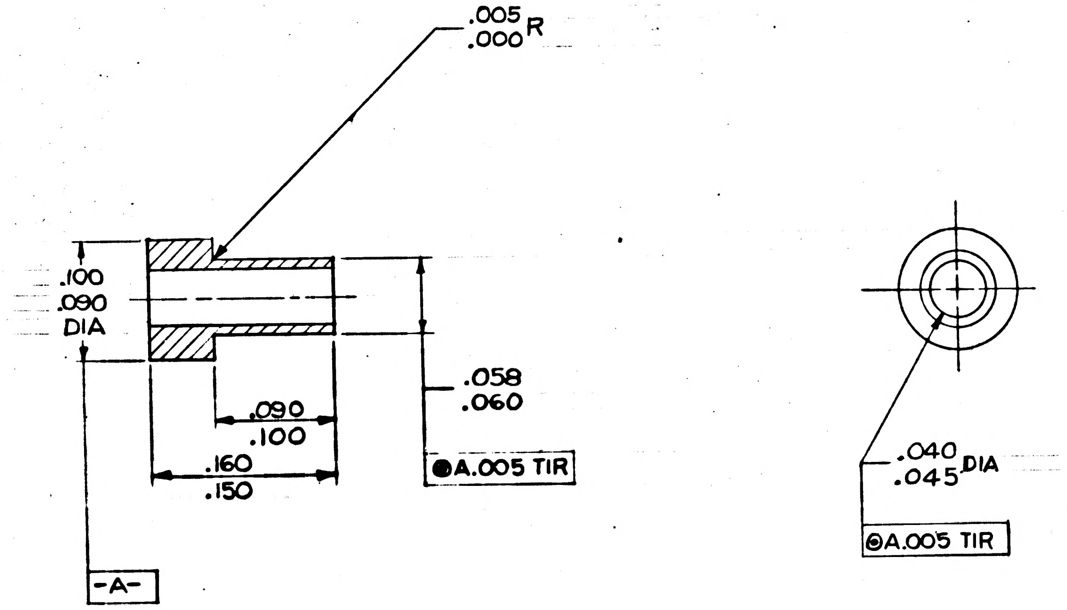
SCALE	UNIT WT.	CODE IDENT.
——		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000270
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

Ⓜ

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\overset{32}{\vee}$ FINISH ALL OVER
3. BREAK ALL SHARP EDGES $^{.005}_{.015}$
4. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANFACTUERS SYMBOL PER MIL-STD-130
5. MATERIAL: BRASS PER QQ-B-611A COMP. B, HALF HARD
   SILVER PLATE .0003 TO .0005 THK PER QQ-S-365
   TYPE I

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000210	DL1000201
1000209	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL:
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	AJ Boyce	4/30/63
CHECKED		
DRAWN	B. MARTIN	4/16/63

APPROVED FOR MSC
W J Rhine 5-1-63

MIT/IL APPROVAL	DATE
W Kupfer	4/16/63

TERMINAL
SOLDER
LIMIT SWITCH

SCALE	UNIT WT.	CODE IDENT.
10/1		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.

DWG. NO.

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NASA DRAWING NO.
1000271

SHEET 1 OF 1

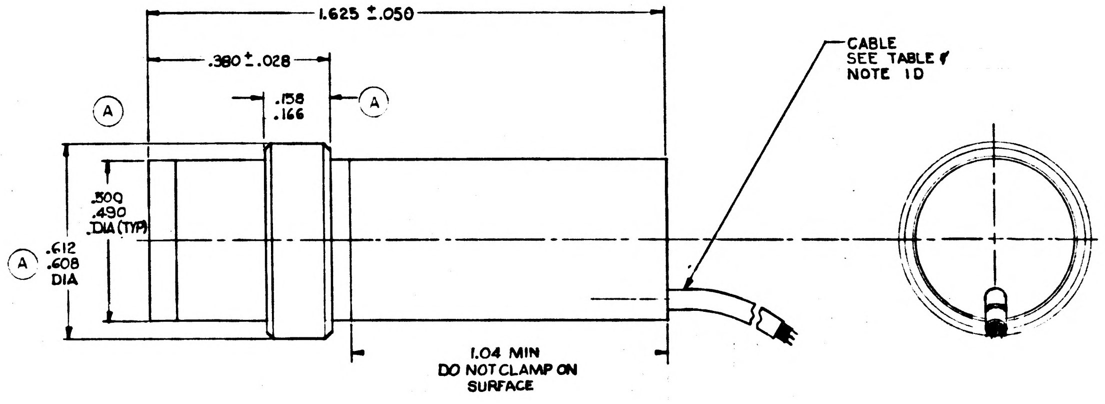
1000271

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

WIRE LEGEND	
COLOR	FUNCTION
GREEN	INPUT +
RED	INPUT −
BLACK	OUTPUT +
WHITE	OUTPUT −

Ⓜ

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01689	6-19-67	



REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPECIFICATION ND1015404 CLASS 3
   - C. PACKING & SHIPPING: THE TRANSDUCER BE PRESERVED AND PACKAGED IN ACCORDANCE WITH MIL-P-17555 LEVEL B
   - D. LEADS TO BE IN ACCORDANCE WITH MIL-W-16878 TYPE E-30. LENGTH 12 INCHES MIN
   - E. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANFACTURERS SYMBOL OR NAME & SERIAL NO PER MIL-STD-130 VENDOR PART NO. AND PART NAME MAY ALSO BE INCLUDED
2. DESIGN REQUIREMENTS:
   - A. ELECTRICAL PARAMETERS

INPUT VOLTAGE	28VDC
POWER REQUIREMENTS	NOMINAL 30MA AT 28VDC
FULL SCALE OUTPUT VOLTAGE	5 VDC ±1%
Ⓐ THERMAL SENSITIVITY SHIFT	LESS THAN 0.02% /°F
THERMAL ZERO SHIFT	LESS THAN 0.02% FULL SCALE /°F
LOAD IMPEDANCE, CALIBRATION:	50,000 OHMS
OUTPUT IMPEDANCE	300 OHMS MAX.

   - B. MECHANICAL PARAMETERS:

SHOCK	50 G FOR 6 MILLISECONDS
Ⓐ AMBIENT TEMPERATURE LIMITS	-65°F TO +175°F
COMPENSATED RANGE	0°F TO +150°F
PRESSURE RANGE	0-25 PSIA
MAX PRESSURE OVERLOAD	200% OF RATED RANGE
RESONANT FREQUENCY	8000 CYCLES PER SECOND
ACCELERATION RESPONSE	
(a) 0 TO 2.5 KC	0.05% FULL SCALE/G
(b) STATIC	0.04% FULL SCALE/G

Ⓐ 3. ACCEPTANCE REQUIREMENTS:

RESOLUTION	CONTINOUS
COMBINED NON-LINEARITY & HYSTERESIS	LESS THAN ±1% FULL SCALE OUTPUT DEVIATION FROM THE BEST FIT STRAIGHT LINE

ORIGINAL SOURCE OF SUPPLY:

STATHAM INSTRUMENTS, INC.
12401 WEST OLYMPIC BLVD.
LOS ANGELES 64, CALIFORNIA
PART NO. PA414TC-25

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

1000205	DL1000201
1000007	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL: —

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	J. Boyce	4-1963
CHECKED		
DRAWN	B. MARTIN	4-1963
APPROVED FOR MSC	W. J. Rhine	5-1-63
MIT/IL APPROVAL	W. Kupfer	1963

TRANSDUCER
ABSOLUTE PRESSURE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

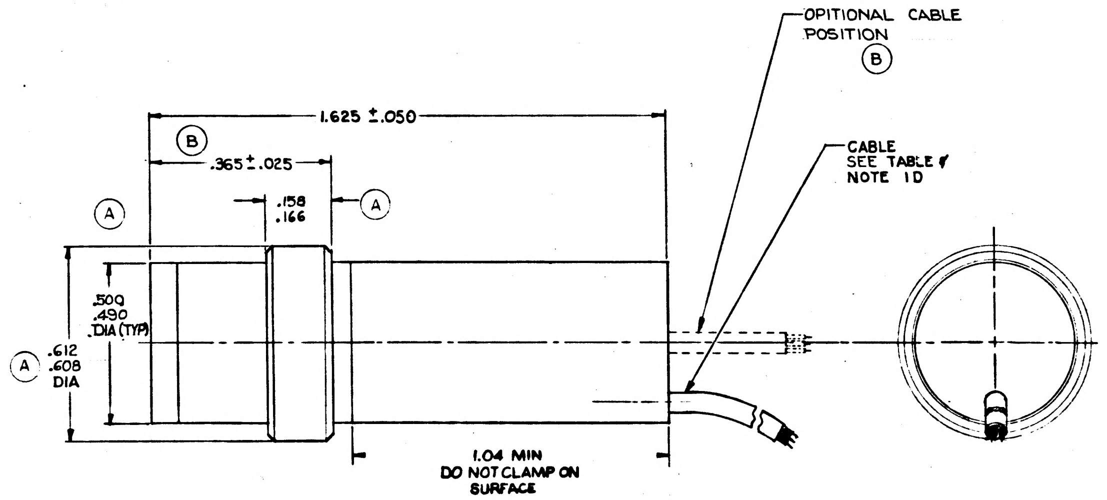
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000272
SHEET 1 OF 1

1000272

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

WIRE LEGEND	
COLOR	FUNCTION
GREEN	INPUT +
RED	INPUT −
BLACK	OUTPUT +
WHITE	OUTPUT −

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	TDRR 01689	6-19-63	WK
	B	TDRR 02127	7-23-63	WK


OPITIONAL CABLE POSITION (B)
CABLE SEE TABLE & NOTE 1D
1.625 ±.050
(B) .365±.025
(A) .158 .166 (A)
.500 .490 DIA (TYP)
(A) .612 .608 DIA
1.04 MIN DO NOT CLAMP ON SURFACE

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPECIFICATION ND1015404 CLASS 3
   - C. PACKING & SHIPPING: THE TRANSDUCER BE PRESERVED AND PACKAGED IN ACCORDANCE WITH MIL-P-17555 LEVEL B
   - D. LEADS TO BE IN ACCORDANCE WITH MIL-W-16878 TYPE E-30. LENGTH 12 INCHES MIN
   - E. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANFACTURERS SYMBOL OR NAME & SERIAL NO PER MIL-STD-130 VENDOR PART NO. AND PART NAME MAY ALSO BE INCLUDED
2. DESIGN REQUIREMENTS:
   - A. ELECTRICAL PARAMETERS

INPUT VOLTAGE	28VDC
POWER REQUIREMENTS	NOMINAL 30MA AT 28VDC
FULL SCALE OUTPUT VOLTAGE	5 VDC ± 1%
Ⓐ THERMAL SENSITIVITY SHIFT	LESS THAN 0.02%/°F
THERMAL ZERO SHIFT	LESS THAN 0.02% FULL SCALE/°F
LOAD IMPEDANCE, CALIBRATION:	50,000 OHMS
OUTPUT IMPEDANCE	300 OHMS MAX.

   - B. MECHANICAL PARAMETERS:

SHOCK	50 G FOR 6 MILLISECONDS
Ⓐ AMBIENT TEMPERATURE LIMITS	-65°F TO +175°F
COMPENSATED RANGE	0°F TO +150°F
PRESSURE RANGE	0-25 PSIA
MAX PRESSURE OVERLOAD	200% OF RATED RANGE
RESONANT FREQUENCY	8000 CYCLES PER SECOND
ACCELERATION RESPONSE	
(a) 0 TO 2.5 KC	0.05% FULL SCALE/G
(b) STATIC	0.04% FULL SCALE/G

Ⓐ 3. ACCEPTANCE REQUIREMENTS:

RESOLUTION	CONTINOUS
COMBINED NON-LINEARITY & HYSTERESIS	LESS THAN ±1% FULL SCALE OUTPUT DEVIATION FROM THE BEST FIT STRAIGHT LINE

Ⓑ PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1000205	DL1000201
1000007	DL1000001

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:

MIT INSTRUMENTATION LAB
CONTRACT NAS 9-153

		DATE
APPROVED		4-5-63
CHECKED		
DRAWN	B. MARTIN	4-26-63
APPROVED FOR MSC	W. J. Rhine	5-1-63
MIT/IL APPROVAL	W. Kupfer	5-6-63

TRANSDUCER
ABSOLUTE PRESSURE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

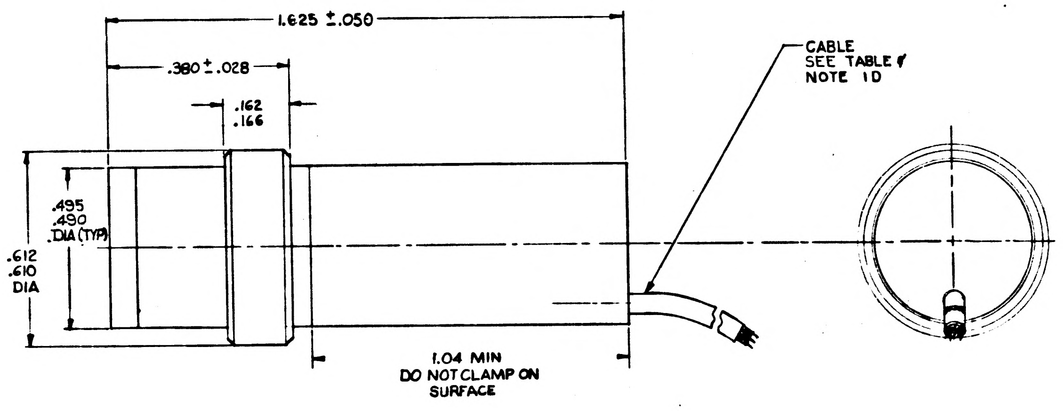
MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000272
SHEET 1 OF 1

1000272

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 01025				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

WIRE LEGEND	
COLOR	FUNCTION
GREEN	INPUT +
RED	INPUT −
BLACK	OUTPUT +
WHITE	OUTPUT −



REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN NASA SPECIFICATION ND1015404 CLASS 3
   - C. PACKING & SHIPPING: THE TRANSDUCER BE PRESERVED AND PACKAGED IN ACCORDANCE WITH MIL-P-17555 LEVEL B
   - D. LEADS TO BE IN ACCORDANCE WITH MIL-W-16878 TYPE E-30. LENGTH 12 INCHES MIN
   - E. IDENTIFY, USING DRAWING NO., REVISION LETTER, MANFACTURERS SYMBOL OR NAME & SERIAL NO PER MIL-STD-130 VENDOR PART NO. AND PART NAME MAY ALSO BE INCLUDED
2. DESIGN REQUIREMENTS:
   - A. ELECTRICAL PARAMETERS:

INPUT VOLTAGE	28VDC
POWER REQUIREMENTS	NOMINAL 30MA AT 28VDC
FULL SCALE OUTPUT VOLTAGE	5 VDC ± 1%
RESOLUTION	CONTINUOUS
COMBINED NON-LINEARITY & HYSTERESIS	LESS THAN ± 1% FULL SCALE OUTPUT DEVIATION FROM THE BEST FIT STRAIGHT LINE
THERMAL SENSITIVITY SHIFT	LESS THAN 0.02% / °F
THERMAL ZERO SHIFT	LESS THAN 0.02% / °F
LOAD IMPEDANCE, CALIBRATION:	50,000 OHMS
OUTPUT IMPEDANCE	300 OHMS MAX.

   - B. MECHANICAL PARAMETERS:

SHOCK	50 G FOR 6 MILLISECONDS
AMBIENT TEMPERATURE LIMITS	-65°F TO +250°F
COMPENSATED RANGE	0°F TO +150°F
PRESSURE RANGE	0-25 PSIA
MAX PRESSURE OVERLOAD	200% OF RATED RANGE
RESONANT FREQUENCY	8000 CYCLES PER SECOND
ACCELERATION RESPONSE	
(a) 0 TO 2.5 KC	0.05% FULL SCALE/G
(b) STATIC	0.04% FULL SCALE/G

ORIGINAL SOURCE OF SUPPLY:
STATHAM INSTRUMENTS, INC.
12401 WEST OLYMPIC BLVD.
LOS ANGELES 64, CALIFORNIA
PART NO. PA414 TC-25

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.
LIST OF PARTS AND MATERIALS					

1000205	DL1000201
1000007	DL1000001
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ___ DECIMALS ___ ANGLES ___
DO NOT SCALE THIS DRAWING
MATERIAL: N/A

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED	A J Boyce	4/11/63
CHECKED		
DRAWN	S. MARTIN	
APPROVED FOR MSC	W J Rhine	5-1-63
INITIAL APPROVAL		DATE

TRANSDUCER
ABSOLUTE PRESSURE
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
4/1		

MIT INSTRUMENTATION LABORATORY
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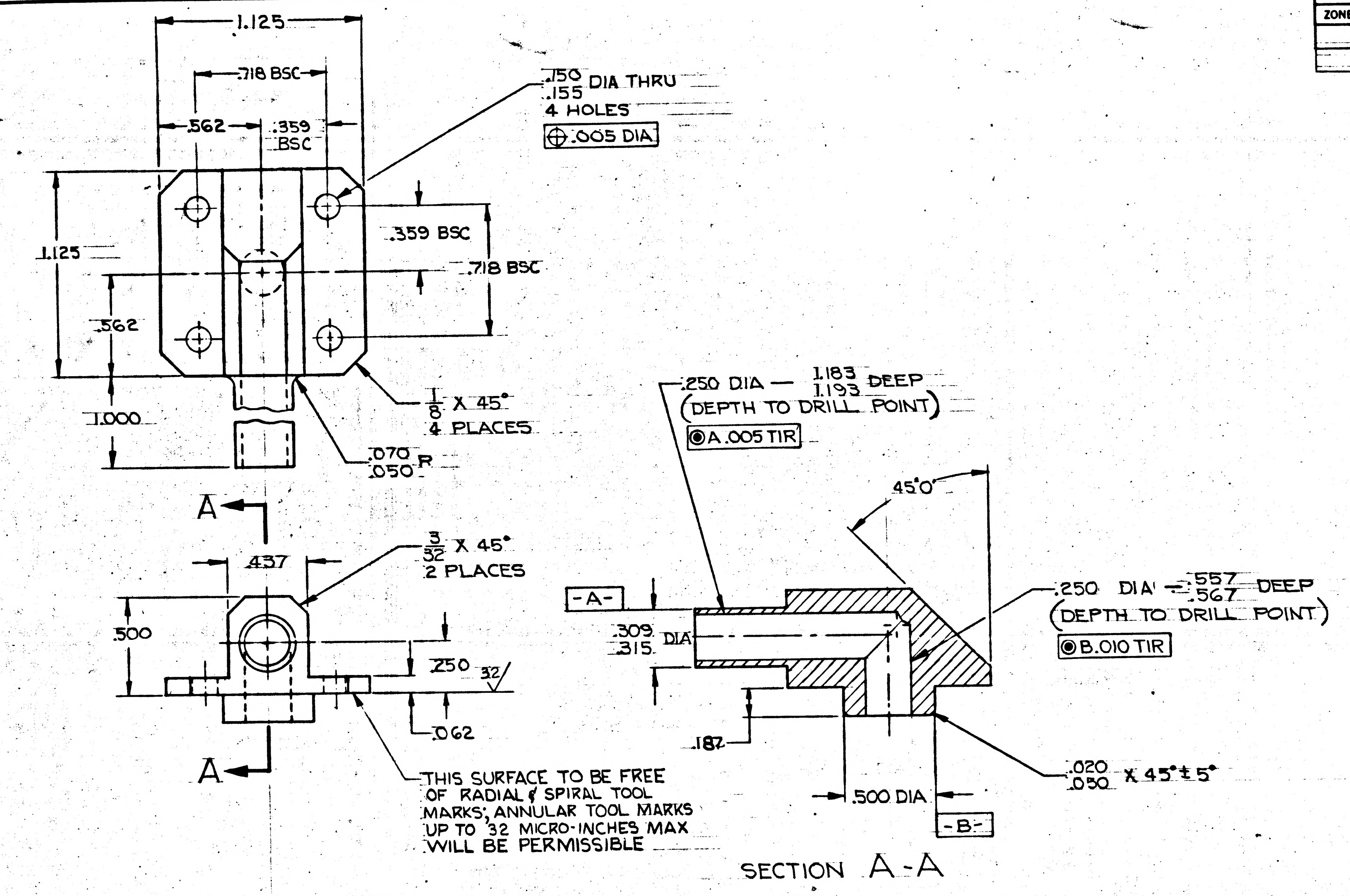
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000272
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	A	REVISED	3-20-63	
	B	REVISED & RELEASED TDRR 06241		



1.125
.718 BSC
.562
.359 BSC
.150 .155 DIA THRU
4 HOLES
⊕ .005 DIA
.359 BSC
.718 BSC
1.125
.562
1.000
1/8 X 45°
4 PLACES
.070 .050 R
A
A
.437
3/32 X 45°
2 PLACES
.500
.250
32
.062
THIS SURFACE TO BE FREE OF RADIAL & SPIRAL TOOL MARKS; ANNULAR TOOL MARKS UP TO 32 MICRO-INCHES MAX WILL BE PERMISSIBLE
.250 DIA — 1.183 1.193 DEEP (DEPTH TO DRILL POINT)
◎ A .005 TIR
45°0'
-A-
.309 .315 DIA
.250 DIA — .557 .567 DEEP (DEPTH TO DRILL POINT)
◎ B .010 TIR
.187
.500 DIA
.020 .050 X 45° ± 5°
-B-
SECTION A-A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. BREAK ALL SHARP EDGES .005 .015
4. INSIDE CORNERS .010 R MAX UNLESS OTHERWISE SPECIFIED
5. MATERIAL: ALUMINUM ALLOY 6061 TEMP T6
ALT. SPEC QQ-A-327 TEMP T6
6. IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
~~7. ANODIC COAT PER MIL-A-8625 TYPE I, CLEAR~~

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

MASTER

1001578	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ±.005 ANGLES ±1°0'
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5

MIT INSTRUMENTATION LAB CONTRACT NAS 9-153

		DATE
APPROVED		2-4-64
CHECKED		
DRAWN	R.G.S.	9-18-63
APPROVED FOR MSC		
MIT/IL APPROVAL		DATE

ELBOW - TUBE
FITTING
(FLEX HOSE ASS'Y.)

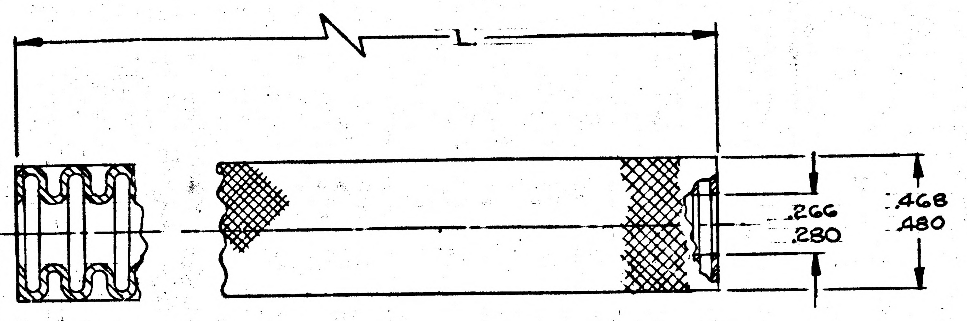
SCALE	UNIT WT.	CODE IDENT.
2/1		

MIT INSTRUMENTATION LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000273
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	L DIM ±.03
1000275-1	7.81
1000275-2	12.54
1000275-3	12.83

REVISIONS 06241				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL



REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327
   - B. IDENTIFY USING DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER MIL-STD-130
   - C. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 3
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL PROPERTIES:
     - 1. DIMENSIONS-AS SHOWN ON DELINEATION AND CHART
3. DESIGN:
   - A. MATERIAL:
     - FLEXIBLE TUBING ¼ I.D.-AL TYPE 303H-12
     - BRAID (SINGLE STRAND) AL TYPE 303H-12
   - B. BURST PRESSURE 90 PSIG (MINIMUM)
   - C. TUBING: SHALL BE CAPABLE OF BEING USED WITH A FLUID MIXTURE PER NASA DRAWING 1001491

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND1002034 FOR THIS DRAWING

MASTER

QTY. REQD.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	FIND NO.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL:
SEE NOTE 3A

MIT INSTRUMENTATION LAB
CONTRACT
NAS 9-153

		DATE
APPROVED	[illegible]	2-11-64
CHECKED		
DRAWN	B.G.M.	FEB-64
APPROVED FOR MSC	W. S. [illegible]	
MIT/IL APPROVAL	W. [illegible]	11 Feb 64

HOSE
FLEXIBLE,
SEAMLESS
SPECIFICATION CONTROL DRAWING

SCALE	UNIT WT.	CODE IDENT.
—		

MIT
INSTRUMENTATION
LABORATORY
CAMBRIDGE, MASS.
DWG. NO.
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
NASA DRAWING NO.
1000275
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY